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PREFACE

The California Energy Commission Energy Research and Development Division supports public interest energy research and development that will help improve the quality of life in California by bringing environmentally safe, affordable, and reliable energy services and products to the marketplace.

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ABSTRACT

California has a broad inventory of geothermal resources. High temperature geothermal systems are well recognized and have been an important part of California's renewable energy portfolio for many years. Significant uncertainty remains regarding how large this resource is. This uncertainty slows development of the geothermal resource base by limiting policy initiatives that can encourage appropriate use of this resource, and slows investment and growth in the industry. This project examined the scale of uncertainty in geothermal resource estimates, and provided a template for developing data compilations, overviews and introductory material that could be useful for streamlining further research efforts. The documents associated with this effort included an extensive bibliography of site-specific literature, an overview of the state-of-knowledge regarding a specific geothermal system (in this case, the Long Valley caldera system), a field guide, and a website with specific data related to the site's characteristics. The report concludes with specific questions on high priority research topics that need to be addressed to significantly reduce the uncertainty regarding the magnitude of the geothermal resource in the Long Valley region.

Keywords: California Energy Commission, geothermal resource assessments, Long Valley caldera

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EXECUTIVE SUMMARY

Introduction

California possesses some of the nation's most extensive geothermal resources. Most of these resources were discovered several decades ago and many of them have undergone significant development. California's current installed capacity for generating electricity from geothermal resources is about 1,800 megawatts (MW) from 43 power plants. Geothermal power plants generally have high capacity factors, operating at 85 percent to 98 percent of their nameplate capacity. Geothermal energy contributes approximately half of all the renewable energy the state produces, with the added advantage that this power contributes to the state's baseload capacity.

It remains uncertain how much electricity could be produced from geothermal resources. Geothermal resources are difficult to assess because they can only be evaluated indirectly from a variety of geological, geophysical and geochemical measurements, unlike other renewable energy resources that can be evaluated relatively easily using direct measurement methods. A variety of techniques are employed to quantify the amount of energy available in the subsurface in the vicinity of a suspected geothermal resource, but significant uncertainty remains regarding the actual magnitude of the accessible resource.

Improving estimates of available geothermal resources is important because these estimates can improve the ability to plan for renewable energy penetration in the energy market, reduce risk when pursuing development of a resource, and provide more credible information on which to base energy policy decisions.

Project Purpose

The California Geothermal Energy Collaborative (CGEC) undertook this project to make publicly available scientific data related to individual geothermal resource areas more easily accessible. The goal of this effort was to streamline research projects so that less time was spent on data searches and compilation and more time could be spent on model development, targeted data acquisition, and improving the state-of-knowledge of resource characteristics. The CGEC believed that this data compilation should be the fundamental first step in well-designed scientific research projects, enabling better definition of research questions and reduced uncertainty of geothermal resource estimates.

Project Results

This report discussed the state-of-knowledge for geothermal energy resources in California. It then provided a compilation of current knowledge regarding the Long Valley Geothermal System (also known as Long Valley caldera, or LVC). A companion document to this compilation was an extensive bibliography of all scientific literature pertaining to the Long Valley caldera system that could be identified using a variety of search tools. A field trip guide written by Dr. Gene Suemnicht was also included as part of this data compilation. The field trip guide provided an excellent summary of the geological evolution of the Long Valley caldera area, and had a field log that can be used as a self-guided excursion plan for becoming familiar with the key features of this area.

These assembled data indicated that the main features of the Long Valley caldera system were established during a cataclysmic eruption around 760,000 years ago. Seismic, geochemical, and geophysical data demonstrated that the system continues to be an active magmatic system. Replenishment of the magma chamber by new volumes of magma appeared to have been responsible for a variety of seismic, geomorphological and geochemical events in the 1980s-2000s. These activities indicated that this geothermal resource had the potential to provide much more geothermal power. The Casa Diablo power production facility was the only one operating in the area at the time this research was conducted.

The authors believed that several key research areas need further support and effort to better resolve the power production potential of this region. Research questions that need to be addressed included:

1. What is the three dimensional geometry of the flow field that maintains the elevated subsurface temperatures?
2. What is the recharge area and rate for the flow system and how does it vary seasonally?
3. What is the precise geometry of the magma body and associated small magmatic intrusions (i.e., dikes) that affect the local temperature field?
4. What is the subsurface pattern of permeability distribution and what controls it?
5. How does the system of faults affect the flow regime?

Project Benefits

Geothermal resources have an important role to play in helping California meet its goal of increasing procurement from renewable energy resources to 33 percent by 2020. This collection of documents was intended to be a template for further studies concerning other resource areas within California. Developing such a library of data resources for all of California's geothermal resource areas would provide an information base that could be used to efficiently plan and carry out research that could reduce risk when considering further geothermal resource development in California.

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CHAPTER 1:
Assessing Geothermal Resources

Gawell (2006) compiled estimates of the magnitude of many geothermal resource systems in California. These are reproduced in Table 1. As pointed out by Gawell, the range in estimates is substantial, resulting in significant uncertainty and confusion as to the ultimately available energy that could be produced using geothermal resources. The disparate results are due to several factors. These factors include:

1. Different mathematical approaches to estimating resource size
2. Different databases used to estimate resource size
3. Different intended uses for results of the assessment
4. Different purposes for undertaking assessments
5. Contrasting definitions of resource base, resource and reserves.

In addition, discussions with researchers have emphasized the need to have a recognized repository of data from which a consistent approach to resource assessment can be developed – the problem repeatedly was noted that it is not possible to achieve consensus regarding resource magnitude in the absence of commonly available and accepted data.

Table 1: Resource Estimates from Indicated Sources for California KGRAs

Location	USGS Circular 790 (MW)	Petty et al, 1992 Low (MW)	Petty et al, 1992 High (MW)	DOE Data (MW)	EIA-2005 Data (MW)	GeothermExMost-likely (MW)	WGA 2006
Border	31						30
Brawley	640	150	640	600	600	326	738
Buckeye HS 90<T<150°C		250	1270	985	985		
Calistoga 90<T<150°C						25	30
Clear Lake Volcanic Field area	900	500	900	900	400	43	70
Coso area	650	650	1000	750	495	75	225

Location	USGS Circular 790 (MW)	Petty et al, 1992 Low (MW)	Petty et al, 1992 High (MW)	DOE Data (MW)	EIA-2005 Data (MW)	GeothermExMost-likely (MW)	WGA 2006
Dunes 90<T<150°C						11	10
East Mesa	360	360	500	460	326	86	150
Glamis 90<T<150°C		275	680	680	680	6.4	10
Heber	650	250	500	350	213	42	70
Honey Lake, Wendell & Amidy						7.1	20
Kelly HS 90<T<150°C		300	3000	1740	1740		10
Lassen National Park - Vapor dominated		116	350	350	350		
Long Valley (HT)		500	1600	200	200		360
Long Valley caldera (LT)	2100	250	750	200	150	71	
Medicine Lake		500	3000	400	153	304	960
Morgan Springs-Growler Springs (includes parts of Lassen not in Park)	116						50
Mount Signal						19	50
Niland						76	225
Randsburg area	84	25	250	250	250	48	50
Salton Sea area	3400	500	3000	1500	407	1400	2860

Location	USGS Circular 790 (MW)	Petty et al, 1992 Low (MW)	Petty et al, 1992 High (MW)	DOE Data (MW)	EIA-2005 Data (MW)	GeothermExMost-likely (MW)	WGA 2006
Sespe HS 90<T<150°C		125	660	555	555	5.3	
Sulphur Bank Mine (Hot Bolata)	75					43	
Superstition Mtn.						9.5	50
Surprise Valley / Lake City	1490	250	1490	850	850	37	75
The Geysers	1610					550	450
Wendell 90<T<150°C		250	650	650	613	1.9	
Westmorland	1710	50	1710	350	350		150
Wilbur HS 90<T<150°C		500	2800	400	400		
Truckhaven							75
Mount Shasta							360
TOTAL California	***13716***	***5801***	***24750***	***12170***	***9717***	***3186.2***	***7078***

Using an independent probabilistic approach, and distinguishing between resources that are currently identified and those that have yet to be identified (a statistical approach for taking into account the likelihood of discovering new underground resources), Williams et al. (2008) have developed estimates of the available resource potential. These values are associated with the statistical certainty of the estimate. A summary of these results, as they relate to California, is presented in Table 2.

Table 2: Total Resource Estimates Based on Williams et al. (2008) Methodology

Identified (MWe)				Undiscovered (MWe)			
95%	50%	Mean	5%	95%	50%	Mean	5%
2,422	5,140	5,404	9,282	3,256	9,532	11,340	25,439

This table makes clear that differences in resource estimates are commonly in excess of a factor of 5. Such large differences impede the ability to establish clear policy goals regarding the use of geothermal energy. A purpose of this report is to assemble information that can serve as a reference compilation of literature and data for further studies. Presented below is a compilation that considers data for the Long Valley caldera region of California. This region was selected for consideration because it is well studied and is geographically well defined. The organization of information presented here can be used as a template for other data compilation activities for the state's other geothermal resource areas.

CHAPTER 2:
Data Compilation – The Bibliography

A systematic compilation of all published references was generated as the initial step in assembling a database. To compile the bibliography, an extensive literature review was performed by electronic search. The topic areas covered were: geochemistry; geochronology; gravity; heat flow; magnetics and magneto-tellurics; remote sensing; seismicity; surface processes; and tectonics. For each topic area, publications were assembled in chronological order and are current through December, 2010. Because some papers and reports covered multiple topics, duplication of some references occur in separate topic areas. There was no attempt to eliminate the duplication, since there were no legitimate criteria for deciding how to select a single topic area for such multi-disciplinary studies. The literature contained in this bibliography include papers published in peer reviewed scientific journals, state and federal government reports, and reports from professional organizations.

In all cases, the database from which the publication was obtained is indicated. Also included for many of the reports are brief abstracts and the reference source. The bibliography represents the most complete compilation of references for a single KGRA ever published, and is a unique resource.

2.1 Data Summary

The remainder of this report provides a summary of the types of data relevant for conducting resources assessments in general, using the Long Valley caldera setting as an example. The information that is presented is that which has been reported in relatively recent, peer-reviewed scientific journals. *In toto*, this summary is intended to provide a conceptual framework useful for envisioning the characteristics of this specific geothermal resource. Such a framework is important in order to carry forward further scientific research that can provide a more highly constrained, rigorous estimate of the magnitude of this particular resource. However, it must be emphasized that the interpretations presented in each topic area are not intended to be a comprehensive review of the current state-of-knowledge regarding the LVC. Rather, they are provided as an example of interpretations that have been published, as a means of illustrating the current level of understanding for the respective subject area.

A summary of data can be accessed on the web at:

http://www.arcgis.com/**explorer/?open=**be58187a67b448368ba9028

This website provides interactive capability to view certain aspects of the geology, water chemistry, well data and other useful information. It is not intended to be a comprehensive summary of all available data. Rather, it is intended as an introduction useful for more detailed exploration of the available research results published in the literature that is listed in the accompanying bibliography.

2.1.1 Geology

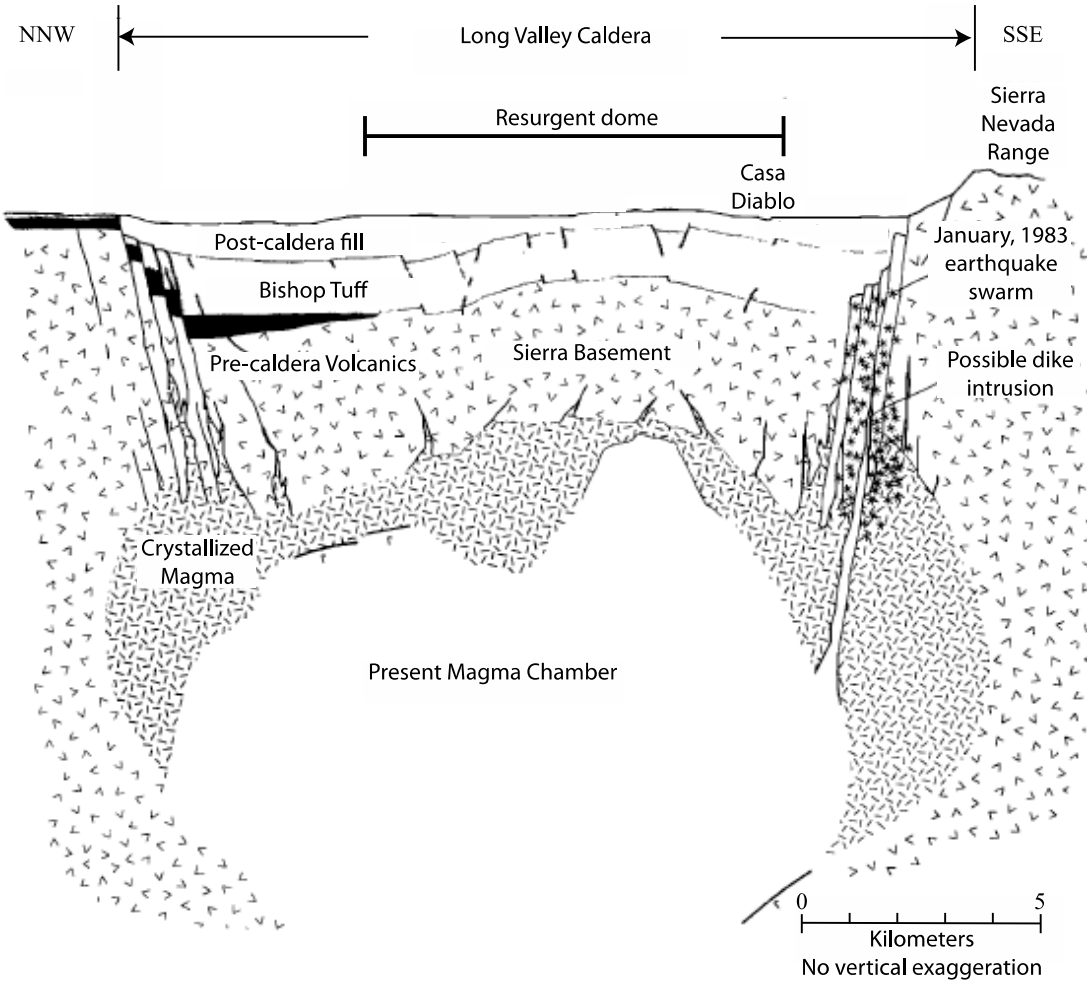
The Long Valley caldera is a volcanic edifice that developed between 4 million years ago and the present day (Bailey and others, 1976, 1989; Metz and Mahood, 1985; Hildreth, 2004). The surface distribution of rock types in this region is shown in Appendix 1.

The main surficial expression of this volcanic system is the caldera that formed as a result of massive collapse of the volcanic center during and after eruption of the Bishop Tuff 760,000 years ago (Bailey and others, 1976). After eruption of the Bishop Tuff, episodic eruptions and other volcanic processes (e.g., dome formation, moat collapse, etc.) continued to modify the caldera, including moat eruptions as young as 50,000 years (Mahood and others, 2010). Since that time, numerous eruptive events have resulted in a series of volcanic features to the west and north of the caldera, forming the Mono-Inyo volcanic chain, some of which are as young as a few hundred years (Bursik & Sieh, 1989). The subsurface magmatic activity that has fed these volcanic features is the underlying energy source for the Long Valley caldera geothermal system. The attached Long Valley Field Trip Guide (Suemnicht, 2011) provides an excellent summary of the geology, history and description of features in the region.

Various authors have developed cross-sectional models of the caldera system, as it exists today. Figure 1, a cross section modified from Hill and others (1985), presents an interpretation of the main elements of the structural characteristics of the caldera system. The most prominent feature is the magma chamber, which occupies a large volume at depths inferred to be as shallow as 5 km beneath the surface of the caldera. The shallowest region is believed to be below Casa Diablo, which is the location of the existing geothermal power complex.

The geothermal activity has evolved over time, and probably during two distinct periods. Hydrothermal activity and associated mineral alteration was extensive during the time period between 300,000 years ago and 130,000 years ago (Sorey and others, 1991). The location and extent of the current hydrothermal activity, which is concentrated around the southern and eastern margins of the central resurgent dome, probably dates from about 40,000 years ago.

Figure 1: Geological Cross Section, Modified from Hill et al., 1985.



2.1.2 Tectonics

The Long Valley caldera is located at the western edge of the Basin and Range tectonic province. It is in an environment of transtensional stress resulting from interaction of the North American and Pacific plates (Dixon and others, 2000; Faulds, 2004; Hill, 2006). This environment, in which thinning of the continental crust occurs during extensional deformation, is favorable for upwelling of subcontinental hot mantle, which leads to the generation of a wide range of melts, some of which reach shallow crustal levels and support surface volcanic activity. The Long Valley caldera is the locus of such activity along the eastern edge of the Sierra Nevada.

Current plate tectonic motions will persist for millions of years, which implies the Long Valley region will remain an area in which tectonic activity will persist. As such, it is likely to remain a region in which geothermal activity will be manifest for the foreseeable future.

2.1.3 Seismicity

Seismic activity in the Long Valley caldera is common, reflecting the current tectonic setting. Up to date reports on present day seismic activity can be retrieved at the U.S. Geological Survey website (http://volcanoes.usgs.gov/observatories/calvo/calvo_activity_update_last10.html). Seismicity in this area generally reflects the fact that this location is geologically complex. The area is part of the transtensional Basin and Range tectonic domain, as noted above. This environment can experience seismic activity related to such a stress regime, resulting in earthquakes that occur in response to a variety of slip mechanism, including transcurrent, strike-slip and dip-slip movement. Superimposed on this stress system are the effects resulting from the presence of an active magma system. Most seismic activity is of very low magnitude (generally less than 3.0) and has a recurrence interval of days to weeks. Rarely, magnitude 6.0 earthquakes have occurred on the eastern edge of the Sierra Nevada in the area south of the caldera (Prejean et al., ****).

Independent of this seismic activity, which is an expression of regional scale stresses imposed by the overall tectonic environment, are seismic events related directly to movement of magma in the subsurface, and adjustments of the geological edifice around the magma chamber to these movements. Swarms of earthquakes, probably related to movement of magma, have occurred episodically for decades. Indicated in Figure 1 is the location of a well-located swarm of earthquakes that occurred in January of 1983 (Hill and others, 1985). Similar events, scattered throughout the southern reaches of the caldera, have been recorded repeatedly (for example, Newman and others, 2001). This activity is likely to continue until the magma body is no longer active (a period of time that is expected to persist into the future).

2.1.4 Surface Processes

Movement of magma in the subsurface can lead to local changes in land elevation. Newman and others (2001) provide a detailed description of surface deformation associated with seismic activity in the period between 1997 and 1998. They note that surface elevation changes of a few cm/year occurred in some regions of the caldera. Similar movements are likely to continue as long as the magma chamber is active. As with the seismicity, much of this change in surface elevation is localized in the southern reaches of the caldera.

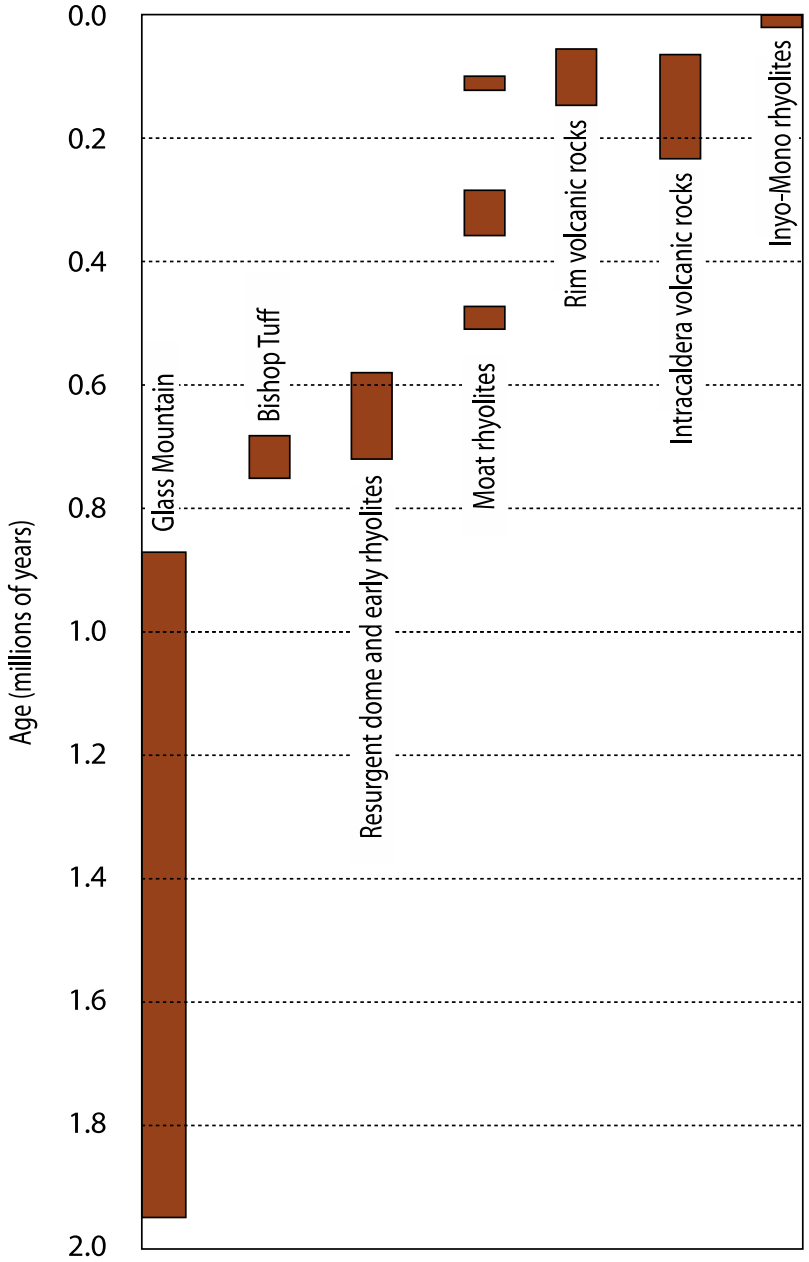
Surface features also reflect tectonic events. As is clear from the geological map in Appendix 1, faulting is common in the Long Valley region. This faulting reflects the regional tectonic environment, which is transtensional in this western edge of the Basin and Range tectonic province, as well as the consequence of caldera formation during and after eruption of the Bishop Tuff. The surface topography in the region is a direct reflection of these features.

2.1.5 Geochronology

The timing of volcanic events has been delineated primarily through radiometric dating. Figure 2, derived from data published by Dalrymple and others (1965), Doell and others, 1966, Dalrymple (1967), Huber and Rinehart (1967), Bailey and others (1976), Metz and Mahood (1985), Bailey (2004) and Hildreath (2004) shows the main events associated with construction of the present day caldera system. These results clearly indicate that the magmatic system has been active for nearly 2 million years, and shows no sign of imminent termination.

The clear history of episodic volcanism up to the present day clearly indicates that magma is present at depth. Indeed, in the 1989-1990 period, kill-off of trees along the western edge of the caldera due to release of large volumes of CO_2 was certainly related to magmatic activity at depth, possibly associated with magma movement and/or replenishment of the magma in the magma chamber. By implication, the energy available for generating electricity from this resource is substantial and being replenished via natural processes.

Figure 2: Age (in millions of years) of Volcanic Rocks Associated with the Long Valley Eruptive History.

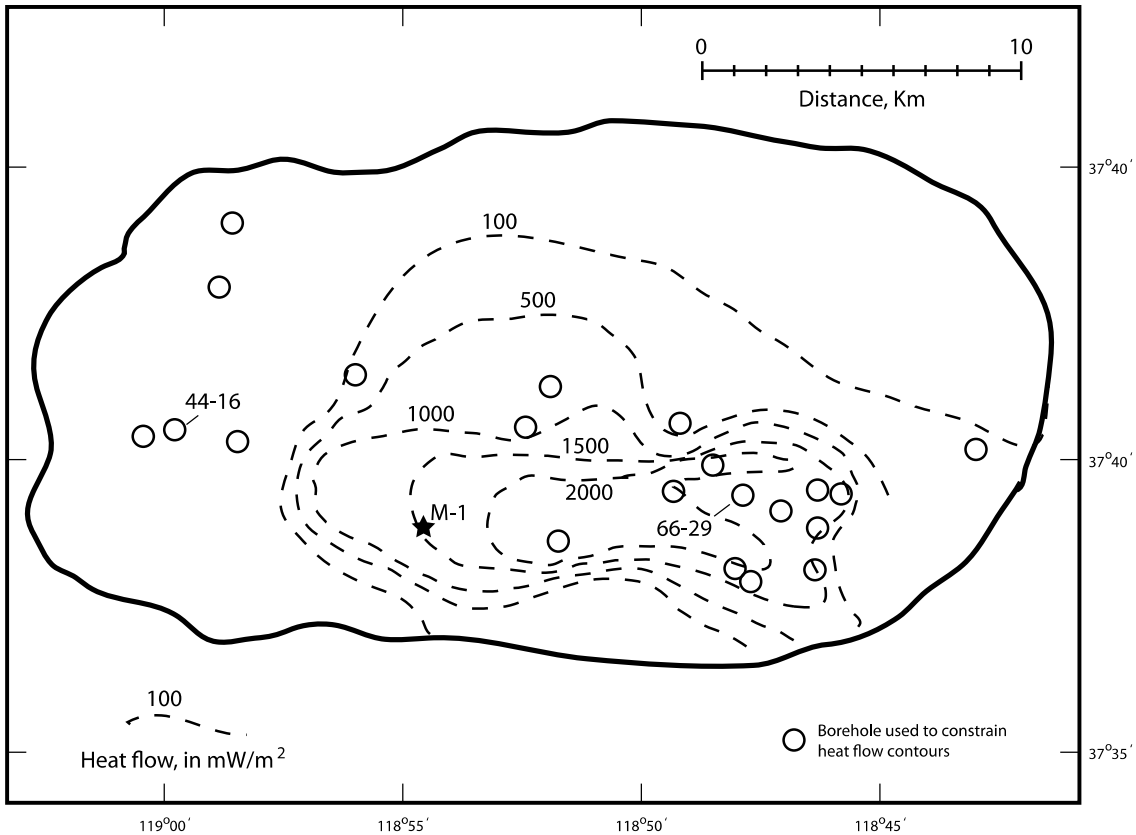


Specific eruptive periods associated with specific volcanic sequences are separated for clarity of presentation.

2.1.6 Heat Flow

The amount of heat available for energy generation is commonly heterogeneously distributed in geothermal systems. This condition is due to a variety of processes, including where heat sources are concentrated, and how fluids in the subsurface migrate through permeable regions.

Figure 3: Heat flow (in mW/m^2) in the Long Valley caldera (caldera edge indicated by heavy solid line), Based on Borehole Data.



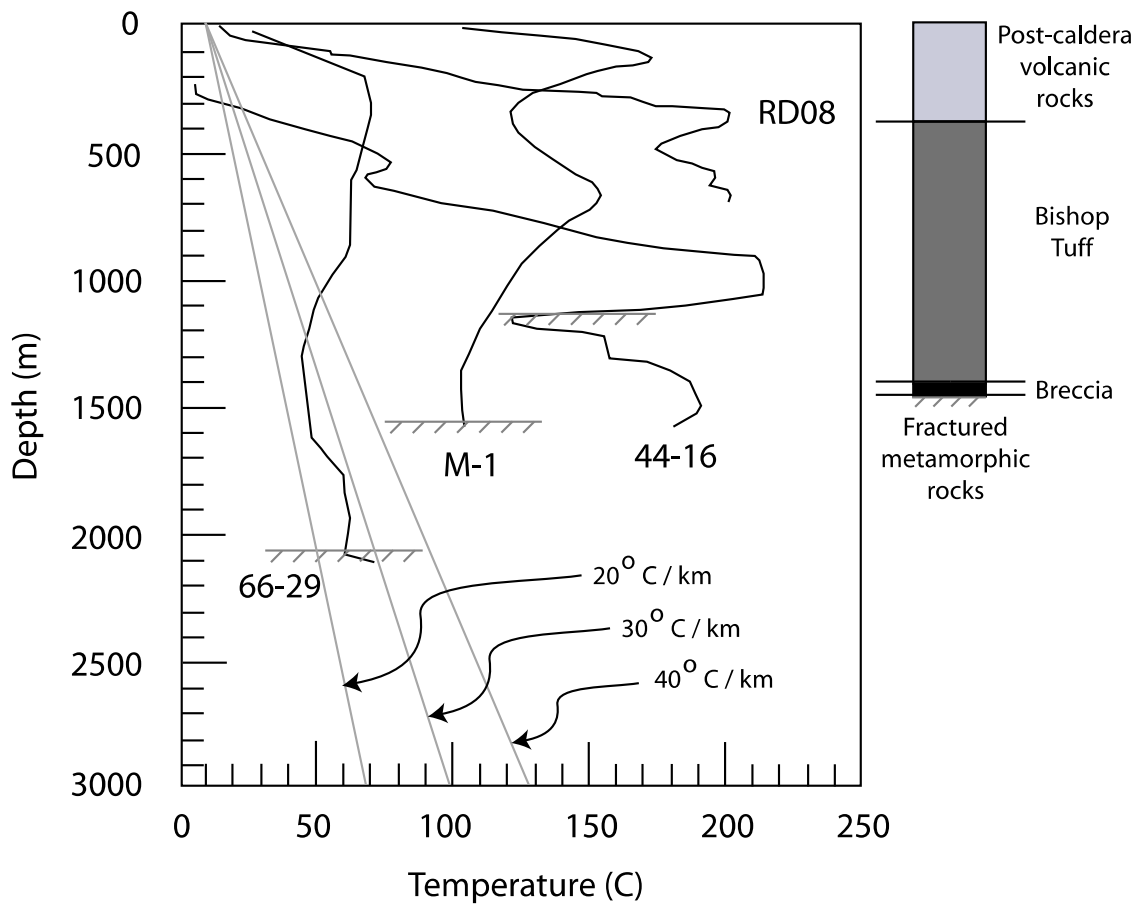
The star indicates the location of the Casa Diablo power plant complex, and the M-1 borehole. Boreholes 44-16 and 66-29 (depicted in Figure 5) are also shown. Modified from Blackwell (1985).

Shown in Figure 3 is a heat flow map, modified from Blackwell (1985). The highest heat flow region lies in the south-central part of the caldera, where heat flow exceeds 2 watts/meter^2. The Casa Diablo power plant complex lies on the western edge of this thermal dome.

The temperature profiles of four boreholes from different areas in the caldera (Figure 4) show a characteristic non-linear temperature distribution as a function of depth. In all four examples, temperature gradients at shallow depths (<500 meters) are very high, exceeding 100°C/km. At greater depths, the temperature profile becomes nearly isothermal for a few hundred to nearly 2,000 meters. Such thermal profiles are typical of systems in which complex flow patterns in the hydrological system are affecting the subsurface temperature distribution. The actual flow

regime, however, cannot be directly determined solely on the basis of the temperature profiles. Even so, the consistent deflection of the isotherms is consistent with a model in which the hydrological system has a significant flow component that transfers water from the Sierra Nevada in the west into the caldera to the east. Variations in water chemistry (discussed below) are consistent with this model.

Figure 4: Temperature as a Function of Depth for Three Boreholes in the Caldera (from Glassley, 2010).



The borehole identifier is indicated, and can be associated with specific boreholes in Figure 4. For reference, linear temperature gradients of 20°C/km, 30°C/km and 40°C/km are shown for reference.

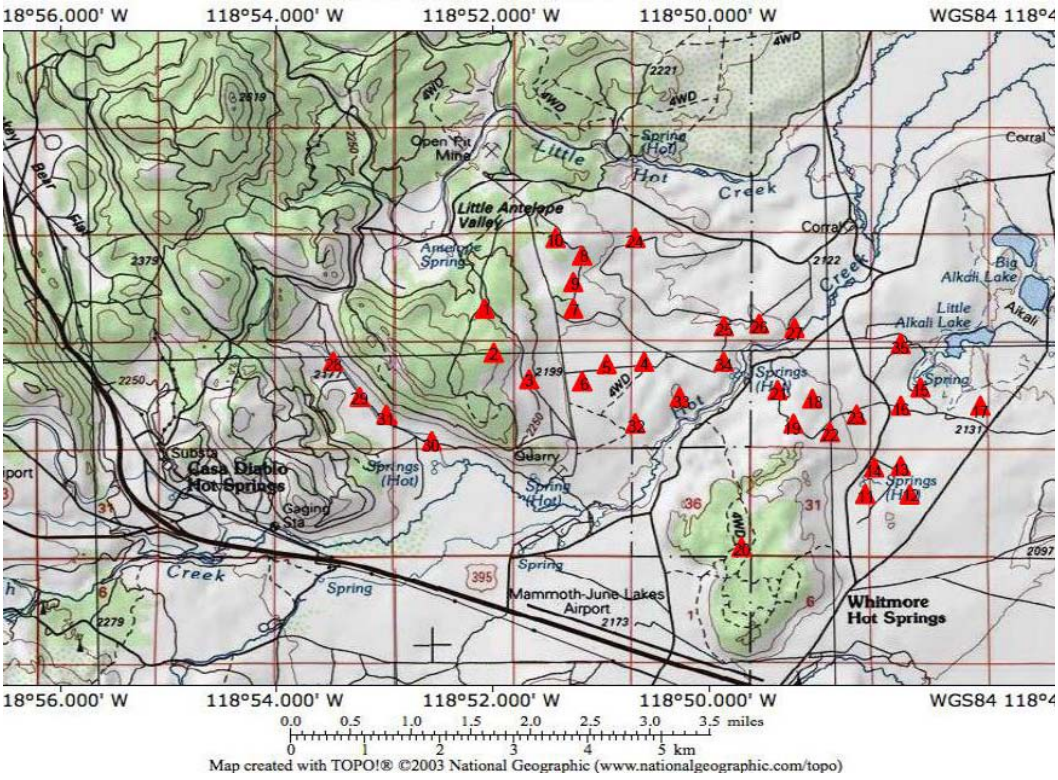
2.1.7 Magnetics and Magneto-Tellurics

Assessing the magnitude of a geothermal resource includes, in part, determining the flow regime (flow pathways and flow volumes) that controls heat transport in the subsurface. Since fluids are often solvents, transporting ionic dissolved species, they act as natural electrical conductors, which also means that they are detectable as magnetic anomalies. Similarly, clay minerals and other secondary alteration products that form as a result of fluids interacting with rock can exhibit electrical and magnetic signatures due to their inherent crystallographic and chemical properties.

Surveys conducted using magnetic and magneto-telluric methods have the potential to map in the subsurface the distribution of conductive zones and magnetic anomalies. High-resolution surveys thus provide the ability to map alteration zones and flow pathways. Although difficult to interpret without additional subsurface data, such as core analyses or other subsurface data, locating detectable electrical or magnetic anomalies can identify potentially important target areas for further study. As part of a Master of Science program, Maia Adrienne Kostlan at the University of California, Davis, has been conducting a high resolution magneto-telluric survey in the south-eastern resurgent dome and Hot Creek areas. This research is focused on deciphering the permeability structure that controls hydrothermal flow.

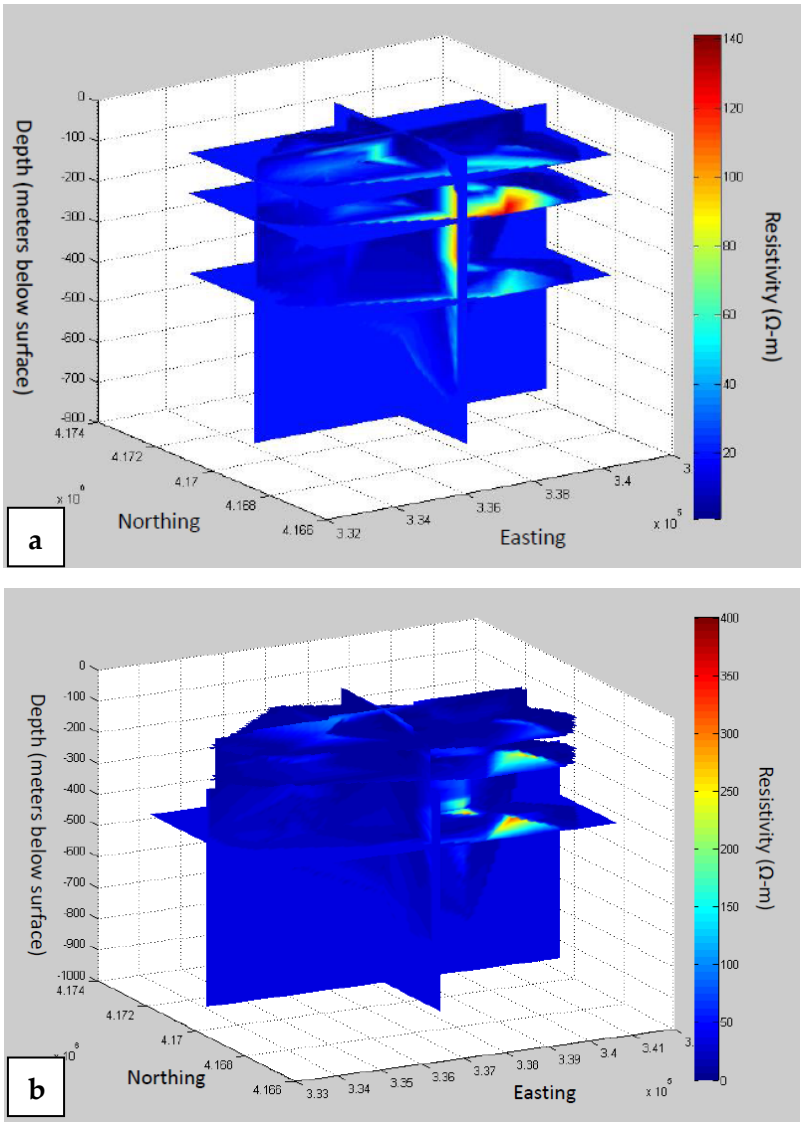
The Kostlan magneto-telluric (MT) study consists of 35 stations across the south-eastern resurgent dome toward Hot Creek, as well as stations south and east of Hot Creek hot springs (Figure 5). The station locations were restricted to lower elevations to increase the chances of sampling the deeper aquifer. Both natural (low frequency) and high, artificial frequency (transmitted by the antenna) sources were used to calculate the resistivity values at depth. The lower frequencies penetrate deeper into the earth as they attenuate slower than high frequencies, which attenuate rapidly, but have higher resolution in the shallow subsurface. By coupling the low and high frequency readings, it is possible to obtain high resolution of resistivity values in the shallow subsurface and greater understanding of the resistivity anomalies at depth across our survey. Two- and three-dimensional inversion routines were used to solve for complex laterally heterogeneous structures.

Figure 5: Map showing the Locations and Station Numbers of All Stations Completed in the Magneto-Telluric Field Study.



Results to date, using Matlab® graphics tools, indicate that the average resistivity values in the east-west direction are much higher than in the north-south direction (Figure 6), suggesting the north-south direction is more conductive, which is in agreement with the preferred fault orientation in the region. In order to identify the resistivity anomalies that may indicate hydrothermal flow and/or alteration, zones of low resistivity, which are indicated by the cooler (blue) colors (Figures 7 and **8**) are mapped. The regions outlined in Figures 7 and **8** are zones of high resistivity, or low conductivity, which may be greatly affecting the direction of subsurface fluid flow. The notable regions to study are the north-west region (stations 1-3, 7-10, and 28-31) where the subsurface fluid flows from the resurgent dome (displaying both low and high resistivity zones), and the eastern section (stations 11-17 and 35) as the fluid both reaches the surface and continues in the subsurface toward Crowley Lake. Further analysis of the data using filtering and inversion techniques will better refine these analyses.

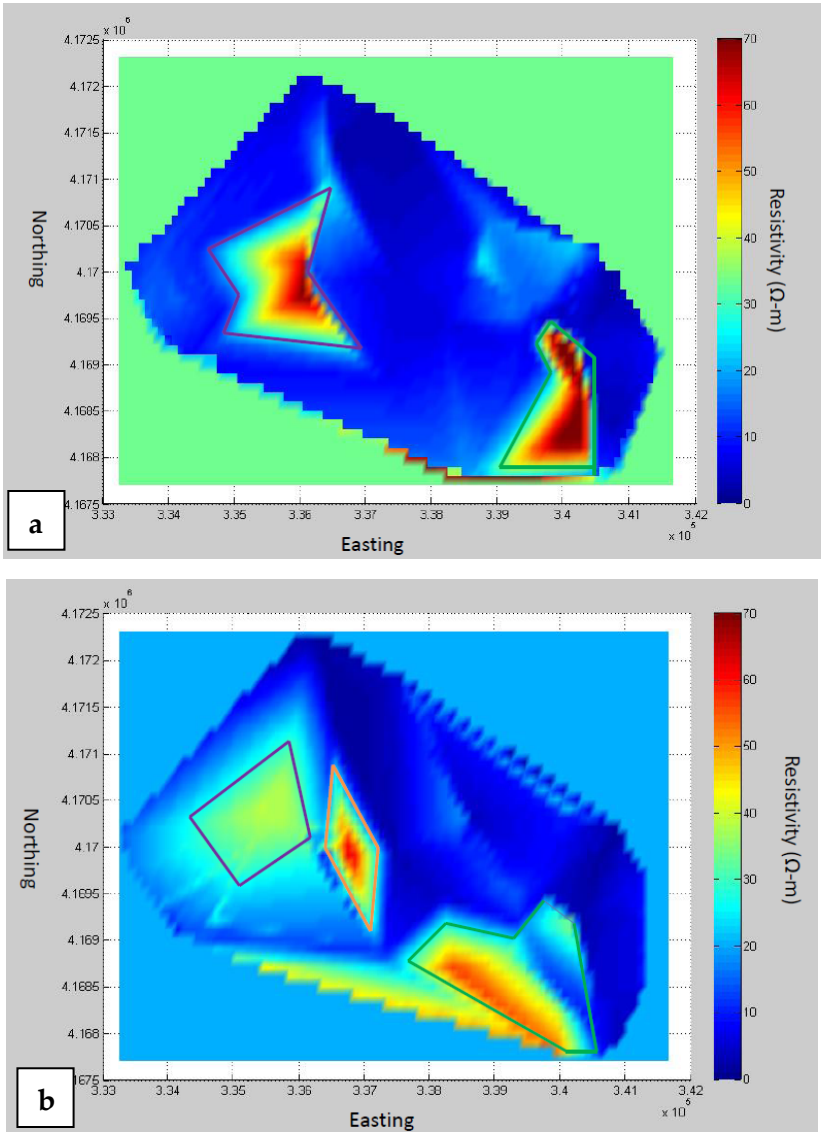
Figure 6: The Models of the Calculated Low Frequency Resistivity Values in the North-South (a) and the East-West Direction (b).



Note the vast difference in scale between the two orientations; the north-south orientation has much lower resistivity values than the east-west direction, indicating the north-south is more conductive than the east-west orientation.

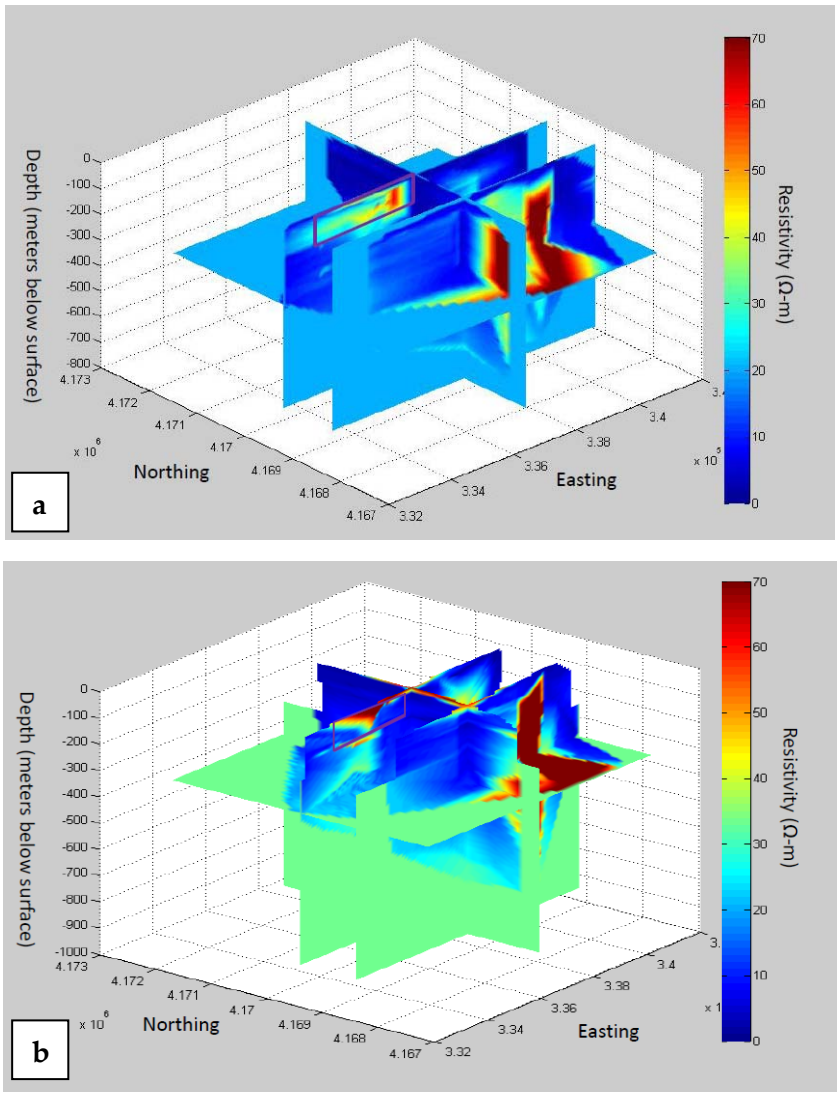
These results expand those of previous studies (such as Park and Torres-Verdin, 1988; Pribnow, et al., 2003; Onacha, 2006) by providing higher resolution information regarding the variability in subsurface properties that will influence the hydrological regime.

Figure 7: Sections, in Map View, at 100m Depth, (a) North-South Low Frequency and (b) East-West Low Frequency.



The regions of interest for comparison between the two orientations are outlined in purple and green in both; the orange outlined region in the east-west is important, as it is not present in the north-south.

Figure 8: Saturated (Exaggerated by Adjusting the Maximum Resistivity Values Displayed) 3D Models of the Low Frequency Resistivity Values in the North-South (a) and East-West (b) Directions.



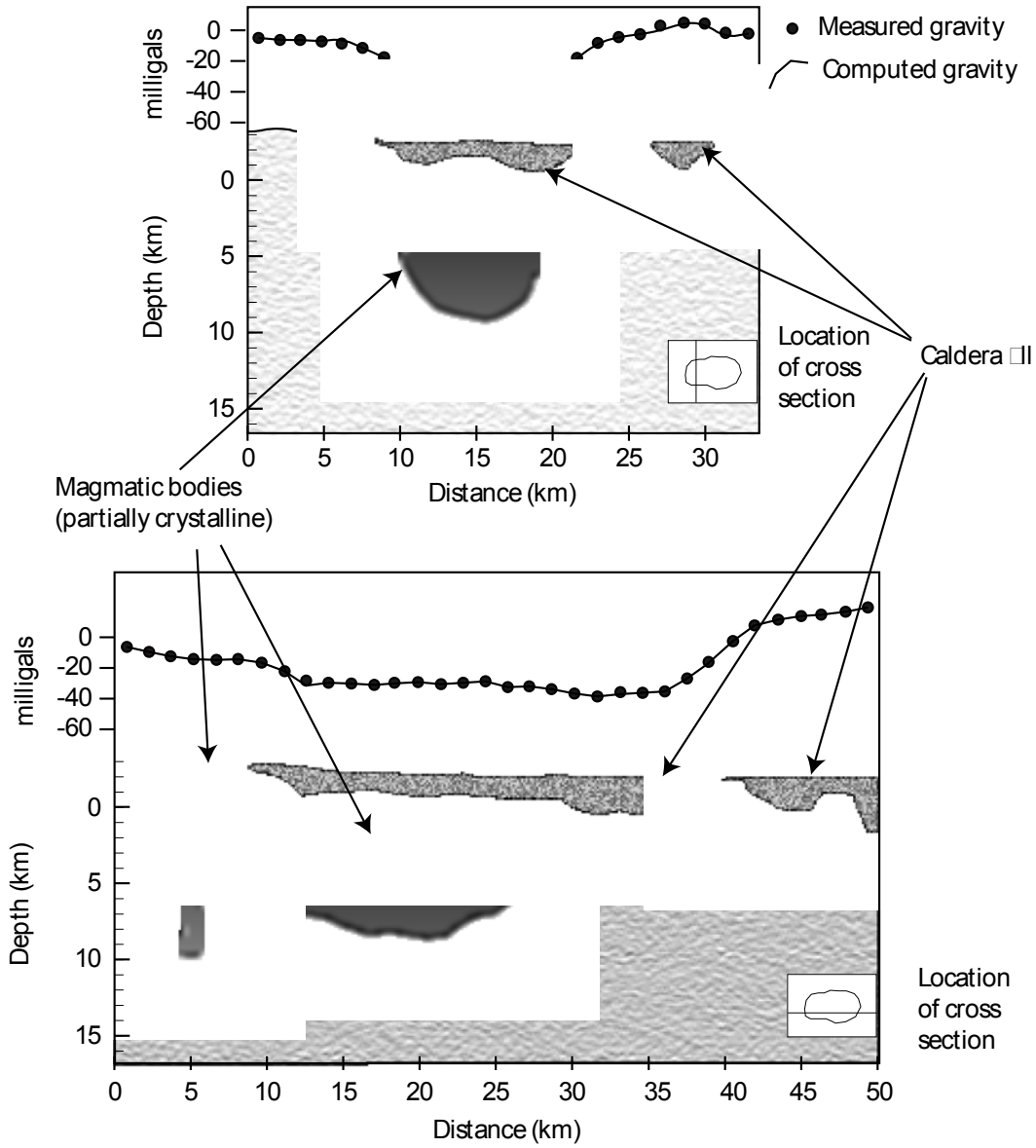
The outlined purple region is a higher resistivity zone that was not obvious until the resistivity scale was adjusted.

2.1.8 Gravity

Measurement of the gravity field provides information about the distribution of mass in the subsurface. Although such measurements can be inverted to produce models of distribution of rock types, they seldom provide unique descriptions since a large number of models can be generated that fit the measured gravity values. However, when coupled with reasonable constraints from measured or inferred rock densities, the depth, thickness and lateral extent of various rock bodies can be determined. Shown in Figure 9 are cross sections showing the likely distribution of key rock types in the Long Valley caldera region, based on gravity surveys reported by Carle (1988). These results are consistent with those shown in Figures 1 and 3 with

respect to the likely depth and lateral extent of the magma body that is the heat source for the geothermal system.

Figure 9: North-South (Upper Figure; North to the Right) and East-West (Lower Figure; East to the Left) Cross Sections of Modeled Rock Types from the Surface to a Depth of 17 Kilometers



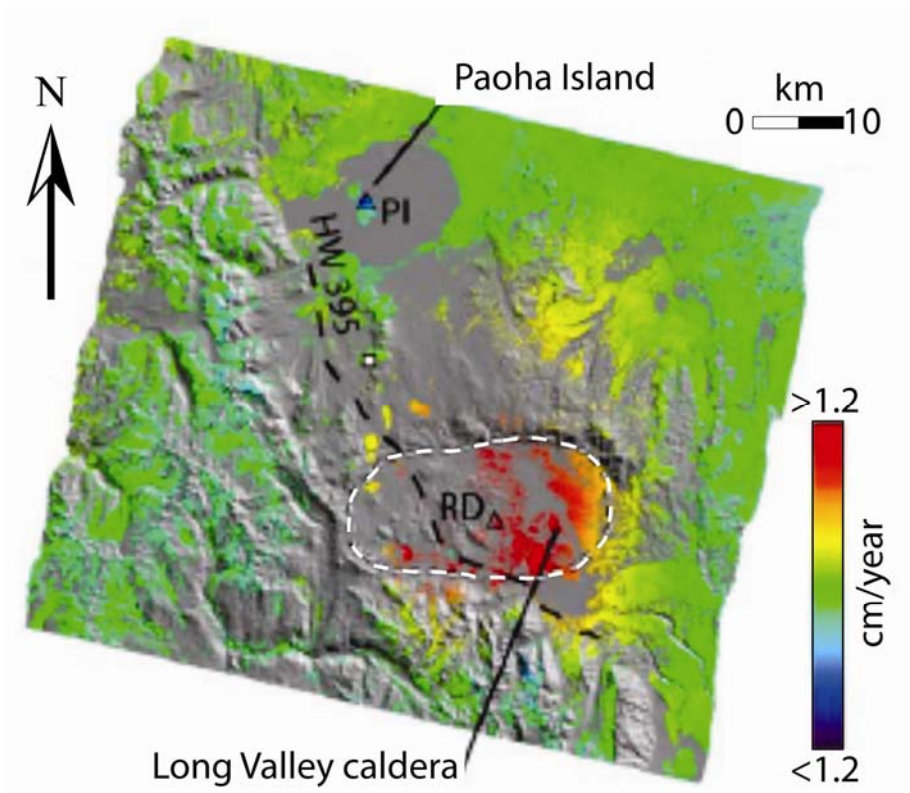
The distribution of volcanic debris erupted after caldera formation (labeled “Caldera fill”) and likely magma bodies are indicated. Modified from Carle (1988).

2.1.9 Remote Sensing

The use of airborne and satellite capabilities to map the distribution of surface elevation changes is a useful means for identifying active areas that may be related to near-surface thermal sources or crustal-scale deformation. Both types of deformation are important for identifying potential areas of development interest, or regions where care must be exercised in developing resources due to the potential for structural damage.

Shown in Figure 10 are changes in surface elevation over the time period from 1992 through 2000 measured using Small Baseline Subset (SBAS) Differential Interferometric Synthetic Aperture Radar (DInSAR). This technique allows small changes in surface elevation over time to be measured using satellite data, but has the limitation of providing only partial areal coverage, due to constraints placed on the analysis technique by the requirements of the algorithm.

Figure 10: Elevation Changes over Time in the Long Valley Caldera Region



Modified from Berardino et al. (****).

The results indicate that substantial increases in elevation are centered within the caldera area. Although there are numerous mechanisms that can explain this history, inflation of the caldera by invasion of magma into the caldera magma chamber is one possibility that is consistent with the recent geological history of the region.

2.1.10 Geochemistry

Geochemistry, in the form of water analyses from springs and gas analyses from fumaroles can provide important in sight into the characteristics of a geothermal resource. Water chemistry is particularly useful for deriving source temperatures while gas analyses, particularly isotopic characteristics, allow identification of magma sources and conditions.

Analysis of water chemistry from springs to the south and southeast of the Resurgent Dome imply reservoir temperatures ranging from 200°C to 280°C (Mariner and Wiley, 1976; Sorey and others, 1978 and 1991). These temperatures are generally higher than those observed in wells such as those depicted in Figure 4. This suggests that the source region for the fluids sampled for water chemistry has not yet been sampled by wells drilled thus far. Further exploration could elucidate the thermal source regions.

These temperatures are well suited for geothermal power production, and suggest that this part of the caldera could support power production significantly beyond that currently provided by the Casa Diablo power generation facility. This is particularly true given that the wells drilled thus far generally do not intersect flow fields that achieve such temperatures.

Variations in gas chemistry indicate the behavior of the system is influenced by both magmatic events and hydrothermal properties of the system. Episodic increases in the ratio of $^{3}He/^{4}He$ occur in temporal association with seismic activity that appears to be related to magma movement. This suggests that this ratio reflects input of magma to the reservoir system. Decreases in $^{3}He/^{4}He$ appear to be associated with spring thaw, which implies input to the hydrological system from spring melt and runoff from the Sierra Nevada to the west. Variations in CO_2 emissions, occasionally sufficient to affect vegetation, have also been noted with these events (Hilton, 1996; Sorey et al., 1998).

CHAPTER 3: Conclusions

Assessing a geothermal resource requires access to a broad range of scientific data derived from multiple disciplines. Assembling that information in a way that allows more efficient and rapid analysis was the goal of this project. In so doing, it is possible to provide an overview of the state-of-knowledge, which this document and supporting material provide. These assembled data demonstrate that the main features of the Long Valley caldera system were established during a cataclysmic eruption around 760,000 years ago. Seismic, geochemical, and geophysical data demonstrate that the system continues to be an active magmatic system. Replenishment of the magma chamber by new volumes of magma appears to have been responsible for a variety of seismic, geomorphological and geochemical events in the 1980s-2000s. Such activity indicates that this geothermal resource, which currently has only the Casa Diablo power production facility operating, has the potential to provide much more geothermal power.

To better resolve the power production potential of this region, several key research areas need further support and effort. Some of these questions are:

6. What is the three dimensional geometry of the flow field that maintains the elevated subsurface temperatures?
7. What is the recharge area and rate for the flow system and how does it vary seasonally?
8. What is the precise geometry of the magma body and associated small magmatic intrusions (i.e., dikes) that affect the local temperature field?
9. What is the subsurface pattern of permeability distribution and what controls it?
10. How does the system of faults affect the flow regime?

Further research targeting these and other questions regarding the geological characteristics of this system could help reduce uncertainty regarding the available geothermal resource in this region.

REFERENCES

Bailey, R.A., Dalrymple, G.B. and Lanphere, M.A., 1976. Volcanism, structure and geochronology of the Long Valley caldera, Mono County, California. J. Geophysical Research 81, 725-744.

Bailey, R.A., Dalrymple, G.B. and Lanphere, M.A., 1989. Quaternary Volcanism of the Long Valley Caldera and Mono-Inyo Craters, Eastern Sierra Nevada. Field Trip Guidebook, 28th International Geological Congress, 36 pp.

Bailey, R.A., 2004. Eruptive History and Chemical Evolution of the Precaldera and Postcaldera Basalt-Dacite Sequences, Long Valley, California: Implications for Magma Sources, Current Seismic Unrest and Future Volcanism. U.S. Geological Survey Professional Paper 1692, 75 pp.

Blackwell, D., 1985. A Transient model of the geothermal system of the Long Valley caldera, California. Journal of Geophysical Research 90, B13, 11-229-11241.

Bursik, M. and Sieh, K., 1989. Range front faulting and volcanism in the Mono Basin, Eastern California. J. Geophysical Research 94, 15,587-15,609.

Carle, S., 1988. Three-dimensional gravity modeling of the geologic structure of Long Valley Caldera. J. Geophysical Research 93, 13237-13250.

Dalrymple, G.B., 1967. Potassium-argon Ages of Recent Rhyolites of the Mono and Inyo Craters, California. Earth and Planetary Science Letters. 3 (1967): 289-298.

Dalrymple, G.B., Cox, A. and Doell, R.R., 1965. Potassium-argon Age and Paleomagnetism of the Bishop Tuff, California. Geological Society of America Bulletin 76, 665-674.

Dixon, T.H., Miller, M., Farina, F., Wang, H. and Johnson, D., 2000. Present-day motion of the Sierra Nevada block and some tectonic implications for the Basin and Range province, North America. Tectonics 19, 1-24.

Doell, R.R., Dalrymple, G.B. and Cox, A., 1966. Geomagnetic Polarity Epochs: Sierra Nevada Data, 3. J. Geophysical Research 71, 531–541.

Gawell, K., 2006. California's Geothermal Resource Base: Its Contribution, Future Potential And A Plan For Enhancing Its Ability To Meet tTe States Renewable Energy and Climate Goals. 39 pages.

GeothermEx, 2004. New Geothermal Site Identification and Qualification. CEC##

Hildreth, W., 2004. Volcanological perspectives on Long Valley, Mammoth Mountain and Mono Craters: several contiguous but discrete systems. J. of Volcanology and Geothermal Research 136, p. 169-198.

Hill, D.P., 2006. Unrest in Long Valley caldera, 1978-2004. In Troise, C., De Natale, G. and Kilburn, C.R.J. (eds.) Mechanisms of Activity and Unrest at Large Calderas. Geological Soc. Of London Special Publication 269, p. 1-24.

Hill, D.P., Bailey, R.A. and Ryail, A.S., 1985. Active tectonics and magmatic processes beneath Long Valley caldera, Eastern California: An Overview. J. Geophysical Res. 90, B13, 11,111 – 11,120.

Hilton, D.R., 1996. The helium and carbon isotope systematics of a continental geothermal system: results from monitoring studies at Long Valley caldera (California, U.S.A.). Chemical Geology 127, 269-295.

Mahood, G.A., Ring, J.H., Manganelli, S. and McWilliams, M.O., 2010. New 40Ar/39Ar ages reveal contemporaneous mafic and silicic eruptions during the past 160,000 years at Mammoth Mountain and Long Valley caldera, California. Geol. Soc. Amer. Bull. 122, p. 396-407.

Metz, J.M. and Mahood, G.A., 1985. Precursors to the Bishop Tuff eruption: Glass Mountain, Long Valley, California. J. Sedimentary Petrology 45, p. 207-211.

Newman, A.V., Dixon, T.H., Ofoegbu, G.I. and Dixon, J.E., 2001. Geodetic and seismic constraints on recent activity at Long Valleycaldera, California: evidence for viscoelastic rheology. J. of Volcanology and Geothermal Res. 105, 183-206.

Onacha, S.A., 2006. Hydrothermal fault zone mapping using seismic and electrical measurements. Doctoral Dissertation, Duke University.

Park, S.K., Torres-Verdin, C., 1988. A systematic approach to the interpretation of magnetotelluric data in volcanic environments with applications to the quest for magma in Long Valley, California. Journal of Geophyics. Research 93, pp. 13265-13283.

Petty, S., Livesay, B., Long, W. and Geyer, J., 1992. Supply of Geothermal Power from Hydrothermal Sources: A Study of the Cost of Power in 20 and 40 Years. Sandia National Laboratory Report SAND-92-7302.

Pribnow, D.F.C, Schutze, C., Hurter, S.J, Flechsig, C. and Sass, J.H. 2003. Fluid Flow in the resurgent dome of Long Valley caldera: implications from thermal data and deep electrical sounding. Journal of Volcanology and Geothermal Research, Vol. 127, pp.329-345.

Prejean, S., Ellsworth, W., Zoback, M. and Waldhauser, F., 2002. Fault structure and kinematics of the Long Valley Caldera region, California, revealed by high-accuracy earthquake hypocenters and focal mechanism stress inversions. J. Geophysical Research 107, B12, 2355-.

Sorey, M.L., Lewis, R.E. and Ohlmstead, F.H., 1978. The Hydrothermal System of Long Valley Cladera, Claifornia. U.S. Geological Survey Prof. Paper 1044-A, 60p.

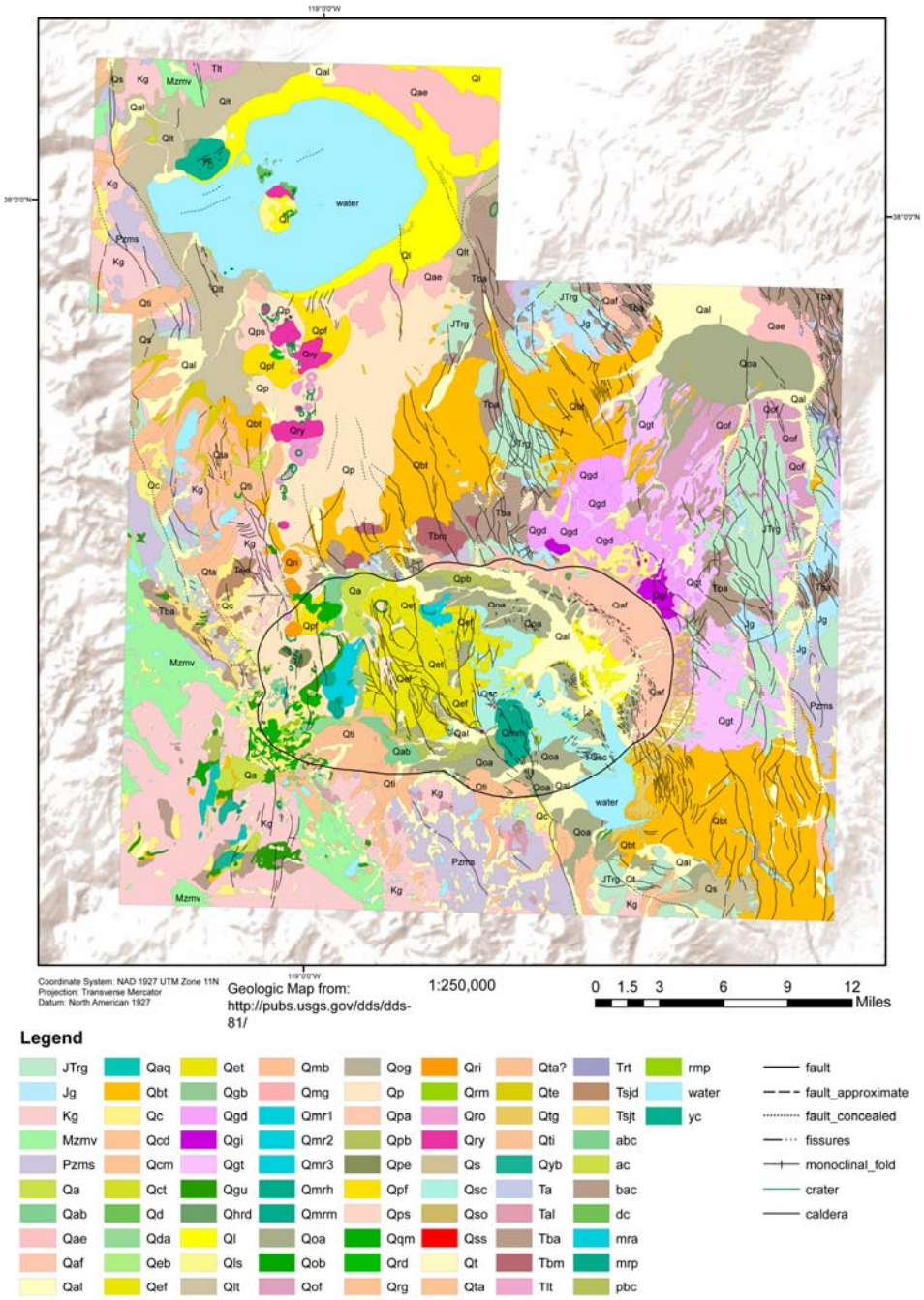
Sorey, M.L., Suemnicht, G.A., Sturchio, N.J. and Nordquist, G.A., 1991. New evidence on the hydrothermal system in Long Valley caldera, California, from wells, fluid sampling electrical geophysicics and age determinations of hot spring deposits. J. of Volcanology and Geothermal Research 48, 229-263.

Sorey, M.L., Evans, W.C., Kennedy, B.M., Farrar, C.D. Hainsworth, L.J. and Hausback, B., 1998. Carbon diosxide and helium emissions from a reservoir of magmatic gas beneath Mammoth Mountain, California. J. Geophysical Research 103, 15,303-15,323.

Muffler, L.J.P. (editor), 1979. Assessment of geothermal resources of the United States – 1978. U.S. Geological Survey Circular 790, 163 p.

Western Governors' Association, 2006. Clean And Diversified Energy Advisory Committee Report.

APPENDIX A:
Geology of the Long Valley Region



Geologic map of the Long Valley caldera.

APPENDIX B:
Long Valley Bibliography

BIBLIOGRAPHY FOR

THE LONG VALLEY CALDERA, CALIFORNIA

Compiled by Chris Silva
for the
California Geothermal Energy Collaborative

April, 2011

PREFACE

The Long Valley Caldera Bibliography is the first in a series of bibliographies intended to collect all reference material on individual geothermal resource areas in the state of California. The purpose of this undertaking is to provide ready access to the entire scientific literature for a region. By doing so, research and development time can be reduced, and thorough review of the literature for any topic area can be enhanced.

The bibliography is organized by subject matter. The subject matter areas considered were: Geochemistry, Geochronology, Gravity, Heat Flow, Magnetics, Remote Sensing, Surface Processes, Seismicity, Tectonics and Volcanism. Electronic searches using these keywords were compiled into a single document. Because some papers and reports covered multiple topics, duplication of some references occurs. We did not attempt to eliminate the duplication, since there were no legitimate criteria for deciding how to select a single topic area for such multi-disciplinary studies.

The literature contained in this bibliography include papers published in peer reviewed scientific journals, state and federal government reports, and reports from professional organizations. In all cases, the database from which the publication was obtained is indicated. Also included are brief abstracts and the reference.

For each topic area, publications are listed in chronological order. The bibliography is current to December, 2010.

Support for this research was provided by the California Energy Commission.

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GEOCHEMISTRY BIBLIOGRAPHY

1. Database ProQuest Deep Indexing: Earth

Title **Geology, geochronology, and *geochemistry* of the Miocene-Pliocene Ancestral Cascades arc, northern Sierra Nevada, California and Nevada: The roles of the upper mantle, subducting slab, and the Sierra Nevada lithosphere**

Author Cousens, Brian; Prytulak, Julie; Henry, Christopher; Alcazar, Al; Brownrigg, Tim

Affiliation Department of Earth Sciences, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S5B6, Canada

Source Geosphere [Geosphere]. Vol. 4, no. 5, pp. 829-853. Oct 2008.

Abstract The assemblage of ca. 28-3 Ma volcanic rocks exposed in the Lake Tahoe-Reno region of the northern Sierra Nevada, United States, is interpreted to be part of the Ancestral Cascades volcanic arc. The volcanic rocks are commonly highly porphyritic, including abundant plagioclase with clinopyroxene, amphibole, and rare biotite, and range from basaltic andesite to dacite in composition. Less common are poorly phyric, olivine- and clinopyroxene-bearing basalts and basaltic andesites. Porphyritic lavas dominate composite volcanic centers, whereas the poorly phyric lavas form isolated cinder cone and lava flow complexes. Tahoe-Reno arc lavas are calc- alkaline, enriched in the large ion lithophile elements but depleted in Nb and Ta relative to the light rare earth elements, and have highly variable radiogenic isotopic compositions. Compared to the modern south Cascade arc, Tahoe-Reno region basalts are enriched in the light rare earth and large ion lithophile elements and have higher 87Sr/86Sr and lower 143Nd/144Nd that are consistent with an old, subduction-modified lithospheric mantle source, such as that proposed for lavas of the Western Great Basin. Melting of the lithospheric mantle may be enhanced by fluid flux from the subducting slab if the Juan de Fuca slab dip is shallow. Andesites and dacites evolved from basaltic magmas by a combination of fractional crystallization and assimilation of lower crustal melts. Available geochronological data indicate that the westward sweep of Cenozoic volcanism through Nevada was associated with steepening of the slab dip, but the dip angle was lower during Miocene-Pliocene arc volcanism than it is today beneath the modern south Cascades.

Article Geographic Terms USA, California, Sierra Nevada Mts.; USA, Nevada; USA, California; USA, Great Basin

Publisher Geological Society of America, 3300 Penrose Place

Publication Type Journal Article

Publication Year 2008

Accession Number 8919904

2. Database GeoRef

Title **Dynamic magma systems, crustal recycling and alteration in the Central Sierra Nevada Batholith; the oxygen isotope record**

Author Lackey, Jade Star; Valley, John W; Chen, James H; Stockli, Daniel F

Affiliation Pomona College, Geology Department, Claremont, CA, United States (USA)

Affiliation University of Wisconsin-Madison, United States (USA); California Institute of Technology, United States (USA); University of Kansas, United States (USA)

Source Journal of Petrology, vol. 49, no. 7, pp.1397-1426, Jul 2008

Resource Location http://petrology.oxfordjournals.org/

Publisher Oxford University Press, Oxford, United Kingdom (GBR)

Abstract Values of delta (super 18) O of zircon from the central Sierra Nevada batholith (SNB), California, yield fresh insight into the magmatic evolution and alteration history of this classic convergent margin batholith. Direct comparison of whole-rock and zircon (Zrc) delta (super 18) O provides evidence for modest (0.5ppm), but widespread, alteration, which has complicated interpretation in previous whole-rock delta (super 18) O studies. Four discrete belts of delta (super 18) O values are recognized in the central Sierra. A small belt of plutons with relatively low delta (super 18) O(Zrc) values (5.2-6.0ppm) intrudes the foothills, with a sharp increase of delta (super 18) O revealing the concealed Foothills Suture; high delta (super 18) O(Zrc) values (7.0-8.5ppm) dominate the rest of the western SNB. East of the axis of the Sierra, delta (super 18) O is distinctly lower (6.75-5.75ppm), and decreases monotonically to
the Sierra Crest. A sharp 1ppm increase of delta (super 18) O in the eastern Sierra reveals a second crustal boundary, with the fourth belt hosted in high-delta (super 18) O North American crust in the White Mountains and Owens and ***Long*** Valleys. Correlated O, Sr, and Pb isotope ratios reveal differences in magma generation between the western and eastern Sierra. The western Sierra experienced massive crustal recycling, with substantial melting and mobilization of accreted oceanic and volcanic arc rocks; crustal contamination affects many western SNB plutons. In contrast, the eastern Sierra was dominated by voluminous recycling of the lithospheric mantle and lower crust, with minimal crustal contamination. Batholith-wide shifts in delta (super 18) O occur between pulses of Cretaceous

magmatism that may be linked to tectonic reorganizations of magma sources. Within intrusive suites, delta (super 18) O may be unchanged (Tuolumne); increase (Sonora and Whitney); or decrease (Sequoia and John Muir) with time. These trends show stable ***long***-lived sources, or those where recycling and contamination may increase or decrease with time. Overall, delta (super 18) O reveals diverse magma system behavior at a range of scales in the Sierran arc.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2009-094053

3. Database GeoRef

Title **Geochemical correlation and (super 40) Ar/ (super 39) Ar dating of the Kern River ash bed and related tephra layers; implications for the stratigraphy of petroleum-bearing formations in the San Joaquin *Valley*, California**

Author Baron, Dirk; Negrini, Robert M; Golob, Elizabeth M; Miller, Don; Sarna-Wojcicki, Andrei M; Fleck, Robert J; Hacker, Bradley; Erendi, Alex

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Affiliation U. S. Geological Survey, Earth Surface Processes Team, United States (USA); California State University at Fullerton, United States (USA); University of Waikato, New Zealand (NZL); Bankers Petroleum, United States (USA); U. S. Geological Survey, United States (USA); University of California at Santa Barbara, United States (USA); Chevron Corporation, United States (USA)

Monograph Title Global tephra studies; John Westgate and Andrei Sarna-Wojcicki commemorative volume

Editor Froese, Duane G; Slate, Janet L; Knott, Jeffrey R; Lowe, David J

Affiliation University of Alberta, Department of Earth and Atmospheric Sciences, Edmonton, AB, Canada (CAN)

Source Quaternary International, vol. 178, pp.246-260, Feb 2008

Resource Location http://www.sciencedirect.com/science/journal/10406182

Publisher Elsevier, Oxford, United Kingdom (GBR)

Abstract The Kern River ash (KRA) bed is a prominent tephra layer separating the K and G sands in the upper part of the Kern River Formation, a major petroleum-bearing formation in the southern San Joaquin ***Valley*** (SSJV) of California. The minimum age of the Kern River Formation was based on the tentative major-element correlation with the Bishop Tuff, a 0.759+ or -0.002 Ma volcanic tephra layer erupted from the ***Long Valley*** Caldera. We report a 6.12+ or -0.05 Ma (super 40) Ar/ (super 39) Ar date for the KRA, updated major-element correlations, trace-element correlations of the KRA and geochemically similar tephra, and a 6.0+ or -0.2 Ma (super 40) Ar/ (super 39) Ar age for a tephra layer from the Volcano Hills/Silver Peak eruptive center in Nevada. Both major and trace-element correlations show that despite the similarity to the Bishop Tuff, the KRA correlates most closely with tephra from the Volcano Hills/Silver Peak eruptive center. This geochemical correlation is supported by the radiometric dates which are consistent with a correlation of the KRA to the Volcano Hills/Silver Peak center but not to the Bishop Tuff. The 6.12+ or -0.05 Ma age for the KRA and the 6.0+ or -0.2 Ma age for the tephra layer from the Volcano Hills/Silver Peak eruptive center suggest that the upper age of the Kern River Formation is over 5 Ma older than previously thought. Re-interpreted stratigraphy of the SSJV based on the new, significantly older age for the Kern River Formation opens up new opportunities for petroleum exploration in the SSJV and places better constraints on the tectonostratigraphic development of the SSJV.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2009-065592

4. Database GeoRef

Title **Allanite and chevkinite as absolute chronometers of rhyolite differentiation**

Author Vazquez, Jorge A

Affiliation California State University, Northridge, Department of Geological Sciences, Los Angeles, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 104th annual meeting; Geological Society of America, Rocky Mountain Section, 60th annual meeting

Author Burns, Scott (chairperson); Middleton, Larry T (chairperson); Metcalf, Rodney V (chairperson)

Source Abstracts with Programs - Geological Society of America, vol. 40, no. 1, pp.74, Feb 2008

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Descriptors allanite; chevkinite; chevkinite group; differentiation; epidote group; ***geochemistry***; igneous rocks; magmas; orthosilicates; P-T conditions; phase equilibria; rhyolites; silicates; sorosilicates; volcanic rocks

Abstract Allanite [(Ca, LREE, Th) (sub 2) (Mg,Fe) (sub 3) Si (sub 3) O (sub 12) (OH)] and chevkinite [(Ca, LREE, Th) (sub 4) Fe (super 2+) (Al, Mg, Fe,Ti) (sub 2) Ti (sub 2) Si (sub 4) O (sub 22)] are accessory minerals which can be particularly useful for delimiting the evolution of rhyolitic magmas because they often contain significant compositional zoning that is sensitive to changes in magmatic conditions and is amenable to geochronology due to high Th concentrations. Both minerals are relatively common in metaluminous rhyolites from a variety of tectonic settings, with allanite generally occurring in hosts that crystallized at lower magmatic temperatures than those hosting chevkinite. Reconnaissance experiments indicate that allanite saturation occurs in high-silica rhyolites between 760-770 degrees C; at > or =780 degrees C, anhydrous chevkinite replaces allanite. The compositions of allanites from rhyolites erupted at ***Long Valley***, Mono Craters, and Coso, USA, and Toba, Indonesia, follow a similar compositional trend of decreasing La, Ce, Ti, Mg and increasing Mn, Y, and Th, which mirrors the variability of compatible and incompatible elements, respectively, during fractionation of rhyolitic magma containing LREE-rich phases. Single crystals of chevkinite from caldera-forming and postcaldera rhyolites at Yellowstone, USA, may contain significant zoning in LREE, Th, Mg, and Y due to differentiation. However, parental melt compositions are difficult to calculate because partition coefficients between chevkinite and metaluminous melts are poorly delimited. For young chevkinites and allanites (<350 ka), the compositional variations in single crystals can be linked to absolute age through (super 238) U- (super 230) Th dating via ion microprobe analysis. Compositional zoning in Toba allanites records crystal growth from rhyolitic melts related by up to 45% fractionation, which when keyed to (super 238) U- (super 230) Th crystallization ages, dates the accumulation and differentiation of a voluminous silicic magma over an approximately 150,000 year interval. Chevkinites from postcaldera rhyolite at Yellowstone yield apparent (super 238) U- (super 230) Th ages that 1) fall within range of crystallization ages for coexisting zircon and 2) correlate with the compositional variations recorded by single crystals.

Publication Year 2008

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-065925

5. Database GeoRef

Title **Geological and hydrological history of the paleo-Owens River drainage since the late Miocene**

Author Phillips, Fred M

Affiliation New Mexico Institute of Mining and Technology, Department of Earth & Environmental Science, Socorro, NM, United States (USA)

Affiliation Smithsonian Institution, United States (USA)

Monograph Title Late Cenozoic drainage history of the southwestern Great Basin and lower Colorado River region; geologic and biotic perspectives

Editor Reheis, Marith C; Hershler, Robert; Miller, David M

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Special Paper - Geological Society of America, vol. 439, pp.115-150, 2008

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract From the late Miocene to the middle Pliocene, the current drainage basin of the Owens River probably consisted of a broad, moderate-elevation, low-relief plateau with radiating drainage toward the Pacific Ocean, the northwestern Great Basin (now Lahontan drainages), and the Mojave and Colorado drainages. This plateau probably contained shallow basins, created by an extensional pulse at 12-11 Ma, at the present locations of major valleys. Between 4 and 3 Ma, this plateau was disrupted by a rapid westward step of extensional Basin and Range Province tectonism, which reactivated the Miocene faults and resulted in a linear north-south ***valley*** (the Owens ***Valley***) with high mountain ranges on each side. This tectonic event resulted in geographic isolation and fragmentation of aquatic habitats and may have been a critical driver for speciation of aquatic organisms. Subsequent to this remarkable transformation of the landscape, the predominant influence on aquatic habitats has been very large, climate-driven fluctuations in the regional water balance that have resulted in the repeated interconnection and disconnection of the various basins that make up the paleo-Owens system. The magnitude of these fluctuations appears to have increased markedly since the early Pleistocene. Searles Lake has generally been the terminus of the Owens River, but at least once, probably at ca. 150 and/or ca. 70 ka, the system overflowed into Death ***Valley***. During the last interglacial (marine isotope stage 5) and the Holocene, Owens Lake has been the terminus, but apparently not frequently before. These very large fluctuations in the water balance undoubtedly produced large shifts in the nature and distribution of aquatic habitats over geologically short periods of time, as well as repeatedly creating and severing connections between various parts of the larger drainage basin. This dynamic hydrological system provided the setting, and no doubt much of the impetus, for speciation, extinction, and distribution of aquatic species within the paleo-Owens system, but any paleohydrological causes will have to be extracted from a complex history.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2008-111786

6. Database GeoRef

Title **On reactive fluid flow and geochemical transport modeling; from natural hydrothermal systems to geothermal energy development**

Author Xu, Tianfu

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Monograph Title Geological Society of America, 2007 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol. 39, no. 6, pp.348, Oct 2007

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Geochemical evolution in both natural hydrothermal systems and geothermal fields occurs through a complex interplay of multiphase fluid and heat flow and chemical transport processes. These complexities include (1) fracture-matrix interaction for fluid, heat, and chemical constituents, (2) gas-phase participation in multiphase fluid flow and geochemical reactions, (3) the kinetics of fluid-rock chemical interaction, and (4) heat effects on thermophysical and chemical properties and processes. Reactive fluid flow and geochemical transport modeling is a powerful tool to get insight into these processes, to test conceptual model, and to study the geochemical behavior, mineral alteration, changes in porosity and permeability. Three modeling examples are used to illustrate the usefulness of the reactive transport modeling. The first example deals with caprock alteration in a ***Long Valley*** Caldera (LVC) hydrothermal system in California. The observed sequence of argillic alteration in the LVC consists of an upper zone with smectite and kaolinite (in the lower-temperature region), a lower illite zone, and an intermediate mixed illite and smectite zone. The sequence is reasonably well reproduced in the numerical simulation. The second example investigates the formation mechanism of an impermeable barrier between acidic and neutral fluid zones in the Onikobe geothermal field, Japan. The third studies geothermal injection well silica scaling and loss of porosity and injectivity at Tiwi Field, Philippines. Open challenges and future directions on the modeling will be discussed.

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-073444

7. Database GeoRef

Title **Cosmogenic nuclide intercalibration and erosion rate study on fault scarps of the Bishop Tuff, CA, USA**

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Affiliation GeoForschungsZentrum Potsdam, Federal Republic of Germany (DEU)

Monograph Title Abstracts of the 17th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol. 71, no. 15S, pp.A335, Aug 2007

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Elsevier, New York, NY, International (III)

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2008-083639

8. Database GeoRef

Title **Compositional zoning of the Bishop Tuff**

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Source Journal of Petrology, vol. 48, no. 5, pp.951-999, May 2007

Resource Location http://petrology.oxfordjournals.org/

Publisher Oxford University Press, Oxford, United Kingdom (GBR)

Abstract Compositional data for >400 pumice clasts, organized according to eruptive sequence, crystal content, and texture, provide new perspectives on eruption and pre-eruptive evolution of the >600 km (super 3) of zoned rhyolitic magma ejected as the Bishop Tuff during formation of ***Long Valley*** caldera. Proportions and compositions of different pumice types are given for each ignimbrite package and for the intercalated plinian pumice-fall layers that erupted synchronously. Although withdrawal of the zoned magma was less systematic than previously realized, the overall sequence displays trends toward greater proportions of less evolved pumice, more crystals (0.5-24 wt %), and higher FeTi-oxide temperatures (714-818 degrees C). No significant hiatus took place during the 6 day eruption of the Bishop Tuff, nearly all of which issued from an integrated, zoned, unitary reservoir. Shortly before eruption, however, the zoned melt-dominant portion of the chamber was invaded by batches of disparate lower-silica rhyolite magma, poorer in crystals than most of the resident magma but slightly hotter and richer in Ba, Sr, and Ti. Interaction with resident magma at the deepest levels tapped promoted growth of Ti-rich rims on quartz, Ba-rich rims on sanidine, and entrapment of near-rim melt
inclusions relatively enriched in Ba and CO (sub 2). Varied amounts of mingling, even in higher parts of the chamber, led to the dark gray and swirly crystal-poor pumices sparsely present in all ash-flow packages. As shown by FeTi-oxide geothermometry, the zoned rhyolitic chamber was hottest where crystal-richest, rendering any model of solidification fronts at the walls or roof unlikely. The main compositional gradient (75-195 ppm Rb; 0.8-2.2 ppm Ta; 71-154 ppm Zr; 0.40-1.73% FeO (super *)) existed in the melt, prior to crystallization of the phenocryst suite observed, which included zircon as much as 100 kyr older than the eruption.
The compositions of crystals, though themselves largely unzoned, generally reflect magma temperature and the bulk compositional gradient, implying both that few crystals settled or were transported far and that the observed crystals contributed little to establishing that gradient.
Upward increases in aqueous gas and dissolved water, combined with the adiabatic gradient (for the approximately 5 km depth range tapped) and the roofward decline in liquidus temperature of the zoned melt, prevented significant crystallization against the roof, consistent with dominance of crystal-poor magma early in the eruption and lack of any roof-rind fragments among the Bishop ejecta, before or after onset of caldera collapse. A model of secular incremental zoning is advanced wherein numerous batches of crystal- poor melt were released from a mush zone (many kilometers thick) that floored the accumulating rhyolitic melt-rich body. Each batch rose to its own appropriate level in the melt-buoyancy gradient, which was self-sustaining against wholesale convective re- homogenization, while the thick mush zone below buffered it against disruption by the deeper (non-rhyolitic) recharge that augmented the mush zone and thermally sustained the whole magma chamber. Crystal-melt fractionation was the dominant zoning process, but
it took place not principally in the shallow melt-rich body but mostly in the pluton-scale mush zone before and during batchwise melt extraction.

Publication Year 2007

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2008-000776

9. Database GeoRef

Title **Rare sulfur and triple oxygen isotope *geochemistry* of volcanogenic sulfate aerosols**

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Source Geochimica et Cosmochimica Acta, vol. 71, no. 9, pp.2326-2343, 01 May 2007

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Elsevier, New York, NY, International (III)

Abstract We present analyses of stable isotopic ratios (super 17) O/ (super 16) O, (super 18) O/ (super 16) O, (super 34) S/ (super 32) S, and (super 33) S/ (super 32) S, (super 36) S/ (super 32) S in sulfate leached from volcanic ash of a series of well known, large and small volcanic eruptions. We consider eruptions of Mt. St. Helens (Washington, 1980, approximately 1 km (super 3)), Mt. Spurr (Alaska, 1953, <1 km (super 3)), Gjalp (Iceland, 1996, 1998, <1 km (super 3)), Pinatubo (Phillipines, 1991, 10 km (super 3)), Bishop tuff

(***Long Valley***, California, 0.76 Ma, 750 km (super 3)), Lower Bandelier tuff (Toledo Caldera, New Mexico, 1.61 Ma, 600 km (super 3)
), and Lava Creek and Huckleberry Ridge tuffs (Yellowstone, Wyoming, 0.64 Ma, 1000 km (super 3) and 2.04 Ma 2500 km (super 3) , respectively). This list covers much of the diversity of sizes and the character of silicic volcanic eruptions. Particular emphasis is paid to the Lava Creek tuff for which we present wide geographic sample coverage. This global dataset spans a significant range in delta (super 34) S, delta (super 18) O, and Delta (super 17) O of sulfate (29 ppm, 30 ppm, and 3.3 ppm, respectively) with oxygen isotopes recording mass-independent (Delta (super 17) O>0. 2ppm) and sulfur isotopes exhibiting mass-dependent behavior. Products of large eruptions account for most of these isotopic ranges. Sulfate with Delta (super 17) O (super 0.2) ppm is present as 1-10 mu m gypsum crystals on distal ash particles and records the isotopic signature of stratospheric photochemical reactions. Sediments that embed ash layers do not contain sulfate or contain little sulfate with delta (super 17) O near 0 ppm, suggesting that the observed sulfate in ash is of volcanic origin. Mass-dependent fractionation of sulfur isotopic ratios suggests that sulfate-forming reactions did not involve photolysis of SO (sub 2) , like that inferred for pre-2.3 Ga sulfates from Archean sediments or Antarctic ice- core sulfate associated with few dated eruptions. Even though the sulfate sulfur isotopic compositions reflect mass-dependent processes, the products of caldera-forming eruptions display a large delta (super 34) S range and exhibit fractionation relationships that do not follow the expected equilibrium slopes of 0.515 and 1.90 for (super 33) S/ (super 32) S vs. (super 34) S/ (super 32) S and (super 36) S/ (super 32) S vs. (super 34) S/ (super 32) S, respectively. The data presented here are consistent with modification of a chemical mass-dependent fractionation of sulfur isotopes in the volcanic plume by either a kinetic gas phase reaction of volcanic SO (sub 2) with OH and/or a Rayleigh processes involving a residual Rayleigh reactant-volcanic SO (sub 2) gas, rather than a Rayleigh product. These results may also imply at least two removal pathways for SO (sub 2) in volcanic plumes. Above -zero Delta (super 17) O values and their positive correlation with delta (super 18) O in sulfate can be explained by oxidation by high-delta (super 18) O and high-Delta (super 17) O compounds such as ozone and radicals such as OH that result from ozone break down. Large caldera-forming eruptions have the highest Delta (super 17) O values, and the largest range of delta (super 18) O, which can be explained by stratospheric reaction with ozone-derived OH radicals. These results suggest that massive eruptions are capable of causing a temporary depletion of the ozone layer. Such depletion may be many times that of the measured 3-8% depletion following 1991 Pinatubo eruption, if the amount of sulfur dioxide released scales with the amount of ozone depletion.

Publication Year 2007

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2008-044377

10. Database GeoRef

Title **Lead isotopes by LA-MC-ICPMS; tracking the emergence of mantle signatures in an evolving silicic magma system**

Author Simon, J I; Reid, M R; Young, E D

Affiliation University of California, Los Angeles, Department of Earth and Space Sciences, Los Angeles, CA, United States (USA)

Affiliation Northern Arizona University, United States (USA)

Source Geochimica et Cosmochimica Acta, vol.71, no.8, pp.2014-2035, 15 Apr 2007

Resource Location http://www.sciencedirect.com/science/journal/00167037

Abstract At ***Long Valley*** (LV) model Sr isotope phenocryst ages and absolute U-Pb zircon ages from precaldera Glass Mountain (GM) and caldera-related Bishop Tuff (BT) rhyolites show that these crystals track >1 Myr of evolution of a voluminous rhyolite magmatic system. In detail, strong disparities between the different age populations complicate ideas for a unified model for rhyolite generation, differentiation, and storage. To better elucidate the age discrepancies a new in situ Pb isotope technique has been developed to measure the compositions of 113 individual LV feldspars (mainly sanidine) and their host glasses by UV laser ablation MC-ICPMS. Given sufficient signal the accuracy and precision of this technique approaches that of double -spike thermal ionization mass spectrometry. The utility of our technique for many geologic materials is, however, limited to determining Pb isotope ratios that include (super 206) Pb, (super 207) Pb, and (super 208) Pb, but exclude (super 204) Pb. New zircon (super 238) U- (super 206) Pb crystallization ages were also obtained for two older Glass Mountain domes. A >1.5 ppm difference between the Pb isotope compositions of feldspars from older (1.7-2.2 Ma) precaldera Glass Mountain (GM) rhyolites and younger LV rhyolites, including the BT, is found. The Pb isotope data for feldspars and their host glasses lie along a regional trend line between young basalts and evolved crust compositions, spanning approximately 15% of that isotopic difference, and show a secular change towards increasing mantle contribution. Most feldspars have Pb isotope compositions that are similar to their host glasses and, as such, there persists an apparent >100k.y. difference between Sr model feldspar ages and zircon ages for some GM rhyolites. Collectively, the feldspars define a Sr-Pb isotope mixing curve. Evidence for mixing complicates the interpretation that the Sr isotope data solely reflect radiogenic ingrowth. Where isotopically heterogeneous feldspar populations occur, there is greater uncertainty about the veracity of the Sr model ages. Specifically, we find no Pb isotope evidence that BT feldspars grew from older GM-like magmas. The distinct Pb isotope signatures for individual rhyolites and their feldspars support evidence based on zircon dating that LV volcanism did not erupt from a single ***long***-lived magma chamber but rather tapped a number of different magmas. Moreover, contrary to the conventional model of gradual build-up prior to cataclysmic eruption, secular changes in the U-Pb age constraints on magma residence times and the magmas' distinct Pb isotopic compositions suggest that, at ***Long Valley***, eruptive volumes increase with shorter magma
residence time and correlate with greater mantle input. Evidently, the plumbing and therefore activity at ***Long Valley*** was influenced by the evolving interaction between source and crustal magma system.

Publication Year 2007

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2007-098132

11. Database GeoRef

Title **Trace-element analysis of four Neogene volcanic ashes; implications for the stratigraphy of petroleum-bearing formations in the San Joaquin *Valley*, CA**

Author Golob, Elizabeth M; Baron, Dirk; Negrini, Rob; Sarna-Wojcicki, Andrei M

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Monograph Title Geological Society of America, 2005 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.37, no.7, pp.181, Oct 2005

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The Kern River ash is a prominent layer of volcanic ash separating the K and G sands of the Kern River Formation, a major petroleum-bearing formation in the Southern San Joaquin ***Valley*** of California. The upper age of the Kern River Formation has ***long*** been based on the major-element geochemical correlation with the Bishop Tuff, a volcanic tephra layer erupted from the ***Long Valley*** Caldera at 0.774+ or -0.002 Myr. Recent radiometric dating of sanidine separates from the Kern River ash at 6.12+ or -0.05 Myr has prompted a review of the geochemical correlations. Based on eight major elements determined by microprobe analysis, two additional possible sources for the Kern River ash have been identified. These possible sources are a 6.0+ or -0.2 Myr tephra from the Fish Lake ***valley*** erupted from the Volcano Hills/Silver Peak range eruptive center in Nevada and the 0.639 Myr Lava Creek B tephra from the Yellowstone caldera complex in Wyoming. We measured the trace element composition of two samples of the Kern River ash, of a Bishop Tuff sample, of a Fish Lake ***valley*** ash sample, and of four samples of the Lava Creek B tephra. Glass separates of the ash samples were dissolved by microwave digestion and analyzed by ICP/MS. In addition, we directly analyzed the glass separates by Laser Ablation ICP/MS. Similarity coefficients were calculated from both the ICP/MS and the Laser Ablation ICP/MS results. In addition, samples were correlated using hierarchical clustering (dendrogram) analysis and cluster diagrams of selected elements. With all three methods, the Kern River ash consistently correlates to the Fish Lake ***Valley*** tephra from the 6.0+ or -0.2 Myr Volcano Hills eruption. The present correlation and the previous dating of sanidine separates suggest a much older age of around 6.1 Myr for the Kern River Formation than previously thought. This new age dramatically alters our understanding of the stratigraphic relationship of the Kern River Formation with other formations in the San Joaquin ***Valley***. Re-interpretation of the stratigraphy of the San Joaquin ***Valley*** may now allow correlating sands that had previously been correlated to non-productive formations to be correlated to the Kern River Formation, providing additional opportunities for petroleum exploration in the San Joaquin ***Valley***.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-050907

12. Database GeoRef

Title **Constraints on evolution and *long*-term slip rates for eastern faults of the San Andreas transform boundary from tephrochronology, new (super 39) Ar/ (super 40) Ar ages, geologic map relations, gravity and magnetic data**

Author McLaughlin, Robert J; Sarna-Wojcicki, Andrei M; Fleck, Robert J; Wagner, David; Clahan, Kevin B; Langenheim, V E; Jachens, Robert C

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Monograph Title Geological Society of America, 2005 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.37, no.7, pp.181, Oct 2005

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract In Northern California the structural evolution and ***long*** term slip rates of the right-stepping Rodgers Creek-Maacama Fault system during and following Neogene volcanism along the east side of the wide transform plate boundary are constrained by tephrochronology and (super 39) Ar/ (super 40) Ar dating, integrated with geologic mapping and aeromagnetic and gravity data.

Pliocene and younger slip on the Maacama Fault is constrained by offset of a geochemically distinct suite of silicic tephra deposits in the Sonoma Volcanics that erupted at 3.4-2.5 Ma from a caldera centered over Mount St. Helena in NW Napa ***Valley***. (super 39) Ar/ (super 40) Ar ages and tephra ***geochemistry*** show that a section of the Mount St. Helena eruptive sequence and underlying gravels exposed on the SW side of the Maacama Fault Zone along the Geysers-Healdsburg Road, is offset right-laterally approximately 17 to
21 km from the Franz ***Valley*** area east of the fault zone, yielding a slip rate of approximately 6.0 + or - 0.7 mm/yr since approximately 3.2 Ma. Stratigraphically high dispersed tephra in synclinally-folded fluvial deposits in the Santa Rosa area correlate with the 1.2-0.8 Ma Bishop-Glass Mountain eruptive sequence of ***Long Valley***. Flat-lying late Pleistocene and Holocene alluvium that overlies the folded strata was deposited in a pull-apart basin in the right step between the Rodgers Creek and Maacama Faults. Slip on the Maacama and Rodgers Creek Faults that accompanied formation of the pull-apart basin (approximately 5 km for the Maacama Fault and approximately 6 km for the Rodgers Creek Fault, as indicated from basin geometry) yields a slip rate of approximately 5.3 + or -
1.1 mm/yr for the Maacama Fault and approximately 6.3 + or - 1.3 mm/yr for the Rodgers Creek Fault since 1.2-0.8 Ma. Possible earlier slip at a slower rate on the Rodgers Creek Fault Zone is suggested by a unique sequence of volcanic and sedimentary rocks, including coarse rhyodacite-sourced fault scarp breccia, deposited along a strike-slip fault basin margin (Cotati Basin). Together with the axis of a prominent antiform, these rocks are offset approximately 28 km right-laterally along the Rodgers Creek Fault Zone. (super 39) Ar/ (super 40) Ar ages of the rhyodacitic rocks are approximately 7.3 to 8.2 Ma, and fluvial deposits (Petaluma Formation) west of the fault that overlie the fault scarp breccia include the 6.26 Ma Roblar Tuff. About 22 km of slip on the fault between 1.2 and
6.3 to 7.3 Ma, yields a slip rate of approximately 4.0 + or - 0.4 mm/yr, much lower than rates since 1.2 Ma.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-050909

13. Database GeoRef

Title **Chemical analysis of western Oklahoma ash beds using the electron microprobe**

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Monograph Title Geological Society of America, 2005 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.37, no.7, pp.343, Oct 2005

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract This project was developed through two separate courses offered at Oklahoma State University (OSU) in the School of Geology and the Department of Plant and Soil Sciences and is an example in which faculty in different departments teaching different courses can provide ideas for successful undergraduate research. Near Waynoka in NW Oklahoma, several meters of volcanic ash have been documented, which may have been either derived from the ***Long Valley*** Caldera in California or the Yellowstone Caldera in Wyoming. Both volcanoes have been shown to have deposited ash well into regions of western Oklahoma, however, little data have been acquired to determine exactly which volcano these sediments were derived from. One of the authors of the poster was introduced to this ash bed during a field trip for a Soil Genesis class. After an ash sample was collected and made into thin sections, it was analyzed and imaged using the OSU Electron Microprobe. Materials present in the ash include glass, sanidine, and zircon. Backscattered electron images show the ash contains 100 mu m-sized vesicles and approximately 40 mu m-sized zircon grains. The initial goal of the study was to qualitatively identify the specific elements that are in the sample to acquire a "chemical signature" for the ash. From that signature, it is proposed that additional research be done on samples from each perspective source caldera to attempt to match this unknown ash sample. Future studies have been planned to attempt to identify the source of this ash, including obtaining ash from areas of Yellowstone and ***Long Valley*** and dating the zircon grains present in the Oklahoma ash beds.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-072178

14. Database GeoRef

Title **New isotopic measurements of zircon and feldspar constrain the magmatic evolution at *Long Valley* Caldera**

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Monograph Title Abstracts of the 15th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol.69, no.10, Suppl., pp.234, May 2005

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2006-029977

15. Database GeoRef

Title **Earthquakes and mass transport in the crust beneath the *Long Valley* Caldera-Mammoth Mountain magmatic systems**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title Proceedings of the 5th U.S.-Japan natural resources meeting and Parkfield, California fieldtrip

Author Detweiler, Shane T; Ellsworth, William L

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 2005-1131, pp.60, 2005

Resource Location http://pubs.usgs.gov/of/2005/1131/

Report Number OF 2005-1131

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2005

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-019118

16. Database GeoRef

Title **Iron isotopic fractionation during continental weathering**

Author Fantle, Matthew S; DePaolo, Donald J

Affiliation University of California at Berkeley, Department of Earth and Planetary Science, Berkeley, CA, United States (USA)

Source Earth and Planetary Science Letters, vol.228, no.3-4, pp.547-562, 15 Dec 2004

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The effect of continental weathering on the iron isotope compositions of natural materials is investigated. Unweathered igneous rocks, pelagic clay, and dust fall within the range delta (super 56) Fe=0+ or -0.3ppm. Rivers with large suspended loads also have delta (super 56) Fe values near zero. Dilute streams have delta (super 56) Fe values that trend towards lower delta (super 56) Fe (approximately -1) suggesting that dissolved riverine iron is isotopically light relative to igneous rocks. Bulk soil and soil leaches display systematically different delta (super 56) Fe profiles, indicating that isotopically distinct Fe pools are generated during pedogenesis. Nannofossil ooze, which contains Fe scavenged from the ocean water column, has delta (super 56) Fe nearly equal 0, but is consistent with seawater dissolved Fe having negative delta (super 56) Fe. It is inferred that continental weathering under modern oxidizing Earth surface conditions preferentially releases dissolved Fe with negative delta (super 56) Fe, which is transported in rivers to the ocean. A preliminary analysis of the marine Fe budget suggests that riverine Fe has a substantial role in determining the delta (super 56) Fe of both the modern and ancient oceans, but other inputs, particularly that from diagenesis of marine sediments, may also be important. Since the chemical pathways of Fe processing during weathering are dependent on oxidation

state and biological activity, Fe isotopes may prove useful for detecting changes in these parameters in the geologic past.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2006-014433

17. Database GeoRef

Title **The dissolution rates of natural glasses as a function of their composition at pH 4 and 10.6, and temperatures from 25 degrees C to 74 degrees C**

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Source Geochimica et Cosmochimica Acta, vol.68, no.23, pp.4843-4858, 01 Dec 2004

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Abstract Far-from-equilibrium dissolution rates of a suite of volcanic glasses that range from basaltic to rhyolitic in composition were measured in mixed flow reactors at pH 4 and 10.6, and temperatures from 25 to 74 degrees C. Experiments performed on glasses of similar composition suggest that dissolution rates are more closely proportional to geometric surface areas than their BET surface areas. Measured geometric surface area normalized dissolution rates (r+ (sub ,geo)) at 25 degrees C were found to vary exponentially with the silica content of the glasses. These equations can be used to estimate lifetimes and metal release fluxes of natural glasses at
far-from-equilibrium conditions. The lifetime at pH 4 and 25 degrees C of a 1 mm basaltic glass sphere is calculated to be 500 yr, whereas that of a 1 mm rhyolitic glass sphere is 4500 yr. Estimated nutrient release rates from natural glasses decrease exponentially with increasing silica content.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2005-026155

18. Database GeoRef

Title **Carbon dioxide emissions from kill zones around the resurgent dome, *Long Valley* Caldera, CA**

Author Bergfeld, D; Evans, W C; Farrar, C D; Howle, J F

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Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract V43D-1441, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-038962

19. Database GeoRef

Title **Boron isotopic variations in hydrous rhyolitic melts; a case study from *Long Valley*, California**

Author Schmitt, A K; Simon, J I

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Source Contributions to Mineralogy and Petrology, vol.146, no.5, pp.590-605, Jan 2004

Resource Location http://www.springerlink.com/(zmx2wiu4y01pcgigj5i3jxf5)/app/ home/journal.asp?refe rrer=parent&backto= linkingpublicationresults,1:100406,1

Publisher Springer International, Heidelberg -New York, International (III)

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2004-065681

20. Database GeoRef

Title **Eruptive history and chemical evolution of the precaldera and postcaldera basalt-dacite sequences, *Long Valley*, California; implications for magma sources, current seismic unrest, and future volcanism**

Author Bailey, Roy A

Affiliation U. S. Geological Survey, USA, (United States)

Source U. S. Geological Survey Professional Paper, Report: P 1692, 75 pp., 2004

Resource Location http://pubs.usgs.gov/pp/pp1692/

Report Number P 1692

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract The ***Long Valley*** Volcanic Field in east-central California straddles the East Sierran frontal fault zone, overlapping the Sierra Nevada and western Basin and Range Provinces. ***Long Valley*** volcanism began about 4 Ma during Pliocene time and has continued intermittently through the Holocene. The current (post-1980) seismic unrest at ***Long Valley***, accompanied by uplift of the resurgent dome, may signal the onset of a new episode of regional extension and basalt injection into the residual magma chamber.

Pages 75

Publication Year 2004

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2005-004738

21. Database GeoRef

Title **Transport of injected isobutane by thermal groundwater in *Long Valley* Caldera, California, USA**

Author Evans, W C; Lorenson, T D; Sorey, M L; Bergfeld, D

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title Proceedings of the Eleventh international symposium on Water-rock interaction

Editor Wanty, Richard B; Seal, Robert R , II

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Proceedings - International Symposium on Water-Rock Interaction, vol. 11, pp.125-129, 2004

Publisher International Association of Geochemistry and Cosmochemistry and Alberta Research Council, Sub-Group on Water-Rock Interaction, Toronto, ON, International (III)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 2007-026949

22. Database GeoRef

Title **A deuterium mass balance model approach for evaluating a groundwater budget of a regional flow system in southeastern Nevada**

Author Thomas, James M; Apambire, Braimah

Affiliation Desert Research Institute, Division of Hydrologic Sciences, Reno, NV, United States (USA)

Affiliation World Vision, International Programs Group, Federal Way, WA, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.616, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract A deuterium-calibrated mass-balance model was constructed for the White River Flow System (WRFS) in southeastern Nevada to evaluate new groundwater recharge and discharge estimates. The model was constructed using deuterium data for mountainous recharge areas and springs discharging from the regional flow system in the valleys. Recharge estimates were assigned to mountain blocks and discharge estimates were assigned to valleys. Discharge in a ***valley*** was assigned as the total spring flow measured for regional springs in a ***valley*** plus calculated evapotranspiration amounts for areas of phreatophytic vegetation. The model also accounted for mixing of groundwater recharge along the greater than 200 km length of the flow system, which encompasses 13 valleys with 35 mountainous recharge areas and four regional spring discharge areas. Average deuterium values for recharge areas and spring discharge areas were used in the model. The model supports (1) new estimates of groundwater recharge and discharge for the WRFS, (2) proposed recharge sources and mixing for the WRFS, (3) the WRFS acting as one continuous carbonate-rock aquifer from ***Long Valley*** in the north to Upper Moapa ***Valley*** (Muddy River Springs area) in the south, and (4) 53,000 acre-feet per year (afy) of groundwater flowing out of Coyote Springs ***Valley*** to the Muddy River Springs area at the terminus of the WRFS. Of this total discharge, 37,000 afy is being discharged in Upper Moapa ***Valley*** and 16,000 afy is flowing out of the WRFS to the south- southeast in the carbonate-rock aquifers. These conclusions are supported by oxygen-18 and geochemical data.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-073747

23. Database GeoRef

Title **Magmatic processes in the central Sierra Nevada Batholith; a cryptic pre-Jurassic boundary in *Long Valley*, CA**

Author Lackey, Jade Star; Valley, John W; Stockli, Daniel F; House, Martha A

Affiliation University of Wisconsin, Department of Geology and Geophysics, Madison, WI, United States (USA)

Affiliation University of Kansas, United States (USA); California Institute of Technology, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.92, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Oxygen isotopes are well suited for tracing input of supracrustal rocks into magmas during granite genesis at convergent margins. We present delta (super T18) O values for zircon (Zc) from 155 granitic rocks across the Mariposa 1X2 degrees sheet in the central Sierra Nevada batholith (SNB), whose varying age and composition allow us to track the evolution of the delta (super 18) O across the batholith. Comparison of delta (super 18) O(Zc) to delta (super 18) O quartz (Qt), and whole rock (WR) show Zc is most suitable for studying delta (super 18) O because: (1) post-magmatic alteration has reset delta (super 18) O(Qt) approximately 0.5 per mil (2) Differing modes, plus crystal fractionation and alteration create variable delta (super 18) O(WR) that obscures trends in magmatic delta (super 18) O. Variation of delta (super 18) O(Zc) across the batholith (projected onto a SW to NE transect) reveals that high values (7.0-8.5 per mil) dominate the westernmost part of the batholith and decrease monotonically toward the Sr (sub i) = 0.706 isopleth. A 0.5 per mil drop in delta (super 18) O at the 0.706 line is resolvable with Zc but not WR. East of the 0.706 line, delta (super 18) O(Zc) values (except Shaver Lake suite) decrease further (6.75 - 5.75 per mil) toward the Sierra Crest and increase sharply by 1 per mil at the eastern SNB margin. The patterns of delta (super 18) O(Zc) allow us to reconsider why the delta (super 18) O-Sr (sub i) trends in the SNB do not match the remarkable delta (super 18) O(WR) vs. Sr (sub i) trends in the coeval Peninsular Ranges batholith in southern CA. Values of delta (super 18) O(Zc) rule out alteration as causing the scattered delta (super 18) O-Sr (sub i) correlations, and thus no single two-component mixing model applies to the entire batholith. For example, the Fine Gold suite in the western part of the study area, with high-delta (super 18) O, low-Sr (sub i) values, records substantial input of hydrothermally

altered, mantle-derived rocks, such as subducted ocean crust or volcanic arc sediments. The high-delta (super 18) O, high-Sr (sub i) values in the Shaver Lake suite records contamination by Proterozoic metasediments of the Kings Sequence. Values of delta (super 18) O(Zc) that approach mantle-like values in the Eastern SNB, including Late Cretaceous Sierra Crest plutons, are consistent with a lithospheric mantle signature as is proposed for the Sierra Crest plutons (e.g., Coleman and Glazner, 1997, Int Geol Rev). Finally, the observed sharp 1 per mil increase of delta (super 18) O(Zc) at the eastern SNB margin is recorded in Cretaceous, Jurassic, and Triassic rocks in ***Long Valley*** and the northern White Mountains. The occurrence of this delta (super 18) O increase of rocks of these ages defines a major pre-Jurassic crustal boundary.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-081127

24. Database GeoRef

Title **Spatially continuous alteration mapping over an entire caldera; new constraints on the genesis, *geochemistry*, and structural control of hydrothermal mineralization at *Long Valley*, CA, USA**

Author Martini, Brigette A; Silver, Eli A

Affiliation HyVista Corporation, Baulkham Hills, N.S.W., Australia (AUS)

Affiliation University of California at Santa Cruz, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.552, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Spatially and spectrally continuous airborne remote sensing imagery was used to map and identify hydrothermal alteration minerals over 450km2 of ***Long Valley*** Caldera in central eastern California. Normally alteration minerals can be challenging to map in the field over large areas (especially if diffusively distributed). Conventional point surveys in the form of drill holes and surface water and rock sampling provide sparse coverage of surface alteration and rock types. Conversely, each five-meter spatial element of a hyperspectral dataset supplies continuous surface material identification allowing for construction of detailed alteration maps over large areas in short amounts of time. ***Long Valley*** alteration assemblages are conclusively identified and mapped throughout the caldera including a preponderance of previously unknown mineralization. The system-scale alteration maps generate new controls on the chemistry, host rock, timing and intensity of alteration stages within the caldera, all of which are captured by caldera-wide maps of sinter, travertine and hydrothermal clays and sulfates. Alteration distribution, density and degree of weathering serve as proxy for alteration timing and intensity, while the comparison of surface alteration with drillcore alteration data at depth provides an innovative way of studying alteration geography and depth to surface zoning. The unprecedented amounts of newly discovered high temperature alteration in the western caldera corroborates hydrothermal circulation models that place a thermal source firmly below the western moat. The western alteration maps ultimately imply a far more intense and complicated alteration regime than previously thought. In addition, hydrothermal discharge maps are generated using linear and point distributions of the alteration assemblages discussed above. These maps mirror known structural networks of ***Long Valley*** and add new, previously un-identified, hydrothermal conduits, including east-west trending faults that allow structurally controlled fluid flow through the central caldera. These refined discharge maps, coupled with topography data, provide a new framework for hydrothermal circulation modeling and are proving instrumental in current local geothermal exploration efforts.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-081503

25. Database GeoRef

Title **Remote sensing and GIS evaluation of CO (sub 2) -induced tree kills at Mammoth Mountain, California; 1989 to present**

Author List, Mark R; Hausback, Brian P; Farrar, Christopher D; Pieri, David C

Affiliation California State University, Geology Department, Sacramento, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Jet Propulsion Laboratory, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.321, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain, a rhyolite to dacite dome complex on the southwestern rim of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold magmatic carbon dioxide (CO (sub 2)), vent from the flanks of the mountain, and this gas is responsible for over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne and satellite based remote sensing data for the field area, collected using multi- and hyperspectral [NS001 (TMS), MASTER, ASTER and AVIRIS] sensors, are evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Two seasons (1998 and 2003) of field spectral measurements have been incorporated into the remote sensing evaluation to establish the reflectance characteristics of the field area, allow for error evaluation, and provide ground truth measurements for improving the quality of the remote sensing analyses. The results of the temporal remote sensing assessment, combined using geographic information systems, are highlighting relationships between surface geology and areas of tree mortality and delineating the migration of tree kills since 1989. These evaluations improve our understanding of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-029575

26. Database GeoRef

Title **Inferences on the hydrothermal system beneath the resurgent dome in *Long Valley* Caldera, East-Central California, USA, from recent pumping tests and geochemical sampling**

Author Farrar, Christopher D; Sorey, Michael L; Roeloffs, Evelyn; Galloway, Devin L; Howle, James F; Jacobson, Ronald

Affiliation U. S. Geological Survey, Carnelian Bay, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA); Sandia National Laboratory, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.305-328, 15 Oct 2003

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Quaternary volcanic unrest has provided heat for episodic hydrothermal circulation in the ***Long Valley*** caldera, including the present - day hydrothermal system, which has been active over the past 40 kyr. The most recent period of crustal unrest in this region of east- central California began around 1980 and has included periods of intense seismicity and ground deformation. Uplift totaling more
than 0.7 m has been centered on the caldera's resurgent dome, and is best modeled by a near -vertical ellipsoidal source centered at depths of 6-7 km. Modeling of both deformation and microgravity data now suggests that (1) there are two inflation sources beneath the caldera, a shallower source 7-10 km beneath the resurgent dome and a deeper source approximately 15 km beneath the caldera"s south moat and (2) the shallower source may contain components of magmatic brine and gas. The ***Long Valley*** Exploration Well (LVEW), completed in 1998 on the resurgent dome, penetrates to a depth of 3 km directly above this shallower source, but bottoms in a zone of 100 degrees C fluid with zero vertical thermal gradient. Although these results preclude extrapolations of temperatures at depths below 3 km, other information obtained from flow tests and fluid sampling at this well indicates the presence of magmatic volatiles and fault-related permeability within the metamorphic basement rocks underlying the volcanic fill. In this paper, we present recently acquired data from LVEW and compare them with information from other drill holes and thermal springs in ***Long Valley*** to delineate the likely flow paths and fluid system properties under the resurgent dome. Additional information from mineralogical assemblages in core obtained from fracture zones in LVEW documents a previous period of more vigorous and energetic fluid circulation beneath the resurgent dome. Although this system apparently died off as a result of mineral deposition and cooling (and/or deepening) of magmatic heat sources, flow testing and tidal analyses of LVEW water level data show that relatively high permeability and strain sensitivity still exist in the steeply dipping principal fracture zone penetrated at a depth of 2.6 km. The hydraulic properties of this zone would allow a pressure change induced at distances of several kilometers below the well to be observable within a matter of days. This indicates that continuous fluid pressure monitoring in the well could provide direct evidence of future intrusions of magma or high-temperature fluids at depths of 5-7 km.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016382

27. Database GeoRef

Title **Empirical calibration of oxygen isotope fractionation in zircon**

Author Valley, John W; Bindeman, Ilya N; Peck, William H

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Affiliation University of Michigan, United States (USA); Colgate University, Department of Geology, Hamilton, NY, United States (USA)

Monograph Title A special issue dedicated to Robert N. Clayton

Author Humayun, Munir (prefacer); O'Neil, James R (prefacer)

Affiliation University of Chicago, Department of the Geophysical Sciences, Chicago, IL, United States (USA)

Source Geochimica et Cosmochimica Acta, vol.67, no.17, pp.3257-3266, Sep 2003

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Abstract New empirical calibrations for the fractionation of oxygen isotopes among zircon, almandine-rich garnet, titanite, and quartz are combined with experimental values for quartz-grossular. The fractionation of oxygen isotopes between zircon and coexisting minerals can provide otherwise unavailable evidence of magmatic processes, including crystallization, remelting, and assimilation-fractional crystallization.

Publication Year 2003

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 2005-006918

28. Database GeoRef

Title **Crystal size distribution and *geochemistry* of rhyolitic lavas from the Inyo volcanic chain, *Long Valley*, California**

Author Meilleur, D; Higgins, M D

Affiliation Universite du Quebec a Chicoutimi, Chicoutimi, QC, Canada (CAN)

Monograph Title Geological Association of Canada, Mineralogical Association of Canada; joint annual meeting; abstracts--Association geologique du Canada, Association mineralogique du Canada; congres annuel conjointe; recueil des resumes

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol.28, unpaginated, 2003

Resource Location http://www.esd.mun.ca/~gac/ANNMEET/annmeet.htmls

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication Canada (CAN)

Accession Number 2007-078271

29. Database GeoRef

Title **Gas *geochemistry* of the Valles Caldera region, New Mexico and comparisons with gases at Yellowstone, *Long Valley* and other geothermal systems**

Author Goff, Fraser; Janik, Cathy J

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.116, no.3-4, pp.299-323, Aug 2002

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Noncondensible gases from hot springs, fumaroles, and deep wells within the Valles caldera geothermal system (210-300 degrees C) consist of roughly 98.5 mol% CO (sub 2) , 0.5 mol% H (sub 2) S, and 1 mol% other components. (super 3) He/ (super 4) He ratios indicate a deep magmatic source (R/R (sub a) up to 6) whereas delta (super 13) C-CO (sub 2) values (-3 to -5 per mil) do not discriminate between a mantle/magmatic source and a source from subjacent, hydrothermally altered Paleozoic carbonate rocks. Regional gases from sites within a 50-km radius beyond Valles caldera are relatively enriched in CO (sub 2) and He, but depleted in H (sub 2) S compared to Valles gases. Regional gases have R/R (sub a) values < or =1.2 due to more interaction with the crust and/or less contribution from the mantle. Carbon sources for regional CO (sub 2) are varied. During 1982-1998, repeat analyses of gases from intracaldera sites at Sulphur Springs showed relatively constant CH (sub 4) , H (sub 2) , and H (sub 2) S contents. The only exception was gas from Footbath Spring (1987-1993), which experienced increases in these three components during drilling and testing of scientific wells VC-2a and VC-2b. Present-day Valles gases contain substantially less N (sub 2) than fluid inclusion gases trapped in deep, early-stage, post-caldera vein minerals. This suggests that the ***long***-lived Valles hydrothermal system (ca. 1 Myr) has depleted subsurface Paleozoic sedimentary rocks of nitrogen. When compared with gases from many other geothermal systems, Valles caldera gases are relatively enriched in He but depleted in CH (sub 4) , N (sub 2) and Ar. In this respect, Valles gases resemble end-member hydrothermal and magmatic gases discharged at hot spots (Galapagos, Kilauea, and Yellowstone).

Publication Year 2002

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2002-060633

30. Database GeoRef

Title **Oxygen isotope and U-Pb insights into dynamics and longevity of large silicic magma systems**

Author Bindeman, Ilya N; Valley, John W

Affiliation University of Wisconsin at Madison, Department of Geology and Geophysics, Madison, WI, United States (USA)

Monograph Title Abstracts of the 12th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol.66, no.15A, pp.78, Aug 2002

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2004-025509

31. Database GeoRef

Title **Comparative characterization of volcanic ash soils exposed to decade-*long* elevated carbon dioxide concentrations at Mammoth Mountain, California**

Author Stephens, Jennie C; Hering, Janet G

Affiliation California Institute of Technology, Environmental Engineering Science Department, Pasadena, CA, United States (USA)

Source Chemical Geology, vol.186, no.3-4, pp.301-313, 15 Jun 2002

Resource Location http://www.sciencedirect.com/science/journal/00092541

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Elevated concentrations of soil CO (sub 2) , ranging from 20% to 90%, from a magmatic source have been killing coniferous trees in the last decade in several distinct areas on the flanks of Mammoth Mountain, California. These areas of elevated soil CO (sub 2) provide a natural laboratory to examine how chemical weathering in soils responds to extremely high-CO (sub 2) concentrations in conjunction with possible changes in organic acids resulting from vegetation mortality. These volcanic ash soils have a particularly low resistance to chemical weathering due to the predominance of volcanic glass and other noncrystalline

phases. Thus,
decade-***long*** exposure to anomalous conditions may result in differences in soil characteristics. Soil samples from within the high-CO (sub 2) region have been analyzed and compared to samples from outside the anomalous area in the adjacent healthy forest areas where background CO (sub 2) concentrations are less than 1%. Compared to the control soil, the high-CO (sub 2) soil has lower pH values (5.0 compared to 5.6), higher soil moisture content, and higher surface area. Dithionite-citrate and acid-oxalate extractants were less effective in leaching Al and Si from the high CO (sub 2) than from the control soil, indicating a distinct difference in the mineralogy of these soils. The observed differences between the high-CO (sub 2) and control soils are consistent with an enhancement of weathering intensity in the soil exposed to elevated CO (sub 2) concentrations.

Publication Year 2002

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2002-054380

32. Database GeoRef

Title **Tracing and quantifying magmatic carbon discharge in cold groundwaters; lessons learned from Mammoth Mountain, USA**

Author Evans, William C; Sorey, Michael L; Cook, Andrea C; Kennedy, B Mack; Shuster, David L; Colvard, Elizabeth M; White, Lloyd D; Huebner, Mark A

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Source Journal of Volcanology and Geothermal Research, vol.114, no.3-4, pp.291-312, 30 May 2002

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A major campaign to quantify the magmatic carbon discharge in cold groundwaters around Mammoth Mountain volcano in eastern California was carried out from 1996 to 1999. The total water flow from all sampled cold springs was > or =1.8X10 (super 7) m (super
3) /yr draining an area that receives an estimated 2.5X10 (super 7) m (super 3) /yr of recharge, suggesting that sample coverage of the groundwater system was essentially complete. Some of the waters contain magmatic helium with (super 3) He/ (super 4) He ratios as high as 4.5 times the atmospheric ratio, and a magmatic component in the dissolved inorganic carbon (DIC) can be identified in virtually every feature sampled. Many waters have a (super 14) C of 0-5 pmC, a delta (super 13) C near -5 per mil, and contain high concentrations (20-50 mmol/l) of CO (sub 2(aq)) ; but are otherwise dilute (specific conductance = 100-300 mu S/cm) with low pH values between 5 and 6. Such waters have previously escaped notice at Mammoth Mountain, and possibly at many other volcanoes, because CO (sub 2) is rapidly lost to the air as the water flows away from the springs, leaving neutral pH waters containing only 1-3 mmol/l HCO (sub 3) (super -) . The total discharge of magmatic carbon in the cold groundwater system at Mammoth Mountain is approximately 20 000 t/yr (as CO (sub 2)), ranging seasonally from about 30 to 90 t/day. Several types of evidence show that this high discharge of magmatic DIC arose in part because of shallow dike intrusion in 1989, but also
demonstrate that a ***long***-term discharge possibly half this magnitude (approximately 10 000 t/yr) predated that intrusion. To sustain a
10 000 t/yr DIC discharge would require a magma intrusion rate of 0.057 km (super 3) per century, assuming complete degassing of magma with 0.65 wt% CO (sub 2) and a density of 2.7 t/m (super 3) . The geochemical data also identify a small (<1 t/day) discharge of magmatic DIC that can be traced to the Inyo Domes area north of Mammoth Mountain and outside the associated ***Long Valley*** caldera. This research, along with recent studies at Lassen Peak and other western USA volcanoes, suggests that the amount of magmatic carbon in cold groundwaters is important to constraining rates of intrusion and edifice weathering at individual volcanoes and may even represent a significant fraction of the global carbon discharge from volcanoes.

Publication Year 2002

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2002-057957

33. Database GeoRef

Title **Detecting volcanic eruption precursors; a new method using gravity and deformation measurements**

Author Williams-Jones, Glyn; Rymer, Hazel

Affiliation Open University, Department of Earth Sciences, Milton Keynes, United Kingdom (GBR)

Affiliation University of Miami, United States (USA); Universidad Nacional Autonoma de Mexico, Mexico (MEX)

Monograph Title A multi-disciplinary study of volcanoes; selected papers from the symposium "Understanding volcanoes by geodesy, seismology, electromagnetics, and ***geochemistry*** " held during the IUGG general assembly

Editor Spichak, Vjacheslav; Dixon, Timothy; Martin-del Pozzo, Ana Lillian

Affiliation Russian Academy of Sciences, Geoelectromagnetic Research Institute, Moscow, Russian Federation (RUS)

Source Journal of Volcanology and Geothermal Research, vol.113, no.3-4, pp.379-389, 30 Mar 2002

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract One of the fundamental questions in modern volcanology is the manner in which a volcanic eruption is triggered; the intrusion of fresh magma into a reservoir is thought to be a key component. The amount by which previously ponded reservoir magma interacts with a newly intruded magma will determine the nature and rate of eruption as well as the chemistry of erupted lavas and shallow dykes.
The physics of this interaction can be investigated through a conventional monitoring procedure that incorporates the simple and much used Mogi model relating ground deformation (most simply represented by Delta h) to changes in volume of a magma reservoir. Gravity changes (Delta g) combined with ground deformation provide information on magma reservoir mass changes. Our models predict how, during inflation, the observed Delta g/Delta h gradient will evolve as a volcano develops from a state of dormancy through unrest into a state of explosive activity. Calderas in a state of unrest and large composite volcanoes are the targets for the methods proposed here and are exemplified by Campi Flegrei, Rabaul, Krafla, and ***Long Valley***. We show here how the simultaneous measurement of deformation and gravity at only a few key stations can identify important precursory processes within a magma reservoir prior to the onset of more conventional eruption precursors.

Publication Year 2002

Publication Type Serial; Conference document; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2002-055679

34. Database GeoRef

Title **Global correlation of the 223 ka Pringle Falls event**

Author McWilliams, Michael

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford, CA, United States (USA)

Monograph Title Frontiers in ***geochemistry*** ; Konrad Krauskopf volume 1; Global inorganic ***geochemistry***

Editor Ernst, W. G.

Source International Book Series, vol.5, pp.311-315, 2002

Publisher Bellwether Publishing for the Geological Society of America, Columbia, MD, United States (USA)

Abstract New (super 40) Ar/ (super 39) Ar ages link records of anomalous geomagnetic field behavior from western North America and New Zealand, and suggest that a reversal event occurred at 223+ or -4 ka (+ or -1sigma). Virtual geomagnetic poles from the Pringle Falls event recorded in both hemispheres lie on a common transition path, suggesting that the geomagnetic field during this interval was dominated by a dipolar component. The Pringle Falls event therefore may be a reverse polarity subchron within the Brunhes Normal Chron.

Publication Year 2002

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2003-068011

35. Database GeoRef

Title **Soil-gas geochemical surveys at *Long Valley* Caldera**

Author Cuff, Kevin E; Krasel, Shannon M; Farrar, Christopher D

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1386, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-070089

36. Database GeoRef

Title **Results of hydraulic testing and geochemical sampling in the *Long Valley* experimental well (LVEW), *Long Valley* Caldera, USA**

Author Farrar, Christopher D; Sorey, Michael L; Galloway, Devin L; Howle, James F; Evans, William C; Sneed, Michelle; Jacobson, Ronald D

Affiliation U. S. Geological Survey, Carnelian Bay, CA, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1386, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-070090

37. Database GeoRef

Title **Magmatic carbon in cold groundwaters at Mammoth Mountain, CA**

Author Evans, William C; Sorey, Michael L; Cook, Andrea C; Kennedy, B Mack

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

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Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1386, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-070091

38. Database GeoRef

Title **The physical controls on residence times in silicic magma chambers**

Author Davies, G R; Heumann, A

Affiliation Vrije Universiteit Amsterdam, Department of Earth Sciences, Amsterdam, Netherlands (NLD)

Monograph Title IAVCEI general assembly 2000; Exploring volcanoes; utilization of their resources and mitigation of their hazards

Author Wirakusumah, A Djumarma (chairperson)

Publisher IAVCEI, Indonesia (IDN)

Pages 79

Publication Year 2000

Publication Type Book; Conference document; Analytic; Abstract only

Country of Publication Indonesia (IDN)

Accession Number 2009-069563

39. Database GeoRef

Title **Geological and geobotanical insights into the hydrothermal, structural, and magmatic systems of a restless caldera using three meter HyMap imagery; *Long Valley* Caldera, California, USA**

Author Martini, B A; Silver, E A; Potts, D C; Pickles, W L

Affiliation University of California at Santa Cruz, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title Proceedings of the Fourteenth international conference on Applied geologic remote sensing

Author Anonymous

Corporate Author Veridan ERIM International, Ann Arbor, MI, United States, sponsor (USA)

Source Proceedings of the ... International Conference on Applied Geologic Remote Sensing, vol.14, pp.28-35, 2000

Publisher Veridian ERIM International, Ann Arbor, MI, United States (USA)

Abstract Ground studies of the restless ***Long Valley*** caldera under the aegis of volcanic hazard monitoring for the past 25 years, have provided a wealth of geophysical and geochemical data culminating in new hydrothermal and structural models. However, limited remote sensing has been attempted at this caldera. Our group is applying spectroscopic mapping with traditional geological data to refine current geological models and maps, to assess the strengths and limitations of using biological phenomena to model and map geological processes and structures, and to prepare baseline datasets for volcano monitoring efforts via space-borne instruments. On September 7, 1999, imagery of the caldera was flown using Integrated Spectronic's HyMap hyperspectral imager. These images are being analyzed to gain a better understanding of the hydrothermal system and to refine present flow models. This includes delineating zones of discharge and their general ***geochemistry*** and temperatures as resolved by hydrothermal mineral assemblage mapping. We present an example of structural mapping in the western caldera which elucidates how this region of crust is accommodating such perturbations as magma chambers, dike intrusions, and regional stress as well as aspects of the transport of hydrothermal fluids, gasses, and magma along such structures. We also present data on the sizes and locations of the CO (sub 2) -induced tree-kills at Mammoth Mt., specifically near Horseshoe Lake.

Publication Year 2000

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 2001-079541

40. Database GeoRef

Title **Cenozoic deformation in the vicinity of the Salmon River suture zone, Idaho; gravity, geologic, and paleomagnetic data**

Author Markley, Michelle J; Kelso, P; Tikoff, Basil; Gillaspy, J; Manduca, C; Minott, J

Affiliation Mount Holyoke College, Department of Earth and Environment, South Hadley, MA, United States (USA)

Affiliation Lake Superior State University, United States (USA); University of Wisconsin-Madison, United States (USA); Carleton College, United States (USA)

Monograph Title Geological Society of America, 2000 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.107, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Miocene-Recent Basin and Range deformation occurs in west-central Idaho, and extension concentrates along the Cretaceous Salmon River suture zone. Domino-style normal faulting occurred on E-dipping normal faults, which parallel the Cretaceous foliation. Normal faulting rotated both the underlying Cretaceous amphibolite facies basement rocks of the western Idaho shear zone and the overlying Miocene Columbia River basalt flows. We present results from a new gravity survey of ***Long Valley*** with 250 measurements. The topographical expression of NS-trending ***Long Valley*** does not correlate directly to the basin at depth. Instead, a 25 mGal negative Bouguer anomaly is centered in the NW part of the ***valley***. No gravity anomaly occurs under the S end of the ***valley***, indicating the presence of bedrock immediately below Quaternary surficial deposits. In the N end of the ***valley***, inversion of the gravity data suggests ca. 1200 m of Miocene-recent basin fill in a relatively narrow (<10 km) ***valley***. The anomaly is consistent with an asymmetric Miocene graben that is deepest on the W side of the ***valley***. The normal faults that bound the graben on the W side parallel Cretaceous basement foliation. Tilted Miocene Columbia River basalts act as critical marker horizons. Paleomagnetic data show that Miocene rotation of crustal blocks occurred about a horizontal axis. Reconstruction of the basalt flows to a sub- horizontal position suggests that the original orientation of both the Late Cretaceous basement foliation and the Miocene normal faults was sub-vertical. Each block contains a distinctive part of the Late Cretaceous shear zone, as defined by petrology, ***geochemistry*** , and structures. These observations indicate that basement contacts and fabrics controlled the regional Miocene structural style.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2002-049947

41. Database GeoRef

Title **Geological and geobotanical studies of *Long Valley* Caldera and Mammoth Mountain, CA utilizing new high resolution hyperspectral imagery**

Author Martini, Brigette A; Silver, Eli A; Pickles, William L; Potts, Donald C

Affiliation University of California, Department of Earth Sciences, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1091, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-018715

42. Database GeoRef

Title **Isotope *geochemistry* in geothermal research**

Author Kennedy, B Mack; DePaolo, Donald J; Truesdell, Alfred H

Affiliation Lawrence Berkeley National Laboratory, Berkeley, CA, United States (USA)

Affiliation University of California Berkeley, United States (USA)

Monograph Title Federal geothermal geoscience research, fiscal year 1998

Author Reed, Marshall (prefacer)

Affiliation U. S. Department of Energy, Office of Geothermal Technologies, Washington, DC, United States (USA)

Source DOE/ID Report, Report: DOE/ID 10732, pp.2.55 -2.63, May 1999

Report Number DOE/ID 10732

Publisher U. S. Department of Energy, Office of Fossil Energy, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Report; Analytic

Country of Publication United States (USA)

Accession Number 2008-095924

43. Database GeoRef

Title **Absolute age constraints on the rates of magma formation and modification in a high-level silicic magma chamber**

Author Heumann, Arnd; Davies, Gareth R; Elliott, Tim R

Affiliation Vrije Universiteit, Department of Earth Sciences, Amsterdam, Netherlands (NLD)

Monograph Title European Union of Geosciences conference; EUG 10; abstracts

Author Anonymous

Source Journal of Conference Abstracts, vol.4, no.1, pp.428-429, Mar 1999

Publisher Cambridge Publications, Cambridge, United Kingdom (GBR)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United Kingdom (GBR)

Accession Number 2001-023845

44. Database GeoRef

Title **Soil pH mapping to evaluate intensive magmatic-hydrothermal diffuse degassing on active volcanoes**

Author Valiente, Marcos; Meneses, Belen; Rodriguez, Paqui; Salazar, Jose M L; Perez, Nemesio M; Hernandez, Pedro A

Affiliation Univ. La Laguna, Faculty of Chemistry, Tenerife, Spain (ESP)

Affiliation ITER, Spain (ESP); University of Tokyo, Japan (JPN)

Monograph Title IUGG 99; abstracts

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.97-98, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2001-068039

46. Database GeoRef

Title **Development of the *Long Valley* rhyolitic magma system; strontium and neodymium isotope evidence from glasses and individual phenocrysts**

Author Davies, Gareth R; Halliday, Alex N

Affiliation Vrije Universiteit, Department of Earth Sciences, Amsterdam, Netherlands (NLD)

Affiliation University of Michigan, United States (USA)

Source Geochimica et Cosmochimica Acta, vol.62, no.21-22, pp.3561-3574, Nov 1998

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 1998

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 1999-032783

47. Database GeoRef

Title **Hydrologic and chemical data from the *Long Valley* Hydrologic Advisory Committee Monitoring Program in *Long Valley* Caldera, Mono County, California, 1988-1997**

Author Sorey, Michael L; Farrar, Christopher D

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 98-0070, 49 pp., 1998

Report Number OF 98-0070

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 49

Publication Year 1998

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1999-006939

48. Database GeoRef

Title **Isotopic and chemical evolution of the post-caldera rhyolitic system at *Long Valley*, California**

Author Heumann, Arnd; Davies, Gareth R

Affiliation Vrije Universiteit Amsterdam, Faculteit der Aardwetenschappen, Amsterdam, Netherlands (NLD)

Affiliation Technische Universitaet Clausthal, Federal Republic of Germany (DEU); U. S. Geological Survey, United States (USA); University of Maryland at College Park, United States (USA)

Monograph Title High level silicic magmatism and related hydrothermal systems; IAVCEI '97 selected papers

Editor Seltmann, Reimar; Lehmann, Bernd; Lowenstern, Jacob B; Candela, Phil A

Affiliation Geoforschungszentrum Potsdam, Potsdam, Federal Republic of Germany (DEU)

Source Journal of Petrology, vol.38, no.12, pp.1661-1678, Dec 1997

Publisher Clarendon Press, Oxford, United Kingdom (GBR)

Publication Year 1997

Publication Type Serial; Conference document; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 1998-032545

49. Database GeoRef

Title **Thermal evolution of rhyolitic magmas delimited by in situ Th isotope analyses of allanite and zircon**

Author Reid, M R; Coath, C D

Affiliation University of California at Los Angeles, Department Earth and Space Sciences, Los Angeles, CA, United States (USA)

Monograph Title AGU 1997 fall meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.814, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1999-001498

50. Database GeoRef

Title **Oxygen isotope compositions of intracaldera rocks; hydrothermal history of the *Long Valley* Caldera, California**

Author McConnell, Vicki S; Valley, John W; Eichelberger, John C

Affiliation University of Alaska, Fairbanks, AK, United States (USA)

Affiliation University of Wisconsin, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.76, no.1-2, pp.83-109, Mar 1997

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The Bishop Tuff and associated rocks filling ***Long Valley*** Caldera, California represent a case where thick and relatively uniform geologic units of known initial compositions have been subjected to a strong geothermal fluid flux within an enclosed basin. Oxygen

isotopic compositions within individual components of this "flux plate" are used to characterize a magmatically driven paleohydrothermal system. Oxygen isotope ratios of silicate components analyzed with a laser-probe/mass-spectrometer system clearly illustrate the isotopic heterogeneity in the hydrothermally altered felsic volcanic rocks. The alteration resulted from moderately high-temperature hydrothermal activity. Hydrothermal activity is linked to periods of post-caldera-collapse volcanism and resurgence in the central caldera. In general, (super 18) O depletion in the Bishop Tuff resulting from exchange with hydrothermal fluids proceeds as pumice>matrix>sanidine>quartz due to progressive resistance to alteration. Samples from the ***Long Valley*** Exploratory Well (LVEW) centered on the resurgent dome show downward increasing exchange and disequilibrium over the well's 2000-m depth. A flanking well shows the opposite pattern over 1300 m depth. Oxygen isotope isopleths along a W-E vertical cross section of the caldera reveals convective circulation upwards and outwards from the central resurgent dome. A paleotemperature maximum of approximately 350 degrees C in LVEW and a geothermal gradient of approximately 130 degrees C/km are deduced from feldspar/water oxygen isotope fractionation equations using the pumice and sanidine components of the intracaldera volcanic rocks. This is consistent with the degree of alteration and the secondary mineralogy. Present-day temperature maximum in the well is approximately 100 degrees C, and the geothermal gradient is 50 degrees C/km. Fossil hydrothermal water, trapped in fluid inclusions in hydrothermal vein quartz hosted by intracaldera rocks, has a calculated oxygen isotope composition of -10.2per mil based on chemistry and trapping temperature. This is 4per mil heavier than the average value for the present-day hydrothermal water and consistent with higher temperatures and water/rock ratios. Intrusive activity was initiated in the resurgent dome area soon after
caldera collapse (760 ka), but migrated toward the western margin of the caldera, the locus of Holocene volcanism. Thus, the central hydrothermal system matured and waned as the heat sources from intrusions shifted westward. Geophysical evidence of renewed intrusive activity located beneath the resurgent dome may presage a future renewal of the cycle of hydrothermal activity in the central caldera region. Although the hydrothermal activity is complex and transitory, this history is normal for a large, relatively active caldera system such as ***Long Valley*** Caldera.

Publication Year 1997

Publication Type Serial; Analytic

Country of Publication Netherlands

Accession Number 1997-033962

51. Database GeoRef

Title **Magmatic evolution of Quaternary mafic magmas at *Long Valley* Caldera and the Devils Postpile, California; effects of crustal contamination on lithospheric mantle-derived magmas**

Author Cousens, Brian L

Affiliation Carleton University, Department of Earth Sciences, Ottawa, ON, Canada (CAN)

Source Journal of Geophysical Research, vol. 101, no. B12, pp.27,673-27,689, 10 Dec 1996

Resource Location http://www.agu.org/journals/jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Isotopic variations in Cenozoic mafic volcanic rocks in the Basin and Range Province of the southwestern United States are considered by many to be due to differences in mantle sources, either subduction -enriched subcontinental lithosphere or the asthenosphere. This is a detailed geochemical investigation of the magmatic evolution and mantle source(s) of Quaternary mafic volcanism at ***Long Valley*** Caldera and the Devils Postpile National Monument, Western Great Basin. The Quaternary mafic lavas are dominantly post-Bishop Tuff (<0.7 Ma) in age, occur as isolated cinder cones and small - volume lava flows within the caldera, and range in composition from alkali basalt to trachyandesite. Whereas fractional crystallization is the dominant process effecting the evolution of ***Long Valley*** lavas with
MgO > 7%, assimilation of Sierra Nevada granitoids becomes increasingly important at MgO < 7%, such that SiO (sub 2) , K/La, and (super 87) Sr/ (super 86) Sr increase asP/K, Zr/Ba, and (super 143) Nd/ (super 144) Nd decrease. Assimilation -fractional crystallization calculations suggest that the most evolved trachyandesites include approximately 30% of upper crustal component. In lavas with > 7% MgO, (super 87) Sr/ (super 86) Sr and La/Sm decrease as (super 143) Nd/ (super 144) Nd, Nb/La, Zr/Ba and (to a lesser extent) Pb isotope ratios increase from the oldest to the youngest Quaternary lavas. The oldest lavas are chemically similar to other lavas in the western Basin and Range thought to have an enriched lithospheric mantle source. Whereas the shifts in Sr and Nd isotope ratios from oldest to youngest basalts might be consistent with a progressively increasing asthenospheric component in the lavas, the shifts in incompatible element ratios and lack of shifts in Pb isotope ratios with time are not. Instead, they indicate that with time the mafic lavas may have increasingly interacted with mafic crust, perhaps gabbroic/dioritic rocks at depth within the Sierra Nevada Batholith. Alternatively, a second, less enriched lithospheric mantle source is present beneath the ***Long Valley*** area that has only recently begun to undergo melt generation, and this source has made progressively larger contributions to the basaltic magmas erupted at the surface. Copyright 1996 by the American Geophysical Union.

Publication Year 1996

Publication Type Serial; Analytic

Accession Number 1997-021098

52. **Database** GeoRef

Title **Carbon isotopic and trace element *geochemistry* of surface waters and their aquatic plants, *Long Valley* Caldera, California**

Author Reynolds, Jesse L; Connolly, Nathan T; Getz, Shari S; Polissar, Pratigya J; Reid, John B, Jr

Affiliation Hampshire College, School of Natural Science, Amherst, MA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.802, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1997-056783

53. Database GeoRef

Title **Pre- and postcaldera lava sequences, *Long Valley*, California; asthenospheric, lithospheric, and lower crustal magma sources, current magmatic unrest, and future volcanism**

Author Bailey, Roy A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.790, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-020263

54. Database GeoRef

Title **The helium and carbon isotope systematics of a continental geothermal system; results from monitoring studies at *Long Valley* Caldera (California, U.S.A.)**

Author Hilton, David R

Affiliation Scripps Institution of Oceanography, Isotope Laboratory, La Jolla, CA, United States (USA)

Source Chemical Geology, vol.127, no.4, pp.269-295, 31 May 1996

Resource Location http://www.sciencedirect.com/science/journal/00092541

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract This study reports fumarole and hot spring gas chemistry of a 3-year monitoring programme (1986-1988) at the seismically -active ***Long Valley*** caldera (LVC) in the Sierra Nevada, eastern California. The focus is on helium and carbon dioxide (isotopes and concentrations) and their variation in response to seismic activity in the region. Within the caldera, both species are predominantly magmatic in origin but their isotopic and elemental characteristics appear to be established prior to shallow -level intrusion and/or are influenced by pre- eruptive degassing. In response to intra-caldera and regional seismicity over the monitoring period, CO (sub 2) and helium show markedly different behaviour: the greatest change in various carbon-related parameters (CO (sub 2) %; delta (super 13) C(CO (sub 2)); CO (sub 2) / (super 3) He) occurred in 1986 and were most likely related to regional seismicity in the nearby Chalfont ***Valley***. Helium did not respond to these events. The largest change (up to approximately 25%) in (super 3) He/ (super 4) He ratios was seen in 1987 with the occurrence of both increases and decreases relative to the almost constant values observed in 1988. The increases are consistent with magma intrusion occurring within the caldera in
1987 whilst the decreases occurred significantly later (>6 months) than any seismic activity. It is suggested that decreases in (super 3) He/ (super 4) He are related to the regional seismicity and that the hydrothermal system exerts a (temporal) control on the release of near -surface (super 4) He. At LVC this is related to the timing of the late spring thaw. Results from previous monitoring programmes (when the level of seismicity in the caldera was higher) are evaluated against variations in the present work. There appears to be a convincing link between higher (super 3) He/ (super 4) He values and the level of seismicity in the caldera although factors related to location, magnitude and frequency of seismic

events are difficult to quantify. Because of the inferred small isotopic contrast between new magma and presently-degassing magma at LVC, it is anticipated that large variations in (super 3) He/ (super 4) He within the central caldera are unlikely to occur until the magmatic volatile signal wanes as a function of degassing and time. Alternatively, only at those localities situated at significant distances from the region of magma intrusion (i.e. away from the resurgent dome vicinity) are helium and/or carbon likely to respond dramatically to intra- caldera seismicity.

Publication Year 1996

Publication Type Serial; Analytic

Accession Number 1996-052023

55. Database GeoRef

Title **Magmatic degassing of CO (sub 2) recorded in tree rings at Mammoth Mountain, California**

Author Fessenden, J E; Rahn, T A

Affiliation Scripps Institution of Oceanography, La Jolla, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.17, Suppl., pp.279-280, 23 Apr 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-005926

56. Database GeoRef

Title **Hydrocarbon gases from hot springs in the *Long Valley* Caldera, California**

Author Lorenson, Thomas D; Tyvoll, David A; Schottle, Rolf G

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Stanford University, United States (USA); University of Hawaii, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.28, no.5, pp.86, Apr 1996

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1997-046470

57. Database GeoRef

Title **Hydrologic data for *Long Valley* Caldera, Mono County, California, 1978-93**

Author Howle, James F; Farrar, Christopher D

Affiliation U. S. Geological Survey, Sacramento, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 96-0382, 286 pp., 1996

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1996

Publication Type Serial; Report; Monographic

Accession Number 1997-015362

58. Database GeoRef

Title **Mantle sources and mantle vs. crustal contributions to Quaternary basaltic volcanism at *Long Valley* Caldera and Devils Postpile National Monument, California**

Author Cousens, Brian L

Affiliation Carleton University, Earth Sciences, Ottawa, ON, Canada (CAN)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.687, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1996-025754

59. Database GeoRef

Title **Volcanology; dead trees tell tales**

Author Williams, Stanley N

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Nature (London), vol.376, no.6542, pp.644, 24 Aug 1995

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-059789

60. **Database** GeoRef

Title **Forest-killing diffuse CO (sub 2) emission at Mammoth Mountain as a sign of magmatic unrest**

Author Farrar, C D; Sorey, M L; Evans, W C; Howle, J F; Kerr, B D; Kennedy, B M; King, C Y; Southon, J R

Affiliation U. S. Geological Survey, Carnelian Bay, CA, United States (USA)

Affiliation Lawrence Berkeley National Laboratory, United States (USA); Lawrence Livermore National Laboratory, United States (USA)

Source Nature (London), vol.376, no.6542, pp.675-678, 24 Aug 1995

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-059792

61. Database GeoRef

Title **Sources of Quaternary basaltic magmas of the western Great Basin, USA; *Long Valley* Caldera and Devils Postpile, California**

Author Cousens, Brian L

Affiliation Carleton University, Ottawa-Carleton Geoscience Centre, Ottawa, ON, Canada (CAN)

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 20, pp.20, 1995

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1996-041471

62. **Database** GeoRef

Title **Applying Sr isotope *geochemistry* to interpreting the history of the *Long Valley* Caldera, California**

Author McConnell, V S

Affiliation Univ. of Alaska, Geophys. Inst., Fairbanks, AK, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.733, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-042948

63. **Database** GeoRef

Title **Apatite in felsic rocks; a model for the estimation of initial halogen concentrations in the Bishop**

Tuff (*Long Valley*) and Tuolumne Intrusive Suite (Sierra Nevada Batholith) magmas

Author Piccoli, Philip; Candela, Philip

Affiliation University of Maryland, Laboratory for Mineral Deposits Research, College Park, MD, United States (USA)

Source American Journal of Science, vol.294, no.1, pp.92-135, Jan 1994

Resource Location http://www.geology.yale.edu/journals/Ajs.html

Publisher Kline Geology Laboratory, Yale University, New Haven, CT, United States (USA)

Publication Year 1994

Publication Type Serial; Analytic

Accession Number 1994-009480

64. Database GeoRef

Title **Melt inclusions as recorders of pre-eruptive geochemical characteristics of the intracaldera Bishop Tuff; an ion and electron microprobe investigation**

Author Servilla, Mark S; Papike, James J

Affiliation University of New Mexico, Department of Earth and Planetary Sciences, Albuquerque, NM, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.26, no.7, pp.450, 1994

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-014745

65. Database GeoRef

Title **Potassic volcanism near Mono Basin, California; evidence for high water and oxygen fugacities inherited from subduction**

Author Lange, Rebecca A; Carmichael, Ian S E; Renne, Paul R

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA); Institute of Human Origins, Berkeley, CA, United States (USA)

Source Geology (Boulder), vol.21, no.10, pp.949-952, Oct 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Exposed around the margins of Mono basin and the periphery of ***Long Valley*** caldera are approximately 100 km (super 3) of potassic, basic to intermediate lavas that record high water and oxygen fugacities. Most eruptions occurred between 4 and 2 Ma, although sporadic potassic volcanism continued into the Quaternary with a pulse between 0.1 and 0.5
Ma, approximately 15 km northeast of Mono basin. The lava types include absarokite, minette, hornblende lamprophyre, trachybasalt, and trachyandesite. Estimated water contents for lavas without hydrous phenocrysts range between 2 and 3 wt%, considerably more than mid-ocean ridge, oceanic island, or back-arc magmas. Calculated f O (sub 2) values fall between -0.4 and +1.2 log units of the Ni-NiO buffer. Although this potassic suite was erupted in an extensional tectonic setting at the western margin of the Basin and Range province, its high K (sub 2) O/TiO (sub 2) and low Zr/Ba ratios suggest a subduction - modified mantle source. If subduction was the process that enriched the lithospheric mantle in large-ion lithophile elements (K, Ba, etc.), it was also a mechanism for mantle oxidation and hydration. October 1993

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-038104

66. Database GeoRef

Title **Volcanology; geochemical hazard indicators**

Author Pyle, David M

Affiliation University of Cambridge, Department of Earth Sciences, Cambridge, United Kingdom (GBR)

Source Nature (London), vol.362, no.6423, pp.787-788, 29 Apr 1993

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-012357

67. Database GeoRef

Title **Petrogenesis and volatile stratigraphy of the Bishop Tuff; evidence from melt inclusion analysis**

Author Dunbar, Nelia W; Hervig, Richard L

Affiliation New Mexico Institute of Mining and Technology, Geoscience Department, Socorro, NM, United States (USA)

Affiliation Arizona State University, United States (USA)

Source Journal of Geophysical Research, vol. 97, no. B11, pp.15,129-15,150, 10 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The Bishop Tuff (BT), erupted from the ***Long Valley*** Caldera at 0.74 Ma, is composed of a Plinian tephra and ignimbrite (Hildreth, 1979). Based on ion and electron microprobe analyses of melt inclusions (MI) in quartz and sanidine phenocrysts, a strong H (sub 2) O gradient was present in the upper portion of the magma chamber, mainly in the first 120 km (super 3) of erupted material. The H (sub 2) O content of the magma which formed the Plinian tephra drops from 6 wt % to 3.5 wt %. In contrast, the magma which formed the ignimbrite contained a relatively constant amount of H (sub 2) O, between 2 and 4 wt %. The strong drop in H (sub 2) O content of the magma which formed the Plinian tephra suggests that only in its extreme upper part, if any, was the P (sub H (sub 2) 0) in the magma close to P (sub total) . The halogen content of the BT magma was low and relatively constant at approximately 700 ppm Cl and approximately 500 ppm F. The trace and major element composition of MI from the Plinian and first-erupted ash flow lobes of the BT are similar to that of bulk tephra. The range in the trace element concentrations of inclusions suggests
that fractional crystallization may have affected magmatic composition. However, in addition to fractional crystallization, the composition of MI, phenocrysts and bulk pumice lumps suggests that magma mixing may have been an important process in establishing the final trace element zonation within the Bishop magma chamber and may be responsible for some of the most dramatic observed trace element variations. The BT eruption appears to have removed sequential stratigraphic compositional layers from the magma chamber, whereas fhe Lower Bandelier Tuff (LBT) appears to have erupted chaotically, although both magma chambers are characterized by essentially the same volatile and therefore density zonation. However, the H (sub 2) O content of the Plinian:ignimbrite transition is different for the two (approximately 3 wt % for the BT, 4-5 wt % for the LBT), suggesting that the LBT Plinian eruption may have ended prematurely, possibly due to caldera collapse. Therefore, the magma withdrawal dynamics of these eruptions may be more strongly controlled by external factors, such as vent configuration, rather that the volatile gradient of the melt. Copyright
1992 by the American Geophysical Union.

Publication Year 1992

Publication Type Serial; Analytic

Accession Number 1992-065433

68. Database GeoRef

Title **Boron-lithium relationships in rhyolites and associated thermal waters of young silicic calderas, with comments on incompatible element behaviour**

Author Shaw, Denis M; Sturchio, Neil C

Affiliation McMaster University, Department of Geology, Hamilton, ON, Canada (CAN)

Affiliation Argonne National Laboratory, United States (USA)

Source Geochimica et Cosmochimica Acta, vol.56, no.10, pp.3723-3731, Oct 1992

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 1992

Publication Type Serial; Analytic

Accession Number 1992-060816

69. Database GeoRef

Title ***Geochemistry* and isotopic composition of post-caldera basaltic lavas from *Long Valley*, California**

Author Cousens, Brian L

Affiliation Universite de Montreal, Departmente de Geologie, Montreal, QC, Canada (CAN)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.14, supplement, pp.337, 07 Apr 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014643

70. Database GeoRef

Title **Origin of the *Long Valley* Caldera moat basalt**

Author Woodburne, Timothy Bradner

Abstract The moat basalt was rapidly erupted between 0.24 and 0.06 Ma ago and flooded the western half of the ***Long Valley*** Caldera, California. Twenty-three moat basalt lava flows and a possible feeder dike have been sampled. Based on chemistry and petrography, these rocks can be divided into five distinct groups: from group V, the most primitive (approximately 48 wt.% Si02) and presumably the oldest, to group I, the most evolved (approximately 58 wt.% Si02) and the youngest. The groups, in general, become more evolved towards the top of the sequence. These groups can be related by assimilation and crystal fractionation. Olivine and pyroxene are the fractionating phases relating group V, group IV, and group III. Plagioclase joins the fractionating phases relating group III, group II and group I. A granodiorite composition has been calculated as the assimilant using multiple linear regression. A chemically zoned lava flow overlain by a primitive group IV flow lying between more evolved group II flows are interpreted as eruptions from a zoned magma chamber.

Publication Year 1992

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1995-058948

71. Database GeoRef

Title **A conceptual model of the hydrothermal system in *Long Valley* Caldera, California, USA**

Author Sorey, Michael L; Farrar, Christopher D

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Proceedings - International Symposium on Water-Rock Interaction, vol.7, pp.1357-1362, 1992

Publisher International Association of Geochemistry and Cosmochemistry and Alberta Research Council, Sub-Group on Water-Rock Interaction, Edmonton, AB, International (III)

Publication Year 1992

Publication Type Serial; Conference document; Analytic

Accession Number 1992-049731

72. Database GeoRef

Title **A Sr-isotopic comparison between thermal waters, rocks, and hydrothermal calcites, *Long Valley* Caldera, California**

Author Goff, Fraser; Wollenberg, Harold A; Brookins, D G; Kistler, Ronald W

Affiliation Los Alamos Natl. Lab., Los Alamos, NM, United States (USA)

Affiliation Lawrence Berkeley Lab., United States (USA); Univ. N.M., United States (USA); U. S. Geol. Surv., United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.48, no.3-4, pp.265-281, Dec 1991

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1992-011306

73. Database GeoRef

Title **Chemical equilibrium and mass balance relationships associated with the *Long Valley* hydrothermal system, California, U.S.A.**

Author White, Art F; Peterson, Maria L

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.48, no.3-4, pp.283-302, Dec 1991

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1992-011307

74. Database GeoRef

Title **Oxygen isotope evidence for past and present hydrothermal regimes of *Long Valley* Caldera, California**

Author Smith, Brian M; Suemnicht, Gene A

Affiliation Lawrence Berkeley Lab., Cent. Isot. Geochem., Berkeley, CA, United States (USA)

Affiliation Unocal Geotherm. Div., United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.48, no.3-4, pp.319-339, Dec 1991

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1992-011309

75. Database GeoRef

Title **Eruption dynamics and magma withdrawal during the plinian phase of the Bishop Tuff eruption, *Long Valley* Caldera**

Author Gardner, James E; Sigurdsson, Haraldur; Carey, Steven N

Affiliation Univ. R.I., Grad. Sch. Oceanogr., Narragansett, RI, United States (USA)

Source Journal of Geophysical Research, vol. 96, no. B5, pp.8097-8111, 10 May 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Variations in eruption column height, magma discharge (intensity), and ***geochemistry*** have been documented for the plinian phase of the Bishop Tuff eruption from the ***Long Valley*** caldera, California. Although exposures of the complete Bishop fall deposit are sparse, their widespread relationships, knowledge of the plinian vent location, and a reasonable estimate of the main dispersal axis allow for the construction of minimum clast isopleths. Column height and intensity are estimated to have increased from 23 km and 7 X 10 (super 7) kg s (super -1) to a peak of 45 km and 7.5 X 10 (super 8) kg s (super -1) at the end of the plinian phase. Variations in ***geochemistry*** of the plinian deposit reveal complex magma withdrawal processes during the Bishop plinian phase. Concentrations of many incompatible trace elements increase from the base to midlevel and then decrease to the top of the plinian deposit. This trend is mirrored by the variation in pumice density, which in turn reflects vesicularity. Based on the physical volcanology and compositional variations in the plinian deposit, a model is proposed for the temporal progression of magma withdrawal during the plinian phase. Relatively less-evolved magma was first tapped by the plinian phase from the side of the magma chamber, with the conduit location being controlled by the Hilton Creek fault system. As eruption intensity increased, more-evolved magma from the chamber roof was drawn down and tapped. Less-evolved magma was again tapped for the duration of the plinian phase, possibly as withdrawal from the roof zone became less efficient. Renewed eruption of slightly more evolved magma by the first post-plinian ignimbrites suggests that the vent migrated along the ring fault system to an area that had not experienced previous magma withdrawal. Copyright 1991 by the American Geophysical Union.

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1991-030086

76. Database GeoRef

Title **Petrogenesis of precaldera mafic and intermediate lavas, *Long Valley*, California**

Author Nielsen, D; Mahood, Gail A; Halliday, A N; Essene, E J

Affiliation Univ. Mich., Dep. Geol. Sci., Ann Arbor, MI, United States (USA)

Affiliation Stanford Univ., United States (USA)

Author Wong, Ivan G (chairperson); Sullivan, Ray (chairperson)

Source Seismological Research Letters, vol.62, no.1, pp.27, Mar 1991

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-046656

77. Database GeoRef

Title **Radionuclides in hydrothermal systems as indicators of repository conditions**

Author Wollenberg, H A; Flexser, S; Smith, A R

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Affiliation Whiteshell Lab., Canada (CAN)

Affiliation Argonne Natl. Lab., Argonne, IL, United States (USA)

Source Materials Research Society Symposia Proceedings, vol.212, pp.711-718, 1991

Publisher North-Holland, New York-Amsterdam-Oxford, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic

Accession Number 1991-049893

78. Database GeoRef

Title **Evidence for 600 year-old basalt and magma mixing at Inyo Craters volcanic chain, *Long Valley* Caldera, California**

Author Varga, Robert J; Bailey, Roy A; Suemnicht, Gene A **Affiliation** Unocal Sci. and Technol. Div., Brea, CA, United States (USA) **Affiliation** U. S. Geol. Surv., United States (USA)

Source Journal of Geophysical Research, vol. 95, no. B13, pp.21,441-21,450, 10 Dec 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Andesite inclusions are found within the vent areas of two 600-year-old rhyolite domes in the Inyo Craters volcanic chain, eastern California. Both domes lie within the present northwestern sector of 0.73 Ma ***Long Valley*** caldera. Inclusion morphology indicates that they were partially molten and ductile during incorporation within coarsely porphyritic rhyolite. The xenocryst assemblage within the inclusions (plagioclase + hornblende + biotite + quartz + or - sanidine) is identical to the phenocryst assemblage within the host rhyolite. Microprobe analyses of xenocrysts within the andesite inclusions show that they have compositions similar to phenocrysts in the host rhyolite. These data suggest that the andesite inclusions are the result of mixing of the coarsely porphyritic rhyolite with a more mafic end member. Whole rock ***geochemistry*** of the inclusions generally supports a simple mixing model between the coarsely porphyritic rhyolite of the Inyo domes and typical postcaldera mafic lavas found throughout the western caldera moat. The inclusions provide the first evidence for involvement of basaltic magma in the 600-year-old rhyolite eruptions of the Inyo Craters volcanic chain and suggest the possibility that the rhyolitic eruptions were initiated by injection of basalt into the lower part of the silicic magma system. Periodic thermal replenishment of the magmatic system through basaltic injection may explain the relatively high temperatures encountered in drill holes within the western caldera moat. The inclusions further suggest that although rhyolite eruptions are statistically more likely from the Inyo Craters volcanic chain, future basaltic eruptions cannot be ruled out. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-010933

79. Database GeoRef

Title **Sources and fractionation processes influencing the isotopic distribution of H, O and C in the *Long Valley* hydrothermal system, California, U.S.A.**

Author White, Art F; Peterson, Maria L; Wollenberg, Harold A; Flexser, Steve

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Pa. State Univ., United States (USA); Lawrence Berkeley Lab., United States (USA)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Applied Geochemistry, vol.5, no.5-6, pp.571-585, Dec 1990

Resource Location http://www.sciencedirect.com/science/journal/08832927

Publisher Pergamon, Oxford-New York-Beijing, International (III)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-019471

80. **Database** GeoRef

Title **Comparisons of oxygen isotope systematics of fossil and active calderas; Bonanza, CO and *Long Valley*, CA**

Author Smith, B M

Affiliation Lawrence Berkeley Lab., Cent. Isot. Geochem., Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1677, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-017887

81. Database GeoRef

Title **Uranium and thorium in tuffs of the *Long Valley* and Valles calderas**

Author Wollenberg, H A; Flexser, S; Smith, A R

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1692, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-018743

82. **Database** GeoRef

Title **Evidence for *long* residence times of rhyolitic magma in the *Long Valley* magmatic system; the isotopic record in precaldera lavas of Glass Mountain; discussion and replies [modified]**

Author Sparks, R Stephen J; Huppert, Herbert E; Wilson, Colin J N; Halliday, Alex N; Mahood, Gail A

Affiliation Bristol Univ., Dep. Geol., Bristol, United Kingdom (GBR)

Affiliation Univ. Cambridge, United Kingdom (GBR); Univ. Mich., United States (USA); Stanford Univ., United States (USA)

Source Earth and Planetary Science Letters, vol.99, no.4, pp.387-399, Sep 1990

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-000858

83. **Database** GeoRef

Title **Degassing of argon from microclines within the thermal aureole of the Obsidian Dome conduit, *Long Valley* Caldera, California; constraints on emplacement history**

Author Ryerson, F J; Harrison, T Mark

Affiliation Lawrence Livermore Natl. Lab., Earth Sci. Dep., Livermore, CA, United States (USA)

Affiliation State Univ. N.Y. at Albany, United States (USA)

Source Journal of Geophysical Research, vol. 95, no. B3, pp.2781-2792, 10 Mar 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Age spectra for microclines separated from samples obtained within the thermal aureole of the conduit to Obsidian Dome are compared with those from a reference sample collected in an area removed from the thermal effects of intrusion. The age spectra are characterized by a zero-age plateau at low fractional release and by an approximately 80 Ma plateau at higher fractional releases. These plateaus correspond to subparallel arrays in the Arrhenius data. These arrays are attributed to two discrete diffusion domain size fractions characterized by identical activation energies but by discrete and different frequency grain size fractions (Lovera et al., 1989). The relative losses of (super 40) Ar* do not show a systematic pattern when compared on the basis of total (super 40) Ar* loss. The (super 40) Ar* losses first increase and then fall with distance from the contact. However, when the data composing the high-temperature array of the Arrhenius data are considered (the large diffusion domain size fraction), the pattern is consistent with that predicted by conductive heating of the aureole. This agreement requires the aureole to have been uniformly preheated to a temperature of approximately 250 degrees C prior to intrusion of the rhyolite dike and surrounding breccia funnel that make up the vent structure. Further, the data require that the material forming the breccia funnel must have been heated to a temperature approaching that of the magma prior to emplacement. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1990-032747

84. Database GeoRef

Title **A detailed study of the USGS reducing-gas sensor with field tests at *Long Valley*, California**

Author McGee, Kenneth A; Sutton, A Jefferson

Affiliation U. S. Geol. Surv., Vancouver, WA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 90-0061, 67 pp., 1990

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1990

Publication Type Serial; Report; Monographic

Accession Number 1990-041370

85. Database GeoRef

Title **Experimental investigation of conditions in subvolcanic magma chambers**

Author Rutherford, Malcolm J; Johnson, Marie C; Fogel, Robert F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, vol. 131, pp.231, 1990

Resource Location http://geoinfo.nmt.edu/publications/home.html

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-004474

86. Database GeoRef

Title **Evidence for *long* residence times of rhyolitic magma in the *Long Valley* magmatic system; the isotopic record in precaldera lavas of Glass Mountain**

Author Halliday, A N; Mahood, G A; Holden, P; Metz, J M; Dempster, T J; Davidson, J P

Affiliation Univ. Mich., Dep. Geol. Sci., Ann Arbor, MI, United States (USA)

Affiliation Stanford Univ., United States (USA); Scott. Univ. Res. and React. Cent., United Kingdom (GBR)

Source Earth and Planetary Science Letters, vol.94, no.3-4, pp.274-290, Sep 1989

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-080082

87. Database GeoRef

Title **Chemical and isotopic evolution of fluids in the active *Long Valley* hydrothermal system**

Author Peterson, Maria L; White, Art F

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Dymek, Robert F (chairperson); Shelton, Kevin L (chairperson)

Source Abstracts with Programs - Geological Society of America, vol.21, no.6, pp.A85, 1989

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1989

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-044003

88. Database GeoRef

Title **Sr-isotopic variations in fracture fillings, fluids, and rock of the *Long Valley* Caldera, California**

Author Wollenberg, H A; Goff, Fraser; Brookins, D G; Kistler, R W

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Affiliation Los Alamos Natl. Lab., United States (USA); Univ. N.M. at Albuquerque, United States (USA); U. S. Geol. Surv., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1481, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-014126

89. Database GeoRef

Title **Evidence for 600-year-old basalt and magma mixing at Inyo Craters volcanic chain, eastern California**

Author Varga, R J; Bailey, R A; Suemnicht, G A

Affiliation UNOCAL, Sci. and Technol. Div., Brea, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1491, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-014195

90. Database GeoRef

Title **Highly evolved liquids in the early history of the *Long Valley* (California) high- silica rhyolite magma system**

Author Halliday, Alex N; Mahood, Gail

Affiliation Univ. Mich., Dep. Geol. Sci., Ann Arbor, MI, United States (USA)

Affiliation Stanford Univ., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1494, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-014222

91. Database GeoRef

Title **Trace element *geochemistry* of the Inyo volcanic chain, California; evidence for multiple magma sources, magma mixing and post-eruption loss of boron**

Author Higgins, Michael D

Affiliation McMaster Univ., Dep. Geol., Hamilton, ON, Canada (CAN)

Source Journal of Volcanology and Geothermal Research, vol.35, no.1-2, pp.97-110, Sep 1988

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-077816

92. Database GeoRef

Title **Chlorine stable isotope compositions of waters derived from crystalline rocks, volcanic waters and geothermal waters**

Author Kaufmann, Ronald S

Affiliation N. Ill. Univ., Dep. Geol., DeKalb, IL, United States (USA)

Author Anonymous

Publication Year 1988

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 1988-066313

93. Database GeoRef

Title **Helium isotopes in geothermal and volcanic gases of the Western United States; 2, *Long Valley* Caldera**

Author Welhan, J A; Poreda, R J; Rison, W; Craig, H

Affiliation Scripps Inst. Oceanogr., Isotope Lab., La Jolla, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.34, no.3-4, pp.201-209, May 1988

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-048468

94. **Database** GeoRef

Title **Oxygen isotope evidence for magma-groundwater interactions in early, post- collapse rhyolites from the *Long Valley* Caldera, California**

Author Smith, Brian M; Gunderson, Richard P; Suemnicht, Gene A

Affiliation Unocal Sci. and Technol. Div., Brea, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.20, no.7, pp.114, 1988

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1989-049336

95. Database GeoRef

Title **Oxygen isotope profiles of seven geothermal wells in the *Long Valley* Caldera, Central California**

Author Smith, Brian M; Suemnicht, Gene A

Affiliation Unocal Science and Technology Division, Brea, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.20, no.7, pp.397, 1988

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2005-040302

96. Database GeoRef

Title **Glass Mountain and the isotopic and chemical evolution of the *Long Valley* Caldera prior to the eruption of the Bishop Tuff**

Author Dempster, Tim; Halliday, Alex N; Mahood, Gail; Metz, Jenny

Affiliation Scott. Univ. Res. and React. Cent., East Kilbride, United Kingdom (GBR)

Affiliation Univ. Mich. at Ann Arbor, United States (USA); Stanford Univ., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1520, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-038406

97. Database GeoRef

Title **The *geochemistry* of the Inyo volcanic chain; multiple magma systems in the *Long Valley* region, eastern California**

Author Sampson, Daniel E; Cameron, Kenneth L

Affiliation Univ. Calif., Earth Sci. Board, Santa Cruz, CA, United States (USA)

Source Journal of Geophysical Research, vol. 92, no. B10, pp.10,403-10,421, 10 Sep 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Chemical data from the Inyo volcanic chain of eastern California illustrate that the most recent eruption (about 600 years B.P.) sampled at least two separate magmatic systems. Two rhyolitic lava types were produced in the eruption, one coarsely porphyritic (CP) and one finely porphyritic (FP). These two lavas are chemically, mineralogically, and texturally distinct from one another, are physically intermixed, and are distributed unequally among three lava flows. The FP lava comprises a range of compositions that form coherent but discontinuous trends on variation diagrams. Quantitative major and trace element modeling indicates that the trends were not produced by fractionation of the observed phenocryst assemblage, but rather that the high-silica end-member could have been produced from the low-silica end-member by fractionation of an equivalent hydrous assemblage. This and compositional discontinuity in the trends could indicate that two slightly zoned FP endmembers were generated at higher water pressure, and then back-mixed to form the present array of FP lava compositions. In contrast, chemical distinctions, physical nature, and chemical modeling suggest that the CP and FP magmas evolved separately along distinct, and possibly parallel, liquid lines of descent. Since these are the most recent lavas to erupt in the ***Long Valley*** caldera, this suggests that at least two chemically isolated magmatic systems are present beneath the region. The three lava flows produced in the 600-year-B.P. eruption lie along a north-trending line that crosses the northwestern boundary of the caldera. The CP lava is not found outside the caldera, increases in abundance toward the caldera center, and shows marked physical and chemical similarity to 100,000-year-old lava erupted in the caldera's northern topographic moat. The more crystalline nature of the CP lava, coupled with its similarity to older ***Long Valley*** lava, may indicate that it came from a source within the caldera, possibly the same magma body as the one detected seismically beneath the northwest moat of the caldera.

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1988-001163

98. Database GeoRef

Title **A strontium isotopic study of processes in a silicic magma chamber; the Bishop Tuff, *Long Valley*, California**

Author Christensen, John Neil

Publication Year 1987

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1990-018308

99. Database GeoRef

Title **Hydrologic and geochemical monitoring in *Long Valley* Caldera, Mono County, California, 1985**

Author Farrar, C D; Sorey, M L; Rojstaczer, Stuart A; Janik, C J; Winnett, T L; Clark, M D

Affiliation U. S. Geol. Surv., Sacramento, CA, United States (USA)

Source Water-Resources Investigations - U. S. Geological Survey, Report: WRI 87-4090, 71 pp., 1987

Publisher U. S. Geological Survey, [Reston, VA], United States (USA)

Publication Year 1987

Publication Type Serial; Report; Monographic

Accession Number 1988-033209

100. **Database** GeoRef

Title **Chemical and isotopical composition and calculated equilibrium temperatures of fumarolic gases and thermal waters from Campi Flegrei and *Long Valley* Caldera**

Author Tedesco, Dario; Sabroux, Jean-Christophe; Pece, Raimondo

Affiliation C.N.R.S.-C.E.A., Cent. Faibles Radioact., Gif-sur-Yvette, France (FRA)

Affiliation Oss. Vesuviano, Italy (ITA)

Source International Union of Geodesy and Geophysics, General Assembly, vol.19, Vol. 2, pp.426, 1987

Publisher International Union of Geodesy and Geophysics (IUGG), Vancouver, BC, Canada (CAN)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-061121

101. **Database** GeoRef

Title **Chemical and isotopic characteristics of thermal fluids in the *Long Valley* Caldera lateral flow system, California**

Author Shevenell, Lisa A; Goff, Fraser; Grigsby, C O; Janik, Cathy J; Trujillo, P E; Counce, Dale

Affiliation Los Alamos Natl. Lab., Earth and Space Sci. Div., Los Alamos, NM, United States (USA) **Affiliation**

U. S. Geol. Surv., United States (USA)

Author Elliot, Leonard T (chairperson)

Affiliation Chevron Resour. Co., USA, (United States)

Source Transactions - Geothermal Resources Council, vol. 11, pp.195-201, 1987

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic

Accession Number 1989-052744

102. **Database** GeoRef

Title **The petrology and *geochemistry* of precaldera magmas, *Long Valley* Caldera, eastern California**

Author Chaudet, Roy Edward

Publication Year 1986

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1989-026328

103. **Database** GeoRef

Title **Volcanic gas *geochemistry*; an overview of approaches, limitations, applications, and possibilities**

Author Williams, Stanley N; Stoiber, Richard E

Affiliation La. State Univ., Dep. Geol., Baton Rouge, LA, United States (USA)

Affiliation Dartmouth Coll., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.397, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-038948

104. **Database** GeoRef

Title ***Geochemistry* and materials studies in support of the Magma Energy Extraction Program**

Author Westrich, H R; Weirick, L J

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Author Crane, George K (chairperson)

Affiliation South. Calif. Edison Co., USA, (United States)

Source Transactions - Geothermal Resources Council, vol.10, pp.99-103, 1986

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic

Accession Number 1987-026658

105. **Database** GeoRef

Title **A chromatographic system for the analysis of selected light gases in geothermal and volcanic systems**

Author Sutton, A Jefferson

Affiliation U. S. Geol. Surv., Vancouver, WA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 87-0013, 12 pp., 1986

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1986

Publication Type Serial; Report; Monographic

Accession Number 1987-065182

106. **Database** GeoRef

Title **The petrology and *geochemistry* of precaldera magmas, *Long Valley* Caldera, eastern California**

Author Chaudet, Roy E

Affiliation Va. Polytech. Inst. and State Univ., Dep. Geol. Sci., Blacksburg, VA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.18, no.6, pp.563, 1986

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-072942

107. **Database** GeoRef

Title **Isotopic composition of carbon in fluids from the *Long Valley* geothermal system, California, U.S.A.**

Author Winnett, Terrie L L; Janik, Cathy J

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Hitchon, Brian (chairperson)

Source Extended Abstracts - International Symposium on Water-Rock Interaction, vol.5, pp.637-640, 1986

Publisher [publisher varies], [location varies], International (III)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-011405

108. **Database** GeoRef

Title **Mineral resource potential of the Rockhouse Basin Wilderness Study Area, Kern and Tulare counties, California**

Author Taylor, Gary C; Loyd, Ralph C; Alfors, John T; Burnett, John L; Stinson, Melvin C; Chapman, Rodger H; Silva, Mike A; Bacon, C Forrest; Bushnell, Marjorie M; Anderson, Thomas P

Affiliation California Department of Conservation, Division of Mines and Geology, Sacramento, CA, United States (USA)

Source Special Report - California Division of Mines and Geology, Report: 157, 31 pp., 1986

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Abstract This report presents the results of a geologic, energy, and minerals (GEM) survey of the Rockhouse Basin Wilderness Study Area (WSA) in the southern Sierra Nevada. The survey was conducted by the California Department of Conservation, Division of Mines and Geology (DMG) during the latter part of 1983 under Contract No. YA-551-CT3-440039 with the U.S. Bureau of Land Management (BLM). The work was contracted as part of a BLM study to determine the suitability of the Rockhouse Basin area for recommendation for inclusion into the National Wilderness Preservation System. The Rockhouse Basin Wilderness Study Area encompasses an uplifted erosional surface of older (pre-Middle Jurassic) metasedimentary rock (Kernville Series) which have been intruded by a succession of younger (Middle Jurassic to Cretaceous) granitic plutons of varying composition. The metamorphic rocks occur as a large roof pendant or as smaller xenoliths. These metamorphic rocks are vertically to steeply dipping, and consist principally of quartzites, schists, and phyllites with minor assemblages of marble, slate, hornfels, and metavolcanic rock. With few exceptions, all known occurrences of mineralization are confined to the metamorphic rocks, and the exceptions appear to be confined to areas containing late-stage pegmatites. The mineral resource potential of the WSA was evaluated and classified on the basis of geological, geochemical, and geophysical data developed during the study. The results of the GEM survey indicate that parts of the study area have a mineral resource potential. Some specific characteristics are presented below: - The WSA has a substantiated high potential for small deposits of tungsten with accessory
molybdenum and copper mineralization associated with small tactite zones developed along metasedimentary-igneous contacts. - Minor barite production has been recorded from prospects within the WSA that have a low-to-moderate barite resource potential. However, outside the WSA, toward VABM Bear, the southward continuation of this stratigraphic
horizon of sedimentary barite has supported moderate historic production and contains an extensive substantiated barite resource. - Geochemical and radiometric data indicate a moderate resource potential for small deposits of uranium associated with pegmatites along the southwestern end of ***Long Valley*** and in the Chimney Peak-Lamont Meadow area. - A small, undeveloped, but substantiated occurrence of gem quality turquoise exists near the southwestern end of ***Long Valley***. - Bodies of marble (metamorphosed limestone and dolomite) and quartz-feldspar-bearing pegmatite dikes are present. The marble has variable magnesium content and shows partial-to-complete silicification and variable widths; pegmatite dikes are small and discontinuous. Thus, variabilities in tonnage, composition, grade, thickness, and extent are not favorable for commercial utilization of either commodity.
- The geologic terrane has no potential for the occurrence of petroleum resources and has low potential for the development of geothermal resources in the area, even though it lies immediately west of the Coso Known Geothermal Resource Area. - Geochemical data indicate a low resource potential for deposits of lead-zinc-silver-gold in the southern and northern parts of the study area possibly associated with undiscovered ore-forming hydrothermal systems. Suggestions for further studies. Additional detailed geochemical and geophysical studies in specific areas might more closely delineate possible hydrothermal

mineralization, particularly in the Big Pine Meadow area and the southern and northern parts of the study area. Also, detailed ground magnetic investigations of small magnetic anomalies occurring near

metasedimentary -igneous rock contacts immediately east of the ***Long Valley***-Lamont Meadows Road might delineate possible concealed tactite zones.

Publication Year 1986

Publication Type Serial; Report; Map; Monographic

Accession Number 2001-046090

110. **Database** GeoRef

Title **Soil radon and elemental mercury distribution and relation to magmatic resurgence at *Long Valley* Caldera**

Author Williams, Stanley N

Affiliation Dartmouth Coll., Dep. Earth Sci., Hanover, NH, United States (USA)

Source Science, vol.229, no.4713, pp.551-553, 09 Aug 1985

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-008228

111. **Database** GeoRef

Title **Degassing of Obsidian Dome magma; hydrogen and oxygen isotope studies in the Inyo Dome chain, *Long Valley* area, California**

Author O'Neil, James R; Taylor, Bruce E

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Geol. Surv. Can., Canada (CAN)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.387, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046946

112. **Database** GeoRef

Title **Two feldspar and iron-titanium oxide equilibria in silicic magmas and the depth of origin of large volume ash-flow tuffs**

Author Stormer, John C, Jr; Whitney, James A

Affiliation Rice Univ., Dep. Geol., Houston, TX, United States (USA)

Affiliation Univ. Ga., Dep. Geol., United States (USA)

Source American Mineralogist, vol.70, no.1-2, pp.52-64, Feb 1985

Publisher Mineralogical Society of America, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-034082

113. **Database** GeoRef

Title **Hydrologic and geochemical monitoring in *Long Valley* Caldera, Mono County, California, 1982-1984**

Author Farrar, C D; Sorey, Michael L; Rojstaczer, S; Janik, C J; Mariner, Robert H; Winnett, T L; Clark, M D

Affiliation U. S. Geol. Surv., Sacramento, CA, United States (USA)

Source Water-Resources Investigations - U. S. Geological Survey, Report: WRI 85-4183, 137 pp., 1985

Publisher U. S. Geological Survey, [Reston, VA], United States (USA)

Publication Year 1985

Publication Type Serial; Report; Map; Monographic

Accession Number 1986-007410

114. **Database** GeoRef

Title **A Nd and Sr isotopic study of the Inyo-Mono Crater rhyolites, eastern California**

Author Cameron, K L; Kelleher, P C; Sampson, D E

Affiliation Univ. Calif., Board Earth Sci., Santa Cruz, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.17, no.7, pp.538, 1985

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-076334

115. **Database** GeoRef

Title **(super 230) Th- (super 238) U disequilibrium systematics from *Long Valley* and Mono domes, California; evidence for magma replenishment since 0.1 m.y. ago**

Author Tanzer, M O; MacDougall, J D

Affiliation Scripps Inst. Oceanogr., La Jolla, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1128, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046352

116. **Database** GeoRef

Title **Mantle CO (sub 2) degassing at *Long Valley*, Steamboat Springs, and the Coso Range**

Author Taylor, Bruce E; Gerlach, Terrence M

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1153, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-050172

117. **Database** GeoRef

Title **Drilling a silicic dome**

Author Eichelberger, John C

Affiliation Sandia Natl. Lab. Div., Alburquerque, NM, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.16, no.6, pp.499, Sep 1984

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-041008

118. **Database** GeoRef

Title ***Geochemistry* of the most recent eruptive event in the Inyo volcanic chain, eastern California; the intersection of two magmatic systems**

Author Sampson, D E; Cameron, K L

Affiliation Univ. Calif., Earth Sci. Board, Santa Cruz, CA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.16, no.6, pp.643, Sep 1984

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-068107

119. **Database** GeoRef

Title **Soil gas radon and mercury at an active silicic caldera; *Long Valley*, California**

Author Williams, Stanley N; Hudnut, Kenneth W

Affiliation Dartmouth Coll., Dep. Earth Sci., Hanover, NH, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.16, no.6, pp.695, Sep 1984

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-087256

120. **Database** GeoRef

Title **Changing mercury anomalies in *Long Valley*, California; indication for magma movement or seismic activity**

Author Varekamp, Johan C; Buseck, Peter R

Affiliation Ariz. State Univ., Dep. Geol. and Chem., Tempe, AZ, United States (USA)

Source Geology (Boulder), vol.12, no.5, pp.283-286, May 1984

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mercury anomalies in soils in geothermal areas form as a result of vapor transport. Comparison of the Hg distribution measured in 1975, and again in 1982, indicates that a new Hg anomaly formed in the Inyo crater zone in the intervening period. Two models can explain this new

anomaly: (1) geothermal water has reached shallow levels as a result of increased permeability created by seismic activity, or (2) addition of a CO (sub 2) -rich, magnetic vapor to the geothermal system at depth caused vapor exsolution in zones where it did not occur before. If the Hg anomaly in the Inyo crater zone is related to the addition of magmatic vapors, the site of the new anomaly may overlie young, intruding magma.-- Modified journal abstract.

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1984-029746

121. **Database** GeoRef

Title **Chemical evolution and current state of the *Long Valley* magma chamber**

Author Bailey, Roy A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.24-40, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059720

122. **Database** GeoRef

Title **Soil Hg (super o) and Rn distribution pattern at *Long Valley* Caldera, eastern California**

Author Williams, Stanley N; Hudnut, Kenneth W

Affiliation Dartmouth Coll., Dep. Earth Sci., Hanover, NH, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.708-713, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059744

123. **Database** GeoRef

Title **Radon-222 in groundwater of the *Long Valley* caldera, California**

Author Wollenberg, H A; Smith, A R; Mosier, D F; Flexser, S; Clark, M **Affiliation**

Lawrence Berkeley Lab., Berkeley, CA 94720, United States (USA) **Affiliation** U. S.

Geol. Surv., Menlo Park, CA 94025, United States (USA)

Source Pure and Applied Geophysics, vol.122, no.2-4, no special, pp.327-339, 1984

Publisher Birkhaeuser Verlag, Basel, Switzerland (CHE)

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1987-050382

124. **Database** GeoRef

Title **Hydrogen isotopic evidence of rhyolitic magma degassing during shallow intrusion and eruption**

Author Taylor, Bruce E; Eichelberger, J C; Westrich, Henry R

Affiliation Univ. Calif., Dep. Geol., Davis, CA 95616, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Source Nature (London), vol.306, no.5943, pp.541-545, 08 Dec 1983

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1986-043310

125. **Database** GeoRef

Title **Continuous hydrogen monitoring for predicting earthquakes**

Author Sato, Motoaki; McGee, K A; Sutton, A J; Casadevall, T J

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.758, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-078206

126. **Database** GeoRef

Title **Postcaldera evolution of the *Long Valley* magma chamber, eastern California**

Author Bailey, R A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.889, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016547

127. **Database** GeoRef

Title **Petrochemical evolution of Mammoth Mountain, *Long Valley* Caldera, eastern California**

Author Koeppen, R P

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.889, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016548

128. **Database** GeoRef

Title **Soil Hg degrees distribution patterns and response to magmatic resurgence at *Long Valley* Caldera, California**

Author Williams, Stanley N; Hudnut, Kenneth W; Lawrence, Elizabeth A; Lytle, Joseph N

Affiliation Dartmouth Coll., Dep. Earth Sci., Hanover, NH, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016561

129. **Database** GeoRef

Title **Radon-222 in ground water of the *Long Valley* Caldera**

Author Wollenberg, H A; Smith, A R; Mosier, D F; Flexser, S; Clark, M

Affiliation Univ. Calif., Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Affiliation U. S. Forest Serv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016562

130. **Database** GeoRef

Title **Correlation of hydrogen gas emissions and seismic activity at *Long Valley* Caldera, California**

Author McGee, K A; Sutton, A J; Sato, Motoaki; Casadevall, T J

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Affiliation U. S. Geol. Surv., Cascades Volcano Obs., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016563

131. **Database** GeoRef

Title ***Long Valley*; increase in the (super 3) He/ (super 4) He ratio from 1978 to 1983**

Author Rison, W; Welhan, J A; Poreda, R; Craig, H

Affiliation Scripps Inst. Oceanogr., La Jolla, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016564

132. **Database** GeoRef

Title **Short polarity reversal (or large geomagnetic excursion) in Brunhes-age lake sediment, *Long Valley*, California**

Author Liddicoat, Joseph C; Lajoie, K R; Sarna-Wojcicki, Andrei M; Bailey, R A

Affiliation Lamont-Doherty Geol. Obs., Palisades, NY, United States (USA) **Affiliation** U. S. Geol. Surv., United States (USA)

Author Anonymous

Affiliation Natl. Sci. Found., USA, (United States)

Source Eos, Transactions, American Geophysical Union, vol.64, no.18, pp.217, 03 May 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-017224

133. **Database** GeoRef

Title **Petrology of Glass Mountain, *Long Valley*, California**

Author Metz, J

Affiliation Stanford Univ., Dep. Geol., Stanford, CA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.15, no.5, pp.391, Mar 1983

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-045649

134. **Database** GeoRef

Title **Chronology of late Pleistocene and Holocene volcanics, *Long Valley* and Mono Basin geothermal areas, eastern California**

Author Wood, Spencer H

Affiliation Occident. Coll., Los Angeles, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 83-0747, 84 pp., 1983

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1983

Publication Type Serial; Report; Map; Monographic

Accession Number 1985-023936

135. **Database** GeoRef

Title **Chemistry and eruptive history of Glass Mountain, CA; precursors to a major caldera-forming eruption**

Author Metz, J; Mahood, Gail A

Affiliation Stanford Univ., Dep. Geol., Stanford, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.883, 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-009963

136. **Database** GeoRef

Title **Changing Hg soil patterns in the *Long Valley* Caldera; a response to new magma influxes?**

Author Buseck, Peter R; Varekamp, Johan C

Affiliation Ariz. State Univ., Dep. Geol. and Dep. Chem., Tempe, AZ, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012949

137. **Database** GeoRef

Title **Geologic and petrologic data bearing on potential volcanic hazards in *Long Valley* Caldera, eastern California**

Author Bailey, Roy A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.72, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054422

138. **Database** GeoRef

Title **Changes in the discharge characteristics of thermal springs and fumaroles in the *Long Valley* caldera, California, resulting from earthquakes on May 25-27, 1980**

Author Sorey, M L; Clark, M D

Affiliation U. S. Geol. Surv., USA, (United States)

Source Open-File Report - U. S. Geological Survey, Report: OF 81-0203, 25 pp., 1981

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1981

Publication Type Serial; Report; Monographic

Accession Number 1981-052478

139. **Database** GeoRef

Title **Reversal of the paleomagnetic field in Brunhesage lacustrine sediments in *Long Valley* and Mono Basin, California**

Author Liddicoat, J C; Lajoie, K R; Bailey, R A; Sarna-Wojcicki, A M; Russell, P C; Woodward, M

Affiliation Lamont-Doherty Geol. Obs., Palisades, N.Y., United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.61, no.17, pp.215, 22 Apr 1980

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1980

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1980-039166

140. **Database** GeoRef

Title **Chemical and isotopic prediction of aquifer temperatures in the geothermal system at *Long Valley*, California**

Author Fournier, R O; Sorey, M L; Mariner, R H; Truesdell, A H

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.5, no.1-2, pp.17-34, Feb 1979

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1979

Publication Type Serial; Analytic

Accession Number 1979-023068

141. **Database** GeoRef

Title **Mercury in soils of the *Long Valley*, California, geothermal system**

Author Klusman, R W; Landress, R A

Affiliation Colo. Sch. Mines, Dep. Chem. and Geochem., Golden, Colo., United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.5, no.1-2, pp.49-65, Feb 1979

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1979

Publication Type Serial; Analytic

Accession Number 1979-023070

142. **Database** GeoRef

Title **Exploration for geothermal areas using mercury; a new geochemical technique**

Author Matlick, Joseph S, III; Buseck, Peter R

Affiliation Ariz. State Univ., Dep. Geol., Tempe, AZ, United States (USA)

Affiliation Ariz. State Univ., Dep. Chem., United States (USA)

Source Geothermal Energy, vol.6, no.9, pp.15-23, Sep 1978

Publisher Geothermal World Corporation, Reseda, CA, United States (USA)

Publication Year 1978

Publication Type Serial; Analytic

Accession Number 1981-060593

143. **Database** GeoRef

Title **Hydrogeology of *Long Valley* geothermal area, California**

Author Olmsted, F H

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source AAPG Bulletin, vol.62, no.7, pp.1231, Jul 1978

Resource Location http://www.aapg.org/datasystems/bullsrch.html

Publisher American Association of Petroleum Geologists, Tulsa, OK, United States (USA)

Publication Year 1978

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1978-039584

144. **Database** GeoRef

Title **Petrology of post-caldera rhyolites in *Long Valley*, California**

Author Bailey, R A (investigator)

Source U. S. Geological Survey Professional Paper, Report: P 1100, pp.182, 1978

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1100.djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1978

Publication Type Serial; Report; Analytic; Abstract only

Accession Number 1978-042964

145. **Database** GeoRef

Title **Nature of the occurrence of mercury in soils of the *Long Valley*, California geothermal area**

Author Landress, R A

Publication Year 1977

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1979-025986

146. **Database** GeoRef

Title **(super 238) U/ (super 230) Th isotope systematics of rhyolites from *Long Valley*, California**

Author Baranowski, James

Publication Year 1977

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1981-065077

147. **Database** GeoRef

Title ***Geochemistry* of thermal waters in *Long Valley*, Mono County, California**

Author Mariner, R H; Willey, L M

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.792-800, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Thermal springs and wells in ***Long Valley***, California, issue sodium bicarbonate-chloride waters containing 1000-1420 mg/l of dissolved solids. Thermal waters of sodium bicarbonate-chloride composition are usually associated with hot-water reservoirs. Chloride concentrations and stable isotope data indicate that the thermal waters have had varied histories. All of the thermal springs issue a mixture of fluid from the thermal reservoir and less saline, cooler water from one or more shallow aquifers. The composition of springs in Hot Creek Gorge may have been further altered by minor subsurface boiling. Thermal springs between Hot Creek and Lake Crowley issue mixtures of fresh and thermal waters which have lost heat by conductive cooling and changed composition by reaction with rock in the shallow aquifer. The silica content of water from Magma Richie 5 and mixing calculations based on the concentrations of silica in thermal waters collected from springs in Hot Creek Gorge and along Little Hot Creek indicate a temperature of at least 200 degrees C in the thermal reservoir. The sodium-potassium-calcium geothermometer yields a reservoir temperature estimate near 200 degrees C for most of the thermal springs. If geothermal energy is developed in ***Long Valley***, the high concentrations of arsenic (up to 2.2 mg/l), boron (up to 15 mg/l), and total dissolved solids in the thermal fluids will make it necessary to isolate the effluent of production wells from the freshwater system.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031719

148. **Database** GeoRef

Title **Thermogravitational mechanisms for chemical variations in zoned magma chambers**

Author Shaw, H R; Smith, R L; Hildreth, W

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Affiliation U. S. Geol. Surv., Reston, Va., United States ; Univ. Calif., Berkeley, United States

Source Abstracts with Programs - Geological Society of America, vol.8, no.6, pp.1102, 1976

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1977-022878

149. **Database** GeoRef

Title **Origin of lithium and other components in the Searles Lake evaporites, California**

Author Smith, George I

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source U. S. Geological Survey Professional Paper, Report: P 1005, pp.92-103, 1976

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1005.djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1976

Publication Type Serial; Report; Analytic

Accession Number 1981-038444

150. **Database** GeoRef

Title **A new exploration method for geothermal sources using mercury**

Author Matlick, Skip; Buseck, P R

Affiliation Ariz. State Univ., Dep. Geol., Tempe, Ariz., United States (USA)

Source U. N. Symp. Dev. Use Geotherm. Resour., Abstr., no.2, unpaginated, 29 May 1975

Publication Year 1975

Publication Type Serial; Conference document; Analytic

Accession Number 1975-029083

151. **Database** GeoRef

Title ***Geochemistry* of thermal waters in *Long Valley*, Mono County, California**

Author Willey, L M; O'Neil, J R; Rapp, J B

Source Open-File Report - U. S. Geological Survey, Report: OF 74-5125, 19 pp., 1974

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1974

Publication Type Serial; Report; Monographic

Accession Number 1985-005344

152. **Database** GeoRef

Title **Volcanism and Geochronology of *Long Valley* Caldera, Mono County, California**

Author Bailey, Roy A; Lanphere, Marvin A; Dalrymple, G Brent

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038967

153. **Database** GeoRef

Title **Structure of the *Long Valley* Caldera from Detailed Seismic-Refraction Measurements**

Author Hill, David P; McHugh, Stuart; Pakiser, L C

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038968

154. **Database** GeoRef

Title **Gravity and magnetic anomalies in *Long Valley*, California**

Author Kane, Martin F; Mabey, Don R

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038969

155. **Database** GeoRef

Title **Prospecting for Heat in *Long Valley***

Author Lachenbruch, Arthur H; Lewis, Robert E; Sass, J H

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038970

156. **Database** GeoRef

Title ***Geochemistry* of Thermal Waters in *Long Valley*, California**

Author Willey, L M; Rapp, J B; Barnes, Ivan

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038971

157. **Database** GeoRef

Title **A total-field resistivity map of *Long Valley*, California**

Author Stanley, William D; Jackson, Dallas B; Zohdy, Adel A R

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038972

158. **Database** GeoRef

Title **Direct current and electromagnetic soundings in *Long Valley*, California**

Author Jackson, Dallas B; Stanley, William D; Zohdy, Adel A R

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038973

159. **Database** GeoRef

Title **Audio-magnetotelluric sounding as a reconnaissance exploration technique in *Long Valley*, California**

Author Hoover, Donald B; Frischknecht, Frank C; Tippens, Charles L

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038974

160. **Database** GeoRef

Title **The application of the self-potential method in the exploration for geothermal energy in *Long Valley*, California**

Author Anderson, Lennart A; Johnson, Gordon R

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038975

161. **Database** GeoRef

Title **A Seismic Noise Survey in *Long Valley*, California**

Author Iyer, H M; Hitchcock, Tim

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038976

162. **Database** GeoRef

Title **Microearthquakes in and near *Long Valley*, California**

Author Steeples, Don W; Pitt, A M

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1213, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038977

GEOCHRONOLOGY BIBLIOGRAPHY

1. **Database** ProQuest Deep Indexing: Earth Sciences

Title **Geology, *geochronology*, and geochemistry of the Miocene-Pliocene Ancestral Cascades arc, northern Sierra Nevada, California and Nevada: The roles of the upper mantle, subducting slab, and the Sierra Nevada lithosphere**

Author Cousens, Brian; Prytulak, Julie; Henry, Christopher; Alcazar, Al; Brownrigg, Tim

Affiliation Department of Earth Sciences, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S5B6, Canada

Source Geosphere [Geosphere]. Vol. 4, no. 5, pp. 829-853. Oct 2008.

Abstract The assemblage of ca. 28-3 Ma volcanic rocks exposed in the Lake Tahoe-Reno region of the northern Sierra Nevada, United States, is interpreted to be part of the Ancestral Cascades volcanic arc. The volcanic rocks are commonly highly porphyritic, including abundant plagioclase with clinopyroxene, amphibole, and rare biotite, and range from basaltic andesite to dacite in composition. Less common are poorly phyric, olivine- and clinopyroxene-bearing basalts and basaltic andesites. Porphyritic lavas dominate composite volcanic centers, whereas the poorly phyric lavas form isolated cinder cone and lava flow complexes. Tahoe-Reno arc lavas are calc-alkaline, enriched in the large ion lithophile elements but depleted in Nb and Ta relative to the light rare earth elements, and have highly variable radiogenic isotopic compositions. Compared to the modern south Cascade arc, Tahoe-Reno region basalts are enriched in the light rare earth and large ion lithophile elements and have higher 87Sr/86Sr and lower 143Nd/144Nd that are consistent with an old, subduction-modified lithospheric mantle source, such as that proposed for lavas of the Western Great Basin. Melting of the lithospheric mantle may be enhanced by fluid flux from the subducting slab if the Juan de Fuca slab dip is shallow. Andesites and dacites evolved from basaltic magmas by a combination of fractional crystallization and assimilation of lower crustal melts. Available geochronological data indicate that the westward sweep of Cenozoic volcanism through Nevada was associated with steepening of the slab dip, but the dip angle was lower during Miocene-Pliocene arc volcanism than it is today beneath the modern south Cascades.

Publisher Geological Society of America, 3300 Penrose Place

Publication Type Journal Article

Publication Year 2008

Accession Number 8919904

2. **Database** GeoRef

Title **Implications of pre-eruptive magmatic histories of zircons for U-Pb *geochronology* of silicic extrusions**

Author Simon, Justin I; Renne, Paul R; Mundil, Roland

Affiliation Berkeley Geochronology Center, Berkeley, CA, United States (USA)

Source Earth and Planetary Science Letters, vol. 266, no. 1-2, pp.182-194, 01 Feb 2008

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Zircons in silicic magmas begin to crystallize 10's to 100's of thousands of years (ka) prior to their eruption. U/Pb and U/Th dating for zircons from 32 young extrusions indicate a range of mean pre-eruption ages from approximately 33 to 247 ka, with a median of 92 ka. Explosive large volume (widespread) eruptions show a narrower range and a younger median of 70 ka. These results indicate that the difference between initial zircon growth and eruption age measured by other (e.g., (super 40) Ar/ (super 39) Ar) techniques is in excess of the achievable analytical uncertainty for eruptions <30 million years (Ma), and likely for eruptions of up to 300 Ma. Protracted pre-eruption zircon growth is well established by an increasing number of studies on magma process time scales, but this source of eruption age bias has been largely ignored in chronostratigraphic applications of high-precision U/Pb data. Until intrinsic properties of zircons or their host deposits enable a priori estimates of pre-eruption age bias, it is prudent to expand the uncertainties attending all U/Pb zircon ages interpreted as deposition ages (in e.g., chronostratigraphic studies) by +0/-200 ka.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2008-071800

3. **Database** GeoRef

Title **Allanite and chevkinite as absolute chronometers of rhyolite differentiation**

Author Vazquez, Jorge A

Affiliation California State University, Northridge, Department of Geological Sciences, Los Angeles, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 104th annual meeting; Geological Society of America, Rocky Mountain Section, 60th annual meeting

Author Burns, Scott (chairperson); Middleton, Larry T (chairperson); Metcalf, Rodney V (chairperson)

Source Abstracts with Programs - Geological Society of America, vol. 40, no. 1, pp.74, Feb 2008

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Allanite [(Ca, LREE, Th) (sub 2) (Mg,Fe) (sub 3) Si (sub 3) O (sub 12) (OH)] and chevkinite [(Ca, LREE, Th) (sub 4) Fe (super 2+) (Al, Mg, Fe,Ti) (sub 2) Ti (sub 2) Si (sub 4) O (sub 22)] are accessory minerals which can be particularly useful for delimiting the evolution of rhyolitic magmas because they often contain significant compositional zoning that is sensitive to changes in magmatic conditions and is amenable to ***geochronology*** due to high Th concentrations. Both minerals are relatively common in metaluminous rhyolites from a variety of tectonic settings, with allanite generally occurring in hosts that crystallized at lower magmatic temperatures than those hosting chevkinite. Reconnaissance experiments indicate that allanite saturation occurs in high-silica rhyolites between 760 -770 degrees C; at > or =780 degrees C, anhydrous chevkinite replaces allanite. The compositions of allanites from rhyolites erupted at ***Long Valley***, Mono Craters, and Coso, USA, and Toba, Indonesia, follow a similar compositional trend of decreasing La, Ce, Ti, Mg and increasing Mn, Y, and Th, which mirrors the variability of compatible and incompatible elements, respectively, during fractionation of rhyolitic magma containing LREE-rich phases. Single crystals of chevkinite from caldera-forming and postcaldera rhyolites at Yellowstone, USA, may contain significant zoning in LREE, Th, Mg, and Y due to differentiation. However, parental melt compositions are difficult to calculate because partition coefficients between chevkinite and metaluminous melts are poorly delimited. For young chevkinites and allanites (<350 ka), the compositional variations in single crystals can be linked to absolute age through (super 238) U- (super 230) Th dating via ion microprobe analysis. Compositional zoning in Toba allanites records crystal growth from rhyolitic melts related by up to 45% fractionation, which when keyed to (super 238) U- (super 230) Th crystallization ages, dates the accumulation and differentiation of a voluminous silicic magma over an approximately 150,000 year interval. Chevkinites from postcaldera rhyolite at Yellowstone yield apparent (super 238) U- (super 230) Th ages that 1) fall within range of crystallization ages for coexisting zircon and 2) correlate with the compositional variations recorded by single crystals.

Publication Year 2008

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-065925

4. Database GeoRef

Title **Cosmogenic nuclide intercalibration and erosion rate study on fault scarps of the Bishop Tuff, CA, USA**

Author Goethals, M M; Niedermann, S; Hetzel, R; Fenton, C R

Affiliation Westfaelische Wilhelms-Universitaet Muenster, Munster, Federal Republic of Germany (DEU)

Affiliation GeoForschungsZentrum Potsdam, Federal Republic of Germany (DEU)

Monograph Title Abstracts of the 17th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol. 71, no. 15S, pp.A335, Aug 2007

Resource Location http://www.sciencedirect.com/ science/journal/00167037

Publisher Elsevier, New York, NY, International (III)

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2008-083639

5. Database GeoRef

Title **High resolution *geochronology*; from planetary progenitors to terrestrial rhyolites**

Author Simon, Justin Ibrahim

Pages 285

Publication Year 2005

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Los Angeles, Los Angeles, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2006-044965

6. Database GeoRef

Title **Alpha-recoil-track-dating (ART-D) of dark mica, *Long Valley* Caldera, California**

Author Glasmacher, Ulrich Anton; Wagner, Guenther A; McConnell, Vicki S; Bailey, Roy

Affiliation Max Planck Institute fuer Kernphysik, Heidelberg, Federal Republic of Germany (DEU)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1161, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2001-063314

7. Database GeoRef

Title **Alpha-recoil-track-dating (ART-d) of dark mica, a new tool for dating young volcanic rocks, *Long-Valley*-Caldera, California**

Author Glasmacher, U A; Wagner, G A

Affiliation Max-Planck-Institut fuer Kernphysik, Heidelberger Akademie der Wissenschaften, Forschungsstelle Archaeometrie, Heidelberg, Federal Republic of Germany (DEU)

Monograph Title Geological Society of America, 1999 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.31, no.7, pp.207, 1999

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Dark micas contain uranium, thorium and their radioactive daughters in trace concentrations. Their alpha-decay releases energies of several MeV, part of which is transferred to the daughter-nucleus as recoil-energy (approximately 10 keV). The alpha-recoil nucleus slows down when interacting with the lattice atoms producing approximately 103 lattice defects which equals one single alpha-recoil track. A model is proposed for the accumulation of alpha-recoil tracks (ART) in micas (Gogen & Wagner, 1999). The age equation which is based on the model combines the volumetric density (r) of ART with the uranium and thorium content. The volumetric density is determined from the linear increase of the area density of etched tracks as a function of the etching time, and can be derived either from the slope (m = vv * r, whereby vv is the etching velocity parallel to the c-axis) or the Y-intersection of the etching curve. The uranium and thorium contents were determined with the induced-fission-track and ICP-MS method. The applicability of the ART-dating technique for natural samples has been initially tested by using phlogopite from dated Quaternary alkaline volcanic rocks (10-300 ka) of the Eifel region, Germany. Annealing experiments using phlogopite from the same area imply that 50% of tracks are lost if a temperature of 50 degrees C is applied over a time period of 1 My (Gogen & Wagner, 1999). Results of an ongoing study dealing with biotite of dated volcanic rocks (500 a-730 ka) of the ***Long-Valley***-Caldera, California will be presented. This study invests the ART-dating technique and Art-annealing properties of biotite as well as the applicability of the ART-technique as a new thermochronological and tephrochronological tool.

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2001-013111

8. Database GeoRef

Title **Magmatic degassing of CO (sub 2) recorded in tree rings at Mammoth Mountain, California**

Author Fessenden, J E; Rahn, T A

Affiliation Scripps Institution of Oceanography, La Jolla, CA, United States (USA)

Monograph Title AGU 1996 spring meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.17, Suppl., pp.279-280, 23 Apr 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1998-005926

9. Database GeoRef

Title **(super 40) Ar/ (super 39) Ar laser probe ages of Bishop Tuff quartz phenocrysts substantiate *long*-lived silicic magma chamber at *Long Valley*, United States**

Author van den Bogaard, Paul; Schirnick, Carsten

Affiliation Geomar Research Center, Kiel, Federal Republic of Germany (DEU)

Source Geology (Boulder), vol.23, no.8, pp.759-762, Aug 1995

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Laser probe (super 40) Ar/ (super 39) Ar dating of quartz phenocrysts with rhyolite glass inclusions from the Bishop Tuff air-fall and ignimbrite deposits reveals that the ***Long Valley*** magma system existed as a ***long***-lived silicic magma chamber throughout most of the Pleistocene. Sanidine phenocryst and matrix glass analyses show that the Bishop Tuff eruption occurred at 759+ or -1 to 761+ or -1 ka. Initial and radiogenic Ar isotope ratios indicate isotopic equilibrium between the sanidine phenocrysts and their host melt at the time of eruption. The quartz phenocrysts, in contrast, the most abundant phenocryst phase of the Bishop rhyolite, crystallized, trapped their glass inclusions, and became a closed system with respect to Ar at 1.89+ or -0.03 to 2.3+ or -0.3 Ma. Consequently, the Bishop rhyolite magma already resided in the ***Long Valley*** basement and had formed most of its quartz phenocrysts approximately 1.1 m.y. before its principal eruption, providing important constraints on the longevity of large silicic magma chambers.

Publication Year 1995

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1995-053241

10. Database GeoRef

Title **Age and correlation of a paleomagnetic episode in the Western United States by (super 40) Ar/ (super 39) Ar dating and tephrochronology; the Jamaica, Blake, or a new polarity episode?**

Author Herrero-Bervera, Emilio; Helsley, C E; Sarna-Wojcicki, A M; Lajoie, K R; Meyer, C E; McWilliams, M O; Negrini, R M; Turrin, B D; Donnelly-Nolan, J M; Liddicoat, J C

Affiliation University of Hawaii, Hawaii Institute of Geophysics and Planetology, Manoa, HI, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Stanford University, United States (USA); California State University at Bakersfield, United States (USA); Barnard College, United States (USA)

Source Journal of Geophysical Research, vol. 99, no. B12, pp.24,091-24,103, 10 Dec 1994

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract High-resolution paleomagnetic records from two sites near Pringle Falls, Oregon, are compared with similar records from Summer Lake, Oregon, approximately 170 km to the southeast: Paoha Island, in Mono Lake, approximately 660 km to the southeast and Benton Crossing, in ***Long Valley***, approximately 700 km to the southeast, in east-central California. The sequences at Pringle Falls contain a distinctive coarse pumice-lapilli tephra layer which we have dated as 218+ or -10 ka by (super 40) Ar/ (super 39) Ar step-heating of plagioclase feldspar. Stratigraphically, this tephra is closely associated with a suite of several other tephra layers that bracket the interval studied paleomagnetically. Each tephra layer is distinguished by the unique chemical composition of its volcanic glass shards. The pumice layer dated at Pringle Falls is correlated with layers at three of the other localities. Using all the tephra layers, we can correlate the lake stratigraphic sequences and associated paleomagnetic records among the four distant localities. Additional age control is obtained from a fifth locality at Tulelake in northern California, where the stratigraphic interval of interest is bracketed between approximately 171+ or -43 and approximately 140 ka. Characteristics of the paleomagnetic records indicate virtually identical paleofield variation, particularly the geometry of a normal to normal (N-N) geomagnetic polarity episode. The observed paleofield behavior resembles the Blake geomagnetic polarity episode, but is significantly older than the generally accepted age of the Blake episode. Either the age of the Blake episode is significantly underestimated, or the polarity episode documented here is older, perhaps the Jamaica episode, or is an as yet unreported episode. A corollary of the latter option is that paleomagnetic polarity episodes of different ages may have similar transition polar paths, a conclusion implying that a common mechanism is involved. Copyright 1994 by the American Geophysical Union.

Publication Year 1994

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1995-021565

11. Database GeoRef

Title **Age and correlation of a paleomagnetic excursion in the Western U.S. by (super 40) Ar/ (super 39) Ar dating and tephrochronology; the Jamaica, Blake or a new polarity episode?**

Author Herrero-Bervera, Emilio; Helsley, C E; Sarna-Wojcicki, A M; Lajoie, K R; Meyer, C E; Turrin, B D; Donnelly-Nolan, J M; McWilliams, M O; Negrini, R M; Liddicoat, J C

Affiliation SOEST-Hawaii Institute of Geophysics and Planetology, Honolulu, HI, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Stanford University, United States (USA); California State University, United States (USA); Columbia University, United States (USA)

Monograph Title AGU 1994 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.190-191, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1996-009351

12. Database GeoRef

Title **Oxygen isotope microanalyses of silicic rocks in *Long Valley* Caldera; uncovering trends in the paleohydrothermal systems**

Author McConnell, V S; Valley, J W; Spicuzza, M J; Eichelberger, J C

Affiliation University of Alaska -Fairbanks, Geophysical Institute, Fairbanks, AK, United States (USA)

Affiliation University of Wisconsin, United States (USA)

Monograph Title Abstracts of the Eighth international conference on ***Geochronology***, cosmochronology, and isotope geology

Editor Lanphere, M A; Dalrymple, G B; Turrin, B D

Source U. S. Geological Survey Circular, Report: C 1107, pp.209, 1994

Report Number C 1107

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1994

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1995-011705

13. Database GeoRef

Title **Pb, Sr, Nd isotope and U-series investigation of the Holocene Inyo and Mono high silica rhyolite domes, E. California**

Author Palacz, Zenon; Gill, James

Affiliation University of California at Santa Cruz, Earth Science Board, Santa Cruz, CA, United States (USA)

Monograph Title Abstracts of the Eighth international conference on ***Geochronology***, cosmochronology, and isotope geology

Editor Lanphere, M A; Dalrymple, G B; Turrin, B D

Source U. S. Geological Survey Circular, Report: C 1107, pp.241, 1994

Report Number C 1107

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1994

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1995-011768

14. Database GeoRef

Title **Preliminary geomagnetic paleointensities from *Long Valley* Caldera, California**

Author Mankinen, Edward A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 94-0633, 17 pp., 1994

Report Number OF 94-0633

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 17

Publication Year 1994

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1995-028494

15. Database GeoRef

Title **Single crystal laser (super 40) Ar/ (super 39) Ar ages of quartz protocrysts in the 0.761 ma Bishop Tuff rhyolite (*Long Valley*, U.S.A.)**

Author Bogaard, P V D; Schirnick, C

Affiliation Geomar Research Center, Department of Volcanology and Petrology, Kiel, Federal Republic of Germany (DEU)

Monograph Title Abstracts of the eighth international conference on ***Geochronology***, cosmochronology, and isotope geology

Editor Lanphere, M A; Dalrymple, G B; Turrin, B D

Source U. S. Geological Survey Circular, Report: C 1107, pp.32, 1994

Report Number C 1107

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1994

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1995-043605

17. Database GeoRef

Title **A late Pliocene to middle Pleistocene pluvial lake in Fish Lake *valley*, Nevada and California; with Suppl. Data 9318**

Author Reheis, Marith C; Slate, Janet L; Sarna-Wojcicki, Andrei M; Meyer, Charles E

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Affiliation University of Colorado, Department of Geological Sciences, Boulder, CO, United States (USA)

Source Geological Society of America Bulletin, vol.105, no.7, pp.953-967, Jul 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The question of whether a pluvial lake existed in Fish Lake ***valley***, Nevada and California, has been debated for more than 100 yr. New stratigraphic evidence indicates that a lake did exist in this ***valley*** at intervals during late Pliocene to middle Pleistocene time. This lake may have drained northward, or it may have been periodically contiguous with a pluvial lake to the north in Columbus Salt Marsh. Proof of the existence of this lake, informally named Pluvial Lake Rennie, is derived from three principal outcrops of shallow - water deposits, two outcrops of deep-water deposits, and several drilling logs. The deposits con- tain beds of silicic tephra, which provide age control. On the basis of thickness, grain size, major -oxide chemistry of glass shards, and paleomagnetism, three of the shallow-water deposits, including deltaic(?), beach, and siliceous hot-spring sediments, consist mainly of Bishop ash derived from the 0.77 Ma eruption of the ***Long Valley*** caldera. A fourth shallow -water deposit(?) is associated with approximately 1 Ma Glass Mountain tephra beds. The exposed deep-water deposits consist of green claystone, siltstone, and fine-grained sandstone containing tephra derived from the eruptions of the approximately 2.1 Ma tuff of Taylor Canyon and the approximately 2.0 Ma Huckleberry Ridge Tuff. The drilling logs record numerous thick beds of clay and sandy clay inferred to be deep-water lacustrine deposits. Pluvial Lake Rennie fluctuated in size and depth beginning prior to 2 Ma and continuing until sometime after 0.77 Ma. At about 0.77 Ma, the lake had a highstand at an elevation of approximately 1,460 m, covered an area of 400 -500 km (super 2) , and had a maximum depth of approximately 250 m. The lake level dropped just after the eruption of the Bishop ash, but the lake may have persisted at a lower level until approximately 0.5 Ma. No large, ***long***- lived lake existed in Fish Lake ***valley*** in late Pleistocene time, probably due to the increasing rain -shadow effect caused by the relative uplift of the White Mountains and Sierra Nevada in the Pleistocene. These results indicate that the late middle to late Pleistocene history of Pluvial Lake Rennie is similar to that of Lake Tecopa but is quite different from those of Lake Lahontan and Searles Lake.

Publication Year 1993

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1993-023434

18. Database GeoRef

Title **Crystallization histories of silicic magmas deduced from Rb-Sr *geochronology***

Author Davies, G R; Halliday, A N; Mahood, G A

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Monograph Title Sixth meeting of the European Union of Geosciences

Source Terra Abstracts, vol.3, no.1, pp.116-117, 1991

Publisher Blackwell Scientific Publications, Oxford, International (III)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 1994-000217

19. Database GeoRef

Title **Evidence for *long* residence times of rhyolitic magma in the *Long Valley* magmatic system; the isotopic record in precaldera lavas of Glass Mountain; discussion and replies [modified]**

Author Sparks, R Stephen J; Huppert, Herbert E; Wilson, Colin J N; Halliday, Alex N; Mahood, Gail A

Affiliation Bristol Univ., Dep. Geol., Bristol, United Kingdom (GBR)

Affiliation Univ. Cambridge, United Kingdom (GBR); Univ. Mich., United States (USA); Stanford Univ., United States (USA)

Source Earth and Planetary Science Letters, vol.99, no.4, pp.387-399, Sep 1990

Resource Location http://www.sciencedirect.com/ science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-000858

20. Database GeoRef

Title **Degassing of argon from microclines within the thermal aureole of the Obsidian Dome conduit, *Long Valley* Caldera, California; constraints on emplacement history**

Author Ryerson, F J; Harrison, T Mark

Affiliation Lawrence Livermore Natl. Lab., Earth Sci. Dep., Livermore, CA, United States (USA)

Affiliation State Univ. N.Y. at Albany, United States (USA)

Source Journal of Geophysical Research, vol. 95, no. B3, pp.2781-2792, 10 Mar 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Age spectra for microclines separated from samples obtained within the thermal aureole of the conduit to Obsidian Dome are compared with those from a reference sample collected in an area removed from the thermal effects of intrusion. The age spectra are characterized by a zero-age plateau at low fractional release and by an approximately 80 Ma plateau at higher fractional releases. These plateaus correspond to subparallel arrays in the Arrhenius data. These arrays are attributed to two discrete diffusion domain size fractions characterized by identical activation energies but by discrete and different frequency grain size fractions (Lovera et al., 1989). The relative losses of (super 40) Ar* do not show a systematic pattern when compared on the basis of total (super 40) Ar* loss. The (super 40) Ar* losses first increase and then fall with distance from the contact. However, when the data composing the high-temperature array of the Arrhenius data are considered (the large diffusion domain size fraction), the pattern is consistent with that predicted by conductive heating of the aureole. This agreement requires the aureole to have been uniformly preheated to a temperature of approximately 250 degrees C prior to intrusion of the rhyolite dike and surrounding breccia funnel that make up the vent structure. Further, the data require that the material forming the breccia funnel must have been heated to a temperature approaching that of the magma prior to emplacement. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1990-032747

21. Database GeoRef

Title **Geothermal system *geochronology* by U-series methods; progress and prospects**

Author Sturchio, N C

Affiliation Argonne Natl. Lab., Argonne, IL, United States (USA)

Monograph Title Continental magmatism; abstracts

Author Anonymous

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, vol. 131, pp.259, 1990

Resource Location http://geoinfo.nmt.edu/publications/ home.html

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1991-004531

22. Database GeoRef

Title **Short reversal of the palaeomagnetic field about 280,000 years ago at *Long Valley*, California**

Author Liddicoat, J C; Bailey, R A

Affiliation Univ. Calif., Earth Sci. Board, Santa Cruz, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Monograph Title Proceedings of the NATO Advanced Study Institute on Geomagnetism and paleomagnetism

Author Lowes, F J; Collinson, D W; Parry, J H; Runcorn, S K; Tozer, D C; Soward, A M

Affiliation Univ. Newcastle upon Tyne, Newcastle upon Tyne, United Kingdom (GBR)

Source NATO Advanced Study Institutes Series. Series C: Mathematical and Physical Sciences, vol. 261, pp.137-153, 1989

Publisher D. Reidel Publishing Company, Dordrecht-Boston, International (III)

Publication Year 1989

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 1989-074506

23. Database GeoRef

Title **Paleomagnetism and K-Ar ages of volcanic rocks from *Long Valley* Caldera, California**

Author Mankinen, Edward A; Gromme, C Sherman; Dalrymple, G Brent; Lanphere, Marvin A; Bailey, Roy A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 91, no. B1, pp.633-652, 10 Jan 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Paleomagnetic measurements and K-Ar age determinations on volcanic rocks from ***Long Valley*** caldera, California, have enabled further refinement of eruptive activity within this large silicic volcanic center. K-Ar age determinations show that postcaldera volcanic eruptions began 0.73 m.y. ago and continued periodically until about 50,000 years ago. The eruptions were not temporally random but tended to occur in distinct episodes separated by periods of quiescence. Volcanism in the western half of the caldera was particularly intense between 0.15 and 0.50 m.y. ago, when many units ranging in composition from basalt to rhyolite were erupted. An average of the virtual geomagnetic poles for 33 units from the caldera yields a paleomagnetic pole at 89.7 degrees N, 138.4 degrees E, (alpha (sub 95) = 5.1 degrees), which is indistinguishable from the earth's rotational axis. The ancient geomagnetic field dispersion about this mean pole is 16.0 degrees , with upper and lower limits of 19.3 degrees and 13.6 degrees , respectively.

Publication Year 1986

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1986-028002

24. Database GeoRef

Title **Application of the fission track dating method to young sediments; principles, methodology and examples**

Author Hurford, Anthony J

Affiliation Univ. Bern, Abteilung Isotopengeol., Bern, Switzerland (CHE)

Affiliation Comm. Coord. Offshore Prospect., Thailand (THA)

Monograph Title Dating young sediments

Editor Hurford, A J; Jaeger, Emilie; Ten Cate, J A M

Affiliation Univ. Berne, Lab. Isotope Geol., Bern, Switzerland (CHE)

Source CCOP/TP, vol.16, pp.199-233, 1986

Publisher [The Office of the Project Manager/Co -ordinator, UNDP Technical Support for Regional Offshore Prospecting in East Asia; United Nations, Economic and Social Commission for Asia and the Pacific], [Bangkok], International (III)

Publication Year 1986

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 1988-061409

25. Database GeoRef

Title **(super 40) Ar- (super 39) Ar dating of young samples**

Author Hammerschmidt, Konrad

Affiliation Univ. Tubingen, Abteilung Geochem. Mineral. Inst., Tubingen, Federal Republic of Germany (DEU)

Affiliation Comm. Coord. Offshore Prospect., Thailand (THA)

Monograph Title Dating young sediments

Editor Hurford, A J; Jaeger, Emilie; Ten Cate, J A M

Affiliation Univ. Berne, Lab. Isotope Geol., Bern, Switzerland (CHE)

Source CCOP/TP, vol.16, pp.339-357, 1986

Publisher [The Office of the Project Manager/Co -ordinator, UNDP Technical Support for Regional Offshore Prospecting in East Asia; United Nations, Economic and Social Commission for Asia and the Pacific], [Bangkok], International (III)

Publication Year 1986

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 1988-061416

26. Database GeoRef

Title **Precursors to the Bishop Tuff eruption; Glass Mountain, *Long Valley*, California**

Author Metz, J M; Mahood, G A

Affiliation Stanford Univ., Dep. Geol., Stanford, CA, United States (USA)

Monograph Title Special section on ***Long Valley*** Caldera, California [modified]

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,121-11,126, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The Glass Mountain volcanic complex represents the oldest rhyolites of the ***Long Valley*** magma system. At least 30 high-silica rhyolites erupted in two major episodes: a minimum of 4.8 km (super 3) (DRE) of lava erupted sporadically between 2.1 and 1.2 Ma, and a minimum of 10.5 km (super 3) erupted at a greater volumetric rate 1.1-0.8 Ma. The rhyolite complex was truncated as a result of caldera collapse on eruption of the Bishop Tuff at 0.73 Ma. Early Glass Mountain lavas are biotitebearing and were cooler and less fluid than later ones, some of which contain pyroxene. This correlates with a crude, ***long***-term trend with time toward less evolved rhyolite compositions; all Glass Mountain lavas are more evolved than the late-erupted Bishop Tuff. A large, integrated, magma chamber may not have been present until approximately 1.1 Ma, as evidenced by the greater chemical homogeneity of lavas of the younger eruptive episode. Glass Mountain is flanked by a pyroclastic apron containing ash-flow tuffs and pumice fall deposits, and correlatives of some of the latter have been found as far away as Ventura County, California, and Beaver County, Utah. Explosive activity occurred throughout the eruptive history of Glass Mountain and is not restricted to more evolved compositions. Although apparent volumetric eruptive rates increased about six fold after 1.1 Ma, the eruptions apparently were not large enough to depressurize the magma chamber and initiate a caldera-forming eruption. As ***Long Valley*** is a tectonically active area, release of pressure on the magma chamber due to rupture along the Hilton Creek -Hartley Springs fault zone seems the most likely mechanism for triggering the catastrophic eruption of the Bishop Tuff.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1986-082042

27. Database GeoRef

Title **Application of thermoluminescence dating to geothermal exploration**

Author Takashima, Isao; Honda, Sakuro

Affiliation Akita Univ., Min. Coll., Akita, Japan (JPN)

Monograph Title 1985 International symposium on geothermal energy

Corporate Author Geothermal Resources Council, Davis, CA, United States (USA)

Source Transactions - Geothermal Resources Council, vol.9, Part 1, pp.503-508, 1985

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1986-035545

28. Database GeoRef

Title **Eruptive history of Glass Mountain, *Long Valley*, California; precursors to a large explosive eruption**

Author Metz, Jenny; Mahood, Gail

Affiliation Stanford Univ., Dep. Geol., Stanford, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Monograph Title Proceedings of Workshop XIX; Active tectonic and magmatic processes beneath ***Long Valley*** Caldera, eastern California

Author Jacobson, Muriel L (compiler)

Editor Hill, David P; Bailey, Roy A; Ryall, Alan S;

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.41 -75, 1984

Report Number OF 84-0939

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1985-059721

29. Database GeoRef

Title **Late Quaternary histories of *Long*, Ruby, and Jakes Valleys,Nevada**

Author Young, Michael A; McCoy, William D

Affiliation Univ. Mass., Dep. Geol. and Geogr., Amherst, MA, United States (USA)

Monograph Title Program and abstracts of the Eighth biennial meeting of the American Quaternary Association

Author Ruddiman, William F (chairperson)

Affiliation Lamont -Doherty Geol. Obs., Palisades, NY, United States (USA)

Source Program and Abstracts - American Quaternary Association. Conference, vol.8, pp.143, 1984

Publisher American Quaternary Association, Seattle, WA, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1985-076079

30. Database GeoRef

Title **Chronology of late Pleistocene and Holocene volcanics, *Long Valley* and Mono Basin geothermal areas, eastern California**

Author Wood, Spencer H

Affiliation Occident. Coll., Los Angeles, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 83-0747, 84 pp., 1983

Report Number OF 83-0747

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 84

Publication Year 1983

Publication Type Serial; Report; Map; Monographic

Country of Publication United States (USA)

Accession Number 1985-023936

31. Database GeoRef

Title **Paleomagnetic secular variation recorded in volcanic rocks of *Long Valley* caldera, California**

Author Mankinen, E A (investigator); Gromme, C S (investigator)

Source U. S. Geological Survey Professional Paper, Report: P 1275, pp.140, 1981

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1275. djvu

Report Number P 1275

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1981

Publication Type Serial; Report; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1982-023853

32. Database GeoRef

Title **Reversal of the paleomagnetic field in Brunhesage lacustrine sediments in *Long Valley* and Mono Basin, California**

Author Liddicoat, J C; Lajoie, K R; Bailey, R A; Sarna-Wojcicki, A M; Russell, P C; Woodward, M

Affiliation Lamont -Doherty Geol. Obs., Palisades, N.Y., United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.61, no.17, pp.215, 22 Apr 1980

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1980

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1980-039166

33. Database GeoRef

Title **U-series chronology of two rhyolites of late Pleistocene age from *Long Valley*, California**

Author Baranowski, J; Harmon, R S

Affiliation Mich. State Univ., Dep. Geol., East Lansing, Mich., United States (USA)

Affiliation Chevron Oil Co., United States (USA)

Monograph Title Short papers of the fourth international conference, ***geochronology***, cosmochronology, isotope geology, 1978

Editor Zartman, R. E.

Source Open-File Report - U. S. Geological Survey, Report: OF 78-0701, pp.22 -24, 1978

Report Number OF 78-0701

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1978

Publication Type Serial; Report; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1979-039036

34. Database GeoRef

Title **Distribution, correlation, and radiocarbon dating of late Holocene tephra, Mono and Inyo craters, eastern California**

Author Wood, S H

Affiliation Calif. Inst. Technol., Div. Geol. Planet. Sci., Pasadena, Calif., United States (USA)

Source Geological Society of America Bulletin, vol.88, no.1, pp.89 -95, Jan 1977

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1977

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1977-015633

35. Database GeoRef

Title **(super 238) U/ (super 230) Th isotope systematics of rhyolites from *Long Valley*, California**

Author Baranowski, James

Pages 122

Publication Year 1977

Publication Type Thesis or dissertation; Master's; Monographic

Organization Name Michigan State University, East Lansing, MI, United States (USA)

Country of Publication United States (USA)

Accession Number 1981-065077

36. Database GeoRef

Title **Thermoluminescence dating of young silicic volcanic rocks**

Author May, R J

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.57, no.12, pp.1014, Dec 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1976

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1978-015394

37. Database GeoRef

Title **Volcanism, structure, and *geochronology* of *Long Valley* Caldera, Mono County, California**

Author Bailey, R A; Dalrymple, G B; Lanphere, M A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.725-744, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** caldera, a 17- by 32-km elliptical depression on the east front of the Sierra Nevada, formed 0.7 m.y. ago during eruption of the Bishop tuff. Subsequent intracaldera volcanism included eruption of (1) aphyric rhyolite 0.68-0.64 m.y. ago during resurgent doming of the caldera floor, (2) porphyritic hornblende -biotite rhyolite from centers peripheral to the resurgent dome at 0.5, 0.3, and 0.1 m.y. ago, and (3) porphyritic hornblende -biotite rhyodacite from outer ring fractures 0.2 m.y. ago to 50,000 yr ago, a sequence that apparently records progressive crystallization of a subjacent chemically zoned magma chamber. Holocene rhyolitic and phreatic eruptions suggest that residual magma was present in the chamber as recently as 450 yr ago. Intracaldera hydrothermal activity began at least 0.3 m.y. ago and was widespread in the caldera moat; it has since declined due to self-sealing of near -surface caldera sediments by zeolitization, argillization, and silicification and has become localized on recently reactivated north-west- trending Sierra Nevada frontal faults that tap hot water at depth.

Publication Year 1976

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1976-031713

38. Database GeoRef

Title **Preliminary potassium-argon age data on volcanic rocks of *Long Valley* Caldera and vicinity, Mono County, California**

Author Dalrymple, G B; Lanphere, M A

Source Open-File Report - U. S. Geological Survey, Report: OF 74-5020, 3 sheets, 1974

Report Number OF 74-5020

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 3 sheets

Publication Year 1974

Publication Type Serial; Report; Map; Monographic

Country of Publication United States (USA)

Accession Number 1985-005308

39. Database GeoRef

Title **Volcanism and *Geochronology* of *Long Valley* Caldera, Mono County, California**

Author Bailey, Roy A; Lanphere, Marvin A; Dalrymple, G Brent

Monograph Title Fall Annual Meeting, San Francisco, 1973; Section of Volcanology, Geochemistry, and Petrology; Geothermal resource investigation; I, ***Long Valley*** Symposium

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1974-038967

GRAVITY BIBLIOGRAPHY

1. Database GeoRef

Title **Analytical modeling of *gravity* changes and crustal deformation at volcanoes; the *Long Valley* Caldera, California, case study**

Author Battaglia, M; Hill, D P

Affiliation Universita di Roma "La Sapienza", Dipartimento di Scienze della Terra, Rome, Italy (ITA)

Affiliation Universita di Roma Tre, Italy (ITA); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA); U. S. Geological Survey, United States (USA)

Monograph Title Understanding stress and deformation in active volcanoes

Editor Gudmundsson, Agust; Acocella, Valerio; Vinciguerra, Sergio

Affiliation University of London Royal Holloway, Department of Earth Sciences, Surrey, United Kingdom (GBR)

Source Tectonophysics, vol. 471, no. 1-2, pp.45-57, 09 Jun 2009

Resource Location http://www.sciencedirect.com/ science/journal/00401951

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Joint measurements of ground deformation and micro-***gravity*** changes are an indispensable component for any volcano monitoring strategy. A number of analytical mathematical models are available in the literature that can be used to fit geodetic data and infer source location, depth and density. Bootstrap statistical methods allow estimations of the range of the inferred parameters. Although analytical models often assume that the crust is elastic, homogenous and isotropic, they can take into account different source geometries, the influence of topography, and ***gravity*** background noise. The careful use of analytical models, together with high quality data sets, can produce valuable insights into the nature of the deformation/***gravity*** source. Here we present a review of various modeling methods, and use the historical unrest at ***Long Valley*** caldera (California) from 1982 to 1999 to illustrate the practical application of analytical modeling and bootstrap to constrain the source of unrest. A key question is whether the unrest at ***Long Valley*** since the late 1970s can be explained without calling upon an intrusion of magma. The answer, apparently, is no. Our modeling indicates that the inflation source is a slightly tilted prolate ellipsoid (dip angle between 91 degrees and 105 degrees) at a depth of 6.5 to 7.9 km beneath the caldera resurgent dome with an aspect ratio between 0.44 and 0.60, a volume change from 0.161
to 0.173 km (super 3) and a density of 1241 to 2093 kg/m (super 3) . The larger uncertainty of the density estimate reflects the higher noise of ***gravity*** measurements. These results are consistent with the intrusion of silicic magma with a significant amount of volatiles beneath the caldera resurgent dome.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2009-099836

2. Database GeoRef

Title **Uplift and magma intrusion at *Long Valley* Caldera from InSAR and *gravity* measurements**

Author Tizzani, Pietro; Battaglia, Maurizio; Zeni, Giovanni; Atzori, Simone; Berardino, Paolo; Lanari, Riccardo

Affiliation CNR, Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation University of Rome "La Sapienza", Italy (ITA); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Source Geology (Boulder), vol. 37, no. 1, pp.63-66, Jan 2009

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The ***Long Valley*** caldera (California) formed approximately 760,000 yr ago following the massive eruption of the Bishop Tuff. Postcaldera volcanism in the ***Long Valley*** volcanic field includes lava domes as young as 650 yr. The recent geological unrest is characterized by uplift of the resurgent dome in the central section of the caldera (75 cm in the past 33 yr) and earthquake activity followed by periods of relative quiescence. Since the spring of 1998, the caldera has been in a state of low activity. The cause of unrest is still debated, and hypotheses range from hybrid sources (e.g., magma with a high percentage of volatiles) to hydrothermal fluid intrusion. Here, we present observations of surface deformation in the ***Long Valley*** region based on differential synthetic aperture radar interferometry (InSAR), leveling, global positioning system (GPS), two-color electronic distance meter (EDM), and microgravity data. Thanks to the joint application of InSAR and microgravity data, we are able to unambiguously determine that magma is the cause of unrest.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2009-020469

3. Database GeoRef

Title **4D volcano gravimetry**

Author Battaglia, Maurizio; Gottsmann, Joachim; Carbone, Daniele; Fernandez, Jose

Affiliation U. S. Geological Survey, Volcano Hazards Team, Menlo Park, CA, United States (USA)

Affiliation University of Bristol, United Kingdom (GBR); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA); CSIC, Instituto de Astronomia y Geodesia, Spain (ESP)

Source Geophysics, vol. 73, no. 6, pp.WA3-WA18, Dec 2008

Resource Location http://www.segdl.org/geophysics/

Publisher Society of Exploration Geophysicists, Tulsa, OK, United States (USA)

Abstract Time-dependent gravimetric measurements can detect subsurface processes ***long*** before magma flow leads to earthquakes or other eruption precursors. The ability of ***gravity*** measurements to detect subsurface mass flow is greatly enhanced if ***gravity*** measurements are analyzed and modeled with ground-deformation data. Obtaining the maximum information from microgravity studies requires careful evaluation of the layout of network benchmarks, the ***gravity*** environmental signal, and the coupling between ***gravity*** changes and crustal deformation. When changes in the system under study are fast (hours to weeks), as in hydrothermal systems and restless volcanoes, continuous ***gravity*** observations at selected sites can help to capture many details of the dynamics of the intrusive sources. Despite the instrumental effects, mainly caused by atmospheric temperature, results from monitoring at Mt. Etna volcano show that continuous measurements are a powerful tool for monitoring and studying volcanoes. Several analytical and numerical mathematical models can be used to fit ***gravity*** and deformation data. Analytical models offer a closed-form description of the volcanic source. In principle, this allows one to readily infer the relative importance of the source parameters. In active volcanic sites such as ***Long Valley*** caldera (California, U.S.A.) and Campi Flegrei (Italy), careful use of analytical models and high-quality data sets has produced good results. However, the simplifications that make analytical models tractable might result in misleading volcanological interpretations, particularly when the real crust surrounding the source is far from the homogeneous/isotropic assumption. Using numerical models allows consideration of more realistic descriptions of the sources and of the crust where they are located (e.g., vertical and lateral mechanical discontinuities, complex source geometries, and topography). Applications at Teide volcano (Tenerife) and Campi Flegrei demonstrate the importance of this more realistic description in ***gravity*** calculations.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2009-054013

4. Database GeoRef

Title **Surface deformation of active volcanic areas retrieved with the SBAS-DInSAR technique; an overview**

Author Pepe, Antonio; Manzo, Mariarosaria; Casu, Francesco; Solaro, Giuseppe; Tizzani, Pietro; Zani, Giovanni; Pepe, Susi

Affiliation Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Monograph Title ***Gravity***, magnetic, electric and electromagnetic methods in seismology and volcanology

Editor Del Negro, Ciro; Gresta, Stefano; Meloni, Antonio

Source Annals of Geophysics, vol. 51, no. 1, pp.247-263, Feb 2008

Resource Location http://www.ingv.it/~wwwannali/

Publisher Editrice Compositori, Bologna, Italy (ITA)

Abstract This paper presents a comprehensive overview of the surface deformation retrieval capability of the Differential Synthetic Aperture Radar Interferometry (DInSAR) algorithm, referred to as Small BAseline Subset (SBAS) technique, in the context of active volcanic areas. In particular, after a brief description of the algorithm some experiments relevant to three selected case-study areas are presented. First, we concentrate on the application of the SBAS algorithm to a single-orbit scenario, thus considering a set of SAR data composed by images acquired on descending orbits by the European Remote Sensing (ERS) radar sensors and relevant to the ***Long Valley*** caldera (eastern California) area. Subsequently, we address the capability of the SBAS technique in a multiple-orbit context by referring to Mt. Etna volcano (southern Italy) test site, with respect to which two different ERS data set, composed by images acquired both on ascending and descending orbits, are available. Finally, we take advantage of the capability of the algorithm to work in a multi-platform scenario by jointly exploiting two different sets of SAR images collected by the ERS and the Environment Satellite (ENVISAT) radar sensors in the Campi Flegrei caldera (southern Italy) area. The presented results demonstrate the effectiveness of the algorithm to investigate the deformation field in active volcanic areas and the potential of the DInSAR methodologies with in routine surveillance scenario.

Publication Year 2008

Publication Type Serial; Conference document; Analytic

Country of Publication Italy (ITA)

Accession Number 2009-076909

7. Database GeoRef

Title **The search for magma reservoirs in *Long Valley* Caldera; single versus distributed sources**

Author Battaglia, M; Vasco, D W

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Affiliation University College London, United Kingdom (GBR); University of California at Berkeley, United States (USA)

Monograph Title Mechanisms of activity and unrest at large calderas

Editor Troise, Claudia; De Natale, Giuseppe; Kilburn, Christopher R J

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, ITA, (Italy)

Source Geological Society Special Publications, vol.269, pp.173-180, 2006

Publisher Geological Society of London, London, United Kingdom (GBR)

Abstract ***Long Valley*** Caldera and the Mono-Inyo Craters chain form a large volcanic complex in eastern California that has experienced persistent earthquake activity and ground uplift over the past 25 years. The central part of ***Long Valley*** Caldera (an area of more than 100 square km) has been slowly rising since 1980 at an average rate of 3 cm a (super -1) . Inversion of micro-gravimetry and deformation data using a single vertical prolate ellipsoid source has helped to define the existence of a relatively shallow (5-8 km) silicic magma intrusion of 0.11-0.19 km (super 3) beneath the caldera's resurgent dome. We use the information from the single-source inversion to constrain a more general three-dimensional distribution of volume changes in the subsurface. The distributed inversion identifies two main inflation areas beneath the resurgent dome: one following the regional trend of north-south faults, and another in the dome's southern section, parallel to a strike-slip fault that is responsible for most of the seismic activity in the caldera's south moat.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-040471

9. Database GeoRef

Title **Constraints on evolution and *long*-term slip rates for eastern faults of the San Andreas transform boundary from tephrochronology, new (super 39) Ar/ (super 40) Ar ages, geologic map relations, *gravity* and magnetic data**

Author McLaughlin, Robert J; Sarna-Wojcicki, Andrei M; Fleck, Robert J; Wagner, David; Clahan, Kevin B; Langenheim, V E; Jachens, Robert C

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation California Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2005 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.37, no.7, pp.181, Oct 2005

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract In Northern California the structural evolution and ***long*** term slip rates of the right-stepping Rodgers Creek-Maacama Fault system during and following Neogene volcanism along the east side of the wide transform plate boundary are constrained by tephrochronology and (super 39) Ar/ (super 40) Ar dating, integrated with geologic mapping and aeromagnetic and ***gravity*** data. Pliocene and younger slip on the Maacama Fault is constrained by offset of a geochemically distinct suite of silicic tephra deposits in the Sonoma Volcanics that erupted at 3.4-2.5 Ma from a caldera centered over Mount St. Helena in NW Napa ***Valley***. (super 39) Ar/ (super 40) Ar ages and tephra geochemistry show that a section of the Mount St. Helena eruptive sequence and underlying gravels exposed on the SW side of the Maacama Fault Zone along the Geysers-Healdsburg Road, is offset right-laterally approximately 17 to 21 km from the Franz ***Valley*** area east of the fault zone, yielding a slip rate of approximately 6.0 + or - 0.7 mm/yr since approximately 3.2 Ma. Stratigraphically high dispersed tephra in synclinally-folded fluvial deposits in the Santa Rosa area correlate with the 1.2-0.8 Ma Bishop-Glass Mountain eruptive sequence of ***Long Valley***. Flat-lying late Pleistocene and Holocene alluvium that overlies the folded strata was deposited in a pull-apart basin in the right step between the Rodgers Creek and Maacama Faults. Slip on the Maacama and Rodgers Creek Faults that accompanied formation of the pull-apart basin (approximately 5 km for the Maacama Fault and approximately 6 km for the Rodgers Creek Fault, as indicated from basin geometry) yields a slip rate of approximately 5.3 + or - 1.1 mm/yr for the Maacama Fault and approximately 6.3 + or - 1.3 mm/yr for the Rodgers Creek Fault since 1.2-0.8 Ma. Possible earlier slip at a slower rate on the Rodgers Creek Fault Zone is suggested by a unique sequence of volcanic and sedimentary rocks,

including coarse rhyodacite-sourced fault scarp breccia, deposited along a strike-slip fault basin margin (Cotati Basin). Together with the axis of a prominent antiform, these rocks are offset approximately 28 km right-laterally along the Rodgers Creek Fault Zone. (super 39) Ar/ (super 40) Ar ages of the rhyodacitic rocks are approximately 7.3 to 8.2 Ma, and fluvial deposits (Petaluma Formation) west of the fault that overlie the fault scarp breccia include the 6.26 Ma Roblar Tuff. About 22 km of slip on the fault between 1.2 and 6.3 to 7.3 Ma, yields a slip rate of approximately 4.0 + or - 0.4 mm/yr, much lower than rates since 1.2 Ma.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-050909

10. Database GeoRef

Title **Integrated *gravity* and magnetic interpretations yield new insights to Basin and Range structures**

Author Lisle, G L

Affiliation Lisle Gravity, Denver, CO, United States (USA)

Monograph Title AAPG Rocky Mountain Section, abstracts

Author George, Lyn (chairperson)

Source Abstracts - AAPG Meeting, Rocky Mountain Section, vol.2005, unpaginated, 2005

Resource Location http://www.searchanddiscovery.net/documents/abstracts/2005rocky/RMlis. htm

Publisher American Association of Petroleum Geologists, Rocky Mountain Section, Tulsa, OK, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-009105

11. Database GeoRef

Title **Study of volcanic sources at *Long Valley* Caldera, California, using *gravity* data and a genetic algorithm inversion technique**

Author Charco, M; Fernandez, Jose; Tiampo, K; Battaglia, M; Kellogg, L; McClain, J; Rundle, J B

Affiliation Ciudad Universitaria, Instituto de Astronomia y Geodesia, Madrid, Spain (ESP)

Affiliation University of Colorado, United States (USA); Stanford University, United States (USA); University of California at Davis, United States (USA); Jet Propulsion Laboratory, United States (USA)

Monograph Title Geodetic and geophysical effects associated with seismic and volcanic hazards

Editor Fernandez, Jose

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Facultad de Ciencias Matematicas, Madrid, Spain (ESP)

Source Pure and Applied Geophysics, vol.161, no.7, pp.1399-1413, 2004

Resource Location http://link.springer.de/link/service/journals/ 00024/index.htm

Publisher Birkhaeuser, Basel, Switzerland (CHE)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication Switzerland (CHE)

Accession Number 2006-018077

12. Database GeoRef

Title **The interpretation of *gravity* changes and crustal deformation in active volcanic areas**

Author Battaglia, M; Segall, P

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Monograph Title Geodetic and geophysical effects associated with seismic and volcanic hazards

Editor Fernandez, Jose

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Facultad de Ciencias Matematicas, Madrid, Spain (ESP)

Source Pure and Applied Geophysics, vol.161, no.7, pp.1453-1467, 2004

Resource Location http://link.springer.de/link/service/journals/00024/index.htm

Publisher Birkhaeuser, Basel, Switzerland (CHE)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication Switzerland (CHE)

Accession Number 2006-018080

13. Database GeoRef

Title **The mechanics of unrest at *Long Valley* Caldera, California; 2, Constraining the nature of the source using geodetic and micro-*gravity* data**

Author Battaglia, M; Segall, P; Roberts, C

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.219-245, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We model the source of inflation of ***Long Valley*** caldera by combining geodetic and micro-***gravity*** data. Uplift from GPS and leveling, two-color EDM measurements, and residual ***gravity*** change determinations are used to estimate the intrusion geometry, assuming a vertical prolate ellipsoidal source. The U.S. Geological Survey occupied the ***Long Valley gravity*** network six times from 1980 to 1985. We reoccupied this network twice, in the summer of 1998 (33 stations), and the summer of 1999 (37 stations). Before ***gravity*** data can be used to estimate the density of the intrusion, they must be corrected for the effect of vertical deformation (the free-air effect) and changes in the water table. We use geostatistical techniques to interpolate uplift and water table changes at the ***gravity*** stations. The inflation source (a vertical prolate ellipsoid) is located 5.9 km beneath the resurgent dome with an aspect ratio equal to 0.475, a volume change from 1982 to 1999 of 0.136 km (super 3) and a density of around 1700 kg/m (super 3) . A bootstrap method was employed to estimate 95% confidence bounds for the parameters of the inflation model. We obtained a range of 0.105 -0.187 km (super 3) for the volume change, and 1180-2330 kg/m (super 3) for the density. Our results do not support hydrothermal fluid intrusion as the primary cause of unrest, and confirm the intrusion of silicic magma beneath ***Long Valley*** caldera. Failure to account for the ellipsoidal nature of the source biases the estimated source depth by 2.9 km (a 33% increase), the volume change by 0.019 km (super 3) (a 14% increase) and the density by about 1200 kg/m (super 3) (a 40% increase).

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016379

14. Database GeoRef

Title **Inferences on the hydrothermal system beneath the resurgent dome in *Long Valley* Caldera, East-Central California, USA, from recent pumping tests and geochemical sampling**

Author Farrar, Christopher D; Sorey, Michael L; Roeloffs, Evelyn; Galloway, Devin L; Howle, James F; Jacobson, Ronald

Affiliation U. S. Geological Survey, Carnelian Bay, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA); Sandia National Laboratory, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.305-328, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Quaternary volcanic unrest has provided heat for episodic hydrothermal circulation in the ***Long Valley*** caldera, including the present - day hydrothermal system, which has been active over the past 40 kyr. The most recent period of crustal unrest in this region of east-central California began around 1980 and has included periods of intense seismicity and ground deformation. Uplift totaling more than 0.7 m has been centered on the caldera's resurgent dome, and is best modeled by a near-vertical ellipsoidal source centered at depths of 6-7 km. Modeling of both deformation and microgravity data now suggests that (1) there are two inflation sources beneath the caldera, a shallower source 7-10 km beneath the resurgent dome and a deeper source approximately 15 km beneath the caldera"s south moat and (2) the shallower source may contain components of magmatic brine and gas. The ***Long Valley*** Exploration Well (LVEW), completed in 1998 on the resurgent dome, penetrates to a depth of 3 km directly above this shallower source, but bottoms in a zone of 100 degrees C fluid with zero vertical thermal gradient. Although these results preclude extrapolations of temperatures at depths below 3 km, other information obtained from flow tests and fluid sampling at this well indicates the presence of magmatic volatiles and fault-related permeability within the metamorphic basement rocks underlying the volcanic fill. In this paper, we present recently acquired data from LVEW and compare them with information from other drill holes and thermal springs in ***Long Valley*** to delineate the likely flow paths and fluid system properties under the resurgent dome.
Additional information from mineralogical assemblages in core obtained from fracture zones in LVEW documents a previous period of more vigorous and energetic fluid circulation beneath the resurgent dome. Although this system apparently died off as a result of mineral deposition and cooling (and/or deepening) of magmatic heat sources, flow testing and tidal analyses of LVEW water level data show that relatively high permeability and strain sensitivity still exist in the steeply dipping principal fracture zone penetrated at a depth of 2.6 km. The hydraulic properties of this zone would allow a pressure change induced at distances of several kilometers below the well to be observable within a matter of days. This indicates that continuous fluid pressure monitoring in the well could provide direct evidence of future intrusions of magma or high-temperature fluids at depths of 5-7 km.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016382

15. Database GeoRef

Title **The *Long Valley* Caldera GIS database**

Author Battaglia, Maurizio; Williams, M J; Venezky, D Y; Hill, D P; Langbein, J O; Farrar, C D; Howle, J F; Sneed, Michelle; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Source U. S. Geological Survey Digital Data Series, Report: DDS-0081, 1 disc, 2003

Resource Location http://pubs.usgs.gov/dds/dds-81/

Report Number DDS-0081

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract This database provides an overview of the studies being conducted by the ***Long Valley*** Observatory in eastern California from 1975 to 2001. The database includes geologic, monitoring, and topographic datasets related to ***Long Valley*** caldera.

Pages 1 disc

Publication Year 2003

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Format Covered Compact disc

Accession Number 2005-008519

16. Database GeoRef

Title **Active tectonism since 8 Ma in the Sierra Nevada- Basin and Range transition zone, Lassen County, California**

Author TenBrink, Andrew L; Cashman, Patricia H; Trexler, James H; John, Louie; Shane, Smith

Affiliation University of Nevada at Reno, Department of Geological Sciences, Reno, NV, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 98th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.5, pp.100, Apr 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Late Miocene fluvial, fluvial-deltaic, and lacustrine sediments of the Hallelujah Formation record the depositional and deformational history in the ***Long Valley***, CA (Hallelujah Junction) area. Deposition of Hallelujah Formation started before 8.0 Ma and continued into the Blancan (5.03-2.68) Ma. Age control for the Hallelujah Formation is based on tephrochronology and mammalian fossils. Granitic boulder conglomerates within the section are monolithologic and immature. They record significant periods of active tectonism during deposition. The ***Long Valley*** section dips west and is bounded by faults to both the east and west. The Diamond Mountain fault, on the west, is a north-striking, east-dipping normal fault. The eastern basin boundary is an unnamed north-striking fault with dextral -normal displacement. This suggests that post-depositional deformation occurred in a transtensional setting. ***Gravity*** profiles across the basin constrain the thickness of the Neogene section and the offset on basin-bounding faults. Modeling based on ***gravity*** and borehole data suggests a total stratigraphic thickness of approximately 3500 meters. The Diamond Mountain fault is modeled to have a total displacement of up to 2500 meters. The unnamed fault bounding Petersen Mountain shows at least 500 meters of west-side -down offset. This indicates as much as 550 meters of section could be present below the 8 Ma tephrochronology date within the lower member of the Hallelujah Formation. The tectonic record in the Neogene sedimentary rocks in ***Long Valley*** differs from nearby Neogene basins in the Sierra Nevada-Basin and Range transition zone. Boulder sheets within the section reveal 2-3 distinct periods of active tectonism between 8.0 and (5.03-2.68) Ma. Correlation of paleocurrent data with volumetric distribution of the boulder sheets suggests a northwest source direction for boulders in the upper section. Boulder sheets in the lower section depict an ambiguous east-west source direction. This suggests geographic distribution of faulting with time. Although ***Long Valley*** appears to be a west-tilted half graben, there is significant faulting along its eastern edge as well, and this faulting includes both strike-slip and dip-slip components.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-023902

17. Database GeoRef

Title **Detecting volcanic eruption precursors; a new method using *gravity* and deformation measurements**

Author Williams-Jones, Glyn; Rymer, Hazel

Affiliation Open University, Department of Earth Sciences, Milton Keynes, United Kingdom (GBR)

Affiliation University of Miami, United States (USA); Universidad Nacional Autonoma de Mexico, Mexico (MEX)

Monograph Title A multi-disciplinary study of volcanoes; selected papers from the symposium "Understanding volcanoes by geodesy, seismology, electromagnetics, and geochemistry" held during the IUGG general assembly

Editor Spichak, Vjacheslav; Dixon, Timothy; Martin-del Pozzo, Ana Lillian

Affiliation Russian Academy of Sciences, Geoelectromagnetic Research Institute, Moscow, Russian Federation (RUS)

Source Journal of Volcanology and Geothermal Research, vol.113, no.3-4, pp.379-389, 30 Mar 2002

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract One of the fundamental questions in modern volcanology is the manner in which a volcanic eruption is triggered; the intrusion of fresh magma into a reservoir is thought to be a key component. The amount by which previously ponded reservoir magma interacts with a newly intruded magma will determine the nature and rate of eruption as well as the chemistry of erupted lavas and shallow dykes. The physics of this interaction can be investigated through a conventional monitoring procedure that incorporates the simple and much used Mogi model relating ground deformation (most simply represented by Delta h) to changes in volume of a magma reservoir. ***Gravity*** changes (Delta g) combined with ground deformation provide information on magma reservoir mass changes. Our models predict how, during inflation, the observed Delta g/Delta h gradient will evolve as a volcano develops from a state of dormancy through unrest into a state of explosive activity. Calderas in a state of unrest and large composite volcanoes are the targets for the methods proposed here and are exemplified by Campi Flegrei, Rabaul, Krafla, and ***Long Valley***. We show here how the simultaneous measurement of deformation and ***gravity*** at only a few key stations can identify important precursory processes within a magma reservoir prior to the onset of more conventional eruption precursors.

Publication Year 2002

Publication Type Serial; Conference document; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2002-055679

18. Database GeoRef

Title **Unrest at *Long Valley* Caldera; GPS and *gravity* investigations**

Author Battaglia, Maurizio

Pages 102

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Stanford University, Stanford, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2005-007418

19. Database GeoRef

Title **Joint interpretation of displacement and *gravity* data in volcanic areas; a text example; *Long Valley* Caldera, California**

Author Fernandez, J; Charco, M; Tiampo, K F; Jentzsch, G; Rundle, J B

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Affiliation University of Colorado, United States (USA); FSU Jena, Federal Republic of Germany (DEU)

Source Geophysical Research Letters, vol. 28, no. 6, pp.1063-1066, 15 Mar 2001

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Volcanic activity produces deformation and ***gravity*** changes that many times can be used as precursors of future eruptions. Applying geodetic techniques to monitoring activity involves interpretation using deformation models. Usually ***gravity*** change data and displacement data are interpreted separately. We show, using modeling of deformation and ***gravity*** change data in ***Long Valley*** Caldera, California, USA, that this can lead to incorrect interpretations. The results obtained show that displacements and ***gravity*** changes must be interpreted together whenever possible and that elastic-gravitational models can be a far more appropriate approximation to problems of volcanic load in the crust than the more commonly used purely elastic models. Therefore it is necessary to change the philosophy normally used to interpret geodetic observations, improving the possibility of predicting future eruptions. Copyright 2001 by the American Geophysical Union.

Publication Year 2001

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2001-033338

20. Database GeoRef

Title **Absolute *gravity* measurements in *Long Valley*, 1985-1999**

Author Sasagawa, Glenn S; Zumberge, Mark A

Affiliation Scripps Institution of Oceanograpy, La Jolla, CA, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-073907

21. Database GeoRef

Title **Magma intrusion beneath *Long Valley* Caldera, California, confirmed by temporal *gravity* changes**

Author Battaglia, Maurizio; Roberts, Carter W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-073908

22. Database GeoRef

Title **On the joint interpretation of displacement and *gravity* data in volcanic areas; application to *Long Valley* Caldera, California**

Author Charco, Maria; Fernandez, Jose; Tiampo, Kristy F; Jentzsch, Gerhard; Rundle, John B

Affiliation CSIC-UCM, Instituto de Astronomia y Geodesia, Madrid, Spain (ESP)

Affiliation University of Colorado at Boulder, United States (USA); Florida State University, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.337, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-055914

23. Database GeoRef

Title **Young volcanism in western *Long Valley* Caldera, California; (1) Hazards due to lahars and block-and-ash flows at Mammoth Mountain; (2) Contemporaneous mafic and silicic eruptions during the past 160 Ka at *Long Valley* Caldera, California; implications of new (super 40) Ar/ (super 39) Ar eruption ages for current volcanic hazard; (3) Evidence for magma mixing from petrography and electron microprobe analyses**

Author Ring, Joshua H

Abstract Over the past two decades at Mammoth Mountain and in the western moat of ***Long Valley*** caldera, in the eastern Sierra Nevada of California, shallow earthquake swarms, CO (sub 2) -saturated soils causing areas of treekill, and He-emissions with >5 Ra have been attributed to the intrusion of magma to shallow depths in the crust. Given the close proximity of Mammoth Mountain to the resort town of Mammoth Lakes an accurate assessment of volcanic hazards is critical. To this end a three-part study was initiated: (1) computer modeling of the extent of lahars and block-and-ash flows of a range of volumes during an eruption of Mammoth Mountain, (2) a (super 40) Ar/ (super 39) Ar dating study of a possible temporal and spatial correlation of past mafic and silicic eruptions, and (3) a petrographic and petrologic study to better understand what types and styles of future eruptions are to be expected in the region. Hazards from ***gravity***-driven flows at Mammoth Mountain are evaluated due to the recent activity being focused beneath the mountain. The extent of hazards from block-and-ash flows around Mammoth Mountain is evaluated by implementing the Energy Cone Model of Sheridan (1980) into a Geographical Information System. Similarly, hazards due to lahars are also evaluated around Mammoth Mountain using the ***valley***-inundation model of Iverson et al. (1998). The results show that the town of Mammoth Lakes is threatened by moderate-volume (1X10 (super 6) m (super 3)) block-and-ash flows and that even small-volume lahars (1X10 (super 5) m (super 3)) could reach the town due to their more fluid nature. A (super 40) Ar/ (super 39) Ar study of the youngest units in and adjacent to the western third of the caldera was undertaken. The results show that the bulk of Mammoth Mountain consists of trachydacitic lavas erupted at approximately 67 ka. These ages and our 29-40 ka ages for trachydacitic lavas in the northwest quadrant of the caldera indicate that these silicic lavas are considerably younger than previously thought. The mafic and silicic eruptions are temporally and spatially correlated and can be divided into four eruptive sequences over the past 160,000 years: the western moat sequence (approximately 160 ka), the Mammoth sequence (approximately 119-57 ka), the northwest caldera sequence (approximately 40-29 ka), and the Inyo trend sequence (approximately 6 ka-present). Mafic magmas vented widely and contemporaneously with felsic lavas throughout the western third of the caldera, suggesting that it cannot have been underlain by a large body (or bodies) of silicic magma in the last 160,000 years, which otherwise would have created a "shadow zone" for the rise of denser basaltic magma. To understand the type(s) of future eruptions in the ***Long Valley*** region, it is important to assess and describe past volcanism and magmatic interactions. The silicic volcanic rocks of the areas in and adjacent to the western third of ***Long Valley*** caldera can be divided into fifteen distinct units based on location, mineral assemblage and mineral abundance. Many of the lavas are complex mixtures of multiple magmas, with evidence in the form of magmatic inclusions, compositional banding, microdioritic inclusions, strongly resorbed phenocrysts, fritted plagioclase jacketed by intact rims of plagioclase or sanidine similar in composition to unresorbed phenocrysts, and xenocrystic phases. The silicic volcanics contain plagioclase with resorbed calcic cores and intact, more albitic rims, suggesting that the cores were derived from a more mafic magma. Large changes in barium concentrations at core-rim boundaries suggest that Ba could be a useful monitor of magma mixing. Two suites of silicic lavas coexisted for at least the past 110 ka: (1) trachydacites and alkali rhyolites associated with Mammoth Mountain, and (2) less alkalic trachydacites and rhyolites all containing phenocrysts of potassic sanidine in lavas north and northeast of Mammoth Mountain, including the Inyo lavas. Electron microprobe data and sparse chemical data suggest that the Mammoth Mo untain suite consists chiefly of mixtures of

differentiation products of the local mafic lavas. The potassic -sanidine-bearing suite contains a contribution from these same magmas, but they also contain components derived from magma bodies related to the residual ***Long Valley*** magma chamber. This latter component, solidified or very nearly so, is available for eruption only where it is remobilized by intrusion of basaltic magma along the north-south Inyo trend. The knowledge that mafic and silicic eruptions have been contemporaneous and have interacted at ***Long Valley*** caldera for the past 160,000 years has implications for volcanic hazards. The unrest of the last two decades may be the result of basalt injected beneath Mammoth Mountain and the caldera and, considering the correlation of mafic and silicic eruptions in the past, the potential for spatially associated silicic eruptions exists, which could be considerably more explosive.

Pages 202

Publication Year 2000

Publication Type Thesis or dissertation; Master's; Monographic

Organization Name Stanford University, Stanford, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2002-042017

24. Database GeoRef

Title **Temporal *gravity* investigations at *Long Valley* Caldera, California**

Author Battaglia, M; Roberts, C W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title European Geophysical Society, 25th general assembly

Author Anonymous

Source Geophysical Research Abstracts, vol.2, 2000

Publisher European Geophysical Society, Katlenburg -Lindau, Federal Republic of Germany (DEU)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication Federal Republic of Germany (DEU)

Format Covered Compact disc

Accession Number 2001-064791

26. Database GeoRef

Title **Temporal *gravity* investigations at *Long Valley* Caldera, California**

Author Battaglia, Maurizio; Roberts, Carter W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2000 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.501, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** caldera has experienced intense seismic activity and ground uplift up to 75-80 cm in the past 20 years. Modeling of the ground deformation, seismicity and temporal ***gravity*** changes indicates that the unrest is due to inflation of a magma reservoir beneath the caldera. In order to better constrain physical processes now active beneath ***Long Valley***, we re-measured 35 stations of the caldera precise ***gravity*** monitoring network in July 1998 and 1999. Relative ***gravity*** measurements reveal a decrease in ***gravity*** of as much as -107+ or -6 mu Gal, centered on the uplifting resurgent dome. A positive residual ***gravity*** change of up to 64+ or -15 mu Gal was found after correcting for the effects of uplift and water table fluctuations. Assuming a point source of intrusion, the density of the intruding material is 2.7 to 4.1 g/cm3 at 95% confidence. The ***gravity*** results require intrusion of silicate magma, and exclude in situ thermal expansion or pressurization of the hydrothermal system as the cause of uplift and seismicity.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-018365

27. Database GeoRef

Title **Magma intrusion beneath *Long Valley* Caldera confirmed by temporal changes in *gravity***

Author Battaglia, M; Roberts, C W; Segall, P

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Source Science, vol.285, no.5436, pp.2119-2122, 24 Sep 1999

Resource Location http://www.sciencemag.org/

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1999-067702

28. Database GeoRef

Title **Microgravity measurements at *Long Valley* Caldera, California, 1997-1998**

Author Leblanc, Sophie; Beaulieu, Alexandre; Stix, John; Williams-Jones, Glyn; Rymer, Hazel; Desilets, Nicolas; Liard, Jacques; Gagnon, Carey; Endo, Elliot; Yamashita, Kenneth

Affiliation Universite de Montreal, Department de Geologie, Montreal, QC, Canada (CAN)

Affiliation Open University, United Kingdom (GBR); Universite du Quebec a Montreal, Canada (CAN); Geomatics Canada Geodetic Division, Canada (CAN); Cascades Volcano Observatory, United States (USA)

Monograph Title AGU 1998 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.963, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-024863

29. Database GeoRef

Title **A three-dimensional view of *Long Valley* Caldera, California**

Author Roberts, Carter W; Blakely, Richard J; Beyer, Larry A; Benz, Harley M

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title AGU 1998 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.962, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-024926

30. Database GeoRef

Title **The development of a deep-towed *gravity* meter, and its use in marine geophysical surveys of offshore Southern California and an airborne laser altimeter survey of *Long Valley*, California**

Author Ridgway, Jeffrey R

Pages 231

Publication Year 1997

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at San Diego, La Jolla, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2000-028065

31. Database GeoRef

Title **Geologic significance of a new isostatic *gravity* overlay of Paul Bateman's geologic compilation of the Mariposa 1 degrees by 2 degrees Quadrangle**

Author Oliver, Howard W; Roberts, Carter W

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 92nd annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.28, no.5, pp.97, Apr 1996

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1997-046532

32. Database GeoRef

Title **Overview of electromagnetic methods applied in active volcanic areas of Western United States**

Author Skokan, Catherine K

Affiliation Colorado School of Mines, Department of Geophysics, Golden, CO, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.56, no.3, pp.309-318, Jun 1993

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A better understanding of active volcanic areas in the United States through electromagnetic geophysical studies received foundation from the many surveys done for geothermal exploration in the 1970's. Investigations by governmental, industrial, and academic agencies include (but are not limited to) mapping of the Cascades, ***Long Valley***/Mono area, the Jemez volcanic field, Yellowstone Park, and an area in Colorado. For one example - Mt. Konocti in the Mayacamas Mountains, California - ***gravity***, magnetic, and seismic, as well as electromagnetic methods have all been used in an attempt to gain a better understanding of the subsurface structure. In each of these volcanic regions, anomalous zones were mapped. When conductive, these anomalies were interpreted to be correlated with hydrothermal activity and not to represent a magma chamber. Electrical and electromagnetic geophysical methods can offer valuable information in the understanding of volcanoes by being the method which is most sensitive to change in temperature and, therefore, can best map heat budget and hydrological character to aid in prediction of eruptions.

Publication Year 1993

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1993-019447

33. Database GeoRef

Title **Analysis of behavior of earth dam using strong-motion earthquake records**

Author Zeghal, Mourad; Abdel-Ghaffar, Ahmed M

Affiliation Univ. South. Calif., Civ. Eng. Dep., Los Angeles, CA, United States (USA)

Source Journal of Geotechnical Engineering, vol.118, no.2, pp.266-277, Feb 1992

Publisher American Society of Civil Engineers, New York, NY, United States (USA)

Publication Year 1992

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1992-013693

34. Database GeoRef

Title **Analysis of potential data over *Long Valley*, California; 1, Regional structural model interpreted from integrated shaded relief map**

Author Miyazaki, Y

Affiliation Geol. Surv. Japan, JPN, (Japan)

Source Butsuri-Tansa = Geophysical Exploration, vol.44, no.5, pp.275-288, Oct 1991

Resource Location http://www.segj.org/committee/hensyu/journal/index_e._html

Publisher Society of Exploration Geophysicists of Japan, Tokyo, Japan (JPN)

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication Japan (JPN)

Accession Number 1992-020288

35. Database GeoRef

Title **Two-phase elasto-plastic seismic response of earth dams: applications**

Author Yiagos, A N; Prevost, J H

Affiliation Princeton Univ., Dep. Civ. Eng., Princeton, NJ, United States (USA)

Source Soil Dynamics and Earthquake Engineering (1984), vol.10, no.7, pp.371-381, Oct 1991

Publisher CML Publications, Southampton, International (III)

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 1995-042154

36. Database GeoRef

Title **Possible tectonomagnetic effect observed from mid-1989, to mid-1990, in *Long Valley* Caldera, California**

Author Mueller, R J; Johnston, M J S; Langbein, J O

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Geophysical Research Letters, vol. 18, no. 4, pp.601-604, Apr 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Precise measurements of local magnetic fields have been obtained with a differentially connected array of three proton magnetometers in the ***Long Valley*** caldera region since 1984. Two magnetometers are located inside the caldera with a third reference magnetometer located 26km southeast of the caldera. After correction for secular variation, it is apparent that an anomalous 2 nT decrease in the magnetic field occurred from mid-1989 to mid-1990 at the magnetometer located closest to the center of the resurgent dome inside the caldera. During this period a significant increase in geodetic strain rate of 8.5 ppm/a was observed on the two-color geodimeter network within the caldera from October, 1989, to mid-1990 and a dramatic increase in seismic activity occurred from December, 1989 to July, 1990. A simple dilatational point-source model with pressure increasing by 52 Mpa from October 1989 to August 1990 at a depth of about 7km beneath the center of the resurgent dome can be fit to the strain

data. If this same model is used to calculate piezomagnetic fields in the caldera, the results obtained agree with the observed local magnetic field data provided the Curie point isotherm is at a depth of < or =5km. Taken together, these magnetic, seismic and

geodetic data suggest that an episode of active magmatic intrusion occurred from late 1989 to mid-1990 at a depth of about 7-8km beneath the resurgent dome within the ***Long Valley*** caldera. Other indications of this intrusion should be evident in measurements of leveling, local ***gravity***, and seismic imaging data. Copyright 1991 by the American Geophysical Union.

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1991-029259

37. Database GeoRef

Title **Microgravity monitoring at active volcanoes; a review of theory and practice**

Author Brown, Geoff; Rymer, Hazel

Affiliation Open University, Milton Keynes, United Kingdom (GBR)

Monograph Title Geodynamical instrumentation applied to volcanic areas

Editor van Ruymbeke, Michel; d'Oreye, Nicolas

Affiliation Royal Observatory of Belgium, Brussels, Belgium (BEL)

Source Cahiers du Centre Europeen de Geodynamique et de Seismologie (ECGS), vol.4, pp.279-304, 1991

Publisher Centre Europeen de Geodynamique et de Seismologie, Luxembourg (LUX)

Publication Year 1991

Publication Type Serial; Conference document; Analytic

Country of Publication Luxembourg (LUX)

Accession Number 2000-019598

38. Database GeoRef

Title **Teleseismic tomography of the compressional wave velocity structure beneath the *Long Valley* region, California**

Author Dawson, P B; Evans, J R; Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,021-11,050, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract In 1982 and 1984 the U.S. Geological Survey used several seismic networks, totaling over 90 stations, to record teleseismic P waves and measure travel time residuals in an area centered on the ***Long Valley*** caldera. We inverted the travel time residuals to obtain a three-dimensional image of the velocity structure with resolution of 5-6 km to depths of 70 km beneath the array. Direct inversion of these data indicates that the 2- to 4-km-thick low-velocity caldera fill contaminates the signal from any midcrustal velocity anomalies beneath the caldera. Thus two methods were used to strip the effects of the upper crust from the travel time residuals: (1) ray tracing through upper crustal velocity models provided by seismic refraction experiments and ***gravity*** surveys, and (2) an iterative stripping scheme using the inversion itself. The methods produce essentially identical results and adequately remove the effects of the shallowest crustal structures, including the caldera fill and hydrothermal alteration effects. The resulting "stripped" models show two well-resolved midcrustal low-velocity bodies in the ***Long Valley*** region. The first body is centered between 7 and 20 km depth beneath the resurgent dome of the ***Long Valley*** caldera and has a volume of 150-600 km (super 3) . The second, with a similar volume, is centered between 10 and 20 km depth beneath the Mono Craters, about 10 km north of ***Long Valley***. Velocity contrasts in both of these bodies are about 6-10%, and the features are interpreted as silicic magma chambers. This experiment does not preclude the presence of additional pockets of magma smaller than 5 km across in the upper crust, particularly beneath the resurgent dome of the caldera (which would be removed with the stripping methods). It is likely that the midcrust anomaly beneath the resurgent dome is a remnant of the caldera forming magma chamber. Upper mantle velocities are lower than average beneath Mono Craters and higher than average beneath ***Long Valley***. We tentatively interpret these anomalies as mantle partial melt beneath the Mono

Craters and refractory upper mantle residuum beneath ***Long Valley***. The high eruptive rate of the Mono Craters and these upper mantle structures suggest that the focus of volcanism is shifting north from ***Long Valley*** to the Mono Craters. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1990-049546

39. Database GeoRef

Title **Two-dimensional two-phase elasto-plastic seismic response of earth dams**

Author Yiagos, Alexandros N

Pages 272

Publication Year 1990

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Princeton University, Princeton, NJ, United States (USA)

Country of Publication United States (USA)

Accession Number 1991-021160

40. Database GeoRef

Title **Modeling of deformation and stresses associated with volcanism at *Long Valley*, California**

Author Wu, Mingdong

Pages 148

Publication Year 1989

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of Wisconsin at Madison, Madison, WI, United States (USA)

Country of Publication United States (USA)

Accession Number 1990-042235

41. Database GeoRef

Title **Geophysical constraints on magmatism and crustal structure**

Author Eaton, G P

Affiliation Iowa State Univ., Ames, IA, United States (USA)

Monograph Title Continental magmatism; abstracts

Author Anonymous

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, Report: 131, pp.80, Apr 1989

Resource Location http://geoinfo.nmt.edu/publications/ home.html

Report Number 131

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Abstract Applications of geophysical measurements in the study of molten or partially molten bodies of magma, as well as of cooler masses of in situ magmatic rocks, of complex subvolcano systems, and of the crustal structure of regions of active magmatism have increased significantly in the past 25 years. A brief review of the successes and failures of such efforts is presented, based on published case studies, on theoretical considerations of the geophysical properties of magma and magmatic rocks (in terms both of the absolute values of such properties and relative to those of the country rocks in which the magma was emplaced), and on the viability of different geophysical techniques applied in attempts to answer specific questions raised by geologists engaged in the study of volcanoes or magmatic systems. The ultimate success of geophysical interpretation in such studies is dependent on the ability to detect, sort and correctly interpret signals arising from, or affected by, a variety of phenomena: the actual presence of magma, itself; the geometric configuration of the magma body; properties of the magma owing to its physical state (e.g., cooling, thermally stable, or warming;
moving, or at rest; convecting or non-convecting; etc.); the presence or absence of vigorous hydrothermal circulation in the region around and above the magma mass; the presence or absence of a rock alteration shroud around the body, which may be present whether the body is hot or has cooled to an ambient regional temperature; and the presence or absence of emplacement - related, localized fracture systems in the country rock nearby or deformation in the region of the body arising from the added effect of far-field stresses. Much of what can be detected geophysically at the surface is thus significantly influenced by processes and phenomena in the shallow crust. These phenomena have the potential to screen, distort, mimic or reinforce signals deriving from a magma body or from the lower crust. In the case of those magmatic systems in which a constructional volcanic edifice is present at the surface, part of the difficulty of interpretation relates to the ability to effect a proper separation of surface or near-surface geologic signals from those arising at the depth of interest and target of relevance. In most cases, the task is not a simple one and the
certainty of interpretation is sometimes a function of the availability of a variety of other information bearing on the specific problem that is to be solved. Some convincing case histories are presented in which the viability of the use of geophysical data is demonstrated and its interpretation independently confirmed. Studies examined here include ***gravity*** investigations, magnetics, active and passive seismic studies and seismic signal delays, electrical methods, thermal gradient measurements and heat flow calculations, and surface deformation studies. Example sites include the Cascade Range of western North America; Hawaii Volcanoes National Park, Hawaii; ***Long Valley***, California; San Juan Mountains, Colorado; Rio Grande ***Valley***, New Mexico; Yellowstone National Park, Wyoming; as

well as several active volcanoes in Japan and ancient magmatic complexes in the British Isles.

Publication Year 1989

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1990-022795

42. Database GeoRef

Title **Instrument validation and application of an absolute *gravity* meter in *Long Valley* and California**

Author Sasagawa, Glenn Shoichi

Pages 177

Publication Year 1989

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at San Diego, La Jolla, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 1990-021165

43. Database GeoRef

Title **System identification of earth dams using seismic records**

Author Zeghal, Mourad; Abdel-Ghaffar, Ahmed M

Affiliation Princeton Univ., Civ. Eng. Dep., Princeton, NJ, United States (USA)

Affiliation Univ. Calif. at Berkeley, United States (USA); Univ. South. Calif., United States (USA)

Monograph Title Seismic engineering; research and practice; proceedings of the sessions related to Seismic engineering at Structures congress '89

Editor Kircher, Charles A; Chopra, Anil K

Affiliation Jack Benjamin and Assoc., Mountain View, CA, United States (USA)

Publisher Am. Soc. Civ. Eng., New York, NY, United States (USA)

Pages 179-188

Publication Year 1989

Publication Type Book; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1992-014654

44. Database GeoRef

Title **Basement structure and implications for hydrothermal circulation patterns in the western moat of *Long Valley* Caldera, California**

Author Suemnicht, Gene A; Varga, Robert J

Affiliation Unocal Geotherm. Div., Santa Rosa, CA, United States (USA)

Monograph Title Special section on ***Long Valley*** Caldera

Author Anonymous

Source Journal of Geophysical Research, vol. 93, no. B11, pp.13,191-13,207, 10 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Detailed surface mapping, subsurface drill hole data, and geophysical modeling are the basis of a structural and hydrothermal model for the western part of ***Long Valley*** caldera. Six fault zones are recognized in the western caldera with dominant orientations of north, northwest, and northeast, sub-parallel to regional fault trends in the surrounding Sierran basement. The internal structural geometry of the cores of 12 exogenous domes inside and outside the caldera suggests that the domes erupted at the intersections of these principal fault trends rather than along the axis of a single dike. ***Gravity*** modeling and subsurface data from deep geothermal wells indicate that the floor of the caldera is segmented into a number of discrete fault blocks with varying offsets. One of the northeast trending fault zones, designated Discovery fault in this paper, appears to be part of the original Sierran embayment that

existed before caldera collapse. Recent hydrothermal alteration occurs along Discovery fault strands and composite vertical offset of intracaldera volcanic units across the entire fault zone may be as much as 400 m. Field relationships, geophysical interpretations, and interpretaions of drill hole data suggest that this fault is a fundamental flaw in the western caldera. The preexisting tectonic framework of the basement rocks controlled the configuration of the western caldera floor and, through it, the location of postcollapse eruptive centers. These deep basement structures may also provide the high fracture density which controls circulation in the present geothermal system of ***Long Valley***.

Publication Year 1988

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1989-010878

45. Database GeoRef

Title **Three-dimensional *gravity* modeling of the geologic structure of *Long Valley* Caldera**

Author Carle, Steven F

Affiliation Lawrence Berkeley Lab., Dep. Mater. Sci. and Min. Eng., Berkeley, CA, United States (USA)

Monograph Title Special section on ***Long Valley*** Caldera

Author Anonymous

Source Journal of Geophysical Research, vol. 93, no. B11, pp.13,237-13,250, 10 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A 48-mGal ***gravity*** low coincides with ***Long Valley*** caldera and is mainly attributed to low-density caldera fill. ***Gravity*** measurements by Unocal Geothermal have been integrated with U.S. Geological Survey data, vastly improving ***gravity*** station coverage throughout the caldera. A strong regional ***gravity*** trend is mainly attributed to isostasy. A "best fitting" (based on regional control of basement densities) Airy-Heiskanen isostatic model was used for the regional correction. A three-dimensional, multiple-unit ***gravity*** modeling program with iterative capabilities was developed to model the residual ***gravity***. The density structure of ***Long Valley*** caldera and vicinity was modeled with 22 discrete density units, most of which were based on geologic units. Information from drill hole lithologies, surface geology, and structural geology interpretations constrain the model. Some important points revealed by the three-dimensional ***gravity*** modeling are that (1) the volume of ejected magma associated with the Bishop Tuff eruption is greater than previously thought, (2) the caldera structure is strongly influenced by precaldera topography and the extensions of major, active faults, (3) the main west ring fracture is coincident with the Inyo Domes -Mono Craters fracture system, (4) a relatively low -density region probably underlies the caldera, and (5) a silicic magma chamber may underlie Devils Postpile.

Publication Year 1988

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1989-010881

46. Database GeoRef

Title **The regional subsurface structure of *Long Valley* (California) Caldera fill from *gravity* and magnetotelluric data**

Author Hermance, John F; Neumann, G A; Slocum, W

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Geological Society of America Bulletin, vol.100, no.11, pp.1819-1823, Nov 1988

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** caldera, in eastern California, is a deep, basinlike feature bounded by steeply dipping normal faults having vertical offsets of at least several kilometers and is largely filled with effusive volcanics and lacustrine deposits. Interest in delineating its substructure has escalated over the past decade for a number of reasons; for example, there is increasing evidence that patterns of recent seismicity and volcanism may be controlled by pre-existing basement structures. In addition, the highly porous fill of the caldera basin forms the major hydrologic element in the region. For these and other reasons, characterizing the subsurface geometry of ***Long Valley*** caldera is an important objective of current geophysical studies.This paper reports a combined ***gravity*** and magnetotelluric interpretation which reveals a close similarity between a simple 3-D ***gravity*** model and a telluric thin sheet interpretation. This underscores the fact that both the ***gravity*** and the MT data are largely influenced by the same geologic elements: the caldera fill, basement topography, and the major boundary faults. Moreover, as in earlier MT interpretations, a conductive zone is seen beneath the southwest moat. In addition, however, because of new data, we now have evidence for a buried resistive ridge cutting across the main body of the caldera from the northwest to the southeast beneath the resurgent dome. Interpreting this resistive feature as a basement structural "high" (that is, a horst block) is compatible with limited drilling data, and it appears to be the same feature that has been described as a "central platform" from previous ***gravity*** studies. The presence of such a horst may be fundamentally related to the structural evolution of the resurgent dome.

Publication Year 1988

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1988-074076

47. Database GeoRef

Title **Evidence for multiple boundary faults beneath the northwest moat of *Long Valley* Caldera; magnetotelluric results**

Author Hermance, John F; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Geophysical Research Letters, vol. 15, no. 12, pp.1437-1440, Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The boundaries of ***Long Valley*** Caldera, in Eastern California, are sharply delineated by steeply dipping normal faults which, for the most part, are buried and obscured by recent volcanic and sedimentary cover. The only evidence for their presence is from their geophysical signatures on regional ***gravity***, seismic and electromagnetic surveys. Recently, a surge of interest has focused studies in the western moat, where the volcanism is most recent, and where many workers feel that the geothermal potential is highest. A detailed, narrow-band (20-80 s) magnetotelluric profile in that area has delineated a parallel set of buried high angle normal faults which have virtually no expression at the surface. The outermost fault has a throw of approximately 500 m, while the innermost has a throw of approximately 2 km; neither has an expression in the surface morphology. Moreover, based on a relatively low resistivity contrast between the basement and the basin fill, we infer a relatively high fracture porosity in the Sierran basement, which suggests that there may be considerable lateral and vertical migration of meteoric water; a result which has considerable significance to understanding the regional hydrology.

Publication Year 1988

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1989-004149

48. Database GeoRef

Title **Two- and three-dimensional dynamic finite element analyses of the *Long Valley* Dam**

Author Griffiths, D V; Prevost, J H

Affiliation Univ. Manchester, Manchester, United Kingdom (GBR)

Affiliation Princeton Univ., United States (USA)

Source Geotechnique, vol.38, no.3, pp.367-388, Sep 1988

Resource Location http://www.thomastelford.com/ journals/JournalContentPage. asp?JournalTitle=G

Publisher Institution of Civil Engineers, London, United Kingdom (GBR)

Abstract Earthquake response records from the well-instrumented ***Long Valley*** Dam in the Mammoth Lake area of California are compared with numerical prediction made using finite element models. The soil response to cyclic loading is accounted for by the use of a multi-surface plasticity model. The input and output to the finite element analyses take the form of accelerations at the base and at various crest locations.--Modified journal abstract.

Publication Year 1988

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 1989-001184

49. Database GeoRef

Title **A three-dimensional structural model for the *Long Valley* Caldera, California**

Author Carle, Steven F; Goldstein, N E

Monograph Title Earth Sciences Division annual report 1987

Corporate Author Lawrence Berkeley Laboratory, Berkeley, CA, United States (USA)

Source LBL - Lawrence Berkeley Laboratory, Report: 24200, pp.99 -103, Sep 1988

Report Number 24200

Publisher Lawrence Berkeley Laboratory, University of California, Berkeley, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic

Country of Publication United States (USA)

Accession Number 1990-030186

50. **Database** GeoRef

Title **High-precision stations for monitoring *gravity* changes in *Long Valley* Caldera, California**

Author Roberts, Carter W; Jachens, Robert C; Morin, Robert L

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 88-0050, 19 pp., 1988

Report Number OF 88-0050

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 19

Publication Year 1988

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1988-058837

51. Database GeoRef

Title **The geophysics of a restless caldera; *Long Valley*, California**

Author Rundle, John B; Hill, David P

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Annual Review of Earth and Planetary Sciences, vol.16, pp.251-271, 1988

Resource Location http://arjournals.annualreviews.org/loi/earth

Publisher Annual Reviews, Palo Alto, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-066038

52. Database GeoRef

Title **Seismological detection and delineation of magma chambers beneath intraplate volcanic centers in western USA**

Author Iyer, H M

Author Anonymous

Publisher Friedrick Vieweg und Sohn, Braunschweig, Federal Republic of Germany (DEU)

Abstract In this review I describe results from experiments conducted by the U.S. Geological Survey in diverse volcanic environments to image velocity anomalies in the crust and upper mantle using teleseismic P-wave residuals. The linear least-squares inversion technique of Aki et. al. (1976, 1977) is extensively used in these studies. The seismic models thus obtained are synthesized with available geologic and geophysical data to infer plausible models of magma genesis in these regions. The three-dimensional velocity model beneath Yellowstone Plateau shows a large low-velocity body of approximately 100 km diameter centered on the caldera and extending from the crust to a depth of about 250 km. This is interpreted to be a massive magma

body which is responsible for the volcanism during the past 2 m.y. in Yellowstone. Teleseismic S-wave residuals, Raleigh-wave dispersion data, heat-flow, ***gravity***, Curie isotherm depths, and magnetotelluric data, all support the existence of a temperature near granite solidus beginning at a depth of 5-10 km beneath the Yellowstone caldera floor. In the Eastern Snake River Plain (ESRP) a low-velocity anomaly is present in the upper mantle but not in the crust, leading to the speculation that ESRP is the healed track of a northeast propagating volcanic center whose present position is Yellowstone. The seismic model for the ESRP-Yellowstone volcanic system, though unable to distinguish between different models of origin of the system, clearly shows that basaltic magma rises from the mantle, melts the lithosphere and yields massive quantities of rhyolitic magma. The seismic velocity structure beneath Hawaii, an oceanic hot spot, shows a complex crustal structure with no evidence for a large magma chamber in the crust. in the asthenosphere may be applicable to Yellowstone and Hawaii, though the chemistry and volume of surface volcanism is greatly different in the two areas. In all the six intra-plate silicic volcanic centers which we have probed using the teleseismic-residual technique, low-velocity anomalies, inferred as crustal magma chambers have been found. In at least one such volcanic center, ***Long Valley*** in California, uplift and S-wave attenuation measurements support that the magma chamber delineated by teleseismic residuals is real. The suggestion of a root to the magma chamber extending into the upper mantle supports the geologic model for magma genesis in these centers, namely, infusion of basaltic magma from the asthenosphere into the lithosphere and crust, and resulting partial melting. In contrast to the silicic volcanic centers, none of the andesitic Cascade volcanoes show evidence for crustal magma chambers detectable using the teleseismic technique. Teleseismic-residual data in two volcanoes, Newberry in Oregon, and Medicine Lake in California, show massive high-velocity intrusions in the crust beneath the volcano edifice. A high-resolution seismic imaging experiment has revealed the presence of a low-velocity anomaly which could be a dike-like molten magma pocket within the high-velocity intrusive in Newberry volcano. On a regional scale, the teleseismic residual experiments using ***long*** profiles have successfully delineated high-velocity anomalies, possibly related to subduction, in the Oregon Cascades, and a low-velocity anomaly due to asthenospheric upwarp beneath the Rio Grande Rift.

Publication Year 1988

Publication Type Book; Analytic

Accession Number 2001-076429

53. Database GeoRef

Title **A structural model of the *Long Valley* Caldera based on a 3-D *gravity* interpretation**

Author Carle, S F; Goldstein, N E

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1543-1544, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-024030

54. Database GeoRef

Title **Principal facts for 548 new *gravity* stations in the *Long Valley* Caldera and vicinity, California**

Author Roberts, Carter W; Sikora, Robert F; Jachens, Robert C

Affiliation U. S. Geol. Surv., USA, (United States)

Source Open-File Report - U. S. Geological Survey, Report: OF 87-0077, 20 pp., 1987

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1987

Publication Type Serial; Report; Monographic

Accession Number 1987-061814

55. Database GeoRef

Title **Estimates of extension in the Basin & Range Province**

Author Boyer, Steven E; Allison, M Lee
Affiliation Univ. Wash., Dep. Geol. Sci., Seattle, WA, United States (USA)
Author Dickinson, William R (chairperson)
Source Abstracts with Programs - Geological Society of America, vol.19, no.7, pp.597, 1987
Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)
Publication Year 1987
Publication Type Serial; Conference document; Analytic; Abstract only
Accession Number 1988-022802

56. Database GeoRef

Title ***Gravity* and fault structures *Long Valley* Caldera, California**
Author Carle, S F; Goldstein, N E
Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)
Author Elliot, Leonard T (chairperson)
Affiliation Chevron Resour. Co., USA, (United States)
Source Transactions - Geothermal Resources Council, vol.11, pp.327-332, 1987
Publisher Geothermal Resources Council, Davis, CA, United States (USA)
Publication Year 1987
Publication Type Serial; Conference document; Analytic
Accession Number 1989-052764

57. Database GeoRef

Title **Modeling *gravity* and trilateration data in *Long Valley*, California, 1983-1984**
Author Rundle, John B; Whitcomb, James H
Affiliation Sandia Natl. Lab., Geophys. Div., Albuquerque, NM, United States (USA)
Affiliation Int. Serv. Technol. Appl., United States (USA)
Source Journal of Geophysical Research, vol. 91, no. B12, pp.12,675-12,682, 10 Nov 1986
Publisher American Geophysical Union, Washington, DC, United States (USA)
Abstract Repeated, high-precision ***gravity*** measurements. Data were collected at about 40 sites using three Lacoste -Romberg model G ***gravity*** meters. At the same time the U. S. Geological Survey was conducting a program of high-precision line length measurements throughout the same area. Significant changes were observed with both types of data during the intervals 1982-1983 and 1983-1984. Previous work by us has shown that deformation data during the interval 1975-1983 are consistent with a model for the inflation of ***Long Valley*** Caldera which includes magma injection beneath the south central caldera at a depth of only 5 km. Simultaneous inversion of the trilateration and ***gravity*** data for the period 1983-1984 shows that most of the previous model is still reasonably consistent with the data and implies injected volumes of between 0.01 and 0.02 km (super 3) . The total amount of uplift in the northwest is small in comparison to the total uplift centered on the central resurgent dome. Several models, one of which involves injection at the base of the crust. This model implies much higher injected volumes, as much as 0.15-0.2 km (super 3) .-- Modified journal abstract.
Publication Year 1986
Publication Type Serial; Analytic
Accession Number 1987-016635

58. Database GeoRef

Title **A three-dimensional *gravity* model of the geologic structure of *Long Valley* Caldera, California**
Author Carle, Steven F; Goldstein, Norman E

Affiliation Univ. Calif. Berkeley, Mater. Sci. and Miner. Eng., Berkeley, CA, United States (USA)

Affiliation Lawrence Berkeley Lab., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1249, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-067669

59. Database GeoRef

Title **The major boundary faults in eastern *Long Valley* Caldera; magnetotelluric and *gravity* constraints**

Author Hermance, John F; Karlsdottir, Ragna

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Affiliation Natl. Energy Auth., Iceland (ISL)

Source Geophysical Research Letters, vol. 13, no. 5, pp.479-482, May 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geophysical studies of the major boundary fault(s) in eastern ***Long Valley*** caldera have led to significantly different models being proposed for the subsurface structure of this area. Pakiser originally interpreted ***gravity*** data to propose a steep vertical offset across the eastern boundary fault(s) which may be as great as 5 km. On the other hand, Hill employing seismic refraction data, and Abers, who reinterpreted the available ***gravity*** data in the light of the "hard" seismic constraints of Hill, suggested that the offset across this fault may be much more gentle. However, new magnetotelluric data may call for a revision of these models. Based on these recent MT results, offsets along the eastern boundary fault appear to be somewhat steeper than recent models would suggest. Our current thinking would favor a model more in keeping with the one originally envisaged by Pakiser, but with less throw (approximately 2 km) across the faults.

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-067523

60. Database GeoRef

Title ***Gravity* fields and the interpretation of volcanic structures; geological discrimination and temporal evolution**

Author Rymer, H; Brown, G C

Affiliation Open Univ., Dep. Earth Sci., Milton Keynes, United Kingdom (GBR)

Source Journal of Volcanology and Geothermal Research, vol.27, no.3-4, pp.229-254, Mar 1986

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A review of ***gravity*** data reflecting shallow concealed structures on volcanoes demonstrates that valuable information may be derived on the geological development of such structures and on the dynamic evolution of active volcanoes. To a first approximation, all recorded examples of anomalous ***gravity*** fields associated with volcanoes are concentric with and have sources that lie within the volcanic edifice. Positive anomalies with wavelengths less than 20 km and amplitudes up to ca. 30 mGal, characterise mainly basaltic volcanoes from various tectonic settings, and are caused by a relatively dense intrusive complex/magma

body which contrasts with its surroundings either because the body is more mafic than average or, more likely, because near surface, previously erupted materials are uncompacted. Negative anomalies with wavelengths up to 100 km and amplitudes up to ca.
60 mGal, occur over much larger volcanic calderas, many of which have erupted highly silicic pyroclastic ash and pumice; uncompacted silicic caldera infill, with a possible contribution from low-density magma bodies, is responsible for the observed anomalies. There is some evidence for a continuum of ***gravity*** anomaly types that corresponds to the geological evolution of volcanic systems generally from primitive rift or subduction-related basaltic andesite to mature, high-level silicic calderas. Repeated microgravity observations over active volcanoes enable magma movements, variations in magma input and changes in magma density to be monitored closely. Dynamic modelling of volcanic systems is providing new evidence on the behaviour of concealed magma bodies and could have considerable potential for predicting eruptive

events.

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-056693

61. Database GeoRef

Title **Analysis of strong-motion earthquake records from a well-instrumented earth dam**

Author Fedock, Joseph J

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Beavers, James E (chairperson)

Publisher Earthquake Eng. Res. Inst., El Cerrito, CA, United States (USA)

Publication Year 1986

Publication Type Book; Conference document; Analytic

Accession Number 1987-030786

62. Database GeoRef

Title **Computer modeling of ground water and Bouguer *gravity* data in the northern *Long Valley*, west-central Idaho**

Author Landle, George Louis

Publication Year 1986

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1992-055369

63. Database GeoRef

Title **Inversion of *gravity* and trilateration data in *Long Valley*, 1983-1984**

Author Rundle, John B; Whitcomb, James H

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation ISTAC, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.852, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-025907

64. Database GeoRef

Title **Absolute *gravity* measurements in California**

Author Sasagawa, Glenn; Zumberge, Mark; Kappus, Mary

Affiliation Univ. Calif., Scripps Inst. Oceanogr., La Jolla, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.857, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-025950

65. Database GeoRef

Title **Temporal and areal *gravity* investigations at *Long Valley* Caldera, California**

Author Jachens, Robert C; Roberts, Carter W

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,210-11,218, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Temporal ***gravity*** measurements over a broad network in the vicinity of ***Long Valley*** caldera, California, reveal significant ***gravity*** decreases over the interval June 1980 to July 1983 at five stations within or close to the caldera. The negative ***gravity*** changes reflect the late stages of an uplift of the caldera which began before the initial June 5-9, 1980, ***gravity*** survey (based on the ***gravity*** data) and after July 1979 according to the results of horizontal deformation measurements. Temporal ***gravity*** measurements at a more detailed network established within the caldera during June 1982 suggest that a low-amplitude uplift occurred immediately after the January 1983 south moat earthquake swarm and that the uplift probably was accompanied by the addition of mass at depth. However, these data are complicated by ***gravity*** changes due to changes in depth to the water table. An areal ***gravity*** survey in the vicinity of the January 1983 swarm reveals two local ***gravity*** highs at 4-5 mGal amplitude and 2-3 km diameter. These local highs occur directly above the two areas that experienced the most intense earthquake swarm activity during the past few years and are believed to mark the locations of past intrusions into the south moat.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082051

67. Database GeoRef

Title **Vertical distortion in *Long Valley*, California, associated with the January 1983 earthquake swarm**

Author Whitcomb, James H; Rundle, John B

Affiliation ISTAC, Altadena, CA, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Source Geophysical Research Letters, vol. 12, no. 8, pp.522-525, Aug 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Repeated, high-precision, ***gravity*** measurements. Significant changes in surface ***gravity*** associated with the January 1983 earthquake swarm in the south moat of ***Long Valley*** Caldera. These changes indicate that the ground around the Casa Diablo hot springs area was uplifted at the time of the swarm. The uplift patterns agrees with that predicted by the model of injection of magma into two chambers at 5 to 8 km depth beneath ***Long Valley*** Caldera.--Modified journal abstract.

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-002111

68. Database GeoRef

Title **The subsurface structure of *Long Valley* Caldera, Mono County, California; a preliminary synthesis of *gravity*, seismic, and drilling information**

Author Abers, Geoffrey

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Journal of Geophysical Research, vol. 90, no. B5, pp.3627-3636, 10 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** Caldera is a 0.7 m.y. old volcanic eruptive center associated with an elliptical collapse structure on the eastern margin of the Sierra Nevada. Two-dimensional models of caldera fill are presented in this study resulting in structures compatible with existing seismic refraction and ***gravity*** data. Modifications to previous seismic models include shifting the north caldera rim to the south and decreasing the dip of the west and south boundaries. Densities in the model are not varied independently but are based on empirical

velocity - density relationships and measured densities from surface outcrops and drill cores. These density values are adequate to account for observed ***gravity*** anomalies, indicating that the assumed subsurface lithologies are approximately correct. The large ***gravity*** anomaly in the shallow eastern caldera is modeled by assuming that the area is underlain by a layer of exceptionally low density.

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1985-057409

69. Database GeoRef

Title **Geothermal systems of the Mono Basin-*Long Valley* region, eastern California and western Nevada**

Author Higgins, Chris T; Flynn, Thomas; Chapman, Rodger H; Trexler, Dennis T; Chase, G R; Bacon, C Forrest; Ghusn, George, Jr

Affiliation Calif. Div. Mines and Geol., Pleasant Hill, CA, United States (USA)

Source Open File Report - California Geological Survey, Report: 85-19, 159 pp., 1985

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Report; Map; Monographic

Accession Number 1991-047564

70. Database GeoRef

Title ***Gravity* evidence for prior igneous intrusion beneath the south moat of *Long Valley* Caldera, California**

Author Roberts, Carter W; Jachens, Robert C

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1117, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046290

71. Database GeoRef

Title **Deformation of *Long Valley* Caldera, Mono County, California, from 1975 to 1982**

Author Denlinger, Roger P; Riley, Francis S S

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 89, no. B10, pp.8303-8314, 30 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Teleseismic and ***gravity*** data acquired in 1973 support the existence of a large body of partial melt (magma) beneath the resurgent dome of ***Long Valley*** caldera in eastern California. Whereas intermittent reoccupation of vertical and horizontal control networks in and near ***Long Valley*** caldera revealed only very small, probably tectonic movements between 1932 and 1979, a leveling survey in September 1980 showed a 250 - mm uplift of Highway 395 on the west side of the resurgent dome. This uplift was apparently related to expansion of the subjacent magma body beginning sometime between July 1979 and September 1980 and may have been coseismic with the Mammoth Lakes magnitude 6 earthquake sequence of May 25-27, 1980. These earthquakes ushered in a period of almost continuous low-level seismicity, punctuated by relatively severe swarms in the southern
moat. Vertical and horizontal displacements within ***Long Valley*** caldera between 1979 and
1982 define a striking radially symmetric pattern of uplift and horizontal distension that is consistent with expansion of the body of partial melt inferred from teleseismic and ***gravity*** data. Specifically, the observed deformation of the caldera floor approximates the theoretical deformation due to expansion of a spherical magma chamber at a depth of at least 7 km. The calculated maximum uplift is 430 mm and is located south of the center of the resurgent dome. Significant deviations from this simple model appear to be associated

with either movement of mapped faults within and adjacent to the caldera or folding of weak surface deposits.

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Accession Number 1985-038348

72. Database GeoRef

Title ***Gravity* investigations at *Long Valley* Caldera, California**

Author Jachens, Robert C; Roberts, Carter W

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.248-279, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059729

73. Database GeoRef

Title ***Gravity* variations in the Mammoth Lakes, Mono Lake and Owens *Valley*, California regions**

Author Whitcomb, James H; Rundle, John B

Affiliation Univ. Colo./NOAA, Coop. Inst. Res. Environ. Sci., Boulder, CO, United States (USA)

Affiliation Univ. Nev., United States (USA); Sandia Lab., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.280, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Accession Number 1985-059730

74. Database GeoRef

Title **A detailed microearthquake survey of *Long Valley*, California, Known Geothermal Resources Area, July-Sept., 1981**

Author Cramer, Chris H; Stierman, Donald J; Lee, Tien Chang

Affiliation California Department of Conservation, Division of Mines and Geology, USA, (United States)

Source Open File Report - California Geological Survey, Report: 84-53, 147 pp., 14 sheets, 1984

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Map; Monographic

Accession Number 2001-062731
|

75. Database GeoRef

Title **The I.G.P.P. absolute *gravity* meter**

Author Zumberge, M A

Affiliation Univ. Calif., Inst. Geophys. and Planet. Phys., La Jolla, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.679, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-040521

76. Database GeoRef

Title ***Gravity* variation in the Mammoth Lakes, Mono Lake and Owens *Valley*, California regions**

Author Whitcomb, James H; Rundle, John B

Affiliation Univ. Colo./NOAA, Coop. Inst. Res. Environ. Sci., Boulder, CO, United States (USA)

Affiliation Sandia Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016551

77. Database GeoRef

Title **Geophysical studies of active geothermal systems in the northern Basin and Range**

Author Ward, Stanley H

Affiliation Univ. Utah Res. Inst., Earth Sci. Lab., Salt Lake City, UT, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.121-157, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1984-044706

78. Database GeoRef

Title **Temporal variations of *gravity* near *Long Valley*, California 1980-82**

Author Roberts, C W; Jachens, R C

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012951

79. Database GeoRef

Title **A *gravity* and magnetic investigation of the *Long Valley* Caldera, Mono County, California**

Author Kane, M F; Mabey, D R; Brace, R -L

Source Journal of Geophysical Research, vol. 81, no. 5, pp.754-762, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Gravity*** studies show that the subsurface part of the ***Long Valley*** caldera is a coincident steep-sided depression filled with porous epiclastic and volcanic materials to a depth of as much as 3 km. The depression contains two major basins, a larger and deeper one making up much of the eastern part and a somewhat smaller, more shallow one to the west; a positive feature underlying the central part of the depression separates the two basin areas. The east side of this feature is linear in plan and coincides with the extension of the Hilton Creek fault which is mapped within and beyond the south edge of the caldera. The indicated relief on the postulated subsurface Hilton Creek fault together with difference in depth of the eastern and western basinal areas indicates that the eastern basin is downdropped in relation to the western one. Gentle ***gravity*** gradients outside the caldera but sloping towards it are interpreted as evidence of a low -density mass located below the caldera fill. We conclude that it is probably related to the magma source. Aeromagnetic data indicate that a northwest-trending belt of metasedimentary rocks on the south flank of ***Long Valley*** may extend into the caldera proper and form much of the bedrock floor of the western part of the caldera. A magnetic low of shallow source in the hot spring region in the southwest is thought to be caused by hydrothermal alteration of the ferrimagnetic minerals in the underlying rocks. A broad positive magnetic anomaly near the center of the caldera may be caused by a thick section of magnetic volcanic flow lying east of the projected Hilton Creek fault and underlying much of the eastern basin.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031715

80. Database GeoRef

Title **Audio-magnetotelluric methods in reconnaissance geothermal exploration**

Author Hoover, D B; Long, C L

Affiliation U. S. Geol. Surv., Theoret. Appl. Geophys., Denver, Colo., United States (USA)

Source U. N. Symp. Dev. Use Geotherm. Resour., Abstr., no.2, unpaginated, 29 May 1975

Publication Year 1975

Publication Type Serial; Conference document; Analytic

Accession Number 1975-029064

81. Database GeoRef

Title ***Gravity* and magnetic anomalies in *Long Valley*, California**

Author Kane, Martin F; Mabey, Don R

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038969

82. Database GeoRef

Title ***Gravity* data for 525 stations in *Long Valley* and vicinity, California**

Author Oliver, H W; Robbins, S L; Pakiser, L C; Kane, M F

Publisher U.S. Geol. Surv., Reston, VA, United States (USA)

Publication Year 1973

Publication Type Report; Monographic

Accession Number 1985-066142

83. Database GeoRef

Title **A *gravity* study of *Long Valley***

Author Pakiser, Louis C

Author Rinehart, C D; Ross, D C

Source U. S. Geological Survey Professional Paper, Report: P 0385, pp.85-89, 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Clastic and volcanic deposits of Cenozoic age, filling ***Long Valley*** to a depth of 12,000 feet, have a much lower average density than crystalline rocks of surrounding mountains, and somewhat higher than the muds of Searles Lake basin. The ***gravity*** relief rivals great minimum anomalies found in basins between the Coast Ranges. The ***gravity*** map suggests a crescentic structural basin bounded on all sides by nearly vertical faults along which it subsided. A pronounced high near the center could represent a mass of dense rock within the pre-Cenozoic bedrock, or a volcanic neck.

Publication Year 1964

Publication Type Serial; Report; Analytic

Accession Number 1964-005751

84. Database GeoRef

Title **Structural geology and volcanism of Owens *Valley* region, California; a geophysical study**

Author Pakiser, L C; Kane, M F; Jackson, W H

Source U. S. Geological Survey Professional Paper, Report: P 0438, 68 pp., 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract ***Gravity*** and seismic measurements in Owens ***Valley***, ***Long Valley***, and Mono Basin, which are directly east of the Sierra Nevada, Calif., show these depressions to be downdropped blocks filled with thousands of feet of Cenozoic deposits. Magnetic measurements suggest locations of buried volcanic rocks. A theory relating volcanism to stress reduction associated with faulting is presented. ***Long Valley*** and Mono Basin are identified as volcano-tectonic depressions.

Publication Year 1964

Publication Type Serial; Report; Monographic

Accession Number 1964-013239

85. Database GeoRef

Title **Anomalous *gravity* field in east-central California**

Author Oliver, Howard W; Mabey, Don R

Source Geological Society of America Bulletin, vol.74, no.10, pp.1293-1298, 1963

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Bouguer ***gravity*** values at about 11,000 stations in E.-central California range from -14 mgal near Merced to -274 mgal in ***Long Valley***. ***Gravity*** lows in the W. and S. parts of the San Joaquin ***Valley*** and over local basins S. and E. of the Sierra Nevada are produced by large thicknesses of Upper Cretaceous and Cenozoic deposits. A large regional ***gravity*** low over the Sierra Nevada can be explained by isostatic compensation of the range together with the effect of the relatively low-density rocks of the Sierra Nevada batholith. A broad ***gravity***
ridge along the E. side of the San Joaquin ***Valley*** shows excellent correlation with a similar magnetic ridge where the 2 sets of data are available, suggesting that both anomalies are caused by a dense, magnetic mass buried at an estimated depth of 5-10 mi. Seismic refraction measurements further indicate that the thickness of the earth's crust under the ***valley*** is less than 12 mi. Thus, the anomalous mass is in the lower part of the earth's crust and is conceivably related to the more mafic rocks of the earth's upper mantle.

Publication Year 1963

Publication Type Serial; Analytic

Accession Number 1963-010483

86. Database GeoRef

Title ***Gravity* anomalies in the central Sierra Nevada, California**

Author Oliver, Howard William; Pakiser, Louis Charles, Jr; Kane, Martin Francis

Source Journal of Geophysical Research, vol.66, no.12, pp.4265-4271, 1961

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract More than 1000 measurements of ***gravity*** in the central Sierra Nevada and adjacent regions to the E. show a decrease in regional Bouguer ***gravity*** values from -75 mgal. at the western edge of the mountains to a minimum of about -235 mgal. just W. of the Sierra crest, a distance of only 100 km. Farther E., a positive regional gradient of about 0.6 mgal./km. continues into the Inyo-White Mountains for a distance of at least 600 km. Local ***gravity***
lows are associated with Cenozoic sediments in Owens ***Valley***, ***Long Valley***, and Mono Basin to the E. of the Sierra Nevada and with a thick, narrow deposit of Pleistocene sediments in Yosemite ***Valley***. Local ***gravity*** highs are associated with roof pendants of metavolcanic rocks which extend down into the Sierra Nevada batholith to depths of more than 2 km. The variation in the regional Bouguer ***gravity*** values of about 160 mgal. can be explained by a thickening of the earth's crust from 35 to 52 km. beneath the central sierra Nevada, combined with an eastward decrease in the density of the Sierra Nevada batholith from 2.76 to 2.64 g./cm. (super 3) . ***Gravity*** data support Romney's conclusion, based on seismic evidence, that a local mountain root exists under the central and southern parts of the Sierra Nevada and not under the lower northern part, in general accordance with regional isostasy.

Publication Year 1961

Publication Type Serial; Analytic

Accession Number 1961-011248

87. Database GeoRef

Title ***Gravity*, volcanism, and crustal deformation in *Long Valley*, California; Article 106**

Author Pakiser, L C

Source U. S. Geological Survey Professional Paper, Report: P 0424-B, pp.B250-B253, 1961

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract A large ***gravity*** low, flanked by steep ***gravity*** gradients, in the ***Long Valley*** area, can be explained by an ellipse-shaped subsided block, bounded on all sides by a vertical fault zone and the depression filled with 18,000 + or - 5000 ft. of low-density Cenozoic deposits. The structural feature may be a volcano-tectonic depression similar to Mono Basin, California.

Publication Year 1961

Publication Type Serial; Report; Analytic

Accession Number 1961-011933

HEAT FLOW BIBLIOGRAPHY

1. Database GeoRef

Title **Active geothermal systems and Pliocene and younger gold deposits of the Great Basin, USA; regional controls and selenium concentrations as a clue to ore environment**

Author Coolbaugh, Mark F; Arehart, Greg B; Faulds, James E; Vikre, Peter G; John, David A

Affiliation AuEx Ventures, Reno, NV, United States (USA)

Affiliation University of Nevada, Reno, United States (USA); Nevada Bureau of Mines and Geology, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2007 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol. 39, no. 6, pp.197, Oct 2007

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Pliocene and younger Au deposits in the Great Basin, USA contain >10 Moz Au. Many of these deposits occur near active geothermal systems with >180 degrees C fluids, suggesting that subsurface Au deposition may be continuing today at some
locations. The young Au deposits and geothermal systems can be classed as either magmatically heated or amagmatic depending on whether there is evidence of coeval silicic magmatism. The magmatically heated deposits and systems (e.g., ***Long Valley*** caldera, CA; Roosevelt, UT) are limited to the margins of the Great Basin whereas young amagmatic Au deposits (e.g., Sulphur (Crofoot- Lewis) and Florida Canyon, NV) and systems, currently producing >100 megawatts electricity, cluster in NW Nevada. Amagmatic epithermal Au deposits and electricity -producing amagmatic geothermal systems are scarce globally, and their abundance in NW NV is attributed to a combination of high ***heat flow*** and active transtensional tectonics. The greatest concentration of such deposits/systems is found where strike-slip faulting of the Walker Lane splays outward into NE-striking extensional faults in the Great Basin interior. Individual deposits and systems formed in structurally complex zones that facilitate deep fluid circulation, such as en echelon step-overs in normal faults, pull-apart blocks, and boundaries between zones of opposite-dipping normal faults. In such environments, Au mineralization and geothermal fluid ***flow*** preferentially occur along structures oriented approximately orthogonal to the current crustal extension direction. Compared to magmatically heated systems, the amagmatic geothermal systems have lower fluid concentrations of As, Li, B, and Cs, lower 3He/4He ratios, and lower overall vertical temperature gradients. The related young Au deposits are of the shallow hot-springs type, with steam- heated advanced argillic alteration, adularia, marcasite, cinnabar, native sulfur, and high concentrations of Sb and As. Limited data indicates that some young amagmatic gold systems have high Se concentrations, similar to many Miocene epithermal Au deposits in NV. High ratios of Se/Ag suggest that, in contrast to the Miocene deposits, Ag minerals may not be the major host of Se. Differences in the level of exposure of the Pliocene vs. Miocene Au deposits may explain host mineral differences.

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-017975

2. Database GeoRef

Title **On reactive fluid *flow* and geochemical transport modeling; from natural hydrothermal systems to geothermal energy development**

Author Xu, Tianfu

Affiliation Lawrence Berkeley National Laboratory, Earth Sciences Division, Berkeley, CA, United States (USA)

Monograph Title Geological Society of America, 2007 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol. 39, no. 6, pp.348, Oct 2007

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Geochemical evolution in both natural hydrothermal systems and geothermal fields occurs through a complex interplay of multiphase fluid and ***heat flow*** and chemical transport processes. These complexities include (1) fracture-matrix interaction for fluid, ***heat***, and chemical constituents, (2) gas-phase participation in multiphase fluid ***flow*** and geochemical reactions, (3) the kinetics of fluid -rock chemical interaction, and (4) ***heat*** effects on thermophysical and chemical properties and processes. Reactive fluid ***flow*** and geochemical transport modeling is a powerful tool to get insight into these processes, to test conceptual model, and to study the geochemical behavior, mineral alteration, changes in porosity and permeability. Three modeling examples are used to illustrate the usefulness of the reactive transport modeling. The first example deals with caprock alteration in a ***Long Valley*** Caldera (LVC) hydrothermal system in California. The observed sequence of argillic alteration in the LVC consists of an upper zone with smectite and kaolinite (in the lower-temperature region), a lower illite zone, and an intermediate mixed illite and smectite zone. The sequence is reasonably well reproduced in the numerical simulation. The second example investigates the formation mechanism of an impermeable barrier between acidic and neutral fluid zones in the Onikobe geothermal field, Japan. The third studies geothermal injection well silica scaling and loss of porosity

and injectivity at Tiwi Field, Philippines. Open challenges and future directions on the modeling will be discussed.

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-073444

3. Database GeoRef

Title **Boiling water at Hot Creek; the dangerous and dynamic thermal springs in California's *Long Valley* Caldera**

Author Farrar, Christopher D; Evans, William C; Venezky, Dina Y; Hurwitz, Shaul; Oliver, Lynn K

Affiliation U. S. Geological Survey, USA, (United States)

Source Fact Sheet - U. S. Geological Survey, Report: FS 2007-3045, 4 pp., 2007

Resource Location http://pubs.usgs.gov/fs/2007/3045/

Report Number FS 2007-3045

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 4

Publication Year 2007

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2007-095064

4. Database GeoRef

Title **Geothermal energy; Canada, Mexico and the United States**

Author Renner, Joel L

Affiliation Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID, United States (USA)

Monograph Title AAPG 2005 annual convention; abstracts volume

Author Anonymous

Source Abstracts: Annual Meeting - American Association of Petroleum Geologists, vol. 14, pp.A116, 2005

Publisher American Association of Petroleum Geologists and Society for Sedimentary Geology, Tulsa, OK, United States (USA)

Abstract World-wide, geothermal resources are most commonly associated with volcanic arcs (Indonesia, Japan, and Philippines) spreading centers (Salton Trough and East African Rift) and with hot spots (Hawaii, Iceland, Yellowstone). Near the margins of the Basin and Range in the U. S. geothermal activity is commonly associated with young Volcanism (***Long Valley*** and Coso volcanic fields). Additional production is associated with deep fluid circulation in the Basin and Range thought to be localized by recent faulting and the higher than average crustal ***heat flow*** in much of the Basin and Range. Geothermal energy is an important energy resource in Mexico and the western United States. Commission Federal de Electricidad produces electricity at Cerro Prieto (just south of Imperial ***Valley***, California), Los Azufres and Tres Virgenes. In the U. S. about 2020 MWe of electrical generation capacity is on-line in California (7 fields), Hawaii (1 field), Nevada (9 fields) and Utah (2 fields). At Meager Creek, British Columbia an electrical generation project is under development. In general, fluids with temperatures of greater than 150 degrees C are used to produce electricity, and above 30 degrees C are used for direct applications such as space heating, crop drying, aquaculture, etc. The U. S. Geological Survey has identified about 23,000 MWe of hydrothermal resources capable of electrical production in the U. S. Mexico is actively exploring for additional production in Baja California and the Central Mexico Volcanic Belt. Canadian activity is currently focused on Meager Mountain, British Columbia.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-055691

5. Database GeoRef

Title **Hydrothermal discharge from volcanic areas in the Western United States**

Author Ingebritsen, S E; Mariner, R H; Evans, W C; Hurwitz, S; Schmidt, M E

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA) **Affiliation**

Oregon State University, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.487, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Except in the MOR environment, voluminous, high-temperature hydrothermal discharge is commonly associated with silicic volcanism and a shallow regional water table (e.g. Yellowstone, Kamchatka, Taupo volcanic zone). In the Western U.S., hydrothermal ***heat*** discharge ranges up to 6 GW (Yellowstone) and values in the 100 MW range are not uncommon (***Long Valley***, Lassen, Austin Hot Springs). Such large ***heat*** discharges likely imply mining of magmatic ***heat*** and, as pointed out by Clive Lister (1974), may require active fluid circulation near or within recently crystallized magma. The average hydrothermal ***heat*** discharge from some silicic magmatic systems is fairly constant on a multidecadal scale. For instance, measurements at Yellowstone and Lassen suggest relatively steady ***heat*** discharge since the early 20th century. Large seasonal variations observed at some localities over the past 30 years are due mainly to interaction with the shallow, cold hydrologic system. Mining of ***heat*** from subaerial deposits (Katmai, Loowit Hot Springs at Mt. St. Helens) can temporarily generate comparably large (100s of MW) values of hydrothermal discharge, but pronounced declines in ***heat*** output are observed on decadal scales. Relative to silicic systems, focused basaltic magmatism can provide similarly large ***heat*** inputs (e.g. 5-6 GW at Kilauea), but depth to water table tends to be greater in basaltic terranes, and hydrothermal discharge tends to be weaker and less conspicuous (e.g. a maximum of approximately 1 GW of subaerial hydrothermal discharge at Kilauea, mainly as low-temperature, dilute discharge near the coast). Andesitic arcs worldwide exhibit a range of length- normalized hydrothermal -discharge rates. The most important factors controlling hydrothermal discharge may be the rate of magmatic ***heat*** input and depth to water table. In the central Oregon Cascade Range, perhaps the most active part of a relatively "weak" andesitic arc (intrusion rate approximately 9-50 cubic km/m.y./km arc length), hydrothermal discharge (approximately 2 MW/km arc length) is relatively hot and visible west of the arc, where the water table is shallow, and relatively cool, dilute, and inconspicuous east of the arc, where the water table is deep. Current length-normalized rates of hydrothermal ***heat*** discharge from the Cascade arc are approximately 10 times lower than those in the Taupo volcanic zone, an arc segment analogous to the more- silicic Miocene Cascades.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-039274

6. Database GeoRef

Title **Fluid *flow* in the resurgent dome of *Long Valley* Caldera; implications from thermal data and deep electrical sounding**

Author Pribnow, Daniel F C; Schuetze, Claudia; Hurter, Suzanne J; Flechsig, Christina; Sass, John H

Affiliation Institut fuer Geowissenschaftliche Gemeinschaftsaufgaben, Hanover, Federal Republic of Germany (DEU)

Affiliation Oregon Department of Natural Resources, United States (USA); Universitaet Leipzig, Federal Republic of Germany (DEU); GeoForschungsZentrum Potsdam, Federal Republic of Germany (DEU); U. S. Geological Survey, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.329-345, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Temperatures of 100 degrees C are measured at 3 km depth in a well located on the resurgent dome in the center of ***Long Valley*** Caldera, California, despite an assumed >800 degrees C magma chamber at 6-8 km depth. Local downflow of cold meteoric water as a process for cooling the resurgent dome is ruled out by a Peclet-number analysis of temperature logs. These analyses reveal zones with fluid circulation at the upper and lower boundaries of the Bishop Tuff, and an upflow zone in the metasedimentary rocks. Vertical Darcy velocities range from 10 to 70 cm a (super -1) . A 21-km-***long*** geoelectrical profile across the caldera provides resistivity values to the order of 10 (super 0) to >10 (super 3) Omega m down to a depth of 6 km, as well as variations of self-potential. Interpretation of the electrical data with respect to hydrothermal fluid movement confirms that there is no downflow beneath the resurgent dome. To explain the unexpectedly low temperatures in the resurgent dome, we challenge the common view that the caldera as a whole is a regime of high temperatures and the resurgent dome is a local cold anomaly. Instead, we suggest that the caldera was cooled to normal thermal conditions by vigorous hydrothermal activity in the past, and that a present -day hot water ***flow*** system is responsible for local hot anomalies, such as Hot Creek and the area of the Casa Diablo geothermal power plant. The source of hot water has been associated with recent shallow intrusions into the West Moat. The focus of planning for future power plants should be to locate this present -day ***flow*** system instead of relying on ***heat*** from the old magma chamber.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016383

7. Database GeoRef

Title **Time-variation of hydrothermal discharge at selected sites in the Western United States; implications for monitoring**

Author Ingebritsen, S E; Galloway, D L; Colvard, E M; Sorey, M L; Mariner, R H

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.111, no.1-4, pp.1-23, Nov 2001

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We compiled time series of hydrothermal discharge consisting of 3593 chloride - or ***heat***-flux measurements from 24 sites in the Yellowstone region, the northern Oregon Cascades, Lassen Volcanic National Park and vicinity, and ***Long Valley***, California. At all of these sites the hydrothermal phenomena are believed to be as yet unaffected by human activity, though much of the data collection was driven by mandates to collect environmental-baseline data in anticipation of geothermal development. The time series average 19 years in length and some of the Yellowstone sites have been monitored intermittently for over 30 years. Many sites show strong seasonality but few show clear ***long***-term trends, and at most sites statistically significant decadal -scale trends are absent. Thus, the data provide robust estimates of advective ***heat flow*** ranging from approximately 130 MW in the north-central Oregon Cascades to approximately 6100 MW in the Yellowstone region, and also document Yellowstone hydrothermal chloride and arsenic fluxes of 1740 and 15-20 g/s, respectively. The discharge time series show little sensitivity to regional tectonic events such as earthquakes or inflation/deflation cycles. Most ***long***-term monitoring to date has focused on high-chloride springs and low -temperature fumaroles. The relative stability of these features suggests that discharge measurements done as part of volcano-monitoring programs should focus instead on high-temperature fumaroles, which may be more immediately linked to the magmatic ***heat*** source.

Publication Year 2001

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2002-023882

8. Database GeoRef

Title **On fluid *flow* and mineral alteration in fractured caprock of magmatic hydrothermal systems**

Author Xu, Tianfu; Pruess, Karsten

Affiliation University of California at Berkeley, Earth Sciences Division, Berkeley, CA, United States (USA)

Source Journal of Geophysical Research, vol. 106, no. B2, pp.2121-2138, 10 Feb 2001

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geochemical evolution in hydrothermal fractured rock systems occurs through a complex interplay of multiphase fluid and ***heat flow*** and chemical transport processes.Building on previous work, we present here simulations of reactive hydrothermal ***flow*** that include (1) detailed fracture-matrix interaction for fluid, ***heat***, and chemical constituents,(2) gas-phase participation in multiphase fluid ***flow*** and geochemical reactions, (3) the kinetics of fluid -rock chemical interaction, and (4) ***heat*** effects on thermophysical and chemical properties and processes. The present study uses, as an example, water and gas chemistry data as well as caprock mineral compositionfrom the hydrothermal system in ***Long Valley*** Caldera (LVC), California. The ***flow*** system studied is intended to capture realistic features of fractured magmatic hydrothermal systems. The purpose of this "numerical experiment" is to gain useful insight into process mechanisms such as fracture-matrix interaction, liquid -gas phase partitioning, and conditions and parameters controlling water-gas-rock interactions in a hydrothermal setting. Simulation results indicate that almost all CO (sub 2) is transported through the fracture. Cooling and condensation results in an elevated CO (sub 2) partial pressure. The CO (sub 2) is the dominant gas-phase constituent close to the land surface. Close to the ***heat*** source, dissolution dominates over precipitation. Away from the ***heat*** source precipitation dominates because chemical constituents, transported from the bottom, precipitate in a lower-temperature environment. Mixing with cold meteoric water enhances mineral dissolution and precipitation effects. The rock alteration pattern is sensitive to reaction kinetics. The predicted alteration of primary rock minerals and the development of secondary mineral assemblages are generally consistent with field observations in the LVC. The observed sequence of argillic alteration in the LVC consists of an upper zone with smectite and kaolinite (in the lower-temperature region), a lower illite zone, and an intermediate mixed illite and smectite zone. The sequence is reasonably well reproduced in the numerical simulation. In addition, calcite and chlorite precipitation in the hot region coincides with the observations. Using the reactive geochemical transport model, we have successfully simulated spatial distribution of the three argillic alteration zones. Copyright 2001 by the American Geophysical Union.

Publication Year 2001

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2001-054599

9. Database GeoRef

Title **Numerical models of fluid and *heat flow* in *Long Valley* Caldera, California**

Author Hurter, Suzanne J; Pribnow, Dan F C

Affiliation Joint Geoscientific Research GGA, Hanover, Federal Republic of Germany (DEU)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1179, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2001-063400

10. Database GeoRef

Title **Are the eastern Sierras overriding a deep *heat*/fluid source at *Long Valley*? A tectonic model for the west central Great Basin**

Author Smith, Kenneth D; Biasi, Glenn P

Affiliation University of Nevada Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.981, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-004777

11. Database GeoRef

Title **Isotope geochemistry in geothermal research**

Author Kennedy, B Mack; DePaolo, Donald J; Truesdell, Alfred H

Affiliation Lawrence Berkeley National Laboratory, Berkeley, CA, United States (USA)

Affiliation University of California Berkeley, United States (USA)

Monograph Title Federal geothermal geoscience research, fiscal year 1998

Author Reed, Marshall (prefacer)

Affiliation U. S. Department of Energy, Office of Geothermal Technologies, Washington, DC, United States (USA)

Source DOE/ID Report, Report: DOE/ID 10732, pp.2.55 -2.63, May 1999

Report Number DOE/ID 10732

Publisher U. S. Department of Energy, Office of Fossil Energy, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Report; Analytic

Country of Publication United States (USA)

Accession Number 2008-095924

12. Database GeoRef

Title **Numerical models of the conductive thermal regime in *Long Valley*, California**

Author Hurter, S; Pribnow, D

Affiliation Geowissenschaftliche Gemeinschaftsaufgaben, Joint Geoscientific Research, Hanover, Federal Republic of Germany (DEU)

Monograph Title IUGG99; abstracts

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol. 99, Week B, pp.192, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2009-069844

13. Database GeoRef

Title **The thermal regime in *Long Valley* Caldera, California**

Author Hurter, Suzanne; Pribnow, Dan

Affiliation BGR, DEU, (Federal Republic of Germany)

Monograph Title AGU 1998 fall meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.79, no.45, Suppl., pp.829, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-004850

14. Database GeoRef

Title **(super 18) O/ (super 16) O mapping and hydrogeology of a short-lived (nearly equal 10 years) fumarolic (>500 degrees C) meteoric-hydrothermal event in the upper part of the 0.76 Ma Bishop Tuff outflow sheet, California**

Author Holt, Elizabeth Warner; Taylor, Hugh P, Jr

Affiliation California Institute of Technology, Division of Geological and Planetary Sciences, Pasadena, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.83, no.1-2, pp.115-139, Jul 1998

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract (super 18) O/ (super 16) O data from the 200-m-thick, 0.76 Ma Bishop Tuff outflow sheet provide evidence for a vigorous, short-lived (nearly equal 10 years), high-temperature, fumarolic meteoric-hydrothermal event. This is proved by: (1) the juxtaposition in the upper, partially welded Bishop Tuff of low-(super 18) O groundmass/glass (delta (super 18) O = -5 to +3) with coexisting quartz and feldspar phenocrysts having magmatic delta (super 18) O values (+8.7+ or -0.3; +7.5+ or -0.3); and (2) the fact that these kinds of (super 18) O/ (super 16) O signatures correlate very well with morphological features and mapped zones of fumarolic activity. Profiles of delta (super 18) O with depth in the Bishop Tuff within the fumarole area define a 40- to 50-m-thick, low-(super 18) O, stratigraphic zone that is sandwiched between the essentially unwelded near-surface portion of the tuff and an underlying, densely welded black tuff that displays magmatic (super 18) O/ (super 16) O values. Shallow-dipping columnar joints and other fumarolic features (i.e., subhorizontal tubular conduits and steep fissures) correlate very well with these pervasively devitrified, low-(super 18) O zones. The base of the low-(super 18) O zone is extremely sharp (approximately 3 per mil per meter) and is located directly above the transition from partially welded tuff to densely welded black tuff. The observed average whole-rock (super 18) O-depletions within this low-(super 18) O zone are about 6-7 per mil, requiring meteoric water/rock ratios in excess of 0.24 in mass units. Rainfall on the surface of the tuff would not have been high enough to supply this much H (sub 2) O in the short lifetime of fumarolic activity, suggesting that some recharge must have been from groundwater ***flow*** through the upper part of the tuff, above the sloping (1 degrees -5 degrees) top of the impermeable lower zone. This is compatible with the observation that the fumarolic areas roughly correlate with

the preeruptive regional drainage pattern. Some of this recharge may in part have been from the lake that filled ***Long Valley*** caldera, which was dammed by the Bishop Tuff up to the level of this boundary between the partially and densely welded zones (nearly equal 7000 ft, the elevation of the highest ***Long Valley*** Lake shorelines). Gazis et al. had previously shown that the 2.8-Ma intracaldera Chegem Tuff from the Caucasus Mountains exhibits exactly the same kind of (super 18) O-signature that we have correlated with fossil fumaroles in the Bishop Tuff outflow sheet. Although not recognized as such by McConnell et al.; (super 18) O/ (super 16) O data from drill-hole samples from the intracaldera Bishop Tuff in ***Long Valley*** also display this characteristic (super 18) O signature (i.e., analogous delta (super 18) O-depth profiles, as well as low- (super 18) O groundmass coexisting with high- (super 18) O feldspar phenocrysts). This fumarolic (super 18) O/ (super 16) O signature is observed to much greater depths (nearly equal 650-750 m) in the intracaldera tuffs (nearly equal 1500 m thick) than it is in the nearly equal 200-m-thick Bishop Tuff outflow sheet (nearly equal 80 m depth).

Publication Year 1998

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1998-045269

16. Database GeoRef

Title **Fluid *flow* along potentially active faults in crystalline rock**

Author Barton, Colleen A; Zoback, Mark D; Moos, Daniel

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Source Geology (Boulder), vol.23, no.8, pp.683-686, Aug 1995

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The relationship between in-situ stress and fluid ***flow*** in fractured and faulted rock is examined by using data from detailed analyses of stress orientation and magnitude, fracture geometry, and precision temperature logs that indicate localized fluid ***flow***. Data obtained from three boreholes that penetrate highly fractured and faulted crystalline rocks indicate that potentially active faults appear to be the most important hydraulic conduits in situ. The data indicate that the permeability of critically stressed faults is much higher than that of faults that are not optimally oriented for failure in the current stress field.

Publication Year 1995

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1995-053222

17. Database GeoRef

Title **Seismological evidence for magmatic and hydrothermal structure in *Long Valley* Caldera from local earthquake attenuation and velocity tomography**

Author Sanders, C O; Ponko, S C; Nixon, L D; Schwartz, E A

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B5, pp.8311-8326, 10 May 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1995-043326

18. Database GeoRef

Title **In-situ stress and fracture permeability in the *Long Valley* Caldera**

Author Barton, Colleen A; Zoback, Mark D; Moos, Daniel; Sass, John H

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title Rock mechanics; proceedings of the 35th U. S. symposium

Editor Daemen, Jaak J K; Schultz, Richard A

Affiliation University of Nevada, Department of Mining Engineering, Reno, NV, United States (USA)

Source Proceedings - Symposium on Rock Mechanics, vol.35, pp.225-229, 1995

Publisher A.A. Balkema, [location varies], United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1996-017399

19. Database GeoRef

Title **Intrusive mechanism of shallow earthquake preparation**

Author Guterman, V G; Khazan, Ya M

Affiliation Ukrainian Academy of Science, Institute of Geophysics, Kiev, Ukraine (UKR)

Monograph Title International Union of Geodesy and Geophysics; XXI general assembly; abstracts

Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.21, Week A, pp.361, 1995

Publisher [publisher varies], [location varies], International (III)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 1998-050335

20. Database GeoRef

Title **Deep exploration of an active silicic caldera; a search for magma in the crust beneath *Long Valley*, California**

Author Rundle, John B; Sass, John H; Finger, John; Eichelberger, John C

Affiliation University of Colorado, Department of Geological Sciences, Boulder, CO, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Sandia National Laboratories, United States (USA); University of Alaska at Fairbanks, United States (USA)

Monograph Title Continental processes; a decade of drilling discoveries

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.59 -62, 1994

Publisher [varies], [location varies], International (III)

Abstract While the deep structure and physical state of active silicic calderas have until now been clouded with uncertainty, a unique opportunity presently exists to make direct observations in deep drill hole within the ***Long Valley*** caldera of eastern California. For the first time, it will be possible to obtain hard data on the physical existence of juvenile magma within the basement rock of ***Long Valley***. To critically test the hypothesis that magma does indeed exist at relatively shallow depth, we need to obtain qualitatively new information on the structure of the basement, on the physical conditions leading to the sudden cessation of earthquakes below approximately 4 km depth at the well site, and on the patterns and thermal efficiency of deep fluid circulation within the basement rock beneath the caldera. These fundamental issues can all be addressed by continuing the ***Long Valley*** Exploration Well that currently extends to a depth of 2.3 km beneath the center of the resurgent dome. We propose to deepen the well to 4.3 km in a third phase of drilling. In contrast to the previous drilling that employed conventional oilfield technology, Phase III will be continuously cored to allow unambiguous characterization of lithology, as well as systematic measurements of physical and chemical properties with depth. The target is the base of the seismogenic zone above the current center of inflation. We expect to resolve the paradox posed by surface geophysical evidence of shallow magma but subdued ***heat flow*** at moderate depth. Models for the caldera system can be critically tested only by observing the qualitatively new information given by the depth dependence of physical and chemical properties.

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 2010-044460

21. Database GeoRef

Title **New evidence on the hydrothermal system in *Long Valley* Caldera, California, from wells, fluid sampling, electrical geophysics, and age determinations of hot-spring deposits**

Author Sorey, Michael L; Suemnicht, Gene A; Sturchio, Neil C; Nordquist, Gregg A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Unocal Geotherm. Div., United States (USA); Argonne Natl. Lab., United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.48, no.3-4, pp.229-263, Dec 1991

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1992-011305

22. Database GeoRef

Title **Analysis of potential data over *Long Valley*, California; 1, Regional structural model interpreted from integrated shaded relief map**

Author Miyazaki, Y

Affiliation Geol. Surv. Japan, JPN, (Japan)

Source Butsuri-Tansa = Geophysical Exploration, vol.44, no.5, pp.275-288, Oct 1991

Resource Location http://www.segj.org/committee/hensyu/journal/index_e. html

Publisher Society of Exploration Geophysicists of Japan, Tokyo, Japan (JPN)

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication Japan (JPN)

Accession Number 1992-020288

23. Database GeoRef

Title ***Heat flow* from DOE's magma-energy research well at *Long Valley*, California**

Author Sass, J H; Jacobson, Ronald; Sorey, M L

Affiliation U. S. Geol. Surv., Flagstaff, AZ, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Monograph Title AGU 1990 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1684, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1992-017933

24. Database GeoRef

Title **DOE thermal regimes drilling program through 1988**

Author Wollenberg, Harold; Eichelberger, John C; Elders, Wilfred A; Goff, Fraser; Younker, Leland W

Affiliation Lawrence Berkeley Lab., Earth Sci. Div., Berkeley, CA, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA); Univ. Calif., United States (USA); Los Alamos Natl. Lab., United States (USA); Lawrence Livermore Natl. Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.70, no.28, pp.697, 706-707, 11 Jul 1989

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1989-080925

25. Database GeoRef

Title **Geophysical constraints on magmatism and crustal structure**

Author Eaton, G P

Affiliation Iowa State Univ., Ames, IA, United States (USA)

Monograph Title Continental magmatism; abstracts

Author Anonymous

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, Report: 131, pp.80, Apr 1989

Resource Location http://geoinfo.nmt.edu/publications/ home.html

Report Number 131

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Abstract Applications of geophysical measurements in the study of molten or partially molten bodies of magma, as well as of cooler masses of in situ magmatic rocks, of complex subvolcano systems, and of the crustal structure of regions of active magmatism have increased significantly in the past 25 years. A brief review of the successes and failures of such efforts is presented, based on published case studies, on theoretical considerations of the geophysical properties of magma and magmatic rocks (in terms both of the absolute values of such properties and relative to those of the country rocks in which the magma was emplaced), and on the viability of different geophysical techniques applied in attempts to answer specific questions raised by geologists engaged in the study of volcanoes or magmatic systems. The ultimate success of geophysical interpretation in such studies is dependent on the ability to detect, sort and correctly interpret signals arising from, or affected by, a variety of phenomena: the actual presence of magma, itself; the geometric configuration of the magma body; properties of the magma owing to its physical state (e.g., cooling, thermally stable, or warming;
moving, or at rest; convecting or non-convecting; etc.); the presence or absence of vigorous hydrothermal circulation in the region around and above the magma mass; the presence or absence of a rock alteration shroud around the body, which may be present whether the body is hot or has cooled to an ambient regional temperature; and the presence or absence of emplacement - related, localized fracture systems in the country rock nearby or deformation in the region of the body arising from the added effect of far-field stresses. Much of what can be detected geophysically at the surface is thus significantly influenced by processes and phenomena in the shallow crust. These phenomena have the potential to screen, distort, mimic or reinforce signals deriving from a magma body or from the lower crust. In the case of those magmatic systems in which a constructional volcanic edifice is present at the surface, part of the difficulty of interpretation relates to the ability to effect a proper separation of surface or near-surface geologic signals from those arising at the depth of interest and target of relevance. In most cases, the task is not a simple one and the
certainty of interpretation is sometimes a function of the availability of a variety of other information bearing on the specific problem that is to be solved. Some convincing case histories are presented in which the viability of the use of geophysical data is demonstrated and its interpretation independently confirmed. Studies examined here include gravity investigations, magnetics, active and passive seismic studies and seismic signal delays, electrical methods, thermal gradient measurements and ***heat flow*** calculations, and surface deformation studies. Example sites include the Cascade Range of western North America; Hawaii Volcanoes National Park, Hawaii; ***Long Valley***, California; San Juan Mountains, Colorado; Rio Grande ***Valley***, New Mexico; Yellowstone National Park, Wyoming; as well as several active volcanoes in Japan and ancient magmatic complexes in the British Isles.

Publication Year 1989

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1990-022795

26. Database GeoRef

Title ***Heat* transport mechanisms in the west moat of the *Long Valley* Caldera, California, as revealed by precision temperature logs in PLV-1 repeated over a 3-yr interval**

Author Urban, T C; Diment, W H; Moses, T H

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Monograph Title AGU 1988 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1187, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1990-018912

27. Database GeoRef

Title **Origin of cryptoperthites in the Bishop Tuff and their bearing in its thermal history**

Author Snow, Eleanour Anne; Yund, Richard A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Journal of Geophysical Research, vol. 93, no. B8, pp.8975-8984, Aug 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The Bishop Tuff is a large rhyolitic ash ***flow*** which erupted from ***Long Valley*** caldera in eastern California and contains abundant sanidine cryptoperthite phenocrysts, which can be used to constrain the time between the two major cooling units. The cryptoperthites (bulk composition Or (sub 66) Ab (sub 33) An (sub 1)) have exsolved in two principal stages, followed by a third, minor stage. The earliest exsolution, which produced patches of relatively wide lamellae (100 -800 nm) without wedge-shaped ends (WSE), occurred by coherent nucleation and was probably related to a high flux of water associated with fumarolic activity in this area. The spacing of these lamellae shows no correlation with depth or thermal history. The second major stage of exsolution occurred by spinodal decomposition, which produced lamellae with WSE having spa ein g s of from 80 to 170 nm, and the spacing of these lamellae varies with depth in a pattern consistent with the two known cooling units. ***Heat flow*** calculations indicate that this pattern of lamellar spacings is consistent with an interval of about 1.0-2.0 years between the eruption of these two cooling units.

Publication Year 1988

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1988-066716

28. Database GeoRef

Title **The mechanism of intrusion of the Inyo Dike, *Long Valley* Caldera, California**

Author Reches, Ze'ev; Fink, Jonathan

Affiliation Heb. Univ., Geol. Dep., Jerusalem, Israel (ISR)

Affiliation Ariz. State Univ., United States (USA)

Monograph Title Special section on How volcanoes work; Part 2

Editor Tilling, Robert I.

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 93, no. B5, pp.4321-4334, 10 May 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We analyze the intrusion of the 11-km-***long*** Inyo Dike at the margins of ***Long Valley*** caldera, eastern California. The dike trends N07 degrees W and is divided into at least three segments which are rotated by as much as 25 degrees with respect to the main trend. The dike seems affected primarily by the regional stress field of right-lateral shear of the western United States and by the local thermal conditions of the crust; the dike seems unaffected by the preexisting caldera margins and Sierra -Nevada frontal fault system. The high ***heat flow*** in ***Long Valley*** caldera implies that crustal rocks below 3-4.5 km deform by steady state creep under tectonic strain rate and support low to vanishing tectonic shear stresses. The upper rocks, above 3-4.5 km, deform by frictional slip along fractures and may support tectonic shear stresses as high as 24 MPa. We demonstrate that depth variations of tectonic stresses may have a profound effect on the segmentation and rotation of dikes, both at ***Long Valley*** and in other areas of high ***heat flow***. The analysis places constraints on several tectonic conditions. The Inyo Dike intruded under a tectonic stress state with a horizontal maximum compression oriented N07 degrees W. The maximum extensional fracture strength of the host rocks is 1-2.5 MPa, and the pressure drop within the

propagating Inyo Dike was about 0.55 MPa/km. The volatile overpressure in the magma chamber was about 15 MPa during eruption of rhyolitic lavas at the Inyo Domes.

Publication Year 1988

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1988-046483

29. Database GeoRef

Title **Precision temperature log in the hottest well in the *Long Valley* Caldera, California; implications as to hydrothermal conditions and fluid exchange along the well**

Author Urban, T C; Diment, W H

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Monograph Title Geological Society of America 1988 centennial celebration

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.20, no.7, pp.92, 1988

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1989-041752

30. Database GeoRef

Title **Results from shallow research drilling at Inyo Domes *Long Valley* Caldera, California and the Salton Sea geothermal field, Salton Trough, California**

Author Younker, L W; Eichelberger, J C; Kasameyer, P W; Newmark, R L; Vogel, T A

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Monograph Title Deep drilling in crystalline bedrock; Volume 2, Review of deep drilling projects, technology, sciences and prospects for the future

Author Eriksson, K G

Editor Boden, A;

Affiliation Vattenfall, Vallingby, Sweden (SWE)

Publisher Springer-Verlag, Berlin Heidelberg New York London Paris Tokyo, Federal Republic of Germany (DEU)

Pages 172-188

Publication Year 1988

Publication Type Book; Conference document; Analytic

Country of Publication Federal Republic of Germany (DEU)

Accession Number 1994-004703

31. Database GeoRef

Title **Seismological detection and delineation of magma chambers beneath intraplate volcanic centers in western USA**

Author Iyer, H M

Monograph Title Modeling of volcanic processes

Author Anonymous

Publisher Friedrick Vieweg und Sohn, Braunschweig, Federal Republic of Germany (DEU)

Abstract In this review I describe results from experiments conducted by the U.S. Geological Survey in diverse volcanic environments to image velocity anomalies in the crust and upper mantle using teleseismic P-wave residuals. The linear least-squares inversion technique of Aki et. al. (1976, 1977) is extensively used in these studies. The seismic models thus obtained are synthesized with available

geologic and geophysical data to infer plausible models of magma genesis in these regions. The three-dimensional velocity model beneath Yellowstone Plateau shows a large low-velocity body of approximately 100 km diameter centered on the caldera and extending from the crust to a depth of about 250 km. This is interpreted to be a massive magma body which is responsible for the volcanism during the past 2 m.y. in Yellowstone. Teleseismic S-wave residuals, Raleigh-wave dispersion data, ***heat-flow***, gravity, Curie isotherm depths, and magnetotelluric data, all support the existence of a temperature near granite solidus beginning at a depth of 5-10 km beneath the Yellowstone caldera floor. In the Eastern Snake River Plain (ESRP) a low-velocity anomaly is present in the upper mantle but not in the crust, leading to the speculation that ESRP is the healed track of a northeast propagating volcanic center whose present position is Yellowstone. The seismic model for the ESRP-Yellowstone volcanic system, though unable to distinguish between different models of origin of the system, clearly shows that basaltic magma rises from the mantle, melts the lithosphere and yields massive quantities of rhyolitic magma. The seismic velocity structure beneath Hawaii, an oceanic hot spot, shows a complex crustal structure with no evidence for a large magma chamber in the crust. However, in the upper mantle there is an elongate north- south trending low-velocity zone, 200 km wide and traceable to a depth of 165 km. Thus, similar hot-spot generation models in the asthenosphere may be applicable to Yellowstone and Hawaii, though the chemistry and volume of surface volcanism is greatly different in the two areas. In all the six intra-plate silicic volcanic centers which we have probed using the teleseismic-residual technique, low-velocity anomalies, inferred as crustal magma chambers have been found. In at least one such volcanic center, ***Long Valley*** in California, uplift and S-wave attenuation measurements support that the magma chamber delineated by teleseismic residuals is real. The suggestion of a root to the magma chamber extending into the upper mantle supports the geologic model for magma genesis in these centers, namely, infusion of basaltic magma from the asthenosphere into the lithosphere and crust, and resulting partial melting. In contrast to the silicic volcanic centers, none of the andesitic Cascade volcanoes show evidence for crustal magma chambers detectable using the teleseismic technique. Teleseismic-residual data in two volcanoes, Newberry in Oregon, and Medicine Lake in California, show massive high- velocity intrusions in the crust beneath the volcano edifice. A high-resolution seismic imaging experiment has revealed the presence of a low-velocity anomaly which could be a dike-like molten magma pocket within the high-velocity intrusive in Newberry volcano. On a regional scale, the teleseismic residual experiments using ***long*** profiles have successfully delineated high-velocity anomalies, possibly related to subduction, in the Oregon Cascades, and a low-velocity anomaly due to asthenospheric upwarp beneath the Rio Grande Rift.

Pages 56

Publication Year 1988

Publication Type Book; Analytic

Country of Publication Federal Republic of Germany (DEU)

Accession Number 2001-076429

32. Database GeoRef

Title **Oxygen isotope profiles of seven geothermal wells in the *Long Valley* Caldera, Central California**

Author Smith, Brian M; Suemnicht, Gene A

Affiliation Unocal Science and Technology Division, Brea, CA, United States (USA)

Monograph Title Geological Society of America 1988 centennial celebration

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.20, no.7, pp.397, 1988

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-040302

33. Database GeoRef

Title **A core hole in the southwestern moat of the *Long Valley* Caldera; early results**

Author Wollenberg, H A; Sorey, M L; Farrar, C D; White, Art F; Flexser, S; Bartel, L C

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Sandia Natl. Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.68, no.20, pp.529, 533-534, 19 May 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1987-083207

34. Database GeoRef

Title **Research core hole completed at *Long Valley***

Author Wollenberg, Harold (reporter); White, Art F (reporter); Sorey, Michael L (reporter); Farrar, Christopher D (reporter); Bartel, Lewis (reporter)

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Sandia Natl. Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.67, no.29, pp.582, 22 Jul 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1987-002816

35. Database GeoRef

Title **Localized measurements of geothermally enhanced *heat flow* through remote infrared imaging**

Author Marley, Mark S

Affiliation Calif. Inst. Technol., Div. Geol. and Planet. Sci., Pasadena, CA, United States (USA)

Source NASA Technical Memorandum, vol.88784, pp.375-379, Jul 1986

Publisher National Aeronautics and Space Administration (NASA), Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1986-083462

36. Database GeoRef

Title **Deep drilling to the magmatic environment in *Long Valley* Caldera**

Author Rundle, John B; Carrigan, Charles R; Hardee, Harry C; Luth, William C

Affiliation Sandia Natl. Lab., Geosci. Dep., Albuquerque, NM, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.67, no.21, pp.490-491, 27 May 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1986-075909

37. Database GeoRef

Title **Assessment of geothermal resources of the United States**

Author Nathenson, Manuel

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Monograph Title The future of geothermal energy

Author Anonymous

Source Transactions - Geothermal Resources Council, vol. 16, pp.99 -124, 1986

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1987-079656

38. Database GeoRef

Title **A transient model of the geothermal system of the *Long Valley* Caldera, California**

Author Blackwell, David D

Affiliation South. Method. Univ., Dep. Geol. Sci., Dallas, TX, United States (USA)

Monograph Title Special section on ***Long Valley*** Caldera, California [modified]

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,229-11,241, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The present -day geothermal system underlying the southern one third of the ***Long Valley*** caldera is discussed, based on interpretation of the complex shapes of temperature-depth curves and the correlation of this interpretation with hydrologic and geologic data. The temperature-depth curves are interpreted using a simple analytical model for transient ***flow*** of hot water in a confined aquifer. The results give information on the transient nature of the geothermal system operating in the ***Long Valley*** caldera and on the application of the analytical model to a complex geothermal system. At the present time there is major west-east ***flow*** of hot fluid in two aquifers. The first aquifer occurs at a depth of 20-120 m. The aquifer is charged with water at a temperature greater than 175 degrees C west of Casa Diablo Hot Springs which then flows eastward at a velocity of the order of 100-200 m/yr to exit in the hot springs along Hot Creek and at the edge of Lake Crowley. Temperatures systematically decrease eastward in the shallow aquifer. In order to interpret the temperature data in ***Long Valley*** caldera a model of the thermal effects of ***flow*** in a shallow aquifer is discussed, and the results are found to be consistent with geologic and hydrologic information. The shapes of inversions of temperature versus depth curves indicate that the age of this aquifer ranges between 50 and 700 years; the best estimate is 500-700 years. The initiation of hot water ***flow*** in the shallow aquifer coincides with extrusive activity associated with the Mono/Inyo craters chain of rhyolitic centers, which was active over a linear distance of about 40 km during the period 500-600 years ago. A second aquifer occurs just below the top of the Bishop Tuff at a depth of approximately 700 m in hole Mammoth 1. Less is known about the ***flow*** velocity and other characteristics of this aquifer. Modeling of the temperature-depth curve in Mammoth 1 suggests that this aquifer is of the order of 3000 years old. Temperatures associated with both aquifers are evidence for transient events which caused a sudden input of hot water along the west side of the caldera into an existing geothermal system that was circulating at temperatures below 120 degrees C. Apparently, previous to the input of hot water into these aquifers, the geothermal system in the caldera was in a waning phase. The waning of the system may have been due to loss of porosity and permeability by mineral deposition in the circulation pathways and/or cooling of the caldera and subjacent intrusive rocks and a consequent decrease in the thermal drive. There is no evidence at the present time of a large-scale, high-temperature geothermal system associated with the magma chamber identified by seismic studies beneath the resurgent dome. Whether the high temperatures in the current geothermal system reflect cooling of magma associated with Mono/Inyo craters or merely fracturing and reconnection of a preexisting source of hot water to the shallow subsurface is not known. Although the direction of ***flow*** of hot water is from west to east, deep temperature data suggest return ***flow*** of cold water from east to west in the lower half of the caldera fill (in the eastern part of the caldera at least). The velocity of this return ***flow*** is probably of the order of a meter per year, or two orders of magnitude below the velocity of ***flow*** in the shallow aquifers.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1986-082053

39. Database GeoRef

Title **Airborne temperature survey maps of *heat flow* anomalies for exploration geology**

Author Kerr del Grande, Nancy

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Source Bulletin - Geothermal Resources Council, vol.14, no.3, pp.3-13, Mar 1985

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1985-054000

40. Database GeoRef

Title **Analysis of aeromagnetic anomalies; mapping of Curie isothermal surface at *Long Valley*, California**

Author Miyazaki, Yoshinori

Pages 207

Publication Year 1985

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Stanford University, Stanford, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 1986-038429

41. Database GeoRef

Title **Precision temperature measurements in a deep geothermal well in the *Long Valley* Caldera, Mono County, California**

Author Urban, T C; Diment, W H

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Monograph Title American Geophysical Union, 1984 Fall Meeting

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1084-1085, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1986-038723

42. Database GeoRef

Title **Drilling to investigate active volcanic processes in *Long Valley*, California**

Author Rundle, John B; Wawersik, W R

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Monograph Title AGU 1984 fall meeting

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1096, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1986-041415

43. Database GeoRef

Title **Continental scientific drilling at Inyo Domes, *Long Valley* Caldera, CA**

Author Eichelberger, J C; Lysne, P C; Younker, Leland W

Affiliation Sandia Natl. Lab., Geochem. Div., Albuquerque, NM, United States (USA)

Affiliation Lawrence Livermore Natl. Lab., United States (USA)

Monograph Title AGU 1984 fall meeting

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1096, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1986-041416

44. Database GeoRef

Title **A national drilling program to study the roots of active hydrothermal systems related to young magmatic intrusions**

Corporate Author U. S., National Research Council, Continental Scientific Drilling Committee, Washington, DC, United States (USA)

Pages 43

Publication Year 1984

Publication Type Report; Monographic

Country of Publication United States (USA)

Accession Number 2000-028222

45. Database GeoRef

Title **Quantitative measurement of thermal radiation from localized heatflow; *Long Valley*, 1982**

Author Kieffer, Hugh H; Marley, Mark

Affiliation U. S. Geol. Surv., Flagstaff, AZ, United States (USA)

Affiliation Calif. Inst. Technol., United States (USA)

Monograph Title AGU 1983 fall meeting

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1987-016565

46. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex in eastern California; status of present knowledge and future research needs**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Reviews of Geophysics and Space Physics, vol. 21, no. 7, pp.1545-1565, Aug 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Silicic complexes. Metallogenesis, mitigation of volcanic and earthquake hazards, and development of conventional and nonconventional forms of geothermal energy. One research technique that has not been exploited is scientific drilling to intermediate depths (2-3 km). If magma has intruded the upper crust of this area, surface geophysics and limited borehole observations may be employed to monitor tectonic and magmatic activity associated with such a phenomenon. A surprising result of commercial drilling for geothermal energy in this area is the failure to detect directly high-temperature hydrothermal reservoirs. Their presence can be inferred from other studies, particularly those using geochemical indicators in thermal fluids.--Modified journal abstract.

Publication Year 1983

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1983-058112

47. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; a rationale for a program of intermediate depth scientific drilling**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Monograph Title The Geological Society of America, Rocky Mountain Section, 36th annual meeting; Cordilleran Section, 79th annual meeting

Source Abstracts with Programs - Geological Society of America, vol.15, no.5, pp.434-435, Mar 1983

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1985-038982

48. Database GeoRef

Title **Geophysical studies of active geothermal systems in the northern Basin and Range**

Author Ward, Stanley H

Affiliation Univ. Utah Res. Inst., Earth Sci. Lab., Salt Lake City, UT, United States (USA)

Monograph Title The role of ***heat*** in the development of energy and mineral resources in the northern Basin and Range Province

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.121-157, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1984-044706

49. Database GeoRef

Title **Analysis of airborne magnetic anomalies; determination of Curie depth for geothermal reconnaissance; (a progress report)**

Author Miyazaki, Yoshinori; Lyon, Ronald J P

Affiliation Stanford Univ., Dep. Appl. Earth Sci., Stanford, CA, United States (USA)

Monograph Title Proceedings of the International symposium on remote sensing of environment; second thematic conference; "Remote sensing for exploration geology"; Volume I

Author Morris-Jones, Donald R (chairperson); Morgan, Ken M (chairperson)

Publisher Environ. Res. Inst. Mich., Ann Arbor, MI, United States (USA)

Pages 455 -465

Publication Year 1982

Publication Type Book; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1984-051974

50. Database GeoRef

Title **Airborne temperature survey maps of *heat flow* anomalies for exploration geology**

Author del Grande, Nancy Kerr

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Monograph Title Proceedings of the International symposium on remote sensing of environment; second thematic conference; "Remote sensing for exploration geology"; Volume I

Author Morris-Jones, Donald R (chairperson); Morgan, Ken M (chairperson)

Publisher Environ. Res. Inst. Mich., Ann Arbor, MI, United States (USA)

Pages 467-479

Publication Year 1982

Publication Type Book; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1984-051975

51. Database GeoRef

Title **Comparative assessment of five potential sites for hydrothermal-magma systems; summary**

Author Luth, W C; Hardee, H C

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Publication Year 1980

Publication Type Report; Monographic

Accession Number 1984-005125

52. Database GeoRef

Title **Notes on the shallow thermal regime of the *Long Valley* Caldera, Mono County, California**

Author Diment, W H; Urban, T C; Nathenson, Manuel

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Author Berge, C W (chairperson)

Affiliation Phillips Pet. Co., USA, (United States)

Source Transactions - Geothermal Resources Council, vol. 4, pp.37-40, 1980

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1980

Publication Type Serial; Conference document; Analytic

Accession Number 1982-038549

53. Database GeoRef

Title **Exploration for geothermal areas using mercury; a new geochemical technique**

Author Matlick, Joseph S, III; Buseck, Peter R

Affiliation Ariz. State Univ., Dep. Geol., Tempe, AZ, United States (USA)

Affiliation Ariz. State Univ., Dep. Chem., United States (USA)

Source Geothermal Energy, vol.6, no.9, pp.15-23, Sep 1978

Publisher Geothermal World Corporation, Reseda, CA, United States (USA)

Publication Year 1978

Publication Type Serial; Analytic

Accession Number 1981-060593

54. Database GeoRef

Title **Hydrogeology of *Long Valley* geothermal area, California**

Author Olmsted, F H

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source AAPG Bulletin, vol.62, no.7, pp.1231, Jul 1978

Resource Location http://www.aapg.org/datasystems/bullsrch.html

Publisher American Association of Petroleum Geologists, Tulsa, OK, United States (USA)

Publication Year 1978

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1978-039584

55. Database GeoRef

Title **Hot dry rock resource assessment and site selection**

Author Crowe, B M; Eddy, A C; Eichelberger, J C; Gambill, D T; Heiken, G; Kintzinger, P R; Laughlin, A W; Linn, G W; Smith, M C; Tester, J W; West, F G

Publication Year 1978

Publication Type Report; Analytic

Accession Number 1978-025621

56. Database GeoRef

Title **Shallo-Temp surveys; a rapid reconnaissance technique for geothermal prospects**

Author LeShack, L A; Lewis, J E; O'Hara, N W; Chang, D C

Affiliation LeShack Assoc., Silver Spring, Md., United States (USA)

Affiliation McGill Univ., Canada (CAN); Fla. Inst. Technol., United States (USA)

Source Abstracts - Society of Exploration Geophysicists International Meeting, no.48, pp.108-109, 1978

Publisher Society of Exploration Geophysicists, International Meeting and Exposition, Tulsa, OK, United States (USA)

Publication Year 1978

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1981-031147

57. Database GeoRef

Title **The hydrothermal system of *Long Valley* Caldera, California**

Author Sorey, M L; Lewis, R E; Olmsted, F H

Source U. S. Geological Survey Professional Paper, Report: P 1044-A, 60 pp., 1978

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1044_a.djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1978

Publication Type Serial; Report; Map; Monographic

Accession Number 1978-046699

58. Database GeoRef

Title **Geothermal setting and simple *heat* conduction models for the *Long Valley* Caldera**

Author Lachenbruch, A H; Sass, J H; Munroe, R J; Moses, T H, Jr

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.769-784, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Heat flow*** and ***heat*** production measurements have been made in the vicinity of ***Long Valley*** from 0-30 km from the rim of the caldera and up to 30 km on either side of the boundary of the Basin and Range province at the eastern scarp of the Sierra Nevada. The search for a thermal anomaly associated with magma is complicated by the location of the caldera at the boundary between these two provinces with strongly contrasting regional ***heat*** flows and by unknown effects of hydrothermal circulation. The data show no conspicuous effect of the province transition, possibly a small local ***heat flow*** anomaly near the east rim of the caldera, and a very substantial anomaly near the west rim. Simple ***heat*** conduction models suggest that ***Long Valley*** caldera is the surface expression of a deep magmatic system; an upper crustal magma chamber could not have sustained molten material throughout the 2-m.y. eruptive history unless it were

resupplied with ***heat*** from deep crustal or subcrustal magmatic sources. If the ***heat*** were supplied by crustal intrusion of mantle basalt, the crust would thicken rapidly unless magmatic activity were accompanied by accelerated local crustal spreading. To generate a viable silicic magma chamber by sill injection in the upper 5-8 km of crust, minimum intrusion rates of the order of l m per century are probably required. Thermal models for the near-normal ***heat flow*** at the east rim
suggest that magma beneath the eastern part of ***Long Valley*** caldera might have been exhausted during eruption of the Bishop Tuff 0.7 m.y. ago and that the resurgent dome, which subsequently formed in the west central caldera, marks the location of a residual chamber more circular in plan. High ***heat flow*** indicated by the single measurement hear the west rim can be attributed to a simple shallow magma chamber beneath the western caldera or to recent local magmatism along the Sierra frontal fault system. Additional ***heat flow*** and hydrologic measurements are necessary for a confident interpretation of the thermal history and the present state of the caldera region.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031717

59. Database GeoRef

Title **Convective *heat flow* from hot springs in the *Long Valley* Caldera, Mono County, California**

Author Sorey, M L; Lewis, R E

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.785-791, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The ***heat*** discharged by the hot spring system in ***Long Valley***, California, has been estimated from measured spring discharges by using geochemical mixing models. Of the total ***flow*** of 1300 l/s from 11 thermal springs in the caldera, approximately 20% or 250 l/s is contributed by the hydrothermal system at depth with temperatures near 210 degrees C. The effects of ***heat*** loss by conductive cooling, mixing, and boiling are quantified for the springs in Hot Creek Gorge, which are the major source of hot water discharge in the caldera. The estimated total convective ***heat*** discharge is 4.3 X 10 (super 7) cal/s, which is in agreement with an estimate obtained from the rate of boron discharge from the caldera into Lake Crowley. To supply ***heat*** conductively to circulating water of meteoric origin at a rate of 4.3 X 10 (super 7) cal/s requires a ***heat*** flux at depth in excess of 10 mu cal/cm (super 2) /s.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031718

60. Database GeoRef

Title **A model of the hydrothermal system of *Long Valley* Caldera, California**

Author Sorey, M

Affiliation U. S. Geol. Surv., Palo Alto, Calif., United States (USA)

Publisher Stanford Univ., Stanford, Calif., United States (USA)

Publication Year 1976

Publication Type Book; Conference document; Analytic

Accession Number 1980-048591

61. Database GeoRef

Title **Numerical modeling of geothermal systems**

Author Sorey, M L

Affiliation U. S. Geol. Surv., Water Resour. Div., Menlo Park, Calif., United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.6, no.7, pp.962, Oct 1974

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1974

Publication Type Serial; Analytic; Abstract only

Accession Number 1976-040971

62. Database GeoRef

Title **Thermal data from *heat-flow* test wells near *Long Valley*, California**

Author Sass, John H; Lachenbruch, A H; Munroe, R J

Source Open-File Report - U. S. Geological Survey, Report: OF 74-5090, 46 pp., 1974

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1974

Publication Type Serial; Report; Monographic

Accession Number 1985-005329

63. Database GeoRef

Title **Prospecting for *Heat* in *Long Valley***

Author Lachenbruch, Arthur H; Lewis, Robert E; Sass, J H

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038970

MAGNETIC BIBLIOGRAPHY

1. Database GeoRef

Title **Surface deformation of active volcanic areas retrieved with the SBAS-DInSAR technique; an overview**

Author Pepe, Antonio; Manzo, Mariarosaria; Casu, Francesco; Solaro, Giuseppe; Tizzani, Pietro; Zani, Giovanni; Pepe, Susi

Affiliation Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Monograph Title Gravity, ***magnetic***, electric and electromagnetic methods in seismology and volcanology

Editor Del Negro, Ciro; Gresta, Stefano; Meloni, Antonio

Source Annals of Geophysics, vol. 51, no. 1, pp.247-263, Feb 2008

Resource Location http://www.ingv.it/~wwwannali/

Publisher Editrice Compositori, Bologna, Italy (ITA)

Abstract This paper presents a comprehensive overview of the surface deformation retrieval capability of the Differential Synthetic Aperture Radar Interferometry (DInSAR) algorithm, referred to as Small BAseline Subset (SBAS) technique, in the context of active volcanic areas. In particular, after a brief description of the algorithm some experiments relevant to three selected case-study areas are presented. First, we concentrate on the application of the SBAS algorithm to a single-orbit scenario, thus considering a set of SAR data composed by images acquired on descending orbits by the European Remote Sensing (ERS) radar sensors and relevant to the ***Long Valley*** caldera (eastern California) area. Subsequently, we address the capability of the SBAS technique in a multiple-orbit context by referring to Mt. Etna volcano (southern Italy) test site, with respect to which two different ERS data set, composed by images acquired both on ascending and descending orbits, are available. Finally, we take advantage of the capability of the algorithm to work in a multi-platform scenario by jointly exploiting two different sets of SAR images collected by the ERS and the Environment Satellite (ENVISAT) radar sensors in the Campi Flegrei caldera (southern Italy) area. The presented results demonstrate the effectiveness of the algorithm to investigate the deformation field in active volcanic areas and the potential of the DInSAR methodologies with in routine surveillance scenario.

Publication Year 2008

Publication Type Serial; Conference document; Analytic

Country of Publication (ITA) Italy

Accession Number 2009-076909

2. Database GeoRef

Title **Paleomagnetic study of late Miocene through Pleistocene igneous rocks from the Southwestern USA; results from the historic collections of the U.S. Geological Survey Menlo Park laboratory**

Author Mankinen, Edward A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Geochemistry, Geophysics, Geosystems - G (super 3), vol. 9, no. 5, Citation Q05017, 2008

Resource Location http://g-cubed.org

Publisher American Geophysical Union and The Geochemical Society, United States (USA)

Abstract Seventy sites from the southwestern United States provide paleomagnetic results that meet certain minimum criteria and can be considered for the Time-Averaged Field Initiative (TAFI). The virtual geomagnetic poles for these 70 units are circularly distributed, and their mean is nearly coincident with the rotational axis. When other published data for the southwestern United States are included (N = 146), the virtual geomagnetic poles are again circularly distributed, but their mean is significantly displaced from the rotational axis. Whichever of these data sets is used, the mean poles for normal- and reversed-polarity data differ by approximately 170 degrees and are not antipodal at greater than 95% confidence. When the data are separated into specific age groups, the 95% confidence limits about the mean poles for the Brunhes, Matuyama, combined Gauss/Gilbert, and late Miocene intervals all include the rotational axis. Angular dispersion about these four mean poles increases systematically with increasing age and is consistent with paleosecular variation Model "G."

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2010-006044

3. Database GeoRef

Title **Drag-out effect of piezomagnetic signals due to a borehole; the Mogi source as an example**

Author Sasai, Yoichi; Johnston, Malcolm J S; Tanaka, Yoshikazu; Mueller, Robert; Hashimoto, Takeshi; Utsugi, Mitsuru; Sakanaka, Shinya; Uyeshima, Makoto; Zlotnicki, Jacques; Yvetot, Paul

Affiliation Tokyo Metropolitan Government, Bureau of General Affairs, Disaster Prevention Division, Tokyo, Japan (JPN)

Affiliation U. S. Geological Survey, United States (USA); Kyoto University, Japan (JPN); Hokkaido University, Japan (JPN); Akita University, Japan (JPN); University of Tokyo, Japan (JPN); Observatoire de Physique du Globe de Clermont-Ferrand, France (FRA)

Monograph Title ***Magnetic*** , electric and electromagnetic methods in seismology and volcanology

Editor Meloni, Antonio; Zlotnicki, Jacques

Source Annals of Geophysics, vol. 50, no. 1, pp.93-104, Feb 2007

Resource Location http://www.ingv.it/~wwwannali/

Publisher Editrice Compositori, Bologna, Italy (ITA)

Abstract We show that using borehole measurements in tectonomagnetic experiments allows enhancement of the observed signals. New ***magnetic*** dipoles, which vary with stress changes from mechanical sources, are produced on the walls of the borehole. We evaluate such an effect quantitatively. First we formulate a general expression for the borehole effect due to any arbitrary source models. This is valid everywhere above the ground surface as well as within the cylindrical hole. A first-order approximate solution is given by a line of horizontal dipoles and vertical quadrupoles along the central axis of the borehole, which is valid above the ground surface and a slightly away (several tens of cm) from the top of the borehole. Selecting the Mogi model as an example, we numerically evaluated the borehole effect. It turned out that the vertical quadrupoles produce two orders of magnitude more intense ***magnetic*** field than the horizontal dipoles. The borehole effect is very local, i.e. detectable only within a few m from its outlet, since it is of the same order or more than the case without a borehole. However, ***magnetic*** lines of force cannot reach the ground surface from a deeper portion (>10 m) of a borehole.

Publication Year 2007

Publication Type Serial; Conference document; Analytic

Country of Publication Italy (ITA)

Accession Number 2008-065919

5. Database GeoRef

Title **Volcanic geology, volcanology and natural resources of the *Long Valley* Caldera, California**

Author Hill, Dave (leader); Farrar, Chris (leader); Lipshie, Steve (leader); Steininger, Roger (leader); Sullivan, Bob (leader); Harmon, Richard (leader)

Affiliation U. S. Geological Survey, USA, (United States)

Source Special Publication - Geological Society of Nevada, vol.41, 213 pp., 4 sheets, 2005

Publisher Geological Society of Nevada, [Reno, NV], United States (USA)

Pages 213, 4 sheets

Publication Year 2005

Publication Type Serial; Map; Monographic

Country of Publication United States (USA)

Accession Number 2006-084936

6. Database GeoRef

Title **Integrated gravity and *magnetic* interpretations yield new insights to Basin and Range structures**

Author Lisle, G L

Affiliation Lisle Gravity, Denver, CO, United States (USA)

Monograph Title AAPG Rocky Mountain Section, abstracts

Author George, Lyn (chairperson)

Source Abstracts - AAPG Meeting, Rocky Mountain Section, vol.2005, unpaginated, 2005

Resource Location http://www.searchanddiscovery.net/documents/abstracts/2005rocky/RMlis. htm

Publisher American Association of Petroleum Geologists, Rocky Mountain Section, Tulsa, OK, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-009105

7. Database GeoRef

Title **Ground *magnetic* data from within the *Long Valley* Caldera, California; a website for data distribution**

Author Anderson, E D; Finn, C A

Affiliation U. S. Geological Survey, USA, (United States)

Source Open-File Report - U. S. Geological Survey, Report: OF 2004-1096, 2004

Resource Location http://pubs.usgs.gov/of/2004/1096/

Report Number OF 2004-1096

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2004

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Format Covered WWW

Accession Number 2004-043722

10. Database GeoRef

Title **Modeling expected and observed piezomagnetic field changes in the *Long Valley* Caldera, California**

Author Sasai, Yoichi; Johnston, Malcolm J S; Mueller, Robert; Tanaka, Yoshikazu; Zlotnicki, Jacques; Goto, Tadanori

Affiliation University of Tokyo, Earthquake Research Institute, Tokyo, Japan (JPN)

Affiliation U. S. Geological Survey, United States (USA); Kyoto University, Japan (JPN); Laboratoire de Geophysique, Orleans, France (FRA); Aichi University of Education, Japan (JPN)

Monograph Title IUGG 99; abstracts

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol. 99, WEEK A, pp.77, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2010-002935

11. Database GeoRef

Title **Record of the younger part of the Pringle Falls excursion at *Long Valley*, California**

Author Liddicoat, Joseph C; Coe, Robert S; Glen, Jonathan M

Affiliation Columbia University, Department of Environmental Science, New York, NY, United States (USA)

Affiliation University of California Santa Cruz, United States (USA)

Source Geophysical Journal International, vol.135, no.2, pp.663-670, Nov 1998

Resource Location http://www.blackwellpublishing.com/ journal.asp?ref=0956-540X

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Publication Year 1998

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 1999-012037

12. Database GeoRef

Title **Review of *magnetic* field monitoring near active faults and volcanic calderas in California; 1974-1995**

Author Mueller, R J; Johnston, M J S

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Centre National de Recherche Scientifique, France (FRA)

Monograph Title Electromagnetic effects of earthquakes and volcanoes

Editor Johnston, M; Parrot, M

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Physics of the Earth and Planetary Interiors, vol.105, no.3-4, pp.131-144, Jan 1998

Resource Location http://www.sciencedirect.com/ science/journal/00319201

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Differential ***magnetic*** fields have been monitored along the San Andreas fault and the ***Long Valley*** caldera since 1974. At each monitoring location, proton precession magnetometers sample total ***magnetic*** field intensity at a resolution of 0.1 nT or 0.25 nT. Every 10 min, data samples are transmitted via satellite telemetry to Menlo Park, CA for processing and analysis. The number of active magnetometer sites has varied during the past 21 years from 6 to 25, with 12 sites currently operational. We use this network to identify ***magnetic*** field changes generated by earthquake and volcanic processes. During the two decades of monitoring, five moderate earthquakes (M5.9 to M7.3) have occurred within 20 km of magnetometer sites located along the San Andreas fault and only one preseismic signal of 1.5 nT has been observed. During moderate earthquakes, coseismic ***magnetic*** signals, with amplitudes from 0.7 nT to 1.3 nT, have been identified for 3 of the 5 events. These observations are generally consistent with those calculated from simple seismomagnetic models of these earthquakes and near-fault coseismic ***magnetic*** field disturbances rarely exceed one nanotesla. These data are consistent with the concept of low shear stress and relatively uniform displacement of the San Andreas fault system as expected due to high pore fluid pressure on the fault. A systematic decrease of 0.8-1 nT/year in ***magnetic*** field has occurred in the ***Long Valley*** caldera since 1989. These ***magnetic*** field data are similar in form to observed geodetically measured displacements from inflation of the resurgent dome. A simple volcanomagnetic model involving pressure increase of 50 MPa/a at a depth of 7 km under the resurgent dome can replicate these ***magnetic*** field observations. This model is derived from the intrusion model that best fits the surface deformation data.

Publication Year 1998

Publication Type Serial; Conference document; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1998-033605

13. Database GeoRef

Title **Anisotropy of *magnetic* susceptibility in undeformed and deformed ignimbrites**

Author Palmer, Currie H; MacDonald, William D

Affiliation University of Western Ontario, Department of Earth Sciences, London, ON, Canada (CAN)

Affiliation State University of New York at Binghamton, United States (USA)

Monograph Title Recueil des resumes; carrefour des sciences de la terre--Abstract volume; carrefour in earth sciences

Author Hebert, Rejean (president)

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 23, pp.140, 1998

Resource Location http://www.esd.mun.ca/~gac/ ANNMEET/annmeet.htmls

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication Canada (CAN)

Accession Number 2002-013263

14. Database GeoRef

Title ***Magnetic*** **field monitoring near active faults and volcanic calderas in California; 1974-1995**

Author Mueller, R J; Johnston, M J S

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title AGU 1995 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.351, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1996-031310

16. Database GeoRef

Title **Repeating waveform initiated by a 180-190 ka geomagnetic excursion in western North America; implications for field behavior during polarity transitions and subsequent secular variation**

Author Negrini, Robert M; Erbes, Daniel B; Roberts, Andrew P; Verosub, Kenneth L; Sarna-Wojcicki, Andrei M; Meyer, Charles E

Affiliation California State University, Department of Physics and Geology, Bakersfield, CA, United States (USA)

Affiliation University of California at Davis, United States (USA); U. S. Geological Survey, United States (USA)

Source Journal of Geophysical Research, vol. 99, no. B12, pp.24,105-24,119, 10 Dec 1994

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract New paleomagnetic, lithologic, and stratigraphic data are presented from the sediments of Lake Chewaucan in the Summer Lake Basin, Oregon. The new data place better age constraints on the sediments and improve the accuracy of the previously published paleomagnetic record from this locality. A complex, yet distinct, waveform is observed in all three components of the paleomagnetic vector. The waveform begins as the 180-190 ka Pringle Falls/***Long Valley***/Summer Lake II geomagnetic excursion and continues for two cycles after the excursion, until the record is interrupted by an unconformity that we correlate to the oxygen isotope stage 6/5e boundary. The waveform's directional morphology in virtual geomagnetic pole (VGP) space is defined by two clockwise loops followed by a distinctive counterclockwise, clockwise, counterclockwise looping sequence. The VGP paths of the two cycles after the excursion are rotated 180 degrees about Earth's spin axis with respect to the VGP paths of the excursion cycle. The waveform also consists of a relative paleointensity variation which repeats during the two cycles after the excursion. The average paleointensity of the postexcursion waveform repetitions is high relative to the extremely low values that occur during the excursion. This observation indicates that excursion-initiated secular variations can occur after the field fully recovers from the low intensities which commonly typify excursions. Because of the similarities noted previously between this excursion and full polarity transitions (Trie et al., 1991), our new observations constrain models for a wide range of field behavior including polarity transitions, excursions, and secular variation. Copyright 1994 by the American Geophysical Union.

Publication Year 1994

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1995-021566

17. Database GeoRef

Title **Age and correlation of a paleomagnetic excursion in the Western U.S. by (super 40) Ar/ (super 39) Ar dating and tephrochronology; the Jamaica, Blake or a new polarity episode?**

Author Herrero-Bervera, Emilio; Helsley, C E; Sarna-Wojcicki, A M; Lajoie, K R; Meyer, C E; Turrin, B D; Donnelly-Nolan, J M; McWilliams, M O; Negrini, R M; Liddicoat, J C

Affiliation SOEST-Hawaii Institute of Geophysics and Planetology, Honolulu, HI, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Stanford University, United States (USA); California State University, United States (USA); Columbia University, United States (USA)

Monograph Title AGU 1994 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.190-191, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1996-009351

18. Database GeoRef

Title **Preliminary geomagnetic paleointensities from *Long Valley* Caldera, California**

Author Mankinen, Edward A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 94-0633, 17 pp., 1994

Report Number OF 94-0633

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 17

Publication Year 1994

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1995-028494

19. Database GeoRef

Title **Overview of electromagnetic methods applied in active volcanic areas of Western United States**

Author Skokan, Catherine K

Affiliation Colorado School of Mines, Department of Geophysics, Golden, CO, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.56, no.3, pp.309-318, Jun 1993

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A better understanding of active volcanic areas in the United States through electromagnetic geophysical studies received foundation from the many surveys done for geothermal exploration in the 1970's. Investigations by governmental, industrial, and academic agencies include (but are not limited to) mapping of the Cascades, ***Long Valley***/Mono area, the Jemez volcanic field, Yellowstone Park, and an area in Colorado. For one example - Mt. Konocti in the Mayacamas Mountains, California - gravity, ***magnetic***, and seismic, as well as electromagnetic methods have all been used in an attempt to gain a better understanding of the subsurface structure. In each of these volcanic regions, anomalous zones were mapped. When conductive, these anomalies were interpreted to be correlated with hydrothermal activity and not to represent a magma chamber. Electrical and electromagnetic geophysical methods can offer valuable information in the understanding of volcanoes by being the method which is most sensitive to change in temperature and, therefore, can best map heat budget and hydrological character to aid in prediction of eruptions.

Publication Year 1993

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1993-019447

20. Database GeoRef

Title **Ongoing volcanomagnetic, geodetic and seismicity anomalies observed from mid-1989 in *Long Valley* Caldera, California**

Author Johnston, M J S; Mueller, R J; Langbein, J O

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title AGU 1992 western Pacific geophysics meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.25, Suppl., pp.60, 23 Jun 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1993-022956

21. Database GeoRef

Title **Geophysical logging of cored section in the *Long Valley* exploration well, *Long Valley*, California**

Author Nelson, P H; Mikesell, J L; Kibler, J E

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 92-0544, 13 pp., 1992

Report Number OF 92-0544

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 13

Publication Year 1992

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1993-000062

22. Database GeoRef

Title **Analysis of potential data over *Long Valley*, California; 1, Regional structural model interpreted from integrated shaded relief map**

Author Miyazaki, Y

Affiliation Geol. Surv. Japan, JPN, (Japan)

Source Butsuri-Tansa = Geophysical Exploration, vol.44, no.5, pp.275-288, Oct 1991

Resource Location http://www.segj.org/committee/hensyu/journal/index_e._html

Publisher Society of Exploration Geophysicists of Japan, Tokyo, Japan (JPN)

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication Japan (JPN)

Accession Number 1992-020288

23. Database GeoRef

Title **Analysis of potential data over *Long Valley*, California; 2, Mapping of Curie isothermal depth from aeromagnetic anomalies**

Author Miyazaki, Y

Affiliation Geol. Surv. Japan, JPN, (Japan)

Source Butsuri-Tansa = Geophysical Exploration, vol.44, no.5, pp.289-310, Oct 1991

Resource Location http://www.segj.org/committee/hensyu/journal/index_e._html

Publisher Society of Exploration Geophysicists of Japan, Tokyo, Japan (JPN)

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication Japan (JPN)

Accession Number 1992-020289

24. Database GeoRef

Title **Magnetotelluric transect of *Long Valley* Caldera; resistivity cross-section, structural implications, and the limits of a 2-D analysis**

Author Wannamaker, Philip E; Wright, Phillip M; Zhou Zi-xing; Li Xing-bin; Zhao Jing-xiang

Affiliation Univ. Utah Res. Inst., Earth Sci. Lab., Salt Lake City, UT, United States (USA)

Affiliation Cent. South Univ. Technol., China (CHN); Minist. Geol. and Miner. Resour., China (CHN)

Source Geophysics, vol.56, no.7, pp.926-940, Jul 1991

Resource Location http://www.segdl.org/geophysics/

Publisher Society of Exploration Geophysicists, Tulsa, OK, United States (USA)

Abstract Twenty-four magnetotelluric (MT) soundings have been collected in an east-west profile across the center of ***Long Valley*** caldera. The average station spacing is approximately 1 km and appears adequate to sample the important features of the upper crustal and deeper resistivity structures. Additional control on the shallowest resistivity is provided by a continuous profile of time domain electromagnetic soundings coincident with the western portion of the MT line. Our MT data set reveals numerous resistivity structures which illuminate the evolution and present state of the ***Long Valley*** system. Many of these have been quantified through two- dimensional (2-D) finite element modeling emphasizing the transverse ***magnetic*** (TM) mode. Important structural components include low -resistivity layers 0.5-1.5 km deep under the eastern half of the caldera, beneath the axial graben of the resurgent dome, and under the west caldera moat. Most of this layering appears to lie in post-caldera Early Rhyolite tuffs, and the uppermost unwelded Bishop Tuff. These rhyolite units have been observed to be porous and highly altered and to commonly contain Pleistocene intercalated lacustrine clays. The remainder and majority of the Bishop Tuff appears highly resistive. A low resistivity layer also occurs below the axial graben near the base of the Bishop Tuff (1.5 km). Hydrothermal fluids or alteration in precaldera volcanic strata or, less likely, carbonaceous metasediments may be the cause of this. Resistive, probably crystalline basement at high levels is apparent beneath the center of resurgence. Low resistivities are modeled at a depth around 5 km below the entire west moat and central graben and may represent a zone of hydrothermal fluids released from magma crystallization, with potential magmatic contributions at greater depths. The correspondence between this low resistivity and teleseismic delay and low density zones found in other studies is quite striking. A subtle anomaly in the transverse electric (TE) mode impedance is weakly suggestive of a midcrustal conductive axis centered beneath the central graben and resurgent dome. However, it cannot be simulated by two- dimensional transverse electric calculations and requires a full three-dimensional evaluation to ensure that the anomaly does not represent resistivity complexity in just the upper few kilometers. A fundamental, caldera-wide 3-D effect is documented by comparison of observed and computed TE impedance and vertical ***magnetic*** field data. The abrupt termination of conductive caldera sediments less than 10 km north and south of our profile greatly depresses the observed TE apparent resistivity and vertical ***magnetic*** field relative to the model calculations for periods greater than 0.3 s for the central and eastern caldera. Analysis of the TE mode data also suggests that a similar finite-strike effect lies in the response at periods greater than 3 s due to the mid-crustal west moat conductor. The TM mode measurements are judged to also contain some large-scale departure from the 2-D assumption related to horizontal current gathering from the north and south. This inflates the apparent resistivity and decreases the phase somewhat around 10 s over the central portion of the caldera relative to the 2-D model response. The regional profile of resistivity for the data at hand can be modeled with a 40 ohm-m basal half-space beneath 30 km of crust of 1000 ohm-m or more. Although stations outside the caldera are very desirable to constrain this deep profile better, there is no evidence for a discrete low-resistivity layer deep below ***Long Valley*** in contrast to our interpretation in the northeastern Basin and Range.

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1991-038676

25. Database GeoRef

Title **Possible tectonomagnetic effect observed from mid-1989, to mid-1990, in *Long Valley* Caldera, California**

Author Mueller, R J; Johnston, M J S; Langbein, J O

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Geophysical Research Letters, vol. 18, no. 4, pp.601-604, Apr 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Precise measurements of local ***magnetic*** fields have been obtained with a differentially connected array of three proton magnetometers in the ***Long Valley*** caldera region since 1984. Two magnetometers are located inside the caldera with a third reference magnetometer located 26km southeast of the caldera. After correction for secular variation, it is apparent that an anomalous 2 nT decrease in the ***magnetic*** field occurred from mid-1989 to mid-1990 at the magnetometer located closest to the center of the resurgent dome inside the caldera. During this period a significant increase in geodetic strain rate of 8.5 ppm/a was

observed on the two-color geodimeter network within the caldera from October, 1989, to mid-1990 and a dramatic increase in seismic activity occurred from December, 1989 to July, 1990. A simple dilatational point-source model with pressure increasing by 52 Mpa from October 1989 to August 1990 at a depth of about 7km beneath the center of the resurgent dome can be fit to the strain data. If this same model is used to calculate piezomagnetic fields in the caldera, the results obtained agree with the observed local ***magnetic*** field data provided the Curie point isotherm is at a depth of < or =5km. Taken together, these ***magnetic***, seismic and geodetic data suggest that an episode of active magmatic intrusion occurred from late 1989 to mid-1990 at a depth of about 7-8km beneath the resurgent dome within the ***Long Valley*** caldera. Other indications of this intrusion should be evident in measurements of leveling, local gravity, and seismic imaging data. Copyright 1991 by the American Geophysical Union.

Publication Year 1991

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1991-029259

26. Database GeoRef

Title **Possible tectonomagnetic effect observed from mid-1989, to mid-1990, in *Long Valley* Caldera, California**

Author Mueller, R J; Johnston, M J S; Langbein, John O

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Monograph Title AGU 1990 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1467, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1992-025315

27. Database GeoRef

Title ***Magnetic* insights to flow fabrics, processes, and source areas for ash-flow tuffs**

Author MacDonald, William D; Palmer, H C

Affiliation State University of New York at Binghamton, Department of Geological Sciences, Binghamton, NY, United States (USA)

Affiliation University of Western Ontario, Canada (CAN)

Monograph Title Geological Society of America, 1990 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.22, no.7, pp.245, 1990

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Descriptors anisotropy; ash-flow tuff; Bandelier Tuff; Basin and Range Province; Bishop Tuff; California; Cenozoic; emplacement; fabric; igneous rocks; lineation; ***Long Valley*** Caldera; ***magnetic*** susceptibility; mineral composition; Mono County California; Nevada; New Mexico; North America; petrology; Pleistocene; protoliths; pyroclastics; Quaternary; textures; United States; Valles Caldera; volcanic rocks

Accession Number 1992-067091

28. Database GeoRef

Title **Review of *magnetic* and electric field effects near active faults and volcanoes in the U.S.A.**

Author Johnston, M J S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Monograph Title Seismoelectromagnetic effects

Editor Parrot, M J S; Johnston, M J S

Affiliation CNRS, L.P.C.E., Orleans, France (FRA)

Source Physics of the Earth and Planetary Interiors, vol.57, no.1-2, pp.47 -63, Oct 1989

Resource Location http://www.sciencedirect.com/ science/journal/00319201

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1989

Publication Type Serial; Conference document; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1989-082289

29. Database GeoRef

Title **Short reversal of the palaeomagnetic field about 280,000 years ago at *Long Valley*, California**

Author Liddicoat, J C; Bailey, R A

Affiliation Univ. Calif., Earth Sci. Board, Santa Cruz, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Monograph Title Proceedings of the NATO Advanced Study Institute on Geomagnetism and paleomagnetism

Author Lowes, F J; Collinson, D W; Parry, J H; Runcorn, S K; Tozer, D C; Soward, A M

Affiliation Univ. Newcastle upon Tyne, Newcastle upon Tyne, United Kingdom (GBR)

Source NATO Advanced Study Institutes Series. Series C: Mathematical and Physical Sciences, vol. 261, pp.137-153, 1989

Publisher D. Reidel Publishing Company, Dordrecht-Boston, International (III)

Publication Year 1989

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 1989-074506

30. Database GeoRef

Title **Sensor motion noise in low frequency geomagnetic fields**

Author Nichols, E A; Morrison, H Frank; Clarke, J

Affiliation Univ. Calif., Berkeley, CA, United States (USA)

Monograph Title Ninth workshop on Electromagnetic induction in the Earth and Moon

Editor Zhdanov, M S; Berdichevsky, M N; Fainberg, E B; Spichak, V V

Source Abstracts - Workshop on Electromagnetic Induction in the Earth and Moon, vol.9, pp.119, 1988

Publisher Soviet Geophysical Committee, Moscow, USSR (SUN)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication USSR (SUN)

Accession Number 1991-053035

31. Database GeoRef

Title **Paleomagnetism and K-Ar ages of volcanic rocks from *Long Valley* Caldera, California**

Author Mankinen, Edward A; Gromme, C Sherman; Dalrymple, G Brent; Lanphere, Marvin A; Bailey, Roy A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 91, no. B1, pp.633-652, 10 Jan 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Paleomagnetic measurements and K-Ar age determinations on volcanic rocks from ***Long Valley*** caldera, California, have enabled further refinement of eruptive activity within this large silicic volcanic center. K-Ar age determinations show that postcaldera volcanic eruptions began 0.73 m.y. ago and continued periodically until about 50,000 years ago. The eruptions were not temporally random but tended to occur in distinct episodes separated by periods of quiescence. Volcanism in the western half of the caldera was particularly intense between 0.15 and 0.50 m.y. ago, when many units ranging in composition from basalt to rhyolite were erupted. An average of the virtual geomagnetic poles for 33 units from the caldera yields a paleomagnetic pole at 89.7 degrees N, 138.4 degrees E, (alpha (sub 95) = 5.1 degrees), which is indistinguishable from the earth's rotational axis. The ancient geomagnetic field dispersion about this mean pole is 16.0 degrees , with upper and lower limits of 19.3 degrees and 13.6 degrees , respectively.

Publication Year 1986

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1986-028002

32. Database GeoRef

Title **Mineral resource potential of the Rockhouse Basin Wilderness Study Area, Kern and Tulare counties, California**

Author Taylor, Gary C; Loyd, Ralph C; Alfors, John T; Burnett, John L; Stinson, Melvin C; Chapman, Rodger H; Silva, Mike A; Bacon, C Forrest; Bushnell, Marjorie M; Anderson, Thomas P

Affiliation California Department of Conservation, Division of Mines and Geology, Sacramento, CA, United States (USA)

Source Special Report - California Division of Mines and Geology, Report: 157, 31 pp., 1986

Report Number 157

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Abstract This report presents the results of a geologic, energy, and minerals (GEM) survey of the Rockhouse Basin Wilderness Study Area (WSA) in the southern Sierra Nevada. The survey was conducted by the California Department of Conservation, Division of Mines and Geology (DMG) during the latter part of 1983 under Contract No. YA-551-CT3-440039 with the U.S. Bureau of Land Management (BLM). The work was contracted as part of a BLM study to determine the suitability of the Rockhouse Basin area for recommendation for inclusion into the National Wilderness Preservation System. The Rockhouse Basin Wilderness Study Area encompasses an uplifted erosional surface of older (pre-Middle Jurassic) metasedimentary rock (Kernville Series) which have been intruded by a succession of younger (Middle Jurassic to Cretaceous) granitic plutons of varying composition. The metamorphic rocks occur as a large roof pendant or as smaller xenoliths. These metamorphic rocks are vertically to steeply dipping, and consist principally of quartzites, schists, and phyllites with minor assemblages of marble, slate, hornfels, and metavolcanic rock. With few exceptions, all known occurrences of mineralization are confined to the metamorphic rocks, and the exceptions appear to be confined to areas containing late-stage pegmatites. The mineral resource potential of the WSA was evaluated and classified on the basis of geological, geochemical, and geophysical data developed during the study. The results of the GEM survey indicate that parts of the study area have a mineral resource potential. Some specific characteristics are presented below: - The WSA has a substantiated high potential for small deposits of tungsten with accessory molybdenum and copper mineralization associated with small tactite zones developed along metasedimentary-igneous contacts. - Minor barite production has been recorded from prospects within the WSA that have a low-to-moderate barite resource potential. However, outside the WSA, toward VABM Bear, the southward continuation of this stratigraphic horizon of sedimentary barite has supported moderate historic production and contains an extensive substantiated barite resource. - Geochemical and radiometric data indicate a moderate resource potential for small deposits of uranium associated with pegmatites along the southwestern end of ***Long Valley*** and in the Chimney Peak-Lamont Meadow area. - A small, undeveloped, but substantiated occurrence of gem quality turquoise exists near the southwestern end of ***Long Valley***. - Bodies of marble (metamorphosed limestone and dolomite) and quartz-feldspar-bearing pegmatite dikes are present. The marble has variable magnesium content and shows partial-to-complete silicification and variable widths; pegmatite dikes are small and discontinuous. Thus, variabilities in tonnage, composition, grade, thickness, and extent are not favorable for commercial utilization of either commodity. - The geologic terrane has no potential for the occurrence of petroleum resources and has low potential for the development of geothermal resources in the area, even though it lies immediately west of the Coso Known Geothermal Resource Area. - Geochemical data indicate a low resource potential for deposits of lead-zinc-silver-gold in the southern and northern parts of the study area possibly associated with undiscovered ore-forming hydrothermal systems. Suggestions for further studies. Additional detailed geochemical and geophysical studies in specific areas might more closely delineate possible hydrothermal mineralization, particularly in the Big Pine Meadow area and the southern and northern parts of the study area. Also, detailed ground ***magnetic*** investigations of small ***magnetic*** anomalies occurring near metasedimentary-igneous rock contacts immediately east of the ***Long Valley***-Lamont Meadows Road might delineate possible concealed tactite zones.

Pages 31

Publication Year 1986

Publication Type Serial; Report; Map; Monographic

Country of Publication United States (USA)

Accession Number 2001-046090

33. Database GeoRef

Title **Refined analysis of telluric, magnetotelluric and *magnetic* variation data in *Long Valley* Caldera**

Author Hermance, John F; Neumann, G A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Monograph Title AGU 1985 spring meeting

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.392, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1986-049098

34. Database GeoRef

Title **Control of *magnetic* induction parameters by the tectonic fabric of the *Long Valley*/eastern Sierra front**

Author Neumann, G A; Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Monograph Title AGU 1985 spring meeting

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.392, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1986-049099

35. Database GeoRef

Title **Analysis of aeromagnetic anomalies; mapping of Curie isothermal surface at *Long Valley*, California**

Author Miyazaki, Yoshinori

Pages 207

Publication Year 1985

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Stanford University, Stanford, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 1986-038429

36. Database GeoRef

Title **Geothermal systems of the Mono Basin-*Long Valley* region, eastern California and western Nevada**

Author Higgins, Chris T; Flynn, Thomas; Chapman, Rodger H; Trexler, Dennis T; Chase, G R; Bacon, C Forrest; Ghusn, George, Jr

Affiliation Calif. Div. Mines and Geol., Pleasant Hill, CA, United States (USA)

Source Open File Report - California Geological Survey, Report: 85-19, 159 pp., 1985

Report Number 85-19

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Pages 159

Publication Year 1985

Publication Type Serial; Report; Map; Monographic

Country of Publication United States (USA)

Accession Number 1991-047564

37. Database GeoRef

Title ***Magnetic* field observations in the *Long Valley* Caldera of east-central California, 1976-1984**

Author Mueller, R J; Johnston, M J S; Keller, V; Silverman, S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Monograph Title AGU 1984 fall meeting

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1117, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1986-046291

38. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; a preliminary magnetotelluric and *magnetic* variation interpretation**

Author Hermance, John F; Slocum, Warren M; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Monograph Title Calderas and associate igneous rocks

Author Anonymous

Source Journal of Geophysical Research, vol. 89, no. B10, pp.8325-8337, 30 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The ***Long Valley***/Mono Basin volcanic complex in eastern California is one of the few major silicic caldera systems in western North America which have exhibited volcanic activity so recently that they may still be potentially active. Whereas, in principle, magnetotelluric measurements offer a significant opportunity to study such systems through mapping subsurface electrical features associated with hydrothermal and magmatic processes in the crust, our studies in this area indicate that such techniques are profoundly affected by the highly three-dimensional structures associated with these complicated volcanic terranes. We argue that while simple plane-layered (one -dimensional) interpretations are likely to be misleading in such a complicated three-dimensional environment, magnetotelluric observations can delineate important physical features associated with caldera structures; in particular, the method can closely determine the location and magnitude of major boundary faults. Because of the high resistivity contrast between basin fill and crystalline basement, these techniques are very useful for characterizing the subsurface hydrologie regime as well. In addition, sites have been occupied in the southwest moat of ***Long Valley*** caldera, an area that is currently exhibiting a variety of tectonic activity. Both the telluric field and ***magnetic*** induction arrows imply the presence of a structurally controlled east-west electric current system at relatively shallow depth in the crust. This elongated east-west zone is aligned along the belt of recent seismic activity in the southwest moat, a zone of seismic shear wave attenuation, and a zone of known hydrothermal alteration at the surface. Finally, we summarize observations from the vicinity of Pumice ***Valley*** (adjacent to Mono Craters) which has been thought to be an active incipient caldera. Since our present data do not indicate an observable decrease in resistivity at shallow depths beneath the ***valley***, we are led to conclude that the parent magma body feeding Mono Craters (and perhaps Inyo domes) is either too thin or too deep to be resolved or is significantly displaced from a position beneath the center of the inferred ring fractures.

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1985-038350

39. Database GeoRef

Title **Changing mercury anomalies in *Long Valley*, California; indication for magma movement or seismic activity**

Author Varekamp, Johan C; Buseck, Peter R

Affiliation Ariz. State Univ., Dep. Geol. and Chem., Tempe, AZ, United States (USA)

Source Geology (Boulder), vol.12, no.5, pp.283-286, May 1984

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mercury anomalies in soils in geothermal areas form as a result of vapor transport. Comparison of the Hg distribution measured in 1975, and again in 1982, indicates that a new Hg anomaly formed in the Inyo crater zone in the intervening period. Two models can explain this new anomaly: (1) geothermal water has reached shallow levels as a result of increased permeability created by seismic activity, or (2) addition of a CO (sub 2) -rich, ***magnetic*** vapor to the geothermal system at depth caused vapor exsolution in zones where it did not occur before. If the Hg anomaly in the Inyo crater zone is related to the addition of magmatic vapors, the site of the new anomaly may overlie young, intruding magma.--Modified journal abstract.

Publication Year 1984

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1984-029746

40. Database GeoRef

Title **Monitoring unrest in a large silicic caldera, the *Long Valley*-Inyo Craters volcanic complex in east-central California**

Author Hill, D P

Affiliation U. S. Geol. Surv., Menlo Park, CA 94025, United States (USA)

Monograph Title On the 1982-1984 bradyseismic crisis at Phlegraean Fields (Italy)

Author Barberi, F; Hill, D P; Innocenti, F; Luongo, G; Treuil, M

Affiliation Univ. Pisa, Dip. Sci. Terra, Pisa, Italy (ITA)

Source Bulletin Volcanologique, vol.47, no.2, special issue, pp.371-395, 1984

Publisher Springer International [for the] International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI), Heidelberg, International (III)

Publication Year 1984

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 1987-059733

41. Database GeoRef

Title **A detailed microearthquake survey of *Long Valley*, California, Known Geothermal Resources Area, July-Sept., 1981**

Author Cramer, Chris H; Stierman, Donald J; Lee, Tien Chang

Affiliation California Department of Conservation, Division of Mines and Geology, USA, (United States)

Source Open File Report - California Geological Survey, Report: 84-53, 147 pp., 14 sheets, 1984

Report Number 84-53

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Pages 147, 14 sheets

Publication Year 1984

Publication Type Serial; Report; Map; Monographic

Country of Publication United States (USA)

Accession Number 2001-062731

42. Database GeoRef

Title **Conductivity anomalies within *Long Valley* Caldera and the Southwest Moat**

Author Slocum, W; Neumann, G A; Hermance, J F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Monograph Title American Geophysical Union; 1983 Fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.693, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1984-040634

43. Database GeoRef

Title **Short polarity reversal (or large geomagnetic excursion) in Brunhes-age lake sediment, *Long Valley*, California**

Author Liddicoat, Joseph C; Lajoie, K R; Sarna-Wojcicki, Andrei M; Bailey, R A

Affiliation Lamont -Doherty Geol. Obs., Palisades, NY, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Monograph Title American Geophysical Union; 1983 spring meeting

Author Anonymous

Affiliation Natl. Sci. Found., USA, (United States)

Source Eos, Transactions, American Geophysical Union, vol.64, no.18, pp.217, 03 May 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1984-017224

44. Database GeoRef

Title **Geophysical studies of active geothermal systems in the northern Basin and Range**

Author Ward, Stanley H

Affiliation Univ. Utah Res. Inst., Earth Sci. Lab., Salt Lake City, UT, United States (USA)

Monograph Title The role of heat in the development of energy and mineral resources in the northern Basin and Range Province

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.121-157, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1984-044706

45. Database GeoRef

Title ***Magnetic* measurements across the *Long Valley* Caldera, 1972-1983; a comparison with observations and mechanisms during the Matsushiro earthquake swarm**

Author Johnston, M J S; Mueller, R J; Silverman, S A; Keller, V G

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Monograph Title 78th annual meeting, Seismological Society of America, abstracts

Editor Long, Tim

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.90, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1983-054459

46. Database GeoRef

Title **Analysis of airborne *magnetic* anomalies; determination of Curie depth for geothermal reconnaissance; (a progress report)**

Author Miyazaki, Yoshinori; Lyon, Ronald J P

Affiliation Stanford Univ., Dep. Appl. Earth Sci., Stanford, CA, United States (USA)

Monograph Title Proceedings of the International symposium on remote sensing of environment; second thematic conference; "Remote sensing for exploration geology"; Volume I

Author Morris-Jones, Donald R (chairperson); Morgan, Ken M (chairperson)

Publisher Environ. Res. Inst. Mich., Ann Arbor, MI, United States (USA)

Pages 455-465

Publication Year 1982

Publication Type Book; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1984-051974

47. Database GeoRef

Title **Total field aeromagnetic anomaly map, *Long Valley* Known Geothermal Resource Area, California**

Corporate Author U. S. Geological Survey, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 81-0994, 1 sheet, 1981

Report Number OF 81-0994

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 1 sheet

Publication Year 1981

Publication Type Map; Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1983-003812

48. Database GeoRef

Title **Implications of a *magnetic* model of the *Long Valley* Caldera, California**

Author Williams, D L; Berkman, F; Mankinen, E A

Affiliation U. S. Geol. Surv., Denver, Colo., United States (USA)

Source Journal of Geophysical Research, vol. 82, no. 20, pp.3030-3038, 10 Jul 1977

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A quantitative ***magnetic*** model of ***Long Valley***, California, shows that the ***magnetic*** field above this caldera is dominated by intracaldera Bishop tuff, part of the ash flow tuff whose eruption precipitated the caldera collapse. We propose that about half of the

350 km (super 3) of intracaldera Bishop tuff, or that part beneath the resurgent dome, has been subjected to extensive hydrothermal alteration. The heat that produced this alteration is apparently associated with the residual magma chamber, and much of the formation may still be hot (>200 degrees C). The ***magnetic*** minerals in the remaining intracaldera Bishop tuff have not been drastically altered, presumably because the tuff was not heated sufficiently. As a result, the tuff may not be very hot today. The model also reveals the existence of parts of two large precaldera mountains beneath the caldera fill. The resolving power attained in this investigation was possible because we were dealing with large, magnetically distinct lithologic units and a large amount of geological and geophysical data were available constraints to produce the solution.

Publication Year 1977

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1977-041254

49. Database GeoRef

Title **A gravity and *magnetic* investigation of the *Long Valley* Caldera, Mono County, California**

Author Kane, M F; Mabey, D R; Brace, R -L

Source Journal of Geophysical Research, vol. 81, no. 5, pp.754-762, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Gravity studies show that the subsurface part of the ***Long Valley*** caldera is a coincident steep-sided depression filled with porous epiclastic and volcanic materials to a depth of as much as 3 km. The depression contains two major basins, a larger and deeper one making up much of the eastern part and a somewhat smaller, more shallow one to the west; a positive feature underlying the central part of the depression separates the two basin areas. The east side of this feature is linear in plan and coincides with the extension of the Hilton Creek fault which is mapped within and beyond the south edge of the caldera. The indicated relief on the postulated subsurface Hilton Creek fault together with difference in depth of the eastern and western basinal areas indicates that the eastern basin is downdropped in relation to the western one. Gentle gravity gradients outside the caldera but sloping towards it are interpreted as evidence of a low-density mass located below the caldera fill. We conclude that it is probably related to the magma source. Aeromagnetic data indicate that a northwest-trending belt of metasedimentary rocks on the south flank of ***Long Valley*** may extend into the caldera proper and form much of the bedrock floor of the western part of the caldera. A ***magnetic*** low of shallow source in the hot spring region in the southwest is thought to be caused by hydrothermal alteration of the ferrimagnetic minerals in the underlying rocks. A broad positive ***magnetic*** anomaly near the center of the caldera may be caused by a thick section of ***magnetic*** volcanic flow lying east of the projected Hilton Creek fault and underlying much of the eastern basin.

Publication Year 1976

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1976-031715

50. Database GeoRef

Title **Implications of a *magnetic* model of the *Long Valley* Caldera, California**

Author Williams, D L

Source Open-File Report - U. S. Geological Survey, Report: OF 76-0439, 11 pp., 1976

Report Number OF 76-0439

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Pages 11

Publication Year 1976

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

51. Database GeoRef

Title **Audio-magnetotelluric methods in reconnaissance geothermal exploration**

Author Hoover, D B; Long, C L

Affiliation U. S. Geol. Surv., Theoret. Appl. Geophys., Denver, Colo., United States (USA)

Source U. N. Symp. Dev. Use Geotherm. Resour., Abstr., no.2, unpaginated, 29 May 1975

Publication Year 1975

Publication Type Serial; Conference document; Analytic

Accession Number 1975-029064

52. Database GeoRef

Title **Gravity and *magnetic* anomalies in *Long Valley*, California**

Author Kane, Martin F; Mabey, Don R

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038969

53. Database GeoRef

Title **Structural geology and volcanism of Owens *Valley* region, California; a geophysical study**

Author Pakiser, L C; Kane, M F; Jackson, W H

Source U. S. Geological Survey Professional Paper, Report: P 0438, 68 pp., 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Gravity and seismic measurements in Owens ***Valley***, ***Long Valley***, and Mono Basin, which are directly east of the Sierra Nevada, Calif., show these depressions to be downdropped blocks filled with thousands of feet of Cenozoic deposits. ***Magnetic*** measurements suggest locations of buried volcanic rocks. A theory relating volcanism to stress reduction associated with faulting is presented. ***Long Valley*** and Mono Basin are identified as volcano-tectonic depressions.

Publication Year 1964

Publication Type Serial; Report; Monographic

Accession Number 1964-013239

54. Database GeoRef

Title **Anomalous gravity field in east-central California**

Author Oliver, Howard W; Mabey, Don R

Source Geological Society of America Bulletin, vol.74, no.10, pp.1293-1298, 1963

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Bouguer gravity values at about 11,000 stations in E.-central California range from -14 mgal near Merced to -274 mgal in ***Long Valley***. Gravity lows in the W. and S. parts of the San Joaquin ***Valley*** and over local basins S. and E. of the Sierra Nevada are produced by large thicknesses of Upper Cretaceous and Cenozoic deposits. A large regional gravity low over the Sierra Nevada can be explained by isostatic compensation of the range together with the effect of the relatively low-density rocks of the Sierra Nevada batholith. A broad gravity ridge along the E. side of the San Joaquin ***Valley*** shows excellent correlation with a similar ***magnetic*** ridge where the 2 sets of data are available, suggesting that both anomalies are caused by a dense, ***magnetic*** mass buried at an estimated depth of 5-10 mi. Seismic refraction measurements further indicate that the thickness of the earth's crust under the ***valley*** is less than 12 mi. Thus, the anomalous mass is in the lower part of the earth's crust and is conceivably related to the more mafic rocks of the earth's upper mantle.

Publication Year 1963

Publication Type Serial; Analytic

Accession Number 1963-010483

55. Database GeoRef

Title **Aeromagnetic map of *Long Valley* and northern Owens *Valley*, California**

Author Henderson, John R; White, Bernard L

Source Geophysical Investigations Map, Report: GP-0329, 1963

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1963

Publication Type Map; Serial; Report; Monographic

Accession Number 1963-014219

56. Database GeoRef

Title **Resistivity imaging of *Long Valley* Caldera; first results from a DC- geoelectrical deep sounding experiment 2000**

Author Schuetze, Claudia; Brunner, Ingolf; Flechsig, Christina; Kulenkampff, Johannes; Jacobs, Franz; Serfling, Ulrich

Affiliation University of Leipzig, Leipzig, Federal Republic of Germany (DEU)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074126

57. Database GeoRef

Title **The regional subsurface structure of *Long Valley* (California) Caldera fill from gravity and magnetotelluric data**

Author Hermance, John F; Neumann, G A; Slocum, W

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Geological Society of America Bulletin, vol.100, no.11, pp.1819-1823, Nov 1988

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** caldera, in eastern California, is a deep, basinlike feature bounded by steeply dipping normal faults having vertical offsets of at least several kilometers and is largely filled with effusive volcanics and lacustrine deposits. Interest in delineating its substructure has escalated over the past decade for a number of reasons; for example, there is increasing evidence that patterns of recent seismicity and ***volcanism*** may be controlled by pre-existing basement structures. In addition, the highly porous fill of the caldera basin forms the major hydrologic element in the region. For these and other reasons, characterizing the subsurface geometry of ***Long Valley*** caldera is an important objective of current geophysical studies.This paper reports a combined gravity and magnetotelluric interpretation which reveals a close similarity between a simple 3-D gravity model and a telluric thin sheet interpretation. This underscores the fact that both the gravity and the MT data are largely influenced by the same geologic elements: the caldera fill, basement topography, and the major boundary faults. Moreover, as in earlier MT interpretations, a conductive zone is seen beneath the southwest moat. In addition, however, because of new data, we now have evidence for a buried resistive ridge cutting across the main body of the caldera from the northwest to the southeast beneath the resurgent dome. Interpreting this resistive feature as a basement structural "high" (that is, a horst block) is compatible with limited drilling data,

and it appears to be the same feature that has been described as a "central platform" from previous gravity studies. The presence of such a horst may be fundamentally related to the structural evolution of the resurgent dome.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-074076

58. Database GeoRef

Title **Three-dimensional interpretation of magnetotelluric data in *Long Valley*, California**

Author Park, S K; Torres-Verdin, C; Morrison, H F

Source LBL - Lawrence Berkeley Laboratory, Report: 24200, pp.125-129, Sep 1988

Publisher Lawrence Berkeley Laboratory, University of California, Berkeley, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic

Accession Number 1990-030193

59. Database GeoRef

Title **Controlled-source electromagnetic soundings at the *Long Valley* Caldera, California**

Author Morrison, H F; Goldstein, N E; Wilt, M J; Lee, K H; Turnross, J L

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016552

60. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; status of present magnetotelluric investigations**

Author Hermance, J F; Slocum, W; Neumann, G A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016554

REMOTE SENSING BIBLIOGRAPHY

1. Database GeoRef

Title **Transtensional analyses of fault patterns and strain provinces of the Eastern California shear zone; Walker Lane on the eastern margin of the Sierra Nevada microplate, California and Nevada**

Author Taylor, Tatia R; Dewey, John F

Affiliation University of California, Davis, Davis, CA, United States (USA)

Affiliation University College Galway, United Kingdom (GBR)

Monograph Title Rise and fall of the Nevadaplano; Part II

Editor Ernst, W. Gary

Source International Geology Review, vol. 51, no. 9-11, pp.843-872, Nov 2009

Resource Location http://www.ingentaconnect.com/ content/bell/

Publisher Winston & Son, Silver Spring, MD, United States (USA)

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication (USA) United States

Accession Number 2009-095028

4. Database GeoRef

Title **Surface deformation of active volcanic areas retrieved with the SBAS-DInSAR technique; an overview**

Author Pepe, Antonio; Manzo, Mariarosaria; Casu, Francesco; Solaro, Giuseppe; Tizzani, Pietro; Zani, Giovanni; Pepe, Susi

Affiliation Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Monograph Title Gravity, magnetic, electric and electromagnetic methods in seismology and volcanology

Editor Del Negro, Ciro; Gresta, Stefano; Meloni, Antonio

Source Annals of Geophysics, vol. 51, no. 1, pp.247-263, Feb 2008

Resource Location http://www.ingv.it/~wwwannali/

Publisher Editrice Compositori, Bologna, Italy (ITA)

Abstract This paper presents a comprehensive overview of the surface deformation retrieval capability of the Differential Synthetic Aperture Radar Interferometry (DInSAR) algorithm, referred to as Small BAseline Subset (SBAS) technique, in the context of active volcanic areas. In particular, after a brief description of the algorithm some experiments relevant to three selected case-study areas are presented. First, we concentrate on the application of the SBAS algorithm to a single-orbit scenario, thus considering a set of SAR data composed by images acquired on descending orbits by the European ***Remote Sensing*** (ERS) radar sensors and relevant to the ***Long Valley*** caldera (eastern California) area. Subsequently, we address the capability of the SBAS technique in a multiple-orbit context by referring to Mt. Etna volcano (southern Italy) test site, with respect to which two different ERS data set, composed by images acquired both on ascending and descending orbits, are available. Finally, we take advantage of the capability of the algorithm to work in a multi-platform scenario by jointly exploiting two different sets of SAR images collected by the ERS and the Environment Satellite (ENVISAT) radar sensors in the Campi Flegrei caldera (southern Italy) area. The presented results demonstrate the effectiveness of the algorithm to investigate the deformation field in active volcanic areas and the potential of the DInSAR methodologies with in routine surveillance scenario.

Publication Year 2008

Publication Type Serial; Conference document; Analytic

Country of Publication Italy (ITA)

Accession Number 2009-076909

5. Database GeoRef

Title **Ground deformation of *Long Valley* Caldera and Mono Basin, eastern California, mapped by satellite radar interferometry**

Author Tizzani, P; Berardino, P; Casu, F; Euillades, P; Manzo, M; Ricciardi, G P; Zeni, G; Lanari, R

Affiliation National Research Council, Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Universita di Cagliari, Italy (ITA); Universidad Nac de Cuyo, Argentina (ARG); Universita della Basilicata, Italy (ITA); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Source International Journal of Remote Sensing, vol. 29, no. 1-2, pp.439-441, Jan 2008

Resource Location http://www.tandf.co.uk/journals/ titles/01431161.asp

Publisher Taylor & Francis, London, United Kingdom (GBR)

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2009-073976

6. Database ProQuest Deep Indexing: Earth Sciences

Title **Surface deformation of *Long Valley* caldera and Mono Basin, California, investigated with the SBAS-InSAR approach**

Author Tizzani, P; Berardino, P; Casu, F; Euillades, P; Manzo, M; Ricciardi, GP; Zeni, G; Lanari, R

Affiliation National Research Council, Via Diocleziano 328, I-80124 Napoli, Italy, lanari.r@irea.cnr.it

Source Remote Sensing of Environment [Remote Sens. Environ.]. Vol. 108, no. 3, pp. 277-289. 15 Jun 2007.

Abstract We investigate the surface deformation of the eastern California area that includes ***Long Valley*** caldera and Mono Basin. We apply the SAR Interferometry (InSAR) algorithm referred to as Small BAseline Subset (SBAS) approach that allows us to generate mean deformation velocity maps and displacement time series for the investigated area. The results presented in this work represent an advancement of previous InSAR studies of the area that are mostly focused on the deformation affecting the caldera. In particular, the proposed analysis is based on 21 SAR data acquired by the ERS-1/2 sensors during the 1992-2000 time interval, and demonstrates the capability of the SBAS procedure to identify and analyze displacement patterns at different spatial scales for the overall area spanning approximately 5000 km super(2). Two previously unreported localized deformation effects have been detected at Paoha Island, located within the Mono Lake, and in the McGee Creek area within the Sierra Nevada mountains, a zone to the south of the ***Long Valley*** caldera. In addition a spatially extended uplift effect, which strongly affects the caldera, has been identified and analyzed in detail. The InSAR results clearly show that the displacement phenomena affecting the ***Long Valley*** caldera have a maximum in correspondence of the resurgent dome and are characterized by the sequence of three different effects: a 1992-1997 uplift background, a 1997-1998 unrest phenomenon and a 1998-2000 subsidence phase. Moreover, the analysis of the retrieved displacement time series allows us to map the extent of the zone with a temporal deformation behavior highly correlated with the detected three-phases deformation pattern: background uplift-unrest-subsidence. We show that the mapped area clearly extends outside the northern part of the caldera slopes; accordingly, we suggest that future inversion models take this new evidence into account. The final discussion is dedicated to a comparison between the retrieved InSAR measurements and a set of GPS and leveling data, confirming the validity of the results achieved through the SBAS-InSAR analysis.

Publisher Elsevier Science Inc., Box 882 New York NY 10159 USA, usinfo-f@elsevier.com

Publication Type Journal Article

Publication Year 2007

Accession Number 7498225

9. Database GeoRef

Title **Volcanic geology, volcanology and natural resources of the *Long Valley* Caldera, California**

Author Hill, Dave (leader); Farrar, Chris (leader); Lipshie, Steve (leader); Steininger, Roger (leader); Sullivan, Bob (leader); Harmon, Richard (leader)

Affiliation U. S. Geological Survey, USA, (United States)

Source Special Publication - Geological Society of Nevada, vol.41, 213 pp., 4 sheets, 2005

Publisher Geological Society of Nevada, [Reno, NV], United States (USA)

Pages 213, 4 sheets

Publication Year 2005

Publication Type Serial; Map; Monographic

Country of Publication United States (USA)

Accession Number 2006-084936

10. Database GeoRef

Title **Lahar in Glass Creek and Owens River during the Inyo eruption, Mono-Inyo craters, California**

Author Bursik, M; Reid, J

Affiliation State University of New York at Buffalo, Department of Geology, Buffalo, NY, United States (USA)

Affiliation Hampshire College, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.131, no.3-4, pp.321-331, 30 Mar 2004

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Nested fluvial and lahar terraces are inset in a volcanic surface where Glass Creek has created an embayment in the Sierran range front, on the north rim of ***Long Valley*** caldera, California. The geomorphic and stratigraphic relationships among these terraces indicate that they record events at the time of the pre-1472 AD Inyo eruption. The volcanic surface records the deposition of the Inyo pyroclastic materials over pre-existing landforms. Somewhat younger terraces contain volcanic beds at depth, overlain by alluvium. The youngest, lowest terraces comprise lahar deposits overlying alluvium and the pyroclastic debris. Downstream from the embayment, in the canyon of Glass Creek, levees line the walls to a maximum height of 35 m above the present stream level. The canyon opens onto a lahar fan, the surface of which is covered with cobbles and pebbles of Inyo pumice. Further downstream, in the floodplain of the Owens River, an abandoned meander belt is filled with graded debris containing large amounts of Inyo pumice. At the distal end of the floodplain, 30 km from the embayment, coarse pumiceous debris occupies low mounds scattered in the abandoned meander belt. The deposits that comprise the mounds are massive -bedded muds and sandy muds. These features record the excavation of approximately 1.9X10 (super 5) m (super 3) of material from the Glass Creek embayment, and perhaps an additional amount up- and downstream, which was transported in a non -cohesive lahar down the Glass Creek and Owens River drainage to a distance of at least 30 km from the source region. Lahars are a previously uncharacterized volcanic hazard in the ***Long Valley*** caldera region. It may be important to consider them in any future assessment of hazards in this restless system.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2006-038768

11. Database GeoRef

Title **The unique radar properties of silicic lava domes**

Author Plaut, Jeffrey J; Anderson, W; Crown, David A; Stofan, Ellen R; van Zyl, Jakob J

Affiliation California Institute of Technology, Jet Propulsion Laboratory, Padadena, CA, United States (USA)

Affiliation Black Hills State University, United States (USA); Planetary Science Institute, United States (USA); Proxemy Research, United States (USA)

Source Journal of Geophysical Research, vol. 109, no. E3, 12 pp., 25 Mar 2004

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 12

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-071358

12. Database GeoRef

Title **Spatially continuous alteration mapping over an entire caldera; new constraints on the genesis, geochemistry, and structural control of hydrothermal mineralization at *Long Valley*, CA, USA**

Author Martini, Brigette A; Silver, Eli A

Affiliation HyVista Corporation, Baulkham Hills, N.S.W., Australia (AUS)

Affiliation University of California at Santa Cruz, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.552, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Spatially and spectrally continuous airborne ***remote sensing*** imagery was used to map and identify hydrothermal alteration minerals over 450km2 of ***Long Valley*** Caldera in central eastern California. Normally alteration minerals can be challenging to map in the field over large areas (especially if diffusively distributed). Conventional point surveys in the form of drill holes and surface water and rock sampling provide sparse coverage of surface alteration and rock types. Conversely, each five-meter spatial element of a hyperspectral dataset supplies continuous surface material identification allowing for construction of detailed alteration maps over large areas in short amounts of time. ***Long Valley*** alteration assemblages are conclusively identified and mapped throughout the caldera including a preponderance of previously unknown mineralization. The system-scale alteration maps generate new controls on the chemistry, host rock, timing and intensity of alteration stages within the caldera, all of which are captured by caldera-wide maps of sinter, travertine and hydrothermal clays and sulfates. Alteration distribution, density and degree of weathering serve as proxy for alteration timing and intensity, while the comparison of surface alteration with drillcore alteration data at depth provides an innovative way of studying alteration geography and depth to surface zoning. The unprecedented amounts of newly discovered high temperature alteration in the western caldera corroborates hydrothermal circulation models that place a thermal source firmly below the western moat. The western alteration maps ultimately imply a far more intense and complicated alteration regime than previously thought. In addition, hydrothermal discharge maps are generated using linear and point distributions of the alteration assemblages discussed above. These maps mirror known structural networks of ***Long Valley*** and add new, previously un-identified, hydrothermal conduits, including east-west trending faults that allow structurally controlled fluid flow through the central caldera. These refined discharge maps, coupled with topography data, provide a new framework for hydrothermal circulation modeling and are proving instrumental in current local geothermal exploration efforts.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-081503

13. Database GeoRef

Title ***Remote sensing*** **and GIS evaluation of CO (sub 2) -induced tree kills at Mammoth Mountain, California; 1989 to present**

Author List, Mark R; Hausback, Brian P; Farrar, Christopher D; Pieri, David C

Affiliation California State University, Geology Department, Sacramento, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Jet Propulsion Laboratory, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.321, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain, a rhyolite to dacite dome complex on the southwestern rim of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold magmatic carbon dioxide (CO (sub 2)), vent from the flanks of the mountain, and this gas is responsible for over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne and satellite based ***remote sensing*** data for the field area, collected using multi- and hyperspectral [NS001 (TMS), MASTER, ASTER and AVIRIS] sensors, are evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Two seasons (1998 and 2003) of field spectral measurements have been incorporated into the ***remote sensing*** evaluation to establish the reflectance characteristics of the field area, allow for error evaluation, and provide ground truth measurements for improving the quality of the ***remote sensing*** analyses. The results of the temporal ***remote sensing*** assessment, combined using geographic information systems, are highlighting relationships between surface geology and areas of tree mortality and delineating the migration of tree kills since 1989. These evaluations improve our understanding of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-029575

14. Database GeoRef

Title **The mechanics of unrest at *Long Valley* Caldera, California; 1, Modeling the geometry of the source using GPS, leveling and two-color EDM data**

Author Battaglia, M; Segall, P; Murray, J; Cervelli, P; Langbein, John O

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.195-217, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We surveyed 44 existing leveling monuments in ***Long Valley*** caldera in July 1999, using dual frequency global positioning system (GPS) receivers. We have been able to tie GPS and leveling to a common reference frame in the ***Long Valley*** area and computed the vertical deformation by differencing GPS-based and leveled orthometric heights. The resurgent dome uplifted 74+ or -7 cm from 1975 to 1999. To define the inflation source, we invert two-color EDM and uplift data from the 1985-1999 unrest period using spherical or ellipsoidal sources. We find that the ellipsoidal source satisfies both the vertical and horizontal deformation data, whereas the spherical point source cannot. According to our analysis of the 1985-1999 data, the main source of deformation is a prolate ellipsoid located beneath the resurgent dome at a depth of 5.9 km (95% bounds of 4.9-7.5 km). This body is vertically elongated, has an aspect ratio of 0.475 (95% bounds are 0.25-0.65) and a volume change of 0.086 km (super 3) (95% bounds are 0.06-0.13 km (super 3)). Failure to account for the ellipsoidal nature of the source biases the estimated source depth by 2.1 km (35%), and the source volume by 0.038 km (super 3) (44%).

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016378

15. Database GeoRef

Title **The mechanics of unrest at *Long Valley* Caldera, California; 2, Constraining the nature of the source using geodetic and micro-gravity data**

Author Battaglia, M; Segall, P; Roberts, C

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.219-245, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We model the source of inflation of ***Long Valley*** caldera by combining geodetic and micro-gravity data. Uplift from GPS and leveling, two-color EDM measurements, and residual gravity change determinations are used to estimate the intrusion geometry, assuming a vertical prolate ellipsoidal source. The U.S. Geological Survey occupied the ***Long Valley*** gravity network six times from 1980 to 1985. We reoccupied this network twice, in the summer of 1998 (33 stations), and the summer of 1999 (37 stations). Before gravity data can be used to estimate the density of the intrusion, they must be corrected for the effect of vertical deformation (the free-air effect) and changes in the water table. We use geostatistical techniques to interpolate uplift and water table changes at the gravity stations. The inflation source (a vertical prolate ellipsoid) is located 5.9 km beneath the resurgent dome with an aspect ratio equal to 0.475, a volume change from 1982 to 1999 of 0.136 km (super 3) and a density of around 1700 kg/m (super 3) . A bootstrap method was employed to estimate 95% confidence bounds for the parameters of the inflation model. We obtained a range of 0.105-0.187 km (super 3) for the volume change, and 1180-2330 kg/m (super 3) for the density. Our results do not support hydrothermal fluid intrusion as the primary cause of unrest, and confirm the intrusion of silicic magma beneath ***Long Valley*** caldera. Failure to account for the ellipsoidal nature of the source biases the estimated source depth by 2.9 km (a 33% increase), the volume change by 0.019 km (super 3) (a 14% increase) and the density by about 1200 kg/m (super 3) (a 40% increase).

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016379

16. Database GeoRef

Title **Deformation of the *Long Valley* Caldera, California; inferences from measurements from 1988 to 2001**

Author Langbein, John O

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.247-267, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Two periods of volcanic unrest occurred between 1989 and 1998 in the ***Long Valley*** Caldera, eastern California. Numerous earthquakes were recorded, and these periods of unrest were documented with high-precision geodetic measurements. The first round of unrest started rapidly in late 1989 and slowly decreased in rate through the early 1990s. For this interval there are both leveling and two-color electronic distance meter (EDM) measurements. The second round of unrest started slowly in mid-1997, climaxed in late 1997, and rapidly returned to quiescence by mid-1998. Deformation was recorded by both the two-color EDM and continuous GPS. Both episodes require inflation at 6-7 km beneath the resurgent dome, and both episodes had roughly 0.1 m extension across the resurgent dome. In addition, the data presented here suggest that there is a deeper, 10-20 km, inflation source beneath the south moat of the caldera. For both episodes, the better-resolved inflation beneath the resurgent dome is a near-vertical, prolate spheroid rather than an isotropic source, which suggests that magma came up through vertical cracks. However, the modeling suggests that the location changed with the depth from 6.0 to 6.7 km for the later episode. In contrast to the earlier episode, the 1997-1998 episode has additional deformation in the south moat, where the simplest model is that of a right-lateral slip on a steeply dipping plane that is defined by the location of earthquakes in the south moat. Models of the time-dependent behavior suggest that slip on this fault occurred from late November through December 1997, corresponding to the time of greatest moment release by the earthquake swarm in the south moat. Confounding the interpretation of these data is an active geothermal field near the center of the EDM network and adjacent to the south moat and resurgent dome. Additional modeling of leveling and EDM data within the geothermal field during a period of low rate of inflation of the dome suggests some methods of adjustments to the EDM data during the inflation episodes.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016380

17. Database GeoRef

Title ***Remote sensing* evaluation of Mammoth Mountain, California; mapping spatial and temporal variations in volcanogenic CO (sub 2) induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Sacramento, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 99th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.4, pp.7, Apr 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain Volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold carbon dioxide (CO (sub 2)), believed to be volcanogenic in nature, are being emitted from the flanks of the mountain. The emitted CO (sub 2) is interpreted to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne ***remote sensing*** data for the field area, collected using multi- and hyperspectral (NS001 (TMS), MASTER, ASTER and AVIRIS) sensors, are being evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Field spectral measurements have been incorporated into the ***remote sensing*** evaluation to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the ***remote sensing*** analyses. The results of the temporal ***remote sensing*** assessment have been integrated into a geographic information system with a detailed geologic map of the field area to highlight relationships between surface geology and areas of tree mortality. These evaluations will assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-010631

18. Database GeoRef

Title **Inferring volcanic activity and subsurface conditions at Mammoth Mountain, California by mapping remotely sensed spatial and temporal variations in CO (sub 2) -induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Geology Department, Sacramento, CA, United States (USA)

Monograph Title Geological Society of America, 2002 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.551, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract High Concentrations of cold Carbon dioxide (CO (sub 2)) emitted from the flanks of Mammoth Mountain volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera, eastern California, are believed to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. To evaluate volcanic activity and interpret subsurface conditions at Mammoth Mountain, this study maps the spatial and temporal variations in the distribution of magmatic CO (sub 2) -induced tree kills using ***remote sensing*** technology. Digital mapping of the time-varied CO (sub 2) -induced tree kills incorporates available multi-and hyper -spectral image sets from NASA, including: AVIRIS, TIMS, NS001 (TM Simulator), and MASTER data for the study area. Spectral measurements have been made in the field to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the ***remote sensing*** analyses. Developing an understanding of the temporal migration of CO (sub 2) emission-induced tree kills may assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-019340

19. Database GeoRef

Title **New insights into the structural, hydrothermal, and biological systems of the *Long Valley* Caldera using hyperspectral imaging**

Author Martini, Brigette Ann

Pages 291

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Santa Cruz, Santa Cruz, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2004-002915

20. Database GeoRef

Title **Hyperspectral *remote sensing* in *Long Valley* Caldera; issues of scale, resolution, and signal to noise**

Author Martini, Brigette A; Silver, Eli A; Potts, Donald C

Affiliation University of California at Santa Cruz, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Monograph Title Proceedings of the Tenth JPL airborne earth science workshop

Editor Green, Robert O.

Affiliation California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA, United States (USA)

Source JPL Publication, Report: 02-1, pp.275-282, Dec 2001

Report Number 02-1

Publisher California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA, United States (USA)

Publication Year 2001

Publication Type Serial; Report; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 2002-049024

21. Database GeoRef

Title **Finite source modelling of magmatic unrest in Socorro, New Mexico, and *Long Valley*, California**

Author Fialko, Yuri; Simons, Mark; Khazan, Yakov

Affiliation California Institute of Technology, Seismological Laboratory, Pasadena, CA, United States (USA)

Affiliation Institute of Geophysics, Ukraine (UKR)

Source Geophysical Journal International, vol.146, no.1, pp.191-200, Jul 2001

Resource Location http://www.blackwellpublishing.com/ journal.asp?ref=0956-540X

Publisher Blackwell Science for the Royal Astronomical Society, the Deutsche Geophysikalische Gesellschaft and the European Geophysical Society, International (III)

Publication Year 2001

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2001-058284

22. Database GeoRef

Title **Geobotanical *remote sensing* for geothermal exploration**

Author Pickles, William L; Kasameyer, Paul W; Martini, Brigette A; Potts, Donald C; Silver, Eli A

Affiliation Comision Federal de Electricidad, Mexico (MEX)

Monograph Title Geothermal energy for the Americas; Geothermal Resources Council 2001 annual meeting

Author Garg, Sabodh K (chairperson); Hiriart, Gerardo (chairperson)

Affiliation SAIC, USA, (United States)

Source Transactions - Geothermal Resources Council, vol. 25, pp.307-312, 2001

Publisher GRC - Geothermal Resources Council, Davis, CA, United States (USA)

Abstract This paper presents a plan for increasing the mapped resource base for geothermal exploration in the Western US. We plan to image large areas in the western US with recently developed high resolution hyperspectral geobotanical ***remote sensing*** tools. The proposed imaging systems have the ability to map visible faults, surface effluents, historical signatures, and discover subtle hidden faults and hidden thermal systems. Large regions can be imaged at reasonable costs. The technique of geobotanical ***remote sensing*** for geothermal signatures is based on recent successes in mapping faults and effluents the ***Long Valley*** Caldera and Mammoth Mountain in California.

Publication Year 2001

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 2003-081407

23. Database GeoRef

Title **Analysis of geodetic measurements of crustal deformation at *Long Valley* Caldera**

Author Simons, M; Fialko, Yuri; Rivera, L; Chapin, E; Hensley, S; Rosen, P A; Shaffer, S; Webb, F H; Langbein, J

Affiliation California Institute of Technology, Seismology Laboratory, Pasadena, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-073905

24. Database GeoRef

Title **Hyperspectral *remote sensing* for research and monitoring in active volcanic regions; *Long Valley* Caldera, CA**

Author Martini, Brigette A; Silver, Eli A; Potts, Donald C; Pickles, William L

Affiliation University of California at Santa Cruz, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-074123

25. Database GeoRef

Title **Resistivity imaging of *Long Valley* Caldera; first results from a DC-geoelectrical deep sounding experiment 2000**

Author Schuetze, Claudia; Brunner, Ingolf; Flechsig, Christina; Kulenkampff, Johannes; Jacobs, Franz; Serfling, Ulrich

Affiliation University of Leipzig, Leipzig, Federal Republic of Germany (DEU)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-074126

26. Database GeoRef

Title **Using airborne laser altimetry to detect topographic change at *Long Valley* Caldera, California**

Author Hofton, M A; Minster, J B; Ridgway, J R; Williams, N P; Blair, J B; Rabine, D L; Bufton, J L

Affiliation Scripps Institution of Oceanography, Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation California Institute of Technology, United States (USA); Arizona State University, United States (USA); NASA, Goddard Space Flight Center, United States (USA)

Monograph Title ***Remote sensing*** of active volcanism

Editor Mouginis -Mark, Peter J; Crisp, Joy A; Fink, Jonathan H

Affiliation University of Hawaii, Hawaii Institute of Geophysics and Planetology, Honolulu, HI, United States (USA)

Source Geophysical Monograph, vol.116, pp.249-264, 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2001-007394

27. Database GeoRef

Title **Geological and geobotanical studies of *Long Valley* Caldera, CA, USA utilizing new 5 m hyperspectral imagery**

Author Martini, B A; Silver, E A; Potts, D C; Pickles, W L

Affiliation University of California at Santa Cruz, Earth Science Department, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title IGARSS 2000; IEEE 2000 international geoscience and ***remote sensing*** symposium; Taking the pulse of the planet; the role of ***remote sensing*** in managing the environment; proceedings

Editor Stein, Tammy I.

Source International Geoscience and Remote Sensing Symposium, vol.2000, Vol. 4, pp.1376-1378, 2000

Publisher Institute of Electrical and Electronics Engineers, New York, NY, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 2001-073594

28. Database GeoRef

Title **Geological and geobotanical insights into the hydrothermal, structural, and magmatic systems of a restless caldera using three meter HyMap imagery; *Long Valley* Caldera, California, USA**

Author Martini, B A; Silver, E A; Potts, D C; Pickles, W L

Affiliation University of California at Santa Cruz, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title Proceedings of the Fourteenth international conference on Applied geologic ***remote sensing***

Author Anonymous

Corporate Author Veridan ERIM International, Ann Arbor, MI, United States, sponsor (USA)

Source Proceedings of the ... International Conference on Applied Geologic Remote Sensing, vol.14, pp.28 -35, 2000

Publisher Veridian ERIM International, Ann Arbor, MI, United States (USA)

Abstract Ground studies of the restless ***Long Valley*** caldera under the aegis of volcanic hazard monitoring for the past 25 years, have provided a wealth of geophysical and geochemical data culminating in new hydrothermal and structural models. However, limited ***remote sensing*** has been attempted at this caldera. Our group is applying spectroscopic mapping with traditional geological data to refine current geological models and maps, to assess the strengths and limitations of using biological phenomena to model and map geological processes and structures, and to prepare baseline datasets for volcano monitoring efforts via space -borne instruments. On September 7, 1999, imagery of the caldera was flown using Integrated Spectronic's HyMap hyperspectral imager. These images are being analyzed to gain a better understanding of the hydrothermal system and to refine present flow models. This includes delineating zones of discharge and their general geochemistry and temperatures as resolved by hydrothermal mineral assemblage mapping. We present an example of structural mapping in the western caldera which elucidates how this region of crust is accommodating such perturbations as magma chambers, dike intrusions, and regional stress as well as aspects of the transport of hydrothermal fluids, gasses, and magma along such structures. We also present data on the sizes and locations of the CO (sub 2) - induced tree-kills at Mammoth Mt., specifically near Horseshoe Lake.

Publication Year 2000

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 2001-079541

29. Database GeoRef

Title **Analysis of geodetic measurements of crustal deformation at *Long Valley* Caldera**

Author Simons, Mark; Fialko, Yuri; Chapin, Elaine; Hensley, Scott; Rosen, Paul A; Shaffer, Scott; Webb, Frank

Affiliation California Institute of Technology, Seismological Laboratory, Pasadena, CA, United States (USA)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1194, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2001-061451

30. Database GeoRef

Title **Seismicity and strain in the Sierra Nevada south of *Long Valley* Caldera**

Author Owen, Susan E; Mills, Suzanne; Higbee, Peter; Buergmann, Roland

Affiliation University of Southern California, Earth Sciences Department, Los Angeles, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.960, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2002-021329

31. Database GeoRef

Title **Geological and geobotanical studies of *Long Valley* Caldera and Mammoth Mountain, CA utilizing new high resolution hyperspectral imagery**

Author Martini, Brigette A; Silver, Eli A; Pickles, William L; Potts, Donald C

Affiliation University of California, Department of Earth Sciences, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title AGU 1999 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1091, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-018715

32. Database GeoRef

Title **Results of the geothermal geobotany hyperspectral imaging program**

Author Martini, Brigette A; Cochran, S A; Potts, D C; Silver, E A; Pickles, William L

Affiliation University of California at Santa Cruz, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title Federal geothermal geoscience research, fiscal year 1998

Author Reed, Marshall (prefacer)

Affiliation U. S. Department of Energy, Office of Geothermal Technologies, Washington, DC, United States (USA)

Source DOE/ID Report, Report: DOE/ID 10732, pp.2.25 -2.29, May 1999

Report Number DOE/ID 10732

Publisher U. S. Department of Energy, Office of Fossil Energy, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Report; Analytic

Country of Publication United States (USA)

Accession Number 2008-095919

33. Database GeoRef

Title **Geobotanical characterization of a geothermal system using hyperspectral imagery; *Long Valley* Caldera, CA, USA**

Author Martini, B A; Cochran, S A; Potts, D C; Silver, E A; Pickles, W L; Carter, M R; Priest, R E; Wayne, B M; White, W T, III

Affiliation University of California at Santa Cruz, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title Proceedings of the thirteenth international conference; Applied geologic ***remote sensing***

Author Anonymous

Source Proceedings of the Thematic Conference on Geologic Remote Sensing, vol.13, no.1, pp.337-341, 1999

Publisher Environmental Research Institute of Michigan, Ann Arbor, MI, United States (USA)

Abstract We have analyzed hyperspectral Airborne Visible-Infrared Imaging System (AVIRIS) imagery taken in September of 1992 in ***Long Valley*** Caldera, CA, a geothermally active region expressed surficially by hot springs and fumaroles. Geological and vegetation mapping are attempted through spectral classification of imagery. Particular hot spring areas in the caldera are targeted for analysis. The data is analyzed for unique geobotanical patterns in the vicinity of hot springs as well as gross identification of dominant plant and mineral species. Spectra used for the classifications come from a vegetation spectral library created for plant species found to be associated with geothermal processes. This library takes into account the seasonality of vegetation by including spectra for species on a monthly basis. Geological spectra are taken from JPL and USGS mineral libraries. Preliminary classifications of hot spring areas indicate some success in mineral identification and less successful vegetation species identification. The small spatial extent of individual plants demands either subpixel analysis or increased spatial resolution of imagery. Future work will also include preliminary analysis of a hyperspectral thermal imagery dataset and a multitemporal air photo dataset. The combination of these remotely sensed datasets for ***Long Valley*** will yield a valuable product for geothermal exploration efforts in other regions.

Publication Year 1999

Publication Type Serial; Conference document; Analytic

Country of Publication United States (USA)

Accession Number 1999-051306

34. Database GeoRef

Title **Characterization of a hydrothermal system geologically and geobotanically using hyperspectral imagery; *Long Valley* Caldera, California, USA**

Author Martini, Brigette A; Cochran, Susan A; Silver, Eli A; Pickles, William L; Potts, Donald C

Affiliation University of California at Santa Cruz, Department of Ocean Sciences, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Monograph Title AGU 1998 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.964, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-024867

35. Database GeoRef

Title **Monitoring of volcanogenic CO (sub 2) -induced tree kills with AVIRIS image data at Mammoth Mountain, California**

Author Strong, Mel; Hausback, Brian P; Farrar, Chris D; Pieri, David

Affiliation California State University, Geology Department, Sacramento, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); California Institute of Technology, United States (USA)

Monograph Title Geological Society of America, Cordilleran section, 94th annual meeting [modified]

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.30, no.5, pp.67, Mar 1998

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2002-044889

36. Database GeoRef

Title **Imaging spectrometry for monitoring tree damage caused by volcanic activity in the *Long Valley* Caldera, California**

Author de Jong, Steven M

Affiliation Utrecht University, Department of Physical Geography, Utrecht, Netherlands (NLD)

Source ITC Journal = Bulletin de l'ITC, vol.1998, no.1, pp.1-10, 1998

Publisher International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands (NLD)

Publication Year 1998

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 1999-018308

37. Database GeoRef

Title **Using airborne laser altimetry to detect topographic change of *Long Valley* Caldera, CA**

Author Hofton, M A; Minster, J B; Ridgway, J R; Williams, N P; Blair, J B; Bufton, J L; Rabine, D L

Affiliation Scripps Institution of Oceanography, Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation NASA, Goddard Space Flight Center, United States (USA)

Monograph Title AGU 1997 fall meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.799, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1999-001401

38. Database GeoRef

Title ***Remote sensing* of volcano deformation by radar interferometry from various satellites**

Author Massonnet, D; Sigmundsson, F; Vadon, H

Affiliation Centre National d'Etudes Spatiales, Toulouse, France (FRA)

Affiliation Univ. Iceland, Iceland (ISL)

Monograph Title AGU 1997 fall meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.817, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1999-001518

39. Database GeoRef

Title **A model depth of 11 km for a single Mogi source for the inflation of *Long Valley* Caldera from 1992.5-1995.75 using InSAR**

Author Webb, Frank H; Simons, Mark; Hensley, Scott; Rosen, Paul A; Chapin, Elaine; Shaffer, Scott

Affiliation California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA, United States (USA)

Monograph Title AGU 1997 fall meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.818, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1999-001524

40. Database GeoRef

Title **Airborne laser altimeter survey of *Long Valley*, California**

Author Ridgway, J R; Minster, J B; Williams, N; Bufton, J L; Krabill, W B

Affiliation Scripps Institution of Oceanography, La Jolla, CA, United States (USA)

Affiliation NASA, United States (USA)

Source Geophysical Journal International, vol.131, no.2, pp.267-280, Nov 1997

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Abstract Airborne laser altimetry has proved useful in recent years in examining volcanic landforms and glacial ice sheets. With the advent of accurate differential GPS aircraft tracking, we believe that airborne lasers will also prove useful in monitoring time-varying topographic uplift, with rates as low as several centimetres of vertical motion per year. The ***Long Valley***, California, caldera provides an excellent testing ground for this new technology. The region has a history of extensive volcanism, and its central dome has recently been

undergoing resurgent uplift of up to 4 cm per year. In September 1993 we conducted three aircraft topographic surveys over the caldera and resurgent dome, utilizing a NASA T39 jet aircraft outfitted with a nadir-profiling altimetric laser (ATLAS), two P- code GPS receivers, a Litton LTN92 inertial unit for attitude, and aerial cameras. In addition, we operated two base-station GPS receivers for post-flight differential navigation and conducted a kinematic automobile survey of roads crossing the dome. The aircraft flew at a mean altitude of 500 m above ground, and at speeds of 80-100 m s (super -1) . The laser had a divergence of 1.7 mrad,
and output 50 pulses per second, yielding footprints of 0.9 m diameter separated by about 2 m along track. Precision flying yielded multiple profiles along nearly identical paths, including crossing profiles over the resurgent dome, off the dome, and along a nearby highway. The surveys included daily flights over Mono Lake for roll and pitch bias calibrations, and over the well-surveyed Lake Crowley to provide an independent check of estimated elevations. Much progress has been made in developing analysis procedures for the laser timing and attitude corrections. Crossover points from repeated profiles over the dome and the lake indicate that although some profiles contain relative bias errors of up to 10 cm, most are substantially more accurate. The accuracy of the measurements will increase as the various sources of error are better defined and dealt with. Even with the present analysis level,
the distribution of crossovers near the centre of the dome is roughly Gaussian, with a mean of 2.6 cm and a standard deviation of 11 cm. The standard error of the mean is low (1 cm), due to the high number of crossover points, which holds promise for measuring systematic changes in the dome height from year to year. Also, comparison of laser heights of Lake Crowley to tidal gauge heights yields only a 1-4 cm difference in absolute height. These encouraging results serve to confirm further the concept of using aircraft laser surveys for geodetic tectonic monitoring.

Publication Year 1997

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 1998-009295

41. Database GeoRef

Title **Crustal deformation of *Long Valley* Caldera, eastern California, 1992-1996, inferred from satellite radar interferometry**

Author Thatcher, Wayne; Massonnet, Didier

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Centre National d'Etudes Spatiales, France (FRA)

Source Geophysical Research Letters, vol. 24, no. 20, pp.2519-2522, 15 Oct 1997

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Satellite radar interferometric images of ***Long Valley*** caldera show a pattern of surface deformation that resembles that expected from analysis of an extensive suite of ground-based geodetic data. Images from 2 and 4 year intervals respectively, are consistent with uniform movement rates determined from leveling surveys. Synthetic interferograms generated from ellipsoidal-inclusion source models based on inversion of the ground-based data show generally good agreement with the observed images. Two interferograms show evidence for a magmatic source southwest of the caldera in a region not covered by ground measurements. Poorer image quality in the 4 year interferogram indicates that temporal decorrelation of surface radar reflectors is progressively degrading the fringe pattern in the ***Long Valley*** region. Copyright 1997 by the American Geophysical Union.

Publication Year 1997

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1999-069136

43. Database GeoRef

Title **Using airborne laser altimetry to detect topographic change in *Long Valley* Caldera, CA, 1993-1995**

Author Hofton, M A; Minster, J B; Ridgway, J R; Williams, N P; Bufton, J L; Blair, J B; Rabine, D L

Affiliation Scripps Institution of Oceanography, Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation NASA/GSFC, United States (USA)

Monograph Title AGU 1996 fall meeting [modified]

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.139, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Descriptors airborne methods; altimetry; calderas; California; geodesy; geologic hazards; Global Positioning System; laser methods ; ***Long Valley*** Caldera; monitoring; Mono County California; RASCAL; ***remote sensing***; SLICER; terrains; topography; United States; volcanic features

Accession Number 1998-030501

44. Database GeoRef

Title **Satellite radar interferometic constraints on rate and extent of deformation at *Long Valley* Caldera, California, 1992-1995**

Author Thatcher, Wayne; Massonnet, Didier; Vadon, Helene; Langbein, John H; Hill, David P; Dzurisin, Dan

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Centre National d'Etudes Spatiales, France (FRA)

Monograph Title American Geophysical Union 1996 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.F50, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1999-018120

45. Database GeoRef

Title **Observations of crustal deformation in *Long Valley*, CA using interferometric synthetic aperature radar**

Author Simons, Mark; Hensley, Scott; Murakami, Makoto; Rosen, Paul A; Tobita, Mikio; Webb, Frank H

Affiliation California Institute of Technology, Pasadena, CA, United States (USA)

Affiliation Jet Propulsion Laboratory, United States (USA); Geographical Survey Institute, Japan (JPN)

Monograph Title AGU 1996 spring meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.17, Suppl., pp.262, 23 Apr 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1998-074525

46. Database GeoRef

Title **Repeat airborne topographic survey of *Long Valley*, CA, using scanning laser altimeters**

Author Hofton, M A; Ridgway, J R; Minster, J B; Williams, N D; Bufton, J L; Blair, J B; Rabine, D L

Affiliation Scripps Institution of Oceanography, La Jolla, CA, United States (USA)

Affiliation NASA/Goddard Space Flight Center, United States (USA)

Monograph Title AGU 1996 spring meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.17, Suppl., pp.262, 23 Apr 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1998-074526

47. Database GeoRef

Title **Inflation of *Long Valley* Caldera from one year of continuous GPS observations**

Author Webb, Frank H; Bursik, Marcus; Dixon, Timothy; Farina, Frederic; Marshall, Grant; Stein, Ross S

Affiliation California Institute of Technology, Jeb Propulsion Laboratory, Pasadena, CA, United States (USA)

Affiliation State University of New York at Buffalo, United States (USA); Rosenstiel School of Marine and Atmospheric Science, United States (USA); U. S. Geological Survey, United States (USA)

Source Geophysical Research Letters, vol. 22, no. 3, pp.195-198, 01 Feb 1995

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A permanent Global Positioning System receiver at Casa Diablo Hot Springs, ***Long Valley*** Caldera, California was installed in January, 1993, and has operated almost continuously since then. The data have been transmitted daily to the Jet Propulsion Laboratory for routine analysis with data from the Fiducial Laboratories for an International Natural sciences Network (FLINN) by the JPL FLINN analysis center. Results from these analyses have been used to interpret the on going deformation at ***Long Valley***, with data excluded from periods when the antenna was covered under 2.5 meters of snow and from some periods when Anti Spoofing was enforced on the GPS signal. The remaining time series suggests that uplift of the resurgent dome of ***Long Valley*** Caldera during 1993 has been 2.5 + or - 1.1 cm/yr and horizontal motion has been 3.0 + or - 0.7 cm/yr at S53W in a no-net-rotation global reference frame, or 1.5 + or - 0.7 cm/yr at S14W relative to the Sierra Nevada block. These rates are consistent with uplift predicted from frequent horizontal strain measurements. Spectral analysis of the observations suggests that tidal forcing of the magma chamber is not a source of the variability in the 3 dimensional station location. These results suggest that remotely operated, continuously recording GPS receivers could prove to be a reliable tool for volcano monitoring throughout the world. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 1995-033007

48. Database GeoRef

Title **Aerial infrared surveys in the investigation of geothermal and volcanic heat sources**

Corporate Author U. S. Geological Survey, United States (USA)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0079-95, 4 pp., 1995

Report Number FS 0079-95

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Fact Sheet 079-95 briefly summarizes and clarifies the application of aerial infrared surveys in geophysical exploration for geothermal energy sources and environmental monitoring for potential volcanic hazards.

Pages 4

Publication Year 1995

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 1995-038540

49. Database GeoRef

Title **Understanding volcanic inflation of *Long Valley* Caldera, California, from differential synthetic aperture radar observations**

Author Webb, F H; Hensley, S; Rosen, P; Langbein, J

Affiliation California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 1994 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.166, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 1996-033992

50. Database GeoRef

Title **Monitoring active volcanoes in near-real time with GPS**

Author Mao, Ailin; Dixon, Timothy H; Farina, Fred; Webb, Frank; Bursik, Marcus; Stein, Ross S; Marshall, Grant

Affiliation Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Affiliation Jet Propulsion Laboratory, United States (USA); State University of New York, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title AGU 1994 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.164, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-037736

51. Database GeoRef

Title **GPS, VLBI and SLR measurements bearing on surface deformation of the Resurgent Dome, *Long Valley* Caldera, California**

Author Dixon, T H; Robaudo, Stefano

Affiliation Rosenstiel School of Marine and Atmospheric Sciences, Miami, FL, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.16, Suppl., pp.106, May 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2007-076520

52. Database GeoRef

Title **Constraints on deformation of the resurgent dome, *Long Valley* Caldera, California from space geodesy**

Author Dixon, Timothy H; Bursik, Marcus; Wolf, Susan Kornreich; Heflin, Michael; Webb, Frank; Farina, Frederic; Robaudo, Stefano

Affiliation University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Affiliation State University of New York, United States (USA); California Institute of Technology, United States (USA)

Affiliation NASA/Goddard Space Flight Center, Greenbelt, MD, United States (USA)

Source Geodynamics Series, vol.23, pp.193-214, 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-017720

53. Database GeoRef

Title **The USGS side-looking airborne radar (SLAR) program; CD-ROMs expand potential for petroleum exploration**

Author Kover, Allan N; Schoonmaker, James W, Jr; Pohn, Howard A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Author Anonymous

Source AAPG Bulletin, vol.75, no.3, pp.613, Mar 1991

Resource Location http://www.aapg.org/datasystems/bullsrch.html

Publisher American Association of Petroleum Geologists, Tulsa, OK, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-059538

54. Database GeoRef

Title **Ash-flow zones of the Bishop Tuff mapped with Landsat satellite data**

Author Levine, Alan H; Sheridan, Michael F

Affiliation Ariz. State Univ., Dep. Geol., Tempe, AZ, United States (USA)

Author Zoback, Mary Lou (chairperson); Rowland, Stephen M (chairperson)

Source Abstracts with Programs - Geological Society of America, vol.22, no.3, pp.37, Mar 1990

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-062754

55. Database GeoRef

Title **Comparative anatomy of ring-fractured calderas deduced from satellite imagery**

Author Muraoka, Hirofumi

Affiliation University of Auckland, Department of Geology, Auckland, New Zealand (NZL)

Author Smith, I E M (convener)

Source Geological Society of New Zealand Miscellaneous Publication, vol. 43, pp.69, 1989

Publisher Geological Society of New Zealand, Christchurch, New Zealand (NZL)

Publication Year 1989

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-032315

56. Database GeoRef

Title **Observing volcanic features with thermal infrared scanners**

Author Kahle, Anne B; Pieri, David C

Affiliation California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA, United States (USA)

Author Lehmann, Jules (chairperson)

Affiliation National Aeronautics and Space Administration, Washington, DC, United States (USA)

Source Airborne Science Workshop, vol.2, pp.79-81, 1987

Publisher Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2005-001917

57. Database GeoRef

Title **Thermal and rheological inferences of lava flows from *remote* observations**

Author Pieri, David C; Baloga, Stephen M; Kahle, Anne B

Affiliation Calif. Inst. Technol., Jet Propul. Lab., Pasadena, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1074, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-034185

58. Database GeoRef

Title **Localized measurements of geothermally enhanced heat flow through *remote* infrared imaging**

Author Marley, Mark S

Affiliation Calif. Inst. Technol., Div. Geol. and Planet. Sci., Pasadena, CA, United States (USA)

Source NASA Technical Memorandum, vol.88784, pp.375-379, Jul 1986

Publisher National Aeronautics and Space Administration (NASA), Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-083462

59. Database GeoRef

Title **Seismic imaging in *Long Valley*, California**

Author Rundle, J B; Ellsworth, W L; Malin, P; McEvilly, T V; Smithson, S B; Henyey, T L

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.301, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-010685

60. **Database** GeoRef

Title **Airborne temperature survey maps of heat flow anomalies for exploration geology**

Author Kerr del Grande, Nancy

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Source Bulletin - Geothermal Resources Council, vol.14, no.3, pp.3-13, Mar 1985

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1985-054000

61. **Database** GeoRef

Title **Analysis of aeromagnetic anomalies; mapping of Curie isothermal surface at *Long Valley*, California**

Author Miyazaki, Yoshinori

Publication Year 1985

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1986-038429

62. **Database** GeoRef

Title **Monitoring hot springs and shallow groundwater in the *Long Valley* Caldera, California**

Author Sorey, M L; Farrar, C D

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.77, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054431

63. **Database** GeoRef

Title **Analysis of airborne magnetic anomalies; determination of Curie depth for geothermal reconnaissance; (a progress report)**

Author Miyazaki, Yoshinori; Lyon, Ronald J P

Affiliation Stanford Univ., Dep. Appl. Earth Sci., Stanford, CA, United States (USA)

Author Morris-Jones, Donald R (chairperson); Morgan, Ken M (chairperson)

Publisher Environ. Res. Inst. Mich., Ann Arbor, MI, United States (USA)

Publication Year 1982

Publication Type Book; Conference document; Analytic

Accession Number 1984-051974

64. **Database** GeoRef

Title **Airborne temperature survey maps of heat flow anomalies for exploration geology**

Author del Grande, Nancy Kerr

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Author Morris-Jones, Donald R (chairperson); Morgan, Ken M (chairperson)

Publisher Environ. Res. Inst. Mich., Ann Arbor, MI, United States (USA)

Publication Year 1982

Publication Type Book; Conference document; Analytic

Accession Number 1984-051975

65. Database GeoRef

Title **Application of *remote sensing* to geothermal prospecting**

Author Hodder, D T

Affiliation North American Rockwell, Space Division, Advanced Programs, Downey, CA, United States (USA)

Source Geothermics, vol.Special issue 2, no.Part 1, pp.368-380, 1970

Publisher Elsevier, Oxford -New York, International (III)

Publication Year 1970

Publication Type Serial; Conference document; Analytic

Accession Number 2007-069985

66. Database GeoRef

Title **The *Long Valley* Caldera GIS database**

Author Battaglia, Maurizio; Williams, M J; Venezky, D Y; Hill, D P; Langbein, J O; Farrar, C D; Howle, J F; Sneed, Michelle; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Source U. S. Geological Survey Digital Data Series, Report: DDS-0081, 1 disc, 2003

Resource Location http://pubs.usgs.gov/dds/dds-81/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract This database provides an overview of the studies being conducted by the ***Long Valley*** Observatory in eastern California from 1975 to 2001. The database includes geologic, monitoring, and topographic datasets related to ***Long Valley*** caldera.

Publication Year 2003

Publication Type Serial; Report; Monographic

Accession Number 2005-008519

67. Database GeoRef

Title **Real-time GPS at the *Long Valley* Caldera, California**

Author Endo, Elliot T; Iwatsubo, Eugene Y

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.320, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-048344

68. Database GeoRef

Title **Diffuse degassing of magmatic tree-killing CO (sub 2) , Mammoth Mountain, CA**

Author Rogie, J D; Chiodini, G; Sorey, M L; Kerrick, D M; Frondini, F; Evans, W C; Virgili, G

Affiliation Pennsylvania State University, Department of Geosciences, University Park, PA, United States (USA)

Affiliation Osservatorio Vesuviano, Italy (ITA); U. S. Geological Survey, United States (USA); Universita di Perugia, Italy (ITA)

Publisher Officine grafiche napoletane Francesco Giannini & Figli s.p.a., Naples, Italy (ITA)

Publication Year 1998

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2000-055538

69. Database GeoRef

Title **Shallow and peripheral volcanic sources of inflation revealed by modeling two-color geodimeter and leveling data from *Long Valley* Caldera, California,1988-1992**

Author Langbein, John; Dzurisin, Daniel; Marshall, Grant; Stein, Ross; Rundle, John

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Colorado at Boulder, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B7, pp.12,487-12,495, 10 Jul 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We refined the model for inflation of the ***Long Valley*** caldera near Mammoth Lakes, California, by combining both geodetic measurements of baseline length and elevation changes. Baseline length changes measured using a two-color geodimeter with submillimeter precision revealed that the resurgent dome started to reinflate in late 1989. Measurements between late 1989 and mid-1992 revealed nearly 13 cm of extension across the resurgent dome. Geodetic leveling surveys with approximately 2-mm precision made in late 1988 and in mid-1992 revealed a maximum of about 8 cm of uplift of the resurgent dome. Two ellipsoidal sources satisfy both the leveling and two-color measurements, whereas spherical point sources could not. The model's primary inflation source is located 5.5 km beneath the resurgent dome with the two horizontal axes being nearly equal in size and the vertical axis being 4 times the length of the horizontal axes. A second ellipsoidal source was added to improve the fit to the two-color measurements. This secondary source is located at a depth between 10 and 20 km beneath the south moat of the caldera and has the geometry of an elongated ellipsoid or pipe that dips down to the northeast. In addition, the leveling data suggest dike intrusion beneath Mammoth Mountain during the 1988-1992 interval, which is likely associated with an intense swarm of small earthquakes during the summer of 1989 at that location. Our analysis shows the dike intrusion to be the shallowest of the three sources with a depth range of 1-3 km below the surface to the top of the intrusion. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-053145

SEISMIC BIBLIOGRAPHY

1. Database GeoRef

Title **New (super 40) Ar/ (super 39) Ar ages reveal contemporaneous mafic and silicic eruptions during the past 160,000 years at Mammoth Mountain and *Long Valley* Caldera, California**

Author Mahood, Gail A; Ring, Joshua H; Manganelli, Simone; McWilliams, Michael O

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford, CA, United States (USA)

Source Geological Society of America Bulletin, vol. 122, no. 3-4, pp.396-407, Mar 2010

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract We undertook a (super 40) Ar/ (super 39) Ar study of young mafic and silicic lavas at Mammoth Mountain and the ***Long Valley*** caldera (east-central California) to better understand the frequency of these eruptions and the magmatic plumbing system that drives them. Our results show that most of Mammoth Mountain, a lava-dome complex straddling the southwestern topographic rim of the caldera, consists of trachydacite lavas erupted at ca. 68 ka. These ages and new 29- and 41 ka ages for trachydacite lavas in the northwest quadrant of the caldera indicate that these silicic lavas are considerably younger than previously thought. Mafic lavas vented widely in the western third of the caldera in the past 190,000 years, suggesting that this area has not been underlain by large bodies of silicic magma during this interval, as such magma would have prevented the rise of the denser basaltic magma. We identify four eruptive sequences over the past 190,000 years: the western moat sequence (approximately 190-160 ka), the Mammoth sequence (approximately 120-58 ka), the northwest caldera sequence (approximately 41-29 ka), and the Inyo chain sequence (approximately 9 ka-present). In each eruptive sequence mafic and silicic lavas erupted contemporaneously from spatially associated vents. This suggests that intrusion of alkali basalt into the shallow crust led to the silicic eruptions. If the ***seismic*** unrest and deformation of the past three decades is a result of basalt injected beneath Mammoth Mountain and perhaps the western third of the caldera, then there is the possibility of spatially associated small-volume silicic eruptions, which would typically be considerably more explosive. In the past 40,000 years, eruptions have occurred along a N-S linear trend less than 10 km wide, limiting the zone subject to volcanic hazards. Our data bear on Pleistocene glaciation in the region. Ages of 162+ or -2 ka and 99+ or -1 ka for bracketing mafic lava flows better constrain the age of the Casa Diablo till. Our results provide equivocal support for a suggested anticorrelation between volcanism and glaciation for the past 800,000 years in eastern California (Glazner et al., 1999).

Publication Year 2010

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2010-029009

2. Database GeoRef

Title **Constraints on continued episodic inflation at *Long Valley* Caldera, based on *seismic* and geodetic observations**

Author Feng, Lujia; Newman, Andrew V

Affiliation Georgia Institute of Technology, School of Earth and Atmospheric Sciences, Atlanta, GA, United States (USA)

Source Journal of Geophysical Research, vol. 114, no. B6, Citation B06403, 2009

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** Caldera, a large and potentially explosive silicic system, has experienced highly anomalous continued inflation since late 1970s. We characterize an episode of rapid episodic uplift occurring between 2002 and 2003 following similar episodes of 1979-1980, 1983, 1989-1990, and 1997-1998. This most recent episode was the first to be observed by a dense array of 13 continuous Global Positioning System (GPS) stations. Similar to previously observed episodes of deformation, uplift is quasi-radially symmetric and is mostly explained by a compact pressure source located approximately 3 km west of the resurgent dome. The maximum uplift during the 2002-2003 episode is approximately 35 + or - 8 mm, about 1/3 the magnitude but with a similar time-dependent behavior as the 1997-1998 episode. The horizontal source location is well constrained at -118.930 degrees , 37.678 degrees , for a small spherical source, and indistinguishable from the location of a vertically dipping prolate spheroidal source. A trade-off between depth and volume change is observed for both spherical and prolate models, with depth between 7.5 and 13.5 km and a volume change of 0.01-0.03 km (super 3) at 95% confidence. For prolate spheroidal models, depth and volume change are additionally affected by the source axis ratio (b/a), which is greater than 0.55. Though the background seismicity remained low during the 2002-2003 episode, we identified a significant spike in activity during the maximum rate of uplift, similar to observations in both the much larger episodes in 1989-1990, and 1997-1998. More interestingly, we additionally find that all three episodes begin immediately after a short period of ***seismic*** quiescence, with background seismicity falling to levels below background levels following the prior uplift event. With the dense GPS coverage, we also identify increased opening of the Mono-Inyo volcanic chain after the 2002-2003 episode suggesting potential interaction of magmatic fluids between the two systems.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2010-049289

5. Database ProQuest Deep Indexing: Earth Sciences

Title **Simulating coseismic deformation of quartz in the middle crust and fabric evolution during postseismic stress relaxation - An experimental study**

Author Trepmann, Claudia A; Stockhert, Bernhard; Dorner, Dorothee; Moghadam, Rasoul Hamidzadeh; Kuster, Martina; Roller, Klaus

Affiliation Institut fur Geologie, Mineralogie und Geophysik, Ruhr-Universitat Bochum, Germany, Collaborative Research Centre 526, Germany

Source Tectonophysics. Vol. 442, no. 1-4, pp. 83-104. 10 Sept. 2007

Abstract Non-steady state deformation and annealing experiments on vein quartz are designed to simulate earthquake-driven episodic deformation in the middle crust. Three types of experiments were carried out using a modified Griggs-type solid medium deformation apparatus. All three start with high stress deformation at a temperature of 400 deg C and a constant strain rate of 10-4s-1 (type A), some are followed by annealing in the stability field of *a-quartz for 14-15h at zero nominal differential stress and temperatures of 800-1000 deg C (type A+B), or by annealing for 15h at 900 deg C and at a residual stress (type A+C). The quartz samples reveal a very high strength > 2GPa at a few percent of permanent strain. The microstructures after short-term high stress deformation (type A) record localized brittle and plastic deformation. Statisc annealing (type A+B) results in recrystallisation restricted to the highly damaged zones. The new grains aligned in strings and without crystallographic preferred orientation, indicate nucleation and growth. Annealing at non-hydrostatic conditions (type A+C) results in shear zones that also develop from deformation bands or cracks that formed during the preceding high stress deformation. In this case, however, the recrystallised zone is several grain diameters wide, the grains are elongate, and a marked crystallographic preferred orientation indicates flow by dislocation creep with dynamic recrystallisation. Quartz microstructures identical to those produced in type A+B experiments are observed in cores recovered from ***Long Valley*** Exploratory Well in the Quaternary ***Long Valley*** Caldera, California, with considerable ***seismic*** activity. The experiments demonstrate the behaviour of quartz at coseismic loading (type A) and subsequent static annealing (type A+B) or creep at decaying stress (type A+C) in the middle crust. The experimentally produced microfabrics allow to identify similar processes and conditions in exhumed rocks.

Publisher Elsevier Science Ltd , Oxford Fulfillment Centre, P.O. Box 800, Kidlington, Oxford, OX5 1DX, UK, http://www.elsevier.com

Publication Type Journal Article

Publication Year 2007

Accession Number 200711-26-278721 (CE)

6. Database GeoRef

Title **Simulating coseismic deformation of quartz in the middle crust and fabric evolution during postseismic stress relaxation; an experimental study**

Author Trepmann, Claudia A; Stoeckhert, Bernhard; Doerner, Dorothee; Moghadam, Rasoul Hamidzadeh; Kuester, Martina; Roer, Klaus

Affiliation Ruhr-Universitaet Bochum, Institut fuer Geologie, Mineralogie und Geophysik, DEU, (Federal Republic of Germany)

Affiliation National Institute for Materials Science, Japan (JPN)

Source Tectonophysics, vol. 442, no. 1-4, pp.83-104, 10 Sep 2007

Resource Location http://www.sciencedirect.com/science/journal/00401951

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Non-steady state deformation and annealing experiments on vein quartz are designed to simulate earthquake-driven episodic deformation in the middle crust. Three types of experiments were carried out using a modified Griggs-type solid medium deformation apparatus. All three start with high stress deformation at a temperature of 400 degrees C and a constant strain rate of 10 (super -4) s (super -1) (type A), some are followed by annealing in the stability field of alpha-quartz for 14-15 h at zero nominal differential stress and temperatures of 800-1000 degrees C (type A+B), or by annealing for 15 h at 900 degrees C and at a residual stress (type A+C). The quartz samples reveal a very high strength >2 GPa at a few percent of permanent strain. The microstructures after short-term high stress deformation (type A) record localized brittle and plastic deformation. Static annealing (type A+B) results in recrystallisation restricted to the highly damaged zones. The new grains aligned in strings and without crystallographic preferred orientation, indicate nucleation and growth. Annealing at non-hydrostatic conditions (type A+C) results in shear zones that also develop from deformation bands or cracks that formed during the preceding high stress deformation. In this case, however, the recrystallised zone is several grain diameters wide, the grains are elongate, and a marked crystallographic preferred orientation indicates flow by dislocation creep with dynamic recrystallisation. Quartz microstructures identical to those produced in type A+B experiments are observed in cores recovered from ***Long Valley*** Exploratory Well in the Quaternary ***Long Valley*** Caldera, California, with considerable ***seismic*** activity. The experiments demonstrate the behaviour of quartz at coseismic loading (type A) and subsequent static annealing (type A+B) or creep at decaying stress (type A+C) in the middle crust. The experimentally produced microfabrics allow to identify similar processes and conditions in exhumed rocks.

Publication Year 2007

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2008-073122

9. Database GeoRef

Title **Exotic *seismic* sources; nearly identically repeating events and non-double-couple earthquakes**

Author Templeton, Dennise Christine

Pages 171

Publication Year 2007

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Berkeley, Berkeley, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2008-103584

10. Database GeoRef

Title ***Long*-range triggered earthquakes that continue after the wave train passes**

Author Brodsky, Emily E

Affiliation University of California Santa Cruz, Department of Earth Sciences, Santa Cruz, CA, United States (USA)

Source Geophysical Research Letters, vol.33, no.15, 5 pp., L15313, 16 Aug 2006

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 5, L15313

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2007-038572

11. Database GeoRef

Title **Monitoring super-volcanoes; geophysical and geochemical signals at Yellowstone and other large caldera systems**

Author Lowenstern, Jacob B; Smith, Robert B; Hill, David P

Affiliation U. S. Geological Survey, Volcano Hazards Team, Menlo Park, CA, United States (USA)

Affiliation University of Utah, United States (USA)

Monograph Title Extreme natural hazards

Editor Thompson, J Michael T; Heppert, H E; Sparks, R Stephen J

Source Philosophical Transactions - Royal Society. Mathematical, Physical and Engineering Sciences, vol.364, no.1845, pp.2055-2072, 15 Aug 2006

Resource Location http://www.pubs.royalsoc.ac.uk/philtransa.shtml

Publisher Royal Society of London, London, United Kingdom (GBR)

Abstract Earth's largest calderas form as the ground collapses during immense volcanic eruptions, when hundreds to thousands of cubic kilometres of magma are explosively withdrawn from the Earth's crust over a period of days to weeks. Continuing ***long*** after such great eruptions, the resulting calderas often exhibit pronounced unrest, with frequent earthquakes, alternating uplift and subsidence of the ground, and considerable heat and mass flux. Because many active and extinct calderas show evidence for repetition of large eruptions, such systems demand detailed scientific study and monitoring. Two calderas in North America, Yellowstone (Wyoming) and ***Long Valley*** (California), are in areas of youthful tectonic complexity. Scientists strive to understand the signals generated when tectonic, volcanic and hydrothermal (hot ground water) processes intersect. One obstacle to accurate forecasting of large volcanic events is humanity's lack of familiarity with the signals leading up to the largest class of volcanic eruptions. Accordingly, it may be difficult to recognize the difference between smaller and larger eruptions. To prepare ourselves and society, scientists must scrutinize a spectrum of volcanic signals and assess the many factors contributing to unrest and toward diverse modes of eruption.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-020807

12. Database GeoRef

Title **Toward "supervolcano" technology**

Author Foulger, Gillian R

Affiliation Durham University, Department of Earth Sciences, Durham, United Kingdom (GBR)

Source Science, vol.313, no.5788, pp.768-769, 11 Aug 2006

Resource Location http://www.sciencemag.org/

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-088243

13. Database GeoRef

Title **Improving earthquake locations in Northern California using waveform based differential time measurements**

Author Waldhauser, Felix (investigator); Schaff, David (investigator)

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Corporate Author Lamont-Doherty Earth Observatory, Palisades, NY, United States, performer (USA)

Abstract We relocated the earthquake catalog of the Northern California ***Seismic*** Network (NCSN), using a recently computed comprehensive database of cross-correlation differential times for earthquakes between 1984-2003. The correlation data base includes approximately 3 billion P-and S-wave differential times that are calculated from pairs of waveforms recorded at common stations with cross correlation coefficients of 0.7 or greater, for events separated by less than 5 km. The cross-correlation data is combined with differential times computed from NCSN phase picks to relocate the hypocenters with the double-difference algorithm. All event pairs with at least 6 pair-wise observed phases are relocated (311,273 events). The relocated catalog has a root mean square (RMS) of the weighted pick based differential-time residuals of 0.017 s, compared to 0.124 s before relocation. The weighted RMS of the cross-correlation data is 0.004 s after relocation. Location precisions range from tens to hundreds of meter. The double-difference locations reveal a focused view of the complex distribution of seismicity in northern California. Discrete faults are imaged with unprecedented detail in tectonic regions as diverse as the San Andreas Fault system (SAF), the Mendocino Triple Junction (MTJ), the ***Long Valley*** Caldera (LVC), and the region of induced earthquakes at the Geysers Geothermal Field (GGF). We find that 90% of the earthquakes have correlated P- and S-wave trains at common stations. The occurrence of correlated earthquakes is widespread across northern California with some of the highest concentrations being observed along the transform faults within the SAF system, in the LVC region, at the GGF, and at the MTJ, indicating the general applicability of these methods to improve hypocenter locations. Using repeating earthquakes we find that, at the 95% confidence level, network locations are mislocated on average by 0.7 km horizontally, and 2 km vertically. This study shows that consistent ***long***-term ***seismic*** monitoring practices and data archiving policies, as is the case at the Northern California ***Seismic*** Network, are key to improve catalogued hypocenters obtained from standard single-event location methods using phase picks, and to determine accurate location of future events within the framework of earthquake monitoring.

Pages 10

Publication Year 2006

Publication Type Report; Monographic

Country of Publication United States (USA)

Accession Number 2008-109508

14. Database GeoRef

Title **Hydrothermal fault zone mapping using *seismic* and electrical measurements**

Author Onacha, Stephen Alumasa

Pages 226

Publication Year 2006

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Duke University, Durham, NC, United States (USA)

Country of Publication United States (USA)

Accession Number 2008-109644

15. Database GeoRef

Title **Non-double-couple earthquakes in the *Long Valley* volcanic region**

Author Templeton, Dennise C; Dreger, Douglas S

Affiliation University of California at Berkeley, Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.96, no.1, pp.69-79, Feb 2006

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract To better understand the connection between earthquake production and geothermal/magmatic systems, we studied the extent of fluid-influenced faulting in the ***Long Valley*** volcanic region. We focused on a 100-km-wide circular area centered at the ***Long Valley*** caldera that also encompassed the Mono-Inyo Craters to the north and the Sierra Nevada Mountain block to the south. We performed a comprehensive search for events greater than M 3.5 since 1993 with significant coseismic volume changes in their source region. Using three-component broadband digital waveforms at regional distances, we solved for four different source models: double couple (DC), deviatoric DC + isotropic, and full moment tensor. Using the F-test as a statistical aid, we determined which of the four models was most appropriate for each event. We then conducted stability tests to determine the robustness of the focal mechanism solutions and isotropic components. Our results show that fluid-influenced earthquakes in the magnitude range studied are quite rare in the ***Long Valley*** volcanic region. Of 33 high-quality events, 28 are best characterized by a simple DC source model, 4 by a DC + isotropic source model, and 1 by a full moment tensor model.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-030986

16. Database GeoRef

Title **A four-dimensional viscoelastic deformation model for *Long Valley* Caldera, California, between 1995 and 2000**

Author Newman, Andrew V; Dixon, Timothy H; Gourmelen, Noel

Affiliation Los Alamos National Laboratory, Earth and Environmental Sciences, Environmental Geology and Spatial Analysis, Los Alamos, NM, United States (USA)

Affiliation University of Miami, United States (USA)

Monograph Title The changing shapes of active volcanoes; recent results and advances in volcano geodesy

Editor Poland, Michael; Newman, Andrew

Source Journal of Volcanology and Geothermal Research, vol.150, no.1-3, pp.244-269, 01 Feb 2006

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We investigate the effects of viscoelastic (VE) rheologies surrounding a vertically dipping prolate spheroid source during an active period of time-dependent deformation between 1995 and 2000 at ***Long Valley*** caldera. We model a rapid magmatic inflation episode and slip across the South Moat fault (SMF) in late 1997. We extend the spherical VE shell model of Newman et al. [Newman, A.V., Dixon, T.H., Ofoegbu, G., Dixon, J.E., 2001. Geodetic and ***seismic*** constraints on recent activity at ***Long Valley*** caldera, California: Evidence for viscoelastic rheology. J. Volcanol. Geotherm. Res. 105, 183-206.] to include a prolate spheroid geometry more accurately representing the probable source geometry inferred from other studies. This paper presents the first attempt to geodetically constrain the volcanic deformation source volume at ***Long Valley***, a parameter for hazard assessment. Including fault slip along the SMF explains significant deformation observed with several EDM baselines and components of two continuous GPS time series. Additionally, the model explains the spatial extent of deformation observed by InSAR data covering the 1997-98 inflation episode. For the time period studied, the VE model requires modest pressure changes (maximum of 14.3 MPa) that are far lower than the overburden pressure (approximately 115 MPa), and less than the maximum for a purely elastic model with the same geometry and elastic strength (approximately 45 MPa). Thus, the inclusion of a realistic VE component significantly lowers the inferred pressures

necessary to explain observed surface deformation. Though our model is non-unique, it is consistent with a broader variety of data compared to purely elastic models. Only right-lateral slip, and not dilitation, was necessary to explain offsets in EDM data near and crossing the SMF.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2007-051292

17. Database GeoRef

Title **The search for magma reservoirs in *Long Valley* Caldera; single versus distributed sources**

Author Battaglia, M; Vasco, D W

Affiliation University of Goettingen, Department of Structural Geology and Geodynamics, Goettingen, Federal Republic of Germany (DEU)

Affiliation University College London, United Kingdom (GBR); University of California at Berkeley, United States (USA)

Monograph Title Mechanisms of activity and unrest at large calderas

Editor Troise, Claudia; De Natale, Giuseppe; Kilburn, Christopher R J

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, ITA, (Italy)

Source Geological Society Special Publications, vol.269, pp.173-180, 2006

Publisher Geological Society of London, London, United Kingdom (GBR)

Abstract ***Long Valley*** Caldera and the Mono-Inyo Craters chain form a large volcanic complex in eastern California that has experienced persistent earthquake activity and ground uplift over the past 25 years. The central part of ***Long Valley*** Caldera (an area of more than 100 square km) has been slowly rising since 1980 at an average rate of 3 cm a (super -1) . Inversion of micro-gravimetry and deformation data using a single vertical prolate ellipsoid source has helped to define the existence of a relatively shallow (5-8 km) silicic magma intrusion of 0.11-0.19 km (super 3) beneath the caldera's resurgent dome. We use the information from the single-source inversion to constrain a more general three-dimensional distribution of volume changes in the subsurface. The distributed inversion identifies two main inflation areas beneath the resurgent dome: one following the regional trend of north-south faults, and another in the dome's southern section, parallel to a strike-slip fault that is responsible for most of the ***seismic*** activity in the caldera's south moat.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-040471

18. Database GeoRef

Title **Evaluation of some software measuring displacements using GPS in real-time**

Author Langbein, John

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 2006-1235, 37 pp., 2006

Resource Location http://pubs.usgs.gov/of/2006/1235/

Report Number OF 2006-1235

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract For the past decade, the USGS has been monitoring deformation at various locations in the western United States using continuous GPS. The main focus of these measurements are estimates of displacement averaged over one day. Essentially, these consist of recording at 30 seconds intervals the carrier-frequency phase-data (equivalent to travel-time) between a GPS receiver and the GPS satellite network. In turn, these observations, which are converted to pseudo-ranges, are processed using one of the "research grade" programs to estimate the position of the GPS receiver averaged over 24 hours. However, it is possible and desirable to estimate the position of the receiver (actually the antenna) more frequently and to do this within a few seconds of the time actual measurement (known as real-time). A recent example, the 2004 Magnitude 6, Parkfield, California earthquake, demonstrated that having GPS estimates of position more frequently than simply a daily average is required if one requires discrimination between co-***seismic*** and post-***seismic*** deformation. The high-rate estimates of position obtained at Parkfield show that post-***seismic*** deformation started less than one-hour after the mainshock and that this deformation was roughly the same magnitude as the co-***seismic*** deformation. The high-rate solutions for Parkfield were done by others including Yehuda Bock at UCSD and Kristine Larson at Univ. of Colorado, but not the USGS.

Pages 37

Publication Year 2006

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2007-055254

19. Database GeoRef

Title **Waveform cross-correlation -based differential travel-time measurements at the Northern California *seismic* network**

Author Schaff, David P; Waldhauser, Felix

Affiliation Lamont -Doherty Earth Observatory, Palisades, NY, United States (USA)

Source Bulletin of the Seismological Society of America, vol.95, no.6, pp.2446-2461, Dec 2005

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract We processed the complete digital seismogram database for northern California to measure accurate differential travel times for correlated earthquakes observed at common stations. Correlated earthquakes are earthquakes that occur within a few kilometers of one another and have similar focal mechanisms, thus generating similar waveforms, allowing measurements to be made via cross-correlation analysis. The waveform database was obtained from the Northern California Earthquake Data Center and includes about 15 million seismograms from 225,000 local earthquakes between 1984 and 2003. A total of 26 billion cross-correlation measurements were performed on a 32-node (64 processor) Linux cluster, using improved analysis tools. All event pairs with separation distances of 5 km or less were processed at all stations that recorded the pair. We computed a total of about 1.7 billion P- wave differential times from pairs of waveforms that had cross-correlation coefficients (CC) of 0.6 or larger. The P-wave differential times are often on the order of a factor of ten to a hundred times more accurate than those obtained from routinely picked phase onsets. 1.2 billion S-wave differential times were measured with CC> or =0.6, a phase not routinely picked at the Northern California ***Seismic*** Network because of the noise level of remaining P coda. We found that approximately 95% of the seismicity includes events that have cross-correlation coefficients of CC> or =0.7 with at least one other event recorded at four or more stations. At some stations more than 40% of the recorded events are similar at the CC> or =0.9 level, indicating the potential existence of large numbers of repeating earthquakes. Large numbers of correlated events occur in different tectonic regions, including the San Andreas Fault, ***Long Valley*** caldera, Geysers geothermal field and Mendocino triple junction. Future research using these data may substantially improve earthquake locations and add insight into the velocity structure in the crust.

Publication Year 2005

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-019262

20. Database GeoRef

Title **Seasonal seismicity at western United States volcanic centers**

Author Christiansen, L B; Hurwitz, S; Saar, M O; Ingebritsen, S E; Hsieh, P A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA) **Affiliation**

University of Minnesota, United States (USA)

Source Earth and Planetary Science Letters, vol.240, no.2, pp.307-321, 01 Dec 2005

Resource Location http://www.sciencedirect.com/ science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We examine 20-yr data sets of ***seismic*** activity from 10 volcanic areas in the western United States for annual periodic signals (seasonality), focusing on large calderas (***Long Valley*** caldera and Yellowstone) and stratovolcanoes (Cascade Range). We apply several statistical methods to test for seasonality in the ***seismic*** catalogs. In 4 of the 10 regions, statistically significant seasonal modulation of seismicity (>90% probability) occurs, such that there is an increase in the monthly seismicity during a given portion of the year. In five regions, seasonal seismicity is significant in the upper 3 km of the crust. Peak seismicity occurs in the summer and autumn in Mt. St. Helens, Hebgen Lake/Madison ***Valley***, Yellowstone Lake, and Mammoth Mountain. In the eastern south moat of ***Long Valley*** caldera (LVC) peak seismicity occurs in the winter and spring. We quantify the possible external forcing mechanisms that could modulate seasonal seismicity. Both snow unloading and groundwater recharge can generate large stress changes of >5 kPa at seismogenic depths and may thus contribute to seasonality.

Publication Year 2005

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2006-082969

22. Database GeoRef

Title **The Idaho-Nevada-California refraction experiment; developing a central Walker Lane and Sierra Nevada crustal model**

Author Heimgartner, M; Scott, J B; Thelen, W A,; Louie, J N; Miller, P

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Affiliation New Mexico Institute of Mining and Technology, United States (USA)

Monograph Title SSA 2005; abstracts of the annual meeting

Author Anderson, John G (chairperson); von Seggern, David (chairperson)

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Source Seismological Research Letters, vol. 76, no. 2, pp.250, Apr 2005

Resource Location http://www.seismosoc.org/publications/srl.html

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034716

23. Database GeoRef

Title **Remotely triggered seismicity on the United States west coast following the M (sub w) 7.9 Denali Fault earthquake**

Author Prejean, S G; Hill, D P; Brodsky, E E; Hough, S E; Johnston, M J S; Malone, S D; Oppenheimer, D H; Pitt, A M; Richards-Dinger, K B

Affiliation U. S. Geological Survey, Anchorage, AK, United States (USA)

Affiliation University of Alaska, United States (USA); Carver Geologic, Kodiak, AK, United States (USA); University of California at Los Angeles, United States (USA); University of Washington, United States (USA); U. S. Navy Geothermal Program, United States (USA)

Monograph Title The 2002 Denali Fault earthquake sequence

Editor Rowe, Charlotte; Christensen, Douglas; Carver, Gary

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Source Bulletin of the Seismological Society of America, vol.94, no.6, Part B, pp.348-359, Dec 2004

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The M (sub w) 7.9 Denali fault earthquake in central Alaska of 3 November 2002 triggered earthquakes across western North America at epicentral distances of up to at least 3660 km. We describe the spatial and temporal development of triggered activity in California and the Pacific Northwest, focusing on Mount Rainier, the Geysers geothermal field, the ***Long Valley*** caldera, and the Coso geothermal field. The onset of triggered seismicity at each of these areas began during the Love and Raleigh waves of the M (sub w) 7.9 wave train, which had dominant periods of 15 to 40 sec, indicating that earthquakes were triggered locally by dynamic stress changes due to low-frequency surface wave arrivals. Swarms during the wave train continued for approximately 4 min (Mount Rainier) to approximately 40 min (the Geysers) after the surface wave arrivals and were characterized by spasmodic bursts of small (M< or =2.5) earthquakes. Dynamic stresses within the surface wave train at the time of the first triggered earthquakes ranged from 0.01 MPa (Coso) to 0.09 MPa (Mount Rainier). In addition to the swarms that began during the surface wave arrivals, ***Long Valley*** caldera and Mount Rainier experienced unusually large ***seismic*** swarms hours to days after the Denali fault earthquake. These swarms seem to represent a delayed response to the Denali fault earthquake. The occurrence of spatially and temporally distinct swarms of triggered seismicity at the same site suggests that earthquakes may be triggered by more than one physical process.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-041002

24. Database GeoRef

Title **Triggered deformation and *seismic* activity under Mammoth Mountain in *Long Valley* Caldera by the 3 November 2002 M (sub w) 7.9 Denali Fault earthquake**

Author Johnston, M J S; Prejean, S G; Hill, D P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Alaska, United States (USA); Carver Geologic, Kodiak, AK, United States (USA)

Monograph Title The 2002 Denali Fault earthquake sequence

Editor Rowe, Charlotte; Christensen, Douglas; Carver, Gary

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Source Bulletin of the Seismological Society of America, vol.94, no.6, Part B, pp.360-369, Dec 2004

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The 3 November 2002 M (sub w) 7.9 Denali fault earthquake triggered deformational offsets and microseismicity under Mammoth Mountain (MM) on the rim of ***Long Valley*** caldera, California, some 3460 km from the earthquake. Such strain offsets and microseismicity were not recorded at other borehole strain sites along the San Andreas fault system in California. The ***Long Valley*** offsets were recorded on borehole strainmeters at three sites around the western part of the caldera that includes Mammoth Mountain--a young volcano on the southwestern rim of the caldera. The largest recorded strain offsets were -0.1 microstrain at PO on the west side of MM, 0.05 microstrain at MX to the southeast of MM, and -0.025 microstrain at BS to the northeast of MM with negative strain extensional. High sample rate strain data show initial triggering of the offsets began at 22:30 UTC during the arrival of the first Rayleigh waves from the Alaskan earthquake with peak-to-peak dynamic strain amplitudes of about 2 microstrain corresponding to a stress amplitude of about 0.06 MPa. The strain offsets grew to their final values in the next 10 min. The associated triggered seismicity occurred beneath the south flank of MM and also began at 22:30 UTC and died away over the next 15 min. This relatively weak seismicity burst included some 60 small events with magnitude all less than M = 1. While poorly constrained, these strain observations are consistent with triggered slip and intrusive opening on a north-striking normal fault centered at a depth of 8 km with a moment of 10 (super 16) N m, or the equivalent of a M 4.3 earthquake. The cumulative ***seismic*** moment for the associated seismicity burst was more than three orders of magnitude smaller. These observations and this model resemble those for the triggered deformation and slip that occurred beneath the north side of MM following the 16 October 1999 M 7.1 Hector Mine, California, earthquake. However, in this case, we see little post-event slip decay reflected in the strain data after the Rayleigh-wave arrivals from the Denali fault earthquake and onset of triggered seismicity did not lag the triggered deformation by 20 min. These observations are also distinctly different from the more widespread and energetic seismicity and deformation triggered by the 1992 M 7.3 Landers earthquake in the ***Long Valley*** caldera. Thus, each of the three instances of remotely triggered unrest in ***Long Valley*** caldera recorded to date differ. In each case, however, the deformation moment inferred from the strain meter data was more than an order of magnitude larger than the cumulative moment for the associated triggered seismicity.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-041003

25. Database GeoRef

Title **Deep borehole receiver functions in *Long Valley* Caldera, California**

Author Chavarria, J; Julia, J; Malin, P

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract S13B-1043, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034473

26. Database GeoRef

Title **The evidence that *long*-range earthquake triggering involves fluids**

Author Brodsky, E E; Prejean, S G

Affiliation University of California at Los Angeles, Department of Earth and Space Sciences, Los Angeles, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract S23C-01, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-038719

27. Database GeoRef

Title **Approaching seismology in the source; earthquake source studies at LVEW and SAFOD**

Author Malin, Peter E

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Corporate Author Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States, performer (USA)

Abstract Our project has resulted 3 significant contributions to the USGS NEHRP program: 1. We have located at least 2 new fault zones between the San Andreas fault and the internationally supported SAFOD drilling site, where current work is being done to drill through the San Andreas at unprecedented depths of 3 km. These faults are important because the drilling will cut through them and they may be a major part of the SAF's mechanical operation. 2. In collaboration with the USGS and Carnegie Institution of Washington DC we have install a geophysical observatory in ***Long Valley*** Caldera in the LV Exploratory Well during the summer of 2003. This observatory is important because it can detect very small changes in the volcanic system underlying the LV area. 3. We have analyzed earlier earthquake data from the LVEW, gathered in preparation for the 2003 installation and found unique earthquake sources. This work is important because it give insight into the multiple ways a volcanic system can produce earthquakes.

Pages 35

Publication Year 2004

Publication Type Report; Monographic

Country of Publication United States (USA)

Accession Number 2005-006809

28. Database GeoRef

Title **A powerful tool**

Author Foulger, G R; Julian, B R

Affiliation University of Durham, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA)

Source Bulletin - Geothermal Resources Council, vol.33, no.3, pp.120-126, Jun 2004

Resource Location http://www.geothermal.org/articles.html

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2007-007040

29. Database GeoRef

Title **Results of a VSP experiment at the Resurgent Dome, *Long Valley* Caldera, California**

Author Gritto, Roland; Romero, Arturo E; Daley, Thomas M

Affiliation Lawrence Berkeley National Laboratory, Earth Sciences Division, Berkeley, CA, United States (USA)

Affiliation Exxon Production Research Company, United States (USA)

Source Geophysical Research Letters, vol.31, no.6, 4 pp., 28 Mar 2004

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 4

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-042683

30. Database GeoRef

Title **Improved differential travel time measurements and a search for repeating events at the Northern California *Seismic* Network**

Author Waldhauser, Felix

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Corporate Author Lamont-Doherty Earth Observatory, Palisades, NY, United States, performer (USA)

Abstract We processed the complete digital seismogram data base for Northern California to measure accurate differential times for correlated earthquakes observed at common stations. Correlated earthquakes are earthquakes that occur within a few kilometers of one another and have similar focal mechanisms, thus generating similar waveforms, which allows measurements to be made via cross correlation analysis. The waveform data base was obtained from the Northern California Earthquake Data Center and includes about 15 million seismograms from 225,000 local earthquakes between 1984-2001. A total of 26 billion cross correlation measurements were performed on a 32-node (64 processor) Linux cluster, using improved analysis tools. We computed a total of about 1.7 billion P-wave differential times from pairs of waveforms with cross correlation coefficients of 0.6 or larger. The P-wave differential times are on the order of a factor of ten to a hundred times more accurate than those obtained from routinely picked phase onsets. 1.2 billion S-wave differential times were measured, a phase not routinely picked at the Northern California ***Seismic*** Network because of the generally weak onset of S-phases. We found that approximately 90% of the seismicity includes events that have cross-correlation coefficients of CC>0.7, with at least one other event recorded at four or more stations. At some stations more than 40% of the recorded events are similar at the CC>0.9 level, indicating the potential existence of large numbers of repeating earthquakes. Large numbers of correlated events occur in different tectonic regions, including the San Andreas Fault, the ***Long Valley*** Caldera, and the Mendocino Triple Junction. Future research using these data may substantially improve earthquake locations and add insight into the velocity structure in the crust. Such work will help the ***seismic*** hazard community to better understand the risks and hazards associated with earthquakes in Northern California.

Pages 15

Publication Year 2004

Publication Type Report; Monographic

Country of Publication United States (USA)

Accession Number 2005-015847

31. Database GeoRef

Title **Ground magnetic data from within the *Long Valley* Caldera, California; a website for data distribution**

Author Anderson, E D; Finn, C A

Affiliation U. S. Geological Survey, USA, (United States)

Source Open-File Report - U. S. Geological Survey, Report: OF 2004-1096, 2004

Resource Location http://pubs.usgs.gov/of/2004/1096/

Report Number OF 2004-1096

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2004

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Format Covered WWW

Accession Number 2004-043722

32. Database GeoRef

Title **Study of volcanic sources at *Long Valley* Caldera, California, using gravity data and a genetic algorithm inversion technique**

Author Charco, M; Fernandez, Jose; Tiampo, K; Battaglia, M; Kellogg, L; McClain, J; Rundle, J B

Affiliation Ciudad Universitaria, Instituto de Astronomia y Geodesia, Madrid, Spain (ESP)

Affiliation University of Colorado, United States (USA); Stanford University, United States (USA); University of California at Davis, United States (USA); Jet Propulsion Laboratory, United States (USA)

Monograph Title Geodetic and geophysical effects associated with ***seismic*** and volcanic hazards

Editor Fernandez, Jose

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Facultad de Ciencias Matematicas, Madrid, Spain (ESP)

Source Pure and Applied Geophysics, vol.161, no.7, pp.1399-1413, 2004

Resource Location http://link.springer.de/link/service/journals/ 00024/index.htm

Publisher Birkhaeuser, Basel, Switzerland (CHE)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication Switzerland (CHE)

Accession Number 2006-018077

33. Database GeoRef

Title **The interpretation of gravity changes and crustal deformation in active volcanic areas**

Author Battaglia, M; Segall, P

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Monograph Title Geodetic and geophysical effects associated with ***seismic*** and volcanic hazards

Editor Fernandez, Jose

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Facultad de Ciencias Matematicas, Madrid, Spain (ESP)

Source Pure and Applied Geophysics, vol.161, no.7, pp.1453-1467, 2004

Resource Location http://link.springer.de/link/service/journals/ 00024/index.htm

Publisher Birkhaeuser, Basel, Switzerland (CHE)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication Switzerland (CHE)

Accession Number 2006-018080

34. Database GeoRef

Title **Eruptive history and chemical evolution of the precaldera and postcaldera basalt-dacite sequences, *Long Valley*, California; implications for magma sources, current *seismic* unrest, and future volcanism**

Author Bailey, Roy A

Affiliation U. S. Geological Survey, USA, (United States)

Source U. S. Geological Survey Professional Paper, Report: P 1692, 75 pp., 2004

Resource Location http://pubs.usgs.gov/pp/pp1692/

Report Number P 1692

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract The ***Long Valley*** Volcanic Field in east-central California straddles the East Sierran frontal fault zone, overlapping the Sierra Nevada and western Basin and Range Provinces. ***Long Valley*** volcanism began about 4 Ma during Pliocene time and has continued intermittently through the Holocene. The current (post-1980) ***seismic*** unrest at ***Long Valley***, accompanied by uplift of the resurgent dome, may signal the onset of a new episode of regional extension and basalt injection into the residual magma chamber.

Pages 75

Publication Year 2004

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2005-004738

35. Database GeoRef

Title **A *seismic* wave-induced fluid pressure increase; an alternative hypothesis for the strain transient at *Long Valley* Caldera following the 1992 M 7.3 Landers, California earthquake**

Author Roeloffs, Ebelyn; Johnston, M

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.84, no.46, Suppl., pp.1071-1072, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-036390

36. Database GeoRef

Title **Applying massive waveform cross correlation and double-difference location to Northern California and China**

Author Schaff, David P; Waldhauser, Felix; Richards, Paul G

Affiliation Lamont -Doherty Earth Observatory, Palisades, NY, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.84, no.46, Suppl., Abstract S21D -0328, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-093488

37. Database GeoRef

Title **Frequency-dependent dynamic triggering**

Author Brodsky, Emily E; Prejean, S G

Affiliation University of California at LosAngeles, Department of Earth and Space Sciences, Los Angeles, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., pp.1061-1062, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-036333

38. Database GeoRef

Title **Fluid influenced faulting in the *Long Valley* volcanic region**

Author Templeton, Dennise C; Dreger, Douglas

Affiliation University of California, Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52B-0439, 08 Dec 2003

Resource Location http://www.seismo.berkeley.edu/~dennise/fdes. html

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005225

39. Database GeoRef

Title ***Seismic* character of an active silicic volcanic system; *Long Valley* Caldera, California**

Author John, Barbara E; Fountain, David M

Affiliation University of Wyoming, Department of Geology and Geophysics, Laramie, WY, United States (USA)

Affiliation NSF, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52B-0441, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005227

40. Database GeoRef

Title **Earthquake-induced fluid pressure changes at *Long Valley*, California; results from the *Long Valley* exploration well**

Author Roeloffs, Evelyn A; Farrar, C D; Henfling, J A; Howle, J F; Jacobson, R D; Sneed, Michelle

Affiliation U. S. Geological Survey, Western Earthquakes Hazard Team, Vancouver, WA, United States (USA)

Affiliation Sandia National Laboratories, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.196, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract At ***Long Valley*** caldera, California, both local and distant earthquakes have produced persistent water level drops in wells on and north of the caldera's resurgent dome, accompanied by earthquake -induced fluid level increases in the caldera's hydrothermally active south moat. Earthquake-induced water-level drops on and north of the resurgent dome may represent diffusion of localized fluid pressure drops induced abruptly by ***seismic*** waves. We evaluate this hypothesis using recent data from the ***Long Valley*** Exploration Well (LVEW), a 3 km deep borehole penetrating the center of the resurgent dome. The uncased interval of the LVEW penetrates relatively impermeable metapelite, and fluid communication is primarily through a conductive fracture 2.6 km below the surface. It has proven useful to collect data using pressure-temperature logging tools built to operate for extended periods at the depth of the fracture zone (temperature 102 degrees C, pressure 22.3 MPa). Data from a pumping test in September, 2001, are consistent with a high-conductance planar fracture 10-100 m ***long*** in country rock with hydraulic diffusivity of 1-10 m (super 2) /s. Tidal amplitudes at the fracture zone depth are 1.93 kPa peak -to -peak, and the ratio of pressure change to strain based on the M2 earth tide constituent is

30.3 kPa/microstrain. Both the Hector Mine, California (Oct. 16, 1999, M7.1) and Denali Fault, Alaska (Nov. 4, 2002, M7. 9) earthquakes produced steplike pressure drops in the LVEW which reached their minimum values (1.24 kPa and 1.17 kPa, respectively) within 3 hours. In contrast, water level drops induced by the same two earthquakes at the shallower LKT well, 4 km NW of the center of the dome, required 10 to 15 days to reach their minima. The Denali Fault earthquake response at the LVEW was not only faster than at LKT, but also about twice as large, consistent with fluid pressure changes occurring abruptly with the passage of ***seismic*** waves at a location closer to the LVEW than to LKT. The pressure drops caused by the Hector Mine earthquake are less consistent with this conceptual model, because the fluid pressure dropped slightly more in LKT than in the LVEW. Continued fluid-pressure monitoring should yield more information about the time-space distribution of earthquake-induced fluid-pressure changes at ***Long Valley***.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-083163

41. Database GeoRef

Title **Remote sensing and GIS evaluation of CO (sub 2) -induced tree kills at Mammoth Mountain, California; 1989 to present**

Author List, Mark R; Hausback, Brian P; Farrar, Christopher D; Pieri, David C

Affiliation California State University, Geology Department, Sacramento, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Jet Propulsion Laboratory, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.321, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain, a rhyolite to dacite dome complex on the southwestern rim of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold magmatic carbon dioxide (CO (sub 2)), vent from the flanks of the mountain, and this gas is responsible for over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from ***seismic*** activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne and satellite based remote sensing data for the field area, collected using multi- and hyperspectral [NS001 (TMS), MASTER, ASTER and AVIRIS] sensors, are evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Two seasons (1998 and 2003) of field spectral measurements have been incorporated into the remote sensing evaluation to establish the reflectance characteristics of the field area, allow for error evaluation, and provide ground truth measurements for improving the quality of the remote sensing analyses. The results of the temporal remote sensing assessment, combined using geographic information systems, are highlighting relationships between surface geology and areas of tree mortality and delineating the migration of tree kills since 1989. These evaluations improve our understanding of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-029575

42. Database GeoRef

Title **Relations between seismicity and deformation during unrest in *Long Valley* Caldera, California, from 1995 through 1999**

Author Hill, David P; Langbein, John O; Prejean, Stephanie

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.175-193, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Unrest in ***Long Valley*** Caldera and the adjacent Sierra Nevada from 1995 through 2000 was dominated by three major episodes: (1) the March-April 1996 earthquake swarm in the east lobe of the south moat; (2) the July 1997-January 1998 caldera-wide unrest; and (3) a sequence of three M>5 earthquakes (9 June 1998, 13 July 1998, and 15 May 1999 UT) located in the Sierra Nevada block immediately south of the caldera. These three unrest episodes each had distinct characteristics with distinct implications for associated hazards. Seismicity developed as earthquake swarms for the 1996 and 1997-98 episodes, both of which were within the caldera. In contrast, the series of three M>5 earthquakes south of the caldera in 1998-99 each developed as a mainshock-aftershock sequence. Marginal deformation within the caldera associated with the 1996 swarm and the 1998-99 M>5 earthquakes is consistent with the cumulative ***seismic*** moments for the respective sequences. Deformation associated with the 1997-98 episode, however, was roughly five times larger than can be accounted for by the cumulative ***seismic*** moment of the associated earthquake swarm. We conclude that the 1997-98 episode was associated with mass transport (local intrusion of magma or magmatic brine) and that the associated earthquake swarm activity, which had a relatively high b-value of 1.2, was largely driven by the intrusive process. In contrast, the 1996 earthquake swarm and the 1998-99 M>5 mainshock-aftershock sequences, both with "normal" b-values of approximately 0.9, represent brittle relaxation to previously accumulated stresses associated with little or no mass transport. These relations emphasize the importance of simultaneous, real-time monitoring of both seismicity and deformation as a basis for judging whether an evolving unrest episode has the potential for culminating in a volcanic eruption.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016377

43. Database GeoRef

Title **Water-level changes induced by local and distant earthquakes at *Long Valley* Caldera, California**

Author Roeloffs, Evelyn; Sneed, Michelle; Galloway, Devin L; Sorey, Michael L; Farrar, Christopher D; Howle, James F; Hughes, Jennifer

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Affiliation Oregon Department of Natural Resources, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.269-303, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Distant as well as local earthquakes have induced groundwater-level changes persisting for days to weeks at ***Long Valley*** caldera, California. Four wells open to formations as deep as 300 m have responded to 16 earthquakes, and responses to two earthquakes in the 3-km-deep ***Long Valley*** Exploratory Well (LVEW) show that these changes are not limited to weathered or unconsolidated near-surface rocks. All five wells exhibit water-level variations in response to earth tides, indicating they can be used as low-resolution strainmeters. Earthquakes induce gradual water-level changes that increase in amplitude for as ***long*** as 30 days, then return more slowly to pre-earthquake levels. The gradual water-level changes are always drops at wells LKT, LVEW, and CH-10B, and always rises at well CW-3. At a dilatometer just outside the caldera, earthquake-induced strain responses consist of either a step followed by a contractional strain-rate increase, or a transient contractional signal that reaches a maximum in about seven days and then returns toward the pre-earthquake value. The sizes of the gradual water-level changes generally increase with earthquake magnitude and decrease with hypocentral distance. Local earthquakes in ***Long Valley*** produce coseismic water-level steps; otherwise the responses to local earthquakes and distant earthquakes are indistinguishable. In particular, water-level and strain changes in ***Long Valley*** following the 1992 M7.3 Landers earthquake, 450 km distant, closely resemble those initiated by a M4.9 local earthquake on November 22, 1997, during a ***seismic*** swarm with features indicative of fluid involvement. At the LKT well, many of the response time histories are identical for 20 days after each earthquake, and can be matched by a theoretical solution giving the pore pressure as a function of time due to diffusion of a nearby, instantaneous, pressure drop. Such pressure drops could be produced by accelerated inflation of the resurgent dome by amounts too small to be detected by the two-color electronic distance-measuring network. Opening-mode displacement in the south moat, inferred to have followed a M4.9 earthquake on November 22, 1997, could also create extensional strain on the dome and lead to water-level changes similar to those following dome inflation. Contractional strain that could account for earthquake-induced water-level rises at the CW-3 well is inconsistent with geodetic observations. We instead attribute these water-level rises to diffusion of elevated fluid pressure localized in the south moat thermal aquifer. For hydraulic diffusivities appropriate to the upper few hundred meters at ***Long Valley***, an influx of material at temperatures of 300 degrees C can thermally generate pressure of 6 m of water or more, an order of magnitude larger than needed to account for the CW-3 water-level rises. If magma or hot aqueous fluid rises to within 1 km of the surface in the eastern part of the south moat, then hydraulic diffusivities are high enough to allow fluid pressure to propagate to CW-3 on the time scale observed. The data indicate that ***seismic*** waves from large distant earthquakes can stimulate upward movement of fluid in the hydrothermal system at ***Long Valley***.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016381

44. Database GeoRef

Title **Open fissure mineralization at 2600 m depth in *Long Valley* Exploratory Well (California); insight into the history of the hydrothermal system**

Author Fischer, Miriam; Roeller, Klaus; Kuester, M; Stoeckhert, Bernhard; McConnell, Vicki Sue

Affiliation Ruhr University Bochum, Institute of Geology, Mineralogy and Geophysics, Bochum, Federal Republic of Germany (DEU)

Affiliation Oregon Department of Natural Resources, United States (USA); Oregon Department of Geology and Mineral Industries, United States (USA)

Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.347-363, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract ***Long Valley*** Exploratory Well, drilled into the Resurgent Dome at ***Long Valley*** Caldera (California) to explore the potential of geothermal power in an active magmatic system, achieved temperatures of only ca. 100 degrees C at 2500-3000 m depth, well below the range expected atop an active magma chamber. Open fissures encountered at 2600 m depth are coated by mm-sized idiomorphic quartz crystals with first- and second-order growth discontinuities. Specific growth defects indicating rapid crystallization reflect sudden changes in SiO (sub 2) supersaturation. Fluid inclusions contain low salinity (0-5 wt% NaCl) and low CO (sub 2) (<3 mole%) aqueous fluids, with V-L homogenization temperatures of 300-350 degrees C, indicating trapping at more than 200 degrees C above the ambient temperatures measured within the borehole today. Fluid composition and inclusion density varies between and within the growth zones, reflecting progressive changes in the hydrothermal system during crystallization. Episodic crystallization from supersaturated fluids is interpreted to reflect sudden changes in the convection pattern, presumably induced by ***seismic*** activity, with a more recent and dramatic reorganization resulting in convective cooling. The quartz crystals are sensitive recorders of the earlier higher temperature history, unaffected by the present-day situation.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016384

45. Database GeoRef

Title **Apparent break in earthquake scaling due to path and site effects on deep borehole recordings**

Author Ide, Satoshi; Beroza, Gregory C; Prejean, Stephanie G; Ellsworth, William L

Affiliation University of Tokyo, Department of Earth and Planetary Science, Tokyo, Japan (JPN)

Affiliation Stanford University, United States (USA); U. S. Geological Survey, United States (USA)

Source Journal of Geophysical Research, vol.108, no.B5, 13 pp., 10 May 2003

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 13

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2004-071667

46. Database GeoRef

Title **Remote sensing evaluation of Mammoth Mountain, California; mapping spatial and temporal variations in volcanogenic CO (sub 2) induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Sacramento, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 99th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.4, pp.7, Apr 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain Volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold carbon dioxide (CO (sub 2)), believed to be volcanogenic in nature, are being emitted from the flanks of the mountain. The emitted CO (sub 2) is interpreted to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from ***seismic*** activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO

(sub 2) gas. Airborne remote sensing data for the field area, collected using multi- and hyperspectral (NS001 (TMS), MASTER, ASTER and AVIRIS) sensors, are being evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) - induced tree kills between 1989 and present. Field spectral measurements have been incorporated into the remote sensing evaluation to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the remote sensing analyses. The results of the temporal remote sensing assessment have been integrated into a geographic information system with a detailed geologic map of the field area to highlight relationships between surface geology and areas of tree mortality. These evaluations will assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-010631

47. Database GeoRef

Title **Three-dimensional crustal structure of *Long Valley* Caldera, California, and evidence for the migration of CO (sub 2) under Mammoth Mountain**

Author Foulger, G R; Julian, B R; Pitt, A M; Hill, D P; Malin, P E; Shalev, Eylon

Affiliation U. S. Geological Survey, Volcano Hazards Team, Menlo Park, CA, United States (USA)

Affiliation Duke University, United States (USA)

Source Journal of Geophysical Research, vol.108, no.B3, 16 pp., 10 Mar 2003

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 16

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2004-066574

48. Database GeoRef

Title **Roots of the *Long Valley* Caldera? Mono Craters volcanic field**

Author Hill, David P; Bailey, Roy A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title AGU 2002 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.83, no.47, Suppl., pp.1032, Nov 2002

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-064003

49. Database GeoRef

Title **Using accurate hypocenter locations to understand volcanic earthquake mechanisms**

Author Julian, Bruce R; Foulger, G R; Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Durham, United Kingdom (GBR)

Monograph Title AGU 2002 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.83, no.47, Suppl., pp.1047, Nov 2002

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-064081

50. Database GeoRef

Title **Inferring volcanic activity and subsurface conditions at Mammoth Mountain, California by mapping remotely sensed spatial and temporal variations in CO (sub 2) -induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Geology Department, Sacramento, CA, United States (USA

Monograph Title Geological Society of America, 2002 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.551, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract High Concentrations of cold Carbon dioxide (CO (sub 2)) emitted from the flanks of Mammoth Mountain volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera, eastern California, are believed to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from ***seismic*** activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. To evaluate volcanic activity and interpret subsurface conditions at Mammoth Mountain, this study maps the spatial and temporal variations in the distribution of magmatic CO (sub 2) -induced tree kills using remote sensing technology. Digital mapping of the time-varied CO (sub 2) -induced tree kills incorporates available multi-and hyper -spectral image sets from NASA, including: AVIRIS, TIMS, NS001 (TM Simulator), and MASTER data for the study area. Spectral measurements have been made in the field to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the remote sensing analyses. Developing an understanding of the temporal migration of CO (sub 2) emission-induced tree kills may assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-019340

51. Database GeoRef

Title **Inferring volcanic activity and subsurface conditions at Mammoth Mountain, California by mapping remotely sensed spatial and temporal variations in CO (sub 2) -induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Geology Department, Sacramento, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.551, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract High Concentrations of cold Carbon dioxide (CO (sub 2)) emitted from the flanks of Mammoth Mountain volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera, eastern California, are believed to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred

from ***seismic*** activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. To evaluate volcanic activity and interpret subsurface conditions at Mammoth Mountain, this study maps the spatial and temporal variations in the distribution of magmatic CO (sub 2) -induced tree kills using remote sensing technology. Digital mapping of the time-varied CO (sub 2) - induced tree kills incorporates available multi-and hyper -spectral image sets from NASA, including: AVIRIS, TIMS, NS001 (TM Simulator), and MASTER data for the study area. Spectral measurements have been made in the field to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the remote sensing analyses. Developing an understanding of the temporal migration of CO (sub 2) emission- induced tree kills may assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2005-019340

52. Database GeoRef

Title **A color code for communicating volcanic hazard information in the *Long Valley* Caldera-Mono Craters region, eastern California**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.5, pp.11, Apr 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** caldera in east-central California has shown twenty years of volcanic unrest beginning with an intense earthquake swarm in May 1980 that included four M6 earthquakes accompanied by a 25-cm upwarping of the resurgent dome. Since 1980, notable unrest episodes have included 1) a ***seismic*** swarm in January 1983 with two M = 5.3 earthquakes; 2) a swarm of 8-months duration beneath Mammoth Mountain on the southwest rim of the caldera in 1989, followed by diffuse carbon dioxide degassing around the flanks of the mountain that continues through the present, and 3) the strong swarm of July 1997-January 1998 that included nine M>4 earthquakes accompanied by an additional 10-cm uplift of the resurgent dome. The resurgent dome currently stands over 70 cm higher than in l978. Each of these unrest episodes appears to have been associated with a magmatic intrusion to depths as shallow as 3 to 4 km beneath the surface. Initial notification of the potential volcanic hazards associated with this unrest in May 1982, which used the lowest of a 3-level USGS warning system then in effect, was met with disbelief and anger by local residents. This 3-level warning system was officially replaced by a "WARNING/no-WARNING" scheme in 1984. In response to the request from a frustrated local official for more systematic emergency-response guidance (short of a full WARNING) during the 1989 unrest episode, we developed a five-level alphabetic code (E...A) for local volcanic hazards. This code worked well between scientists and the civil authorities but was widely misunderstood by both the media and the public. In an attempt to make the notification system more understandable to all concerned, we converted this alphabetic code to a four-level color code (green, yellow, orange, red) in June 1997. This new system worked well during the strong unrest episode of July 1997 - January 1998. While relative quiescence in caldera unrest since mid-1999 has not further tested the color -code scheme, it has emphasized the challenge in maintaining awareness of local volcanic hazards and the hazards communication system by emergency response agencies and the public over the ***long*** term.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-017741

53. Database GeoRef

Title **Source processes of *Long Valley* Caldera seismicity determined by moment- tensor inversion**

Author Templeton, D C; Dreger, D S

Affiliation University of California at Berkeley, Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol. 73, no. 2, pp.253-254, Apr 2002

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2005-003709

54. Database GeoRef

Title **Moment-tensor statistics of the 1997 *Long Valley* microearthquake swarm**

Author Stroujkova, A; Malin, P E

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Source Journal of Seismology, vol.6, no.1, pp.69-85, Jan 2002

Resource Location http://www.springerlink.com/(4knaa555jbo5tsia1ithmgaw)/app/home/ journal.asp?referrer=parent&backto=linkingpublicationresults,1:100300,1

Publisher Kluwer Academic Publishers, Dordrecht - Boston - London, Netherlands (NLD)

Publication Year 2002

Publication Type Serial; Analytic

Accession Number 2003-069780

55. Database GeoRef

Title **The vertical component P-wave receiver function**

Author Langston, Charles A; Hammer, John K

Affiliation University of Memphis, Center for Earthquake Research and Information, Memphis, TN, United States (USA)

Affiliation Shell Deepwater Development, United States (USA)

Source Bulletin of the Seismological Society of America, vol.91, no.6, pp.1805-1819, Dec 2001

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The vertical component P-wave receiver function is an important source of data in studies of the crust/mantle transfer function for determining Earth structure under isolated receivers or under receiver arrays. This waveform illuminates a missing aspect of the wave propagation in receiver function studies that employ only the horizontal components of motion, and yields complementary constraints on near receiver heterogeneity and P-wave propagation. The vertical component P-wave receiver function is formed using an array estimate for the effective teleseismic source function that is then deconvolved from all the vertical and horizontal components of ground motion at each station in the array. One-dimensional, three-dimensional, and stochastic wave-propagation models are used to test the robustness of the technique. Breakdown of single-station receiver function deconvolution occurs because of high levels of noncorrelated noise between the ground-motion components. Receiver functions for stations of the southern California TERRAscope array are investigated using the array technique. Vertical receiver functions for stations in the Los Angeles Basin and ***Long Valley*** Caldera show high-amplitude secondary arrivals that cannot be explained by simple 1D structures but probably reflect wave propagation in 3D basin structures. Three-component receiver functions from the station at Mammoth Lakes, California, show pathological behavior where the horizontal components of ground motion exceed the amplitude of the vertical components, suggesting extreme topographic and 3D velocity heterogeneity. Use of all three components of the receiver function in modern passive array experiments is encouraged to reduce the problems of nonuniqueness in determining Earth models.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2002-027612

56. Database GeoRef

Title **Study of deep earth structure using body waves**

Author Tkalcic, Hrvoje

Publication Year 2001

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 2005-054980

57. Database GeoRef

Title **Multiple ruptures for *Long Valley* microearthquakes; a link to volcanic tremor?**

Author Stroujkova, A; Malin, P

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.106, no.1-2, pp.123-143, Apr 2001

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Despite several episodes of ground deformation and intense ***seismic*** activity starting in 1978, the ***Long Valley***, California, volcanic area has not produced clearly recognized volcanic tremor. Instead, a variety of atypical microearthquakes have been recorded during these episodes, including events dominated by low-frequency (***long***-period) or mixed high

and low-frequency (hybrid) signals. During a 1997 episode, a number of unusual microearthquakes occurred within a temporary 40-station ***seismic*** network surrounding the Casa Diablo area, allowing the events to be precisely located and analyzed as a function of azimuth, offset, and source characteristics. Eight prime examples lie within two, 7 km-deep clusters of seismicity separated by about 1km, with four events in each cluster. Empirical Green's function deconvolution shows that these events are composed of two to three sub-events, the sub-events consisting of ordinary (single rupture, double-couple) microearthquakes. The delay times between the sub-events are constant within each cluster, equaling 0.092s in one and 0.06s in the other. Events from other clusters show similar delays. The signal interference produced by the closely spaced sub-events gives rise to modulated, delay-dependent source spectra. The regularity of the delays suggests that the sub-events are being triggered by a fixed length and/or time scale process, an example being the length/inflation rate of a magmatic or hydrothermal flow structure. With continued action of the triggering process, the sub-events could proliferate and evolve into observable volcanic tremors at Mammoth.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-040543

58. Database GeoRef

Title **Observations of earthquake source parameters at 2 km depth in the *Long Valley* Caldera, eastern California**

Author Prejean, Stephanie G; Ellsworth, William L

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Source Bulletin of the Seismological Society of America, vol.91, no.2, pp.165-177, Apr 2001

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract To investigate ***seismic*** source parameter scaling and ***seismic*** efficiency in the ***Long Valley*** caldera, California, we measured source parameters for 41 earthquakes (M 0.5 to M 5) recorded at 2 km depth in the ***Long Valley*** Exploratory Well. Borehole recordings provide a wide frequency bandwidth, typically 1 to 200-300 Hz, and greatly reduce ***seismic*** noise and path effects compared to surface recordings. We calculated source parameters in both the time and frequency domains for P and S waves. At frequencies above the corner frequency, spectra decay faster than omega (super 3) , indicating that attenuation plays an important role in shaping the spectra (path averaged Q (sub p) = 100-400, Q (sub s) = 200-800). Source parameters are corrected for attenuation and radiation pattern. Both static stress drops and apparent stresses range from approximately 0.01 to 30 MPa. Although static stress drops do not vary with ***seismic*** moment for these data, our analyses are consistent with apparent stress increasing with increasing moment. To estimate tectonic driving stress and ***seismic*** efficiencies in the region, we combined source parameter measurements with knowledge of the stress field and a Coulomb failure criterion to infer a driving stress of 40-70 MPa. Subsequent ***seismic*** efficiencies are consistent with McGarr's (1999) hypothesis of a maximum ***seismic*** efficiency of 6%.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-049453

59. Database GeoRef

Title **Common features and peculiarities of the *seismic* activity at Phlegraean Fields, *Long Valley*, and Vesuvius**

Author Marzocchi, W; Vilardo, G; Hill, D P; Ricciardi, G P; Ricco, C

Affiliation INGV-Osservatorio Vesuviano, Naples, Italy (ITA)

Affiliation U. S. Geological Survey, United States (USA)

Source Bulletin of the Seismological Society of America, vol.91, no.2, pp.191-205, Apr 2001

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract We analyzed and compared the ***seismic*** activity that has occurred in the last two to three decades in three distinct volcanic areas: Phlegraean Fields, Italy; Vesuvius, Italy; and ***Long Valley***, California. Our main goal is to identify and discuss common features and peculiarities in the temporal evolution of earthquake sequences that may reflect similarities and differences in the generating processes between these volcanic systems. In particular, we tried to characterize the time series of the number of events and of the ***seismic*** energy release in terms of stochastic, deterministic, and chaotic components. The time sequences from each area consist of thousands of earthquakes that allow a detailed quantitative analysis and comparison. The results obtained show no evidence for either deterministic or chaotic components in the earthquake sequences in ***Long Valley*** caldera, which appears to be dominated by stochastic behavior. In contrast, earthquake sequences at Phlegraean Fields and Mount Vesuvius show a deterministic signal mainly consisting of a 24-hour periodicity. Our analysis suggests that the modulation in seismicity is in some way related to thermal diurnal processes, rather than luni-solar tidal effects. Independently from the process that generates these periodicities on the seismicity, it is suggested that the lack (or presence) of diurnal cycles in ***seismic*** swarms of volcanic areas could be closely linked to the presence (or lack) of magma motion.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-049455

60. Database GeoRef

Title **Geodetic and *seismic* constraints on recent activity at *Long Valley* Caldera, California; evidence for viscoelastic rheology**

Author Newman, A V; Dixon, T H; Ofoegbu, G I; Dixon, J E

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation Rosenstiel School of Marine and Atmospheric Science, United States (USA); Southwest Research Institute, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.105, no.3, pp.183-206, Feb 2001

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract ***Long Valley*** Caldera is an active volcanic region in east central California. Surface deformation on the resurgent dome within the caldera was an order of magnitude higher for the five-month period September 1997 through January 1998 compared to the previous three-year average. However, the location of the immediate (shallow) source of deformation remained essentially constant, 5-7 km beneath the dome, near the top of a region of probable magma accumulation defined by ***seismic*** data. Similarly, although the rate of ***seismic*** moment release increased dramatically, earthquake locations remained similar to earlier periods. The rate of deformation increased exponentially between April-May 1997 and late November 1997 with a time constant of approximately 55-65 days, after which it
decreased exponentially with about the same time constant. We develop a model consistent with these observations and also consistent with independent constraints on sub-surface rheology from thermal, geochemical and laboratory data. Deformation at sites on the resurgent dome most sensitive to the shallow deformation source are well fit by a model with a single pressure source at 6km depth which experienced a pressure pulse that began in
late 1996, peaked in November 1997, close to the time of major ***seismic*** moment release, and essentially ended in mid-1999. The pressure source in our model is surrounded by a 1 km thick "shell" of Maxwell viscoelastic material (shell viscosity 10 (super 16) Pa s) within an elastic half space, and has peak values that are much lower than corresponding purely elastic half space models. The shell viscosity is characteristic of a weak, deformable solid, e.g. quartz-bearing country rock surrounding the magma chamber at temperatures in the range 500-600 degrees C, i.e. above the brittle-ductile transition, and/or largely crystallized rhyolite near its solidus temperature of approximately 670 degrees C, material that probably
exists near the top of the zoned magma chamber at ***Long Valley***.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-030954

61. Database GeoRef

Title **Observation of diffusion processes in earthquake populations and implications for the predictability of seismicity systems**

Author Marsan, David; Bean, Christopher J; Steacy, Sandy; McCloskey, John **Affiliation** University College Dublin, Geology Department, Dublin, Ireland (IRL) **Affiliation** University of Ulster at Coleraine, United Kingdom (GBR)

Source Journal of Geophysical Research, vol. 105, no. B12, pp.28,081-28,094, 10 Dec 2000

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Scale invariance, either in space or in time, has been shown in many papers to characterize earthquake distributions. Unfortunately, little work has been dedicated to looking at the general space-time scaling invariance of seismicity systems, even though a better understanding of how the two domains (spatial and temporal) link together could help the development of the stochastic dynamical modeling of earthquake populations. In this paper we report the observation of diffusion processes of temporally correlated ***seismic*** activity for three different data sets: a mine (Creighton Mine, Canada), the ***Long Valley*** Caldera in eastern California, and a 7-year period of recorded ***seismic*** activity in southern California. The observed subdiffusion processes are indicative of the general space-time scaling of the system, taking the form of a slow power law growth R(t) approximately t (super H) of the mean distance R(t) between the main event and the temporally correlated afterevents occuring after a delay t. H is found on average to be small (0.1 for Creighton Mine, 0.22 for the ***Long Valley*** Caldera, and 0.22 for the southern California main events with magnitude > or = 1.5) but fluctuates significantly from one main event to the other: the diffusion is found to be intermittent (non-Gaussian) and multiscaling, and except for the ***Long Valley*** Caldera, a systematic correlation between the sizes of the main event and subsequent afterevents and the growth exponent H is observed. While classical viscous relaxation models (e.g., elastic listhosphere-plastic asthenosphere coupling, or fluid flow triggered by sudden changes in pore pressure) have been proposed to characterize this relaxation by homogeneous (i.e., nonintermittent) normal (H = 0.5) diffusion processes, the direct implication of the reported results is that seismicity systems, at spatial scales from meters to hundreds of kilometers and small (microearthquakes in a mine) to intermediate magnitudes, relax spatiotemporally in a nonelastic way, revealing the stochastic space-time scale-invariant nature of such systems. Since these diffusion processes correspond to a loss of information with time on the location of the main event, they can be used to investigate the limits of predictability, at all spatial scales, of seismicity systems in terms of the spatiotemporal clustering of temporally correlated earthquakes. Copyright 2000 by the American Geophysical Union.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2002-028992

62. Database GeoRef

Title **Tomographic evidence for migration of volcanic gas beneath Mammoth Mountain, *Long Valley* Caldera, California, between 1989 and 1997**

Author Foulger, G R; Julian, Bruce R; Pitt, A M; Hill, David P; Malin, Peter E; Shalev, Eylon

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Duke University, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1323, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073911

63. Database GeoRef

Title **Earthquake mechanisms at *Long Valley* Caldera, California**

Author Julian, Bruce R; Foulger, G R; Pitt, A M; Hill, David P; Malin, Peter E; Shalev, Eylon

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Duke University, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1384, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074119

64. Database GeoRef

Title **Strain transients preceding LP events, local earthquakes and during triggered seismicity from the October 16, 1999, M 7.1 Hector Mine, California, earthquake in the *Long Valley* Caldera**

Author Johnston, Malcolm J S; Hill, David P; Pitt, Andrew M

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1384, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074120

65. Database GeoRef

Title **Geodetic and *seismic* constraints on the 1997 inflation event at *Long Valley* Caldera**

Author Newman, Andrew V; Dixon, Timothy H; Ofoegbu, Goodluck I; Dixon, Jacqueline E

Affiliation University of California, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation University of Miami, United States (USA); Southwest Research Institute, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074122

66. Database GeoRef

Title **Deep geophysical observatory in *Long Valley* Caldera; strain measurements**

Author Sacks, I Selwyn; Linde, Alan T

Affiliation Carnegie Institution of Washington, Department of Terrestrial Magnetism, Washington, DC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074125

67. Database GeoRef

Title **Numerical analysis of near-source velocity structure bias on the recovery of isotropic**

moment tensors

Author Dreger, Douglas S; Panning, Mark

Affiliation University of California at Berkeley, UC Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.870, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-018913

68. Database GeoRef

Title **A volcano deformation model incorporating viscoelastic rheology**

Author Dixon, Timothy H; Ofoegbu, G; Dixon, J E; Newman, A V

Affiliation University of Miami, Miami, FL, United States (USA)

Affiliation Southwest Research Institute, United States (USA); University of California at Santa Cruz, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.337, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2006-055913

69. Database GeoRef

Title **Temporal evolution of the *seismic* activity at Phlegraean Fields, *Long Valley*, and Vesuvius**

Author Marzocchi, W; Vilardo, G; Hill, D P; Ricciardi, G P; Ricco, C

Affiliation Osservatorio Vesuviano, Naples, Italy (ITA)

Affiliation U. S. Geological Survey, United States (USA)

Author Wirakusumah, A Djumarma (chairperson)

Publisher IAVCEI, Indonesia (IDN)

Publication Year 2000

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2009-069509

70. Database GeoRef

Title **Faulting in the 1986 Chalfant, California, sequence; local tectonics and earthquake source parameters**

Author Smith, Kenneth D; Priestley, Keith F

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Affiliation University of Cambridge, United Kingdom (GBR)

Source Bulletin of the Seismological Society of America, vol.90, no.4, pp.813-831, Aug 2000

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The July 1986, moment magnitude (M (sub w)) 6.3 Chalfant, California, earthquake is the largest of a recent series (1978-present) of moderate-sized earthquakes near the ***Long Valley*** volcanic region of east-central California. The sequence consists primarily of three moderate-sized strike-slip events. High-quality aftershock relocations and short-period focal mechanisms define the temporal and spatial development of the foreshock -mainshock- aftershock periods of these three events. Faulting during the M (sub w) 5.7 (event I; July 20) and the M (sub w) 6.3 (event II; 21 July) events constitute a set of conjugate strike-slip faults. Event I involved predominantly left-lateral motion on a NE-striking fault plane initiating at shallow depth (7 km). Event II initiated at 10.5 km depth exhibiting right-lateral strike-slip motion on a NW-striking fault dipping moderately to the southwest. An M (sub L) 5.5 strike- slip event on 31 July (event III) extended the aftershock sequence to the south into the
White Mountains fault zone. P-wave pulse-width stress drops are determined for 185 M (sub L) 2.7-4.0 earthquakes that sample the entire sequence. Higher stress drops are observed near the intersection of event I and II fault planes and at the northern and southern ends of the aftershock zone. The moving-window b-value of the temporal magnitude distribution shows a general inverse relationship to stress drop with observed changes in both the average stress drop level and the b-value preceding event III. The average aftershock stress drop tends to increase as the sequence progresses suggesting that the faulted volume is equilibrating to the regional stress. Source parameters have been determined for the principal earthquakes from teleseismic body waves, local strong-motion records, and the extent of aftershock activity. The Chalfant sequence appears to be transferring strike-slip motion away from the White Mountains front, contributing to the observed increase in the relative normal offset, from south to north, along the White Mountains and the opening of the White Mountains relative to the Sierra Nevada Range front north of Owens ***Valley***.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2003-006251

71. Database GeoRef

Title **A study of microseismotectonics and earthquake sources in *Long Valley* Caldera, California**

Author Stroujkova, Anastasia Felixovna

Publication Year 2000

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 2003-038332

72. Database GeoRef

Title **The 1998 earthquake sequence south of *Long Valley* Caldera, California; hints of magmatic involvement**

Author Hough, S E; Dollar, R S; Johnson, P A B

Affiliation U. S. Geological Survey, Pasadena, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.90, no.3, pp.752-763, Jun 2000

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2000-060760

73. Database GeoRef

Title **Hydrologic events related to earthquakes in *Long Valley* Caldera, California**

Author Armstrong, Denise L

Abstract The ***Long Valley*** caldera in Eastern California is the site of recent volcanic and tectonic unrest. To better understand and predict this unrest, water level data collected between 1989 and 1990 from two observation wells (CH 10B and LKT) were studied to determine if aseismic precursory strain was recorded in the water levels. Hydrographs from the two wells were compared with ***seismic*** events, barometric pressure, rainfall, and runoff, and in CH 10B's case, flow rate data from the near by Casa Diablo Geothermal Power Plant. Water level data from CH 10B showed a number of inconsistencies and was difficult to interpret, probably in part because its shallow depth made it more susceptible to surface processes. Water levels from well LKT showed no precursory anomalies, however, the water levels did respond coseismically to large earthquakes as distant as 450 km, but not to small local events. These data show that it is extremely difficult using water levels in wells to predict earthquakes. Though

some workers believe they have detected precursory signals in water level data from other parts of the world, none have been able to predict consistently the location, size, and timing of a future earthquake.

Publication Year 2000

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 2002-037496

74. Database GeoRef

Title **Rapid distribution of earthquake information for everybody**

Author Jones, Alan; Michael, Andy; Simpson, Bob; Jacob, Stephen; Oppenheimer, David

Affiliation State University of New York, Binghamton, NY, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Source Seismological Research Letters, vol. 71, no. 3, pp.355-358, Jun 2000

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2008-126727

75. Database GeoRef

Title **Dilational processes accompanying earthquakes in the *Long Valley* Caldera**

Author Dreger, Douglas S; Tkalcic, Hrvoje; Johnston, Malcolm

Affiliation University of California at Berkeley, Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Source Science, vol.288, no.5463, pp.122-125, 07 Apr 2000

Resource Location http://www.sciencemag.org/

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2000-033386

76. Database GeoRef

Title **A magma mass beneath Casa Diablo? Further evidence from reflected *seismic* waves**

Author Stroujkova, A F; Malin, P E

Affiliation Duke University, Division of Earth and Ocean Science, Durham, NC, United States (USA)

Source Bulletin of the Seismological Society of America, vol.90, no.2, pp.500-511, Apr 2000

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract A forty-station seismographic network operating in ***Long Valley*** caldera in California during the summer of 1997 recorded a number of earthquakes with unusual secondary phases. The phases can be seen on several stations throughout the network, allowing the use of particle motions and differential travel times to examine their nature and points of origin. Based on amplitude, frequency, and travel-time considerations, it appears that some of the phases are mode-converted S-to-P reflections from a zone below the Casa Diablo area near Mammoth Lakes, CA. The locus of reflection points was imaged using time-domain signal migration and stacking under the assumptions of first-order scattering theory. The results indicate that the reflecting zone is a curved, 1.5 km by 2 km surface 7.6 km below and 1.4 km west of the Casa Diablo geothermal plant. Previous studies show low P-wave velocities and high S-wave attenuations in the same location as the reflecting zone. An amplitude analysis of the suspected reflections suggests they are produced by large contrasts in material properties, with the possible range of transitions including solid to partially molten or dry to fluid-saturated rock. Given these observations plus the volcanic history of the caldera and its recent tectonic activity, the most straightforward interpretation of the reflections is that they come from either the top of a sill or intrusion, or the overlying hydrothermal system of such structures.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2000-046632

77. Database GeoRef

Title **Evidence of coseismic volumetric expansion in the *Long Valley*, CA**

Author Dreger, D S; Tkalcic, H; Johnston, M J S

Affiliation Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol. 71, no. 2, pp.250, Apr 2000

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-015348

78. Database GeoRef

Title **When magma's on the move**

Author Wheeler, Mark

Source Smithsonian, vol.30, no.11, pp.40 -48, Feb 2000

Resource Location http://www.smithsonianmagazine.com/

Publisher Smithsonian Associates, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2005-008252

79. Database GeoRef

Title **Are the Sierras overriding a deep volcanic source at *Long Valley*?**

Author Smith, Ken; Biasi, Glenn P

Affiliation University of Nevada-Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.461, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract A synthesis of tectonic, geologic and geophysical evidence supports the hypothesis that the Sierran Mountain block in east central California is overriding the deep volcanic source responsible for ***Long Valley*** Caldera (LVC). For 12 mm/yr of NW motion of the Sierran block relative to a fixed volcanic source at depth, at least 10 km of southerly offset would have accumulated since the 0.75 Ma caldera forming event at ***Long Valley***. The modern period of earthquake activity (1978-present), extends 15-20 km south into the Sierran block and 20-30 km east and southeast of the current expression of LVC. This distribution of earthquake activity is difficult to reconcile with a crustal volcanic source associated exclusively with resurgence of the central caldera. Teleseismic P-wave tomography of the lower crust and upper mantle shows a region of decreased velocities extending south of LVC into the
Sierran lithosphere. The largest earthquakes, the distributed seismicity and the anomalous local orientation of stress axes from earthquake focal mechanisms that appear to be related to the upper mantle feature implies that the velocity contrast is also a lithospheric strength boundary. Although Mono Craters represent a northward extension of volcanism since the formation of ***Long Valley***, several lines of evidence also suggest the evolution of a deeper volcanic source south of the caldera. Magmatic intrusion into the Sierran block has been inferred from modeling deformation dominated by uplift in the central caldera (Langbein and others, 1995), attenuation of shear waves (Sanders and Nixon, 1995), reflections from potential magma sources from local earthquakes (Peppin and others, 1989) and anomalous signatures from modeling

earthquake dislocations (Julian, 1983; Dreger and others, 2000). The most plausible deep source for volcanism south of LVC is the continued dewatering of upper mantle originally hydrated by post-20 Ma subduction. Caldera -forming volcanism implies the original presence of huge quantities of volatiles including water and CO2. These quantities would be hard to concentrate in the small area of LVC through purely crustal tectonic mechanisms.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-014856

80. Database GeoRef

Title **Temporal gravity investigations at *Long Valley* Caldera, California**

Author Battaglia, Maurizio; Roberts, Carter W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.501, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** caldera has experienced intense ***seismic*** activity and ground uplift up to 75-80 cm in the past 20 years. Modeling of the ground deformation, seismicity and temporal gravity changes indicates that the unrest is due to inflation of a magma reservoir beneath the caldera. In order to better constrain physical processes now active beneath ***Long Valley***, we re-measured 35 stations of the caldera precise gravity monitoring network in July 1998 and 1999. Relative gravity measurements reveal a decrease in gravity of as much as -107+ or -6 mu Gal, centered on the uplifting resurgent dome. A positive residual gravity change of up to 64+ or -15 mu Gal was found after correcting for the effects of uplift and water table fluctuations. Assuming a point source of intrusion, the density of the intruding material is 2.7 to 4.1 g/cm3 at 95% confidence. The gravity results require intrusion of silicate magma, and exclude in situ thermal expansion or pressurization of the hydrothermal system as the cause of uplift and seismicity.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-018365

81. Database GeoRef

Title **A magma mass beneath Casa Diablo? Further evidence from reflected *seismic* waves**

Author Stroujkova, Anastasia; Malin, Peter

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1162, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-063318

82. Database GeoRef

Title **Borehole strain measurements and volcanic activity**

Author Linde, Alan T; Sacks, Selwyn

Affiliation Carnegie Institution of Washington, Washington, DC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.972-973, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-021395

83. Database GeoRef

Title **Stress drops, apparent stresses, and tectonic driving stress in the *Long Valley* Caldera, California**

Author Prejean, Stephanie G; Ellsworth, William L

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.682, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004613

84. Database GeoRef

Title **Water level changes at *Long Valley* Caldera, California, following distant and local earthquakes**

Author Roeloffs, Evelyn A; Sneed, Michelle; Galloway, Devin L; Quilty, Eddie G; Sorey, Michael L; Farrar, Christopher D; Hughes, Jennifer S

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.980, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004774

85. Database GeoRef

Title **Observation of volumetric *seismic* moment tensors in *Long Valley*, CA, earthquakes and involvement of fluids in the faulting process**

Author Dreger, Douglas S; Tkalcic, Hrvoje; Johnston, Malcolm J S

Affiliation University of California at Berkeley, Seismological Laboratory, Berkeley, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, suppl., pp.729, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-007412

86. Database GeoRef

Title **Three-dimensional *seismic* structure of *Long Valley* Caldera, eastern California**

Author Foulger, G R; Julian, Bruce R; Hill, David P; Pitt, A Mitchell; Malin, Peter E; Shalev, Eylon

Affiliation University of Durham Science Laboratories, Department of Geological Sciences, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA); Duke University, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.665, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-018639

87. Database GeoRef

Title ***Seismic* evidence for a complex magmatic system beneath *Long Valley* Caldera, California**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.222, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056553

88. Database GeoRef

Title **The summer 1998 "Tom's Place" sequence southeast of *Long Valley* Caldera, California; hints of magmatic/geothermal involvement?**

Author Hough, S E; Dollar, R S

Affiliation U. S. Geological Survey, Pasadena, CA, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.222, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056554

89. Database GeoRef

Title **Applications of GPS to volcano monitoring**

Author Newman, A; Dixon, T H; Dixon, J; Meertens, C; Perin, B; Stein, S

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation Rosenstiel School of Marine and Atmospheric Science, United States (USA); UNAVCO, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.224, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056561

90. Database GeoRef

Title **Earthquake source parameter scaling from deep borehole observations in *Long Valley*, California**

Author Prejean, S G; Ellsworth, W L; Ito, H

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Geological Survey of Japan, Japan (JPN)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.236, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056619

91. Database GeoRef

Title **Geodetic and *seismic* constraints on Recent activity and shallow magmatic properties at *Long Valley* Caldera, CA, USA**

Author Newman, Andrew V; Dixon, Jacqueline E; Dixon, Timothy H

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation University of Miami, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.100, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068061

92. Database GeoRef

Title **Temporal and three-dimensional spatial analyses of the frequency-magnitude distribution near *Long Valley* Caldera, California**

Author McNutt, Stephen R; Wiemer, Stefan; Wyss, Max

Affiliation University of Alaska at Fairbanks, Geophysical Institute, Fairbanks, AK, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.101, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068062

93. Database GeoRef

Title **Imaging gas beneath an active volcano using *seismic* tomography**

Author Foulger, G R; Julian, B R; Pitt, A M; Hill, D P

Affiliation University of Durham, Department of Geological Sciences, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, WEEK B, pp.151, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-064520

94. Database GeoRef

Title **High resolution spatial and temporal mapping of the frequency-magnitude distribution in volcanic areas for structural analysis and monitoring; capabilities and limitations**

Author Wiemer, Stefan

Affiliation ETH Hoenggerberg, Institute of Geophysics, Zurich, Switzerland (CHE)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, WEEK B, pp.155-156, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-064556

95. Database GeoRef

Title **Common features and peculiarities of the *seismic* activity at Campi Flegrei, *Long Valley*, and Vesuvius**

Author Marzocchi, Warner; Hill, David P; Ricciardi, Gianni; Vilardo, Giuseppe

Affiliation Osservatorio Vesuviano, Naples, Italy (ITA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.962, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2009-024927

96. Database GeoRef

Title **Analysis of non-tectonic events recorded on a portable array at *Long Valley* Caldera; it there signal in the noise?**

Author Hough, Susan E; Johnson, Peggy A; Dollar, Robert S; Pitt, Mitch; Hill, David P; Drake, Robert

Affiliation U. S. Geological Survey, Pasadena, CA, United States (USA)

Affiliation Southern California Earthquake Center, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.963, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2009-024930

97. Database GeoRef

Title **Audio frequency observations of local earthquakes at 2000 m depth in the *Long Valley* exploratory well, California**

Author Prejean, Stephanie; Ellsworth, William; Wilkinson, S; Rock, D; Harben, P; Kasameyer, P; Ito, H; Ohminato, T; Malin, P

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Lawrence Livermore National Laboratory, United States (USA); Geological Survey of Japan, Japan (JPN); Duke University, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.651, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2010-035202

98. Database GeoRef

Title **Peak ground accelerations recorded at *Long Valley* Caldera, California and at Guerrero, Mexico; the effects of site versus the effects of differing tectonic environments**

Author Peppin, William A

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Publication Year 1998

Publication Type Report; Monographic

Accession Number 2000-044882

99. Database GeoRef

Title ***Seismic* monitoring and activity increase in California caldera**

Author Foulger, Michael G R; Malin, Peter E; Shalev, E; Julian, Bruce R; Hill, David P

Affiliation University of Durham, Department of Geological Sciences, Durham, United Kingdom (GBR)

Affiliation Duke University, United States (USA); U. S. Geological Survey, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.79, no.30, pp.357, 363, 28 Jul 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1998-050575

100. Database GeoRef

Title ***Seismic* image of a CO (sub 2) reservoir beneath a seismically active volcano**

Author Julian, Bruce R; Pitt, A M; Foulger, G R

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Durham, United Kingdom (GBR)

Source Geophysical Journal International, vol.133, no.1, pp.F7-F10, Apr 1998

Resource Location http://www.blackwellpublishing.com/ journal.asp?ref=0956-540X

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Abstract Mammoth Mountain is a seismically active volcano 200 000 to 50 000 years old, situated on the southwestern rim of ***Long Valley*** caldera, California. Since 1989 it has shown evidence of unrest in the form of earthquake swarms (Hill et al. 1990), volcanic "***long***-period" earthquakes (Pitt & Hill 1994), increased output of magmatic (super 3) He (Sorey et al. 1993) and the emission of about 500 tonnes day (super -1) of CO (sub 2) (Farrar et al. 1995; Hill 1996; M. Sorey, personal communication, 1997), which has killed trees and poses a threat to human safety. Local-earthquake tomography shows that in mid-1989 areas of subsequent tree-kill were underlain by extensive regions where the ratio of the compressional and shear elastic-wave speeds V (sub p) /V (sub S) was about 9 per cent lower than in the surrounding rocks. Theory (Mavko & Mukerji 1995), experiment (Ito, DeVilbiss & Nur 1979), and experience at other geothermal/volcanic areas (Julian et al. 1996) and at petroleum reservoirs (Harris et al. 1996) indicate that V (sub p) /V (sub S) is sensitive to pore-fluid compressibility, through its effect on V (sub p) . The observed V (sub p) /V (sub S) anomaly is probably caused directly by CO (sub 2) , and ***seismic*** V (sub p) /V (sub S) tomography is thus a promising tool for monitoring gas concentration and movement in volcanoes, which may in turn be related to volcanic activity.

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1998-032566

101. **Database** GeoRef

Title **Moment tensor solutions of 1997-1998 *Long Valley* earthquake swarm**

Author Pasyanos, M E; Tkalcic, H; Dreger, D S; Hill, D S

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA)

Affiliation Colorado University, CIRES, United States (USA); U. S. Geological Survey, United States (USA)

Author Shedlock, Kaye M (chairperson); Sheehan, Anne F (chairperson)

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Seismological Research Letters, vol. 69, no. 2, pp.170, Apr 1998

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-052331

102. **Database** GeoRef

Title **Scattered waves as an imaging tool**

Author Bean, C J; O'Doherty, K; McCloskey, J

Affiliation University College Dublin, Department of Geology, Dublin, Ireland (IRL)

Affiliation University of Ulster, United Kingdom (GBR)

Author Anonymous

Source Annales Geophysicae (1988), vol.16, Suppl. 1, pp.151, 1998

Publisher European Geophysical Society, Kathlenburg-Lindau, Federal Republic of Germany (DEU)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-019688

103. **Database** GeoRef

Title ***Seismic*** **travel time tomography studies of two volcanoes, the** ***Long Valley*** **Caldera, California, and the Hengill Volcano, Iceland**

Author Tryggvason, A; Benz, H M; Rognvaldsson, S T

Affiliation Uppsala University, Department of Earth Sciences, Uppsala, Sweden (SWE)

Affiliation U. S. Geological Survey, United States (USA); Icelandic Meteorological Office, Iceland (ISL)

Author Anonymous

Source Annales Geophysicae (1988), vol.16, Suppl. 1, pp.174, 1998

Publisher European Geophysical Society, Kathlenburg-Lindau, Federal Republic of Germany (DEU)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-020780

104. **Database** GeoRef

Title **A microearthquake survey of the Mammoth Mountain area,** ***Long Valley*** **Caldera, California, summer 1997**

Author Foulger, G R; Julian, B R; Hill, D P; Sharer, G; Foulger, L E; Perlroth, R; Dotson, N; Pitt, A M; Brodsky, E

Affiliation University of Durham, Department of Geological Sciences, Durham, United Kingdom (GBR)

Source Open-File Report - U. S. Geological Survey, Report: OF 98-0236, 63 pp., 1998

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1998

Publication Type Serial; Report; Monographic

Accession Number 2000-030628

105. **Database** GeoRef

Title ***Seismic*** **tomography; inversion for P- and S-wave velocities**

Author Tryggvason, Ari

Affiliation Uppsala University, Department of Earth Sciences, Uppsala, Sweden (SWE)

Source Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, vol. 369, 31 pp., 1998

Publisher Acta Universitatis Upsaliensis, Uppsala, Sweden (SWE)

Abstract Seismology is undoubtedly the most powerful method for determining the structure of the Earth below the deepest borehole. This thesis describes the use of ***seismic*** signals from both man-made and earthquake sources to model ***seismic*** velocities within a volume of the Earth. Based on data from explosions, a two-dimensional model for the P-wave velocities from the Baltic Shield in southern Sweden, across Denmark and into the North German Basin is presented. The observed crustal structures show clear signs of extension,
estimated to be at least 20% along the profile. However, the emphasis of my work has been on modeling ***seismic*** velocities in three dimensions using local earthquake travel times. Two studies have been conducted, one using data from the ***Long Valley*** caldera, California. Originally formed in a catastrophic eruption 0.76 My ago, the caldera is today characterized by intense ***seismic*** activity. To better understand this volcanic system we have imaged the three-dimensional P- and S-wave velocity structure beneath the caldera. Low ***seismic*** velocities are observed below the resurgent dome down to depths of 9 km, which we believe are caused by hydrothermal circulation of fluids rather than by a large magma chamber. The observed lower than normal Vp/Vs ratios (<1.7) are associated with fractured rock containing compressible and low density fluids. Partially molten or hot material will reduce the S- more than the P-wave velocities, thus producing elevated Vp/Vs ratios. The second study exploits the earthquake data catalog from southwest Iceland. Within the study region are several volcanic centers, active and extinct. The seismically most active one is the Hengill volcanic complex, within 30 km of Reykjavik. The large fissure system is characterized by lower than normal velocities and, similar to the ***Long Valley*** caldera, low Vp/Vs ratios. We

conclude that supercritical magmatic fluids, such as CO (sub 2) and H (sub 2) O, circulate in the fissure system and cause the reduced velocities. These findings are important for understanding the nature of the volcanism and volcanic hazard in both study regions.

Publication Year 1998

Publication Type Serial; Monographic

Accession Number 1999-024845

106. Database GeoRef

Title **Spectral analysis of earthquakes in the 1989 Mammoth Mountain swarm near *Long Valley*, California**

Author Cramer, Chris H; McNutt, Stephen R

Affiliation California Department of Conservation, Division of Mines and Geology, Sacramento, CA, United States (USA)

Affiliation University of Alaska Fairbanks, United States (USA)

Source Bulletin of the Seismological Society of America, vol.87, no.6, pp.1454-1462, Dec 1997

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The 1989 earthquake swarm beneath Mammoth Mountain, near ***Long Valley***, California, was unique for the area because of the occurrence of low-frequency and unusual mixed-frequency events. At the time of the swarm, a computer-based earthquake detection system with near-real-time location and spectral fitting capabilities was operational at ***Long Valley***. This system detected over 1500 earthquakes during the swarm. About 64% of the events had a high-frequency content (4 to 8 Hz). 34% had a medium-frequency content (<4 Hz only), and 2% were low-or mixed-frequency events (approximately 2 HZ). Unusual events detected by the computer system during the 6-month swarm were 1) spasmodic tremor (14 strong bursts); 2) low-frequency events (30); and 3) low-frequency events with high-frequency riders, or mixed-frequency events (4 of the 30 low-frequency events). Filtering of mixed-frequency event waveforms suggests that they are a low-frequency event triggered by an earthquake. Mixed-frequency events had a limited source depth of 4 to 6 km while most low-frequency events were shallow. However, earthquakes with lower than average frequencies had source depths of 1 to 9 km, which include most of the depth range of the swarm earthquakes. Based on a comparison with tremor models by Chouet (1992), fluid resonance is a satisfactory explanation for the observed mixed-frequency events, although not the only possible explanation. Estimated resonant cavity size is 100 to 150 m for the Mammoth Mountain swarm. Geodetic and geothermal as well as ***seismic*** data suggest that an intrusion of water or magma probably occurred beneath Mammoth Mountain during this swarm. Finally, the computer-based detection and data-processing system used in this study demonstrated the value of spectral fitting capabilities for monitoring volcanic areas.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1998-031899

107. Database GeoRef

Title **1997 Mammoth Wave Propagation Experiment; a microearthquake study at Mammoth Mountain, California**

Author Hill, D P; Julian, B R; Pitt, A M; Foulger, G R; Sharer, G K; Brodsky, E

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Durham, United Kingdom (GBR); University of Washington, United States (USA); California Institute of Technology, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.443, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037808

108. Database GeoRef

Title **The 1997 Mammoth Wave Propagation Experiment; S-wave splitting, fault-guided**

waves, seismotectonics, and exotic sources in the Casa Diablo area

Author Malin, P; Shalev, E; Schleupner, D; Stroujkova, A; Boyd, L; Newman, A; Alvarez, M; Lyster, D

Affiliation Duke University, Durham, NC, United States (USA)

Affiliation Northwestern University, United States (USA); Stanford University, United States (USA); Mono County Energy Management Department, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.443, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037809

109. Database GeoRef

Title **The 1997 Mammoth Wave Propagation Experiment; high-resolution relative microearthquake locations in the Casa Diablo area**

Author Stroujkova, A; Shalev, E; Malin, P; Got, J L

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Affiliation Universite de Savoie, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.444, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037810

110. Database GeoRef

Title **Continuous monitoring of *seismic* and electromagnetic radiation in *Long Valley***

Author Kedar, Sharon; Fraser-Smith, Anthony; Johnston, Malcolm J S; Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Stanford University, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.476, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-056062

111. Database GeoRef

Title **Source processes of small earthquakes, M 1-5; studies of the San Andreas Fault at Parkfield and *Long Valley* Caldera, California**

Author Johnson, Peggy Ann

Publication Year 1997

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1999-047617

112. **Database** GeoRef

Title **Coda wave imaging of the *Long Valley* Caldera using a spatial stacking technique**

Author O'Doherty, Kathryn B; Bean, Christopher J; McCloskey, John

Affiliation University College, Dublin, Ireland (IRL)

Affiliation University of Ulster, United Kingdom (GBR)

Source Geophysical Research Letters, vol.24, no.13, pp.1547-1550, 01 Jul 1997

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1999-012937

113. Database GeoRef

Title **Continuous monitoring of surface deformation at *Long Valley* Caldera, California, with GPS**

Author Dixon, Timothy H; Mao, Ailin; Bursik, Marcus I; Heflin, Michael B; Langbein, John; Stein, Ross S; Webb, Frank H

Affiliation University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Affiliation State University of New York at Buffalo, United States (USA); Jet Propulsion Laboratory, United States (USA); U. S. Geological Survey, United States (USA)

Source Journal of Geophysical Research, vol. 102, no. B6, pp.12,017-12,034, 10 Jun 1997

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Continuous Global Positioning System (GPS) measurements at ***Long Valley*** Caldera, an active volcanic region in east central California, have been made on the south side of the resurgent dome since early 1993. A site on the north side of the dome was added in late 1994. Special adaptations for autonomous operation in remote regions and enhanced vertical precision were made. The data record ongoing volcanic deformation consistent with uplift and expansion of the surface above a shallow magma chamber. Measurement precisions (1 standard error) for "absolute" position coordinates, i.e., relative to a global reference frame, are 3-4 mm (north), 5-6 mm (east), and 10-12 mm (vertical) using 24 hour solutions. Corresponding velocity uncertainties for a 12 month period are about 2 mm/yr in the horizontal components and 3-4 mm/yr in the vertical component. High precision can also be achieved for relative position coordinates on short (<10 km) baselines using broadcast ephemerides and observing times as short as 3 hours, even when data are processed rapidly on site. Comparison of baseline length changes across the resurgent dome between the two GPS sites and corresponding two-color electronic distance measurements indicates similar extension rates within error (approximately 2 mm/yr) once we account for a random walk noise component in both systems that may reflect spurious monument motion. Both data sets suggest a pause in deformation for a 3.5 month period in mid-1995, when the extension rate across the dome decreased essentially to zero. Three dimensional positioning data from the two GPS stations suggest a depth (5.8 + or - 1.6 km) and location (west side of the resurgent dome) of a major inflation center, in agreement with other geodetic techniques, near the top of a magma chamber inferred from ***seismic*** data. GPS systems similar to those installed at ***Long Valley*** can provide a practical method for near real-time monitoring and hazard assessment on many active volcanoes. Copyright 1997 by

the American Geophysical Union.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1998-001026

114. Database GeoRef

Title **Future eruptions in California's *Long Valley* area; what's likely?**

Author Hill, David P; Bailey, Roy A; Miller, C Dan; Hendley, James W, II; Stauffer, Peter H

Affiliation U. S. Geological Survey, USA, (United States)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0073-97, 2 pp., 1997

Resource Location http://pubs.usgs.gov/fs/fs073-97/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1997

Publication Type Serial; Report; Monographic

Accession Number 1997-056107

115. Database GeoRef

Title **Presentation of three-dimensional geologic data**

Author Jachens, R C; Howell, David G; Wentworth, Carl M; Chan, Clara S; Roberts, Michelle A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.29, no.6, pp.424, 1997

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Traditional geologic maps present geologic data in two-dimensions (representing the surface of the Earth), with information about the third dimension included in the form of cross sections and stratigraphic columns. Standard map symbology, such as strikes, dips, fault attitudes, and fold axes, allow skilled geologic-map users to infer, with varying degrees of
confidence, quantitative information about the subsurface, while less skilled or lay users may have difficulty visualizing the subsurface geometries and relationships. To facilitate the use of geologic maps as windows into the subsurface, we are developing methods to produce and release "three-dimensional geologic maps", or Data Volumes (DVs). Capturing and displaying data in their true spatial relationships will enhance the interpretive value of the information. A pilot study is underway to demonstrate the utility of DVs, we are using the commercial software "EarthVision" mounted an a Sun Ultrasparc platform. This study focuses on a lithospheric volume roughly 100 km deep, 100 km wide, and 400 km ***long*** extending northeast across California from the oceanic crust west of Monterey Bay to ***Long Valley*** caldera east of the Sierra Nevada. The model includes topography and bathymetry as a Digital Elevation Model (DEM), surface and subsurface geology, drill-hole data, reflection and refraction information, earthquake hypocenters, geophysical interpretations from potential-field relations, and physical, chemical, and hydrologic property information. Problems and difficulties being addressed include the following: * Models must be able to display and manipulate three-dimensional data with broad dynamic range while also accommodating large overall spatial dimensions. Scales may range from 10 to 100 m in the near surface to several km in the deeper parts of the model. * Procedures must be able to capture spatial relations involving complex surfaces, volumes, and point data. A single model should be able to incorporate, for example, basin stratigraphy, chemical concentrations, and ***seismic*** velocity. * Procedures must be able to accommodate multiple interpretations. * Models must include the ability to express uncertainties throughout the volume. * Procedures must allow for fourth dimensional presentations where data are appropriate, e.g. earthquake hypocenters, fast moving toxic plumes.

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-051858

116. Database GeoRef

Title **Tectonic strain rate as the control parameter for earthquake interactions**

Author Scotti, O; Grasso, J R; Bossu, R; Cotton, F

Affiliation LGIT-IRIGM, Grenoble, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.516, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-010301

117. Database GeoRef

Title **Coda wave tomographic imaging through spatial stacking**

Author O'Doherty, K B; Bean, C J; McCloskey, J

Affiliation University College, Department of Geology, Dublin, Ireland (IRL)

Affiliation University of Ulster, United Kingdom (GBR)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.468, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-020146

118. Database GeoRef

Title **Inversion for the volcanic source at *Long Valley*, California, using a genetic algorithm technique**

Author Tiampo, K F; Hofton, M; Rundle, J B; Minster, J B

Affiliation University of Colorado, Department of Geological Sciences, Boulder, CO, United States (USA)

Affiliation Scripps Institution of Oceanography, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.146, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-030537

119. Database GeoRef

Title ***Seismic* triggering by rectified diffusion in geothermal systems**

Author Sturtevant, Bradford; Kanamori, Hiroo; Brodsky, Emily E

Affiliation California Institute of Technology, Graduate Aeronautical Laboratories, Pasadena, CA, United States (USA)

Source Journal of Geophysical Research, vol. 101, no. B11, pp.25,269-25,283, 10 Nov 1996

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Widespread seismicity was triggered by the June 28, 1992, Landers California, earthquake at a rate which was maximum immediately after passage of the exciting ***seismic*** waves. Rectified diffusion of vapor from hydrothermal liquids and magma into bubbles oscillating in an earthquake can increase the local pore pressure to seismically significant levels within the duration of the earthquake. In a hydrothermal system modeled as a two-component H (sub 2) O-CO (sub 2) fluid in porous rock the pressure initially increases linearly with time. The rate of pressure buildup depends sensitively on the mean bubble radius and is large for small bubbles. The diffusion-induced pressure is relaxed by percolation and resorption of vapor into the liquid solution. The induced seismicity itself also relieves stress. Values of parameters used in the present calculations give results consistent with observations of triggered seismicity at ***Long Valley*** caldera after the Landers earthquake. For one representative condition, at 250 degrees C and 5.6 km depth, oscillating strain acting on 10- mu m-diameter bubbles increases pore pressure at the rate of 151 Pa/s resulting in a pressure increase of 12 kPa in the 80-s duration of the Landers earthquake. The elevated pressure induced by a single 26-m-diameter cloud of bubbles in saturated rock relaxes by percolation through soil of 0.2-mdarcy permeability in 53.6 hours. Observations of earthquake swarms at other locations suggest that self-induced buildup of pore pressure by rectified diffusion can provide a positive feedback mechanism for amplifying seismicity. Copyright 1996 by the American Geophysical Union.

Publication Year 1996

Publication Type Serial; Analytic

Accession Number 1997-009029

120. **Database** GeoRef

Title **Microseismicity and hydrothermal circulation in *Long Valley* Caldera, CA**

Author von Damm, Gina Katharine

Abstract In late 1994, a small high density ***seismic*** array was deployed in ***Long Valley*** Caldera, CA. Its purpose was to better constrain the locations of the shallow microseismicity associated with the active hydrothermal system in the caldera. The array was able to record a number of small earthquakes that were not recorded by the US Geological Survey's (USGS) regional network. The earthquakes' small size and proximity to the array indicates that they may be related to near-surface processes, and this suggests that small, high-density arrays may indeed prove valuable in describing such processes. However, the correlation between microseismicity and hydrothermal circulation proved weak for a number of reasons, including one or more of the following hypotheses: 1) the significant hydrothermal plumbing system may have been too far away from the array, 2) microseismicity does not play a fundamental role in the dynamics of the hydrothermal system or 3) the water levels from the hydrologic monitoring well did not reflect the changes in the hydrothermal system that the ***seismic*** array was recording. Earthquakes not correlated with the USGS were all located within 4 km of the array which suggests that the array has a limited range of detection for these very small events. Earthquakes that were correlated with the USGS were significantly larger, and most were consistent with activity on the Hilton Creek fault, the Mammoth Embayment or fluid movement from the west moat toward Lake Crowley.

Publication Year 1996

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1998-040539

121. **Database** GeoRef

Title **The helium and carbon isotope systematics of a continental geothermal system; results from monitoring studies at *Long Valley* Caldera (California, U.S.A.)**

Author Hilton, David R

Affiliation Scripps Institution of Oceanography, Isotope Laboratory, La Jolla, CA, United States (USA)

Source Chemical Geology, vol.127, no.4, pp.269-295, 31 May 1996

Resource Location http://www.sciencedirect.com/ science/journal/00092541

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract This study reports fumarole and hot spring gas chemistry of a 3-year monitoring programme (1986-1988) at the seismically-active ***Long Valley*** caldera (LVC) in the Sierra Nevada, eastern California. The focus is on helium and carbon dioxide (isotopes and concentrations) and their variation in response to ***seismic*** activity in the region. Within the caldera, both species are predominantly magmatic in origin but their isotopic and elemental characteristics appear to be established prior to shallow-level intrusion and/or are influenced by pre-eruptive degassing. In response to intra-caldera and regional seismicity over the monitoring period, CO (sub 2) and helium show markedly different behaviour: the greatest change in various carbon-related parameters (CO (sub 2) %; delta (super 13) C(CO (sub 2)); CO (sub 2) / (super 3) He) occurred in 1986 and were most likely related to regional seismicity in the nearby Chalfont ***Valley***. Helium did not respond to these events. The largest change (up to approximately 25%) in (super 3) He/ (super 4) He ratios was seen in 1987 with the occurrence of both increases and decreases relative to the almost constant values observed in 1988. The increases are consistent with magma intrusion occurring within the caldera in 1987 whilst the decreases occurred significantly later (>6 months) than any ***seismic*** activity. It is suggested that decreases in (super 3) He/ (super 4) He are related to the regional seismicity and that the hydrothermal system exerts a (temporal) control on the release of near-surface (super 4) He. At LVC this is related to the timing of the late spring thaw. Results from previous monitoring programmes (when the level of seismicity in the caldera was higher) are evaluated against variations in the present work. There appears to be a convincing link between higher (super 3) He/ (super 4) He values and the level of seismicity in the caldera although factors related to location, magnitude and frequency of ***seismic*** events are difficult to quantify. Because of the inferred small isotopic contrast between new magma and presently-degassing magma at LVC, it is anticipated that large variations in (super 3) He/ (super 4) He within the central caldera are unlikely to occur until the magmatic volatile signal wanes as a function of degassing and time. Alternatively, only at those localities situated at significant distances from the region of magma intrusion (i.e. away from the resurgent dome vicinity) are helium and/or carbon likely to respond dramatically to intra-caldera seismicity.

Publication Year 1996

Publication Type Serial; Analytic

Accession Number 1996-052023

122. **Database** GeoRef

Title **Three-dimensional structure of Mammoth Mtn., *Long Valley* Caldera, from**

***seismic* tomography**

Author Foulger, G R; Pitt, A M; Julian, B R; Hill, D P

Affiliation University of Durham, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.351, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1996-031312

123. Database GeoRef

Title **Pg velocity structure of the western Great Basin by a simple tomography scheme**

Author Asad, Abu M; Louie, John N

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.427-428, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1996-067356

124. Database GeoRef

Title **Nonlinear teleseismic tomography at *Long Valley* Caldera, using three- dimensional minimum travel time ray tracing**

Author Weiland, Charles M; Steck, Lee K; Dawson, Phillip B; Korneev, Valeri A

Affiliation University of California, Santa Barbara, CA, United States (USA)

Affiliation Los Alamos National Laboratory, United States (USA); U. S. Geological Survey, United States (USA); Lawrence Berkeley Laboratory, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B10, pp.20,379-20,390, 10 Oct 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We explore the impact of three-dimensional minimum travel time ray tracing on nonlinear teleseismic inversion. This problem has particular significance when trying to image strongly contrasting low-velocity bodies, such as magma chambers, because strongly refracted and/or diffracted rays may precede the direct P wave arrival traditionally used in straight-ray ***seismic*** tomography. We use a simplex-based ray tracer to compute the three-dimensional, minimum travel time ray paths and employ an iterative inversion technique to cope with nonlinearity. Results from synthetic data show that our algorithm results in better model reconstructions compared with traditional straight-ray inversions. We reexamine the teleseismic data collected at ***Long Valley*** caldera by the U. S. Geological Survey. The most prominent feature of our result is a 25-30% low-velocity zone centered at 11.5 km depth beneath the northwestern quadrant of the caldera. Beneath this at a depth of 24.5 km is a more diffuse 15% low-velocity zone. In general, the low velocities tend to deepen to the south and east. We interpret the shallow feature to be the residual ***Long Valley*** caldera magma chamber, while the deeper feature may represent basaltic magmas ponded in the midcrust. The deeper position of the prominent low-velocity region in comparison to earlier tomographic images is a result of using three-dimensional rays rather than straight rays in our ray tracing. The magnitude of our low- velocity anomaly is a factor of approximately 3 times larger than earlier models from linear arrival time inversions and is consistent with models based on observations of ray bending at sites within the caldera. Our results imply the presence of anywhere from 7 to 100% partial melt beneath the caldera. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1996-016094

125. Database GeoRef

Title **S wave attenuation in *Long Valley* Caldera, California, from three-component S-to-P amplitude ratio data**

Author Sanders, Christopher O; Nixon, Lesley D

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B7, pp.12,395-12,404, 10 Jul 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Using S-to-P amplitude ratios measured from three-component seismograms we tomographically imaged spatial variations in S wave attenuation in parts of ***Long Valley*** caldera. Data from seismograms of local earthquakes in the ***Long Valley*** caldera region that occurred during 1984 were employed with the S-to-P amplitude ratio technique with corrections for source radiation pattern to determine Q (sub S). Resolution is limited throughout most of the model; however, significant resolution and acceptable error in parts

of the model allow meaningful interpretation of the results. The primary result is the image of a low-Q (sub S) anomaly at 7-8 km depth beneath the resurgent dome. This is independent evidence for high temperatures and possible magma accumulation at this location. Other regions of anomalously low Q (sub S) are marginally significant or poorly resolved; of these low Q (sub S) at 4-5 km depth beneath the Inyo Domes has the most potential significance. The similarity of the results from the three-component data and from the vertical-component data implies that vertical-component data, which are generally more abundant, can be used with confidence. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-053137

126. Database GeoRef

Title **Response of *Long Valley* Caldera to the M (sub w) = 7.3 Landers, California, earthquake**

Author Hill, David P; Johnston, Malcolm J S; Langbein, John O; Bilham, Roger

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Colorado at Boulder, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B7, pp.12,985-13,005, 10 Jul 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Of the many sites in the western United States responding to the June 28, 1992, Landers earthquake (M (sub w) = 7.3) with remotely triggered seismicity, only ***Long Valley*** caldera is monitored by both ***seismic*** and continuous deformation networks. A transient strain pulse and surge in seismicity recorded by these networks began within tens of seconds following arrival of the shear pulse from Landers. The cumulative strain and number of triggered earthquakes followed the same exponentially decaying growth rate (time constant 1.8 days) during the first 6 days following Landers. The strain transient, which was recorded on a borehole dilatometer at the west margin of the caldera and a ***long***-base tiltmeter 20 km to the east, peaked on the sixth day at nearly equal 0.25 ppm and gradually decayed over the next 15-20 days. The absence of a clear strain signal exceeding 0.4 ppm in data from the two-color geodimeter deformation lines, which span the central section of the caldera, indicates that the strain transient cannot be due solely to pressure changes in the concentrated pressure source 7 km beneath the central part of the caldera that accounts for most of the uplift of the resurgent dome since 1980. The triggered seismicity occupied the entire seismogenic volume beneath the caldera. The focal mechanisms, the frequency- magnitude distribution, and the spatial distribution of the triggered earthquakes are typical of other swarms in ***Long Valley*** caldera. The cumulative ***seismic*** moment of the triggered earthquakes through the first 2 weeks after the Landers earthquake corresponds to a single M = 3.8 earthquake, which is too small by nearly 2 orders of magnitude to account for the 0.25-ppm peak amplitude of the observed strain transients. Evidently, the strain transient represents the dominant response mode, which precludes direct triggering of local earthquakes by the large dynamic stresses from Landers as the dominant process. Conditionally viable models for the triggering process beneath the caldera include (1) the transient pressurization of magma bodies beneath the resurgent dome and Mammoth Mountain by the advective overpressure of rising bubbles, (2) a surge in fluid pressure within the seismogenic zone due to upward cascading failure of isolated compartments containing superhydrostatic pore fluids, (3) relaxation (fluidization) of a partially crystallized magma body or dike intrusion in the deep crustal roots of ***Long Valley*** magmatic system, or (4) aseismic slip on midcrustal faults. Either the deep, relaxing-magma body or lower crustal dike intrusion satisfy all the strain observations with a single deformation source. The latter model admits the possibility that large, regional earthquakes can trigger the episodic recharge of the deep roots of crustal magmatic systems. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-053175

127. Database GeoRef

Title **Application of *seismic* tomographic techniques in the investigation of geothermal systems**

Author Romero, Arturo Espejo

Publication Year 1995

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1996-066189

128. Database GeoRef

Title **Seismicity and eruptions triggered by large earthquakes**

Author Linde, Alan T; Sacks, I Selwyn

Affiliation Carnegie Instition of Washington, Department of Terrestrial Magnetism, Washington, DC, United States (USA)

Author Anonymous

Publisher Executive Committee, Japan (JPN)

Publication Year 1995

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2009-071892

129. Database GeoRef

Title **Transient deformation during triggered seismicity from the 28 June 1992 M (sub W) = 7.3 Landers earthquake at *Long Valley* volcanic caldera, California**

Author Johnston, M J S; Hill, D P; Linde, A T; Langbein, J; Bilham, R

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Carnegie Inst. of Washington, United States (USA); University of Colorado, United States (USA)

Source Bulletin of the Seismological Society of America, vol.85, no.3, pp.787-795, Jun 1995

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-041987

131. Database GeoRef

Title ***Seismic* evidence for an earthquake nucleation phase**

Author Ellsworth, W L; Beroza, G C

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Stanford University, United States (USA)

Source Science, vol.268, no.5212, pp.851-855, 12 May 1995

Resource Location http://www.sciencemag.org/

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-038488

132. Database GeoRef

Title **Seismological evidence for magmatic and hydrothermal structure in *Long Valley* Caldera from local earthquake attenuation and velocity tomography**

Author Sanders, C O; Ponko, S C; Nixon, L D; Schwartz, E A

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B5, pp.8311-8326, 10 May 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-043326

133. Database GeoRef

Title **Simulated annealing inversion of teleseismic P-wave slowness and azimuth for crustal velocity structure at *Long Valley* Caldera**

Author Steck, Lee K

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Source Geophysical Research Letters, vol. 22, no. 4, pp.497-500, 15 Feb 1995

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Simulated annealing, a non-linear global search algorithm, is used to invert teleseismic P-wave slowness and azimuth data for crustal velocity structure. Synthetic tests show that simulated annealing is able to locate low P-wave velocity zones with reasonable accuracy in space, and recovers almost 70% of the target velocity perturbations. Testing suggests that significant results can be obtained with as few as two stations. Inversion of ray direction data from ***Long Valley*** caldera finds an asymmetrical low velocity zone beneath the resurgent dome at 8km depth, having a perturbation of -25% from the background. This zone extends to the east and south to depths of at least 24km, with a perturbation of about -10%. These features generally agree with previous results from teleseismic travel-time inversion and forward modeling of ray direction, and are probably associated with the residual ***Long Valley*** caldera magma chamber. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-039197

134. Database GeoRef

Title **Seismicity and eruptions triggered by large earthquakes**

Author Linde, Alan T; Sacks, I Selwyn

Affiliation Carnegie Institution of Washington, Department of Terrestrial Magnetism, Washington, DC, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.21, Week A, pp.353, 1995

Publisher [publisher varies], [location varies], International (III)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-050273

135. Database GeoRef

Title **Intrusive mechanism of shallow earthquake preparation**

Author Guterman, V G; Khazan, Ya M

Affiliation Ukrainian Academy of Science, Institute of Geophysics, Kiev, Ukraine (UKR)

Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.21, Week A, pp.361, 1995

Publisher [publisher varies], [location varies], International (III)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-050335

136. Database GeoRef

Title **Comparison of crustal structure beneath Valles Caldera, New Mexico and *Long Valley* Caldera, California**

Author Steck, L; Lutter, W; Fehler, M; Thurber, C; Weiland, C; Baldridge, S; Roberts, P

Affiliation Los Alamos National Laboratory, Geo-Engineering Group, Los Alamos, NM, United States (USA)

Affiliation University of Wisconsin, United States (USA); University of California at Santa Barbara, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.21, Week A, pp.452-453, 1995

Publisher [publisher varies], [location varies], International (III)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-011053

137. Database GeoRef

Title **Evidence for processes driving unrest in *Long Valley* Caldera, California**

Author Hill, D P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Periodico di Mineralogia, vol.64, no.1-2, pp.197-198, 1995

Resource Location http://tetide.geo.uniroma1.it/riviste/permin/permin.html

Publisher Bardi Editore, Rome, Italy (ITA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2006-084336

138. Database GeoRef

Title **Evidence for a constant b-value above magnitude 0 in the southern San Andreas, San Jacinto, and San Miguel fault zones, and at the *Long Valley* Caldera, California**

Author Abercrombie, R E; Brune, James N

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Source Geophysical Research Letters, vol. 21, no. 15, pp.1647-1650, 15 Jul 1994

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The cumulative b-value (the slope of the Gutenberg - Richter relationship between earthquake occurrence rate and magnitude) is commonly found to be constant (approximately 1). Network catalogues, however,

reveal a decrease at small magnitudes (<
3). Some recent studies have suggested that this decrease in b-value is not just an artifact of catalogue incompleteness, but that small earthquakes are really not as numerous as a constant b-value extrapolated from larger events would predict. Brune & Allen [1967] recorded microseismicity in both the San Andreas and San Jacinto fault zones in southern California, calculating that they were complete to magnitude 0. Reyes et al. [1975] performed a similar study of the San Miguel fault zone, Baja California, estimating completeness above magnitude -0.5. We compare the results of these studies with the occurrence rates of earthquakes on the same faults recorded by the Southern California and RESNOR ***seismic*** networks. The observed microseismicity rates are in good agreement
with the rates predicted by extrapolating the b-values of the larger earthquakes. In a new microseismicity survey at the ***Long Valley*** caldera, Mammoth Lakes, California, microearthquakes were recorded and counted within 24 km of stations CLK and CHS. This study is estimated to be complete above 0.6 M at CLK and 0.9 M at CHS, and the microseismicity rates are found to be in good agreement with the rate predicted by extrapolating the b-value from the local network recorded seismicity. The constant b-value in the magnitude range 0 to 5 observed in all four areas considered is consistent with a scale invariant earthquake rupture process. Copyright 1994 by the American Geophysical Union.

Publication Year 1994

Publication Type Serial; Analytic

Accession Number 1995-010332

139. Database GeoRef

Title **Crustal structure beneath *Long Valley* caldera from modeling of teleseismic P wave polarizations and Ps converted waves**

Author Steck, Lee Karl; Prothero, William A, Jr

ffiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Affiliation University of California at Santa Barbara, United States (USA)

Source Journal of Geophysical Research, vol. 99, no. B4, pp.6881-6898, 10 Apr 1994

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract In this study we present new constraints on the nature of the low-velocity zone beneath ***Long Valley*** caldera, based on the measured propagation directions of teleseismic P waves and on modeling of P to S converted waves. The low-velocity body is a large asymmetrical volume which deepens to the east, extending from depths of 7 to 30 km. It contains lower velocities than originally proposed by earlier teleseismic studies. In particular, there is a tabular feature between 7 and 11 km depth that has a reduction in velocity of about 30%. These low velocities imply a much greater percentage of melt in the crust beneath ***Long Valley*** caldera than previously estimated. Array analysis of large delayed arrivals identifies them to be Ps converted waves from the shoulders and roof of this tabular zone. These conversions bound the depth to the magma chamber roof to be within about 10 km of the surface. Our results are consistent with elements from several other studies, and we present an integrated and improved model of crustal structure at ***Long Valley***. The concordance of the deeper low-velocity zones with regional structural trends implies that the shallow low velocity feature is a cupola on top of an asymmetric diapiric ridge rising up from the migmatized lower crust of the Basin and Range. We present two contrasting interpretations of the geometry of low-velocity zones in the crust: one implies a time invariant magma chamber and conduit system for ***Long Valley*** caldera, the other implies an evolution of that system from a simple vertical regime to its current asymmetrical geometry. Copyright 1994
by the American Geophysical Union.

Publication Year 1994

Publication Type Serial; Analytic

Accession Number 1995-041207

140. Database GeoRef

Title **Simulated annealing inversion of teleseismic P-wave slowness and azimuth for crustal velocity structure**

Author Steck, L K

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.65, no.1, pp.15, Mar 1994

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-066215

141. **Database** GeoRef

Title **Local earthquake attenuation and velocity tomography for magmatic and hydrothermal structure in *Long Valley* Caldera, California**

Author Sanders, C O; Ponko, S C; Nixon, L D; Schwartz, E A

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.65, no.1, pp.56, Mar 1994

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-066399

142. **Database** GeoRef

Title **Response of *Long Valley* Caldera to the M7.4 Landers earthquake; tweaking a magma body?**

Author Hill, David P; Johnston, M J S; Langbein, J O; Bilham, Roger

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Colorado, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.65, no.1, pp.58, Mar 1994

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-066408

143. **Database** GeoRef

Title **Inversion for P and S wave attenuation structure, *Long Valley* Caldera, California**

Author Ponko, Stefan C; Sanders, Christopher O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 99, no. B2, pp.2619-2635, 10 Feb 1994

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract P and S wave amplitude data from digital, three-component seismograms of local earthquakes recorded on a temporary ***seismic*** array have been used to tomographically invert for the three-dimensional attenuation structure in the upper crust of ***Long Valley*** caldera, California. Differential attenuation (theta Q (super -1)) values are obtained through the use of a spectral ratio technique that minimizes the site effect on the spectral ratios. The spectral ratios are inverted for theta Q (super -1) using the LSQR algorithm. Zones of high, positive P wave theta Q (super -1) (greater P wave attenuation) are observed at a depth of 4-5 km beneath the east flank of Mammoth Mountain and at 6-8 km beneath the southwestern edge of the resurgent dome. A region of positive S wave theta Q (super -1) is seen at 7-8 km beneath the southern edge of the resurgent dome, whereas at 6-7 km, the S wave results are near average. The region of positive S wave theta Q (super -1) at 7-8 km beneath the resurgent dome may indicate the roof of a magmatic system. The positive P wave theta Q (super -1) at 4-5 km beneath Mammoth Mountain and 6-8 km beneath the resurgent dome may be due to the presence of a compressible fluid such as supercritical water. These zones may represent some of the source regions for the ***Long Valley*** geothermal system. Copyright 1994 by the American Geophysical Union.

Publication Year 1994

Publication Type Serial; Analytic

Accession Number 1995-037341

144. **Database** GeoRef

Title **Reanalysis of S-to-P amplitude ratios for gross attenuation structure, *Long Valley* Caldera, California**

Author Sanders, Christopher O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 98, no. B12, pp.22,069-22,079, 10 Dec 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Because of the strong interest in the magmatism and volcanism at ***Long Valley*** caldera, eastern California, and because of recent significant improvements in our knowledge of the caldera velocity structure and earthquake locations, I have reanalyzed the local-earthquake S-to-P amplitude -ratio data of Sanders (1984) for the gross three-dimensional attenuation structure of the upper 10 km of ***Long Valley*** caldera. The primary goals of the analysis are to provide more accurate constraints on the depths of the attenuation anomalies using improved knowledge of the ray locations and an objective inversion procedure. The new image of the high S wave attenuation anomaly in the west-central caldera suggests that the top of the principal anomaly is at 7-km depth, which is 2 km deeper than previously determined. Because of poor resolution in much of the region, some of the data remain unsatisfied by the final attenuation model. This unmodeled data may imply unresolved attenuation anomalies, perhaps small anomalies in the kilometer or two just above the central -caldera anomaly and perhaps a larger anomaly at about 7-km depth in the northwest caldera or somewhere beneath the Mono Craters. The central -caldera S wave attenuation anomaly has a location similar to mapped regions of low teleseismic P wave velocity, crustal inflation, reduced density, and aseismicity, strongly suggesting magmatic association. Copyright 1993 by the American Geophysical Union.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-024600

145. Database GeoRef

Title **Velocity structure of the *Long Valley* Caldera from the inversion of local earthquake P and S travel times**

Author Romero, Arturo E, Jr; McEvilly, Thomas V; Majer, Ernest L; Michelini, Alberto

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Affiliation CNR-Istituto Talassografico Sperimentale, Italy (ITA)

Source Journal of Geophysical Research, vol. 98, no. B11, pp.19,869-19,879, 10 Nov 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A high-resolution tomographic study of the ***Long Valley*** region began in 1989 with the installation of a special fan array of eight three-component borehole (80-160 m depths) receivers on the northwestern rim of the caldera to provide the data necessary for a joint inversion for hypocenters and the three-dimensional P and S wave velocity structure in and below the caldera. The experiment specifically targeted the subsurface location of the previously inferred magma chamber beneath the Resurgent Dome. Additional coverage was provided by existing U.S. Geological Survey and University of Nevada, Reno seismographic networks. We employed the progressive inversion scheme of Thurber (1983), with cubic spline interpolation after Michelini and McEvilly (1991). The final model is based on data from 280 well-distributed local earthquakes. Some 6900 arrival times were used, including about 700 S wave times from the three-component stations. The resulting velocity structure reflects the known geology, defining the low-velocity caldera fill to 2 km depth, contrasting markedly with the surrounding higher-velocity Sierran block and highland terrane. No isolated distinct low-velocity anomalies are revealed beneath the caldera floor, although a diffuse zone of reduced velocity persists to a depth of about 8 km. These lower velocities may be related to hydrothermal alteration and/or extensive fractures. The V (sub p) /V (subs) structure contains significant lateral variation within and beneath the caldera to about 8 km depth, and these variations can be related to accepted models of the active geothermal system. The lack of a significant S wave velocity anomaly, along with the normal or low values of the V (sub p) /V (sub s) ratio, argues against the presence of a sizable and distinct magma body at shallow to midcrustal depth beneath ***Long Valley*** caldera, although a very low percentage of partial melt cannot be precluded. Copyright 1993 by the American Geophysical Union.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-009368

146. Database GeoRef

Title **Imaging volcanoes using teleseismic tomography**

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Affiliation Kyoto University, Japan (JPN)

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Publisher Chapman and Hall, London, United Kingdom (GBR)

Publication Year 1993

Publication Type Book; Analytic

Accession Number 1994-011064

147. Database GeoRef

Title **Local earthquake tomography; attenuation; theory and results**

Author Sanders, C O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Affiliation Kyoto University, Japan (JPN)

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Publisher Chapman and Hall, London, United Kingdom (GBR)

Publication Year 1993

Publication Type Book; Analytic

Accession Number 1994-011071

148. Database GeoRef

Title **Analysis of VSP data from the DOE exploratory well (LVF 51-20) at *Long Valley* Caldera, eastern California**

Author Romero, A E; Gritto, R; Daley, T M; Majer, E L; Rector, J W

Affiliation University of California at Berkeley, Department of Geology and Geophysics, Berkeley, CA, United States (USA)

Affiliation Lawrence Berkeley Laboratory, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.43, Suppl., pp.409, 26 Oct 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-044946

149. Database GeoRef

Title **Observations of direct P-wave slowness and azimuth anomalies for teleseisms recorded in *Long Valley* Caldera, California**

Author Steck, Lee K; Prothero, William A, Jr

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of California-Santa Barbara, United States (USA)

Source Bulletin of the Seismological Society of America, vol.83, no.5, pp.1391-1419, Oct 1993

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-038171

150. **Database** GeoRef

Title **An episode of reinflation of the *Long Valley* Caldera, eastern California; 1989-1991**

Author Langbein, John O; Hill, David P; Parker, Timothy N; Wilkinson, Stuart K

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 98, no. B9, pp.15,851-15,870, 10 Sep 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Following the episodes of inflation of the resurgent dome associated with the May 1980 earthquake sequence (four M 6 earthquakes) and the January 1983 earthquake swarm (two M 5.2 events), 7 years of frequently repeated two-color geodimeter measurements spanning the ***Long Valley*** caldera document gradually decreasing extensional strain rates from 5 ppm/yr in mid-1983, when the measurements began, to near zero in mid-1989. The corresponding ***seismic*** activity within the caldera persisted at a low rate of fewer than 10 M > or = 1.2 earthquakes per week from 1985 through November 1989 with no events exceeding M 3.0. Early October 1989 marked a change in activity when measurements of the two-color geodimeter network showed a significant increase in extensional strain rate (9 ppm/yr) across the caldera. The ***seismic*** activity began exceeding 10 M > or = 1.2 per week in early December 1989 and rapidly increased to a sustained level of tens of M > or = 1.2 per week with bursts having hundreds of events per day. Many events exceeded M 3.0 and the largest event was M nearly equal 4. The 1989-1991 inflation episode is the first time that we have sufficient geodetic measurements in ***Long Valley*** to define the temporal relation between onset of an inflation episode and onset of brittle failure (earthquake swarm within the caldera). Here, the onset of deformation preceded the onset of increased earthquake activity by more than 2 months. The seismicity rate began to decrease in mid-July 1990, consistent with a gradually slowing of extension across the caldera as measured by the two- color geodimeter. The recent episode of inflation can be modeled by a single Mogi point source located about 7 km beneath the center of the resurgent dome. In contrast, the deformation pattern observed between mid-1983 and mid-1989 is best reproduced by fault slip in the south moat, inflation at 6.5 km depth near Casa Diablo Hot Springs and inflation beneath the resurgent dome. It appears that the 7-km source beneath the resurgent dome that was active for the earlier episodes is the primary source for the more recent episode. The model used to satisfy the line length observations predicts 7.5 cm of uplift along leveling route along highway 395 from mid-1983 to mid-1989 and an additional 11 cm through the end of 1991. To comp are with the energy release from seismicity, the modeled inflation from late 1989 through the end of 1991 has a moment that is a factor of 40 more than the cumulative ***seismic*** moment from earthquakes located within the caldera from the same period. Thus the recent inflation episode represents a significant portion of the observed geodetic deformation with only little ***seismic*** energy release.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-041614

151. **Database** GeoRef

Title **Helium isotope and gas discharge variations associated with crustal unrest in *Long Valley* Caldera, California, 1989-1992**

Author Sorey, M L; Kennedy, B M; Evans, W C; Farrar, C D; Suemnicht, G A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA); Unocal Geothermal Division, United States (USA)

Source Journal of Geophysical Research, vol. 98, no. B9, pp.15,871-15,889, 10 Sep 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The onset of anomalous ***seismic*** activity in 1989 beneath Mammoth Mountain on the southwestern rim of the ***Long Valley*** caldera, California, was followed within approximately 4 months by a large increase in (super 3) He/ (super 4) He in vapor discharged from a fumarole on the north side of the mountain. The helium isotopic ratio at this vent rose to a maximum of 6.7 RA in July 1990 and subsequently declined to values near 5 R (sub A) . Potential sources of the (super 3) He-rich vapors include degassing of fresh magma, degassing from fresh surfaces generated in newly fractured igneous rocks, and volatile release from a (super 3) He-rich gas chamber situated above previously emplaced intrusives. The magnitude of the increase in helium isotopic composition (from 3.8 to 6.7 R (sub A)), the persistence of relatively high values (>5 R (sub A)) over a period of 3 years, the increase in the flux of total He relative to gases in air-saturated water, and the increases in the rates of discharge of steam and gas from this fumarole indicate that magmatic intrusion did in fact begin in 1989 beneath Mammoth Mountain. ***Seismic*** activity and limited measurements of extensional deformation at the surface suggest that the depth of intrusion may be as shallow as 2 km, consistent with the prompt appearance of increased (super 3) He/ (super 4) He ratios in the fumarolic gas, and that the intrusive process may have persisted for approximately 1 year. In contrast, a similar combination of magmatic intrusion and anomalous ***seismic*** activity beneath the resurgent dome -south moat region during the 1989-1991 period resulted in at most relatively small changes in (super 3) He/ (super 4) He in fumarolic discharge at the southern edge of the resurgent dome. The more subdued response may result from a combination of greater intrusive depths and greater dilution of (super 3) He-rich inputs to thermal fluid reservoirs in the shallow hydrothermal system in this area compared with Mammoth Mountain.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-041615

153. Database GeoRef

Title **Overview of electromagnetic methods applied in active volcanic areas of Western United States**

Author Skokan, Catherine K

Affiliation Colorado School of Mines, Department of Geophysics, Golden, CO, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.56, no.3, pp.309-318, Jun 1993

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A better understanding of active volcanic areas in the United States through electromagnetic geophysical studies received foundation from the many surveys done for geothermal exploration in the 1970's. Investigations by governmental, industrial, and academic agencies include (but are not limited to) mapping of the Cascades, ***Long Valley***/Mono area, the Jemez volcanic field, Yellowstone Park, and an area in Colorado. For one example - Mt. Konocti in the Mayacamas Mountains, California - gravity, magnetic, and ***seismic***, as well as electromagnetic methods have all been used in an attempt to gain a better understanding of the subsurface structure. In each of these volcanic regions, anomalous zones were mapped. When conductive, these anomalies were interpreted to be correlated with hydrothermal activity and not to represent a magma chamber. Electrical and electromagnetic geophysical methods can offer valuable information in the understanding of volcanoes by being the method which is most sensitive to change in temperature and, therefore, can best map heat budget and hydrological character to aid in prediction of eruptions.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-019447

154. Database GeoRef

Title **Strain transient recorded in the *Long Valley* Caldera during triggered seismicity from the June 28, 1992, M (sub L) 7.4 Landers, California, earthquake**

Author Johnston, M J S; Linde, A T; Hill, D P; Langbein, J

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Carnegie Institution, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.16, Suppl., pp.317, May 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-007314

155. Database GeoRef

Title **Three-dimensional variations in the compressional to shear wave velocity ratio for *Long Valley* Caldera, California**

Author Schwartz, Elizabeth Ann

Abstract Two ***seismic*** tomography back projection techniques were used to determine the three- dimensional compressional to shear wave velocity ratio (Vp/Vs) structure for the shallow crust beneath ***Long Valley*** caldera. Both magmatic and geothermal activity are well documented at ***Long Valley*** caldera, and variations in Vp/Vs can distinguish between these areas. Both Vp and Vs decrease in magmatic and geothermal regions. However, Vs decreases faster than Vp in magmatic regions resulting in an increase in Vp/Vs, whereas Vp decreases faster than Vs in geothermal regions resulting in a decrease in Vp/Vs. The goal of this study was to distinguish between magmatic and geothermal areas in the shallow crust beneath the caldera. The two techniques used in this study were ***seismic*** tomography for Vp/Vs and simultaneous inversion for velocity structure and hypocentral earthquake location. The simultaneous inversion provided a three-dimensional P-wave velocity model for the caldera that was used in the ***seismic*** tomography inversion for Vp/Vs. The best resolved Vp/Vs results came from the ***seismic*** tomography inversion using a 1X1X1 fan model block size. This inversion showed good ray coverage, azimuth distribution, and synthetic anomaly recovery. The strongest and best resolved anomalies appear at a depth of 4-5 and 6-7 km. High Vp/Vs beneath the Inyo Domes Chain in the northwest caldera at 4- 5 km indicates that pockets of partial melt may still exist beneath the Inyo Domes Chain and may indicate that magmatic activity has not ceased in this area. Two areas of low Vp/Vs just east of Mammoth Mountain in the southwestern caldera at 4-5 km and along the resurgent dome's western edge at 6-7 km indicate areas of geotherrnal activity. The presence of fluids at

these depths is most likely due to fluid-filled cracks in alteration zones above deeper magmatic areas.

Publication Year 1993

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1994-053906

156. Database GeoRef

Title ***Long* period earthquakes at mid-crust depths beneath the western margin of *Long Valley* Caldera, California**

Author Hill, David P; Pitt, Andrew M

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Japan Meteorological Agency, Japan (JPN)

Author Newhall, Christopher G (chairperson); Tsumura, Kenshiro (chairperson)

Affiliation U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1993

Publication Type Report; Conference document; Analytic; Abstract only

Accession Number 2003-007249

157. Database GeoRef

Title **Deformation modelling in the *Long Valley* Caldera using the Michelson tiltmeter**

Author Behr, Jeffrey Alan

Abstract Data from the biaxial, ***long***-baseline, Michelson tiltmeter near Mammoth Lakes, California are used to model deformation in ***Long Valley*** caldera from September 1989 to January 1992. The ***long***-baseline, half-filled fluid tube tiltmeter, based on the design of the Michelson-Gale ***long***-baseline tiltmeters, was redesigned in the late 1970's to improve transducer resolution and reduce thermal sensitivity. The tiltmeter deployed at ***Long Valley*** is enhanced to provide ***long*** term stability in monitoring deformation associated with proposed magma chamber inflation. The tiltmeter transducers are referenced to approximately 20 m depth by three borehole extensometers to remove surface noise from the observed tilt record. Non-tectonic tilts induced by surface loading and unloading, and potential thermoelastic effects within the materials surrounding the transducer vaults are removed by subtraction of these records during data reduction. Anomalous vertical displacements from March to August 1991 are analyzed for their possible response to the spring 1991 South Moat earthquake swarm. The extensometers are further examined to assess their applicability as vertical strainmeters. The data have been analyzed for their coherence to thermal and barometric pressure variations within the tiltmeter vaults and fluid tubes. Atmospheric pressure contamination on the north-south fluid tube, which is believed to have induced apparent tilts as great as 0.3 microradians, is identified and removed through coherence analysis and predictive filtering. Interior vault temperature records were used to remove thermoelastic water height changes via the method of forward modelling. Power spectra for the preprocessed and post-processed data display an order of magnitude decrease in noise level on the north-south line, and an overall tiltmeter stability of approximately 0.1 microradians from one month to one year periods. The tilt data are modelled as a response to proposed magma chamber inflation beginning in late September

1989. The Mogi method (1958) for point-source expansion within an elastic half-space is used to model tilt as a response to volume changes in two connected magma chambers. Tilts and strains possibly caused by displacements on nearby faults are modelled using Okada's (1985) method for finite dislocations in a semi-infinite elastic half-space. Results compare well with the findings of a dense two-color geodimeter array to indicate cumulative magma chamber inflation of approximately 0.025 km (super 3) from September 1989 to January 1992. A four month delay between the onset of proposed magma intrusion and increased caldera seismicity appears to indicate the dominance of a magmatic deformation source within ***Long Valley*** caldera. In addition, the deficit between the modelled deformation moment and the cumulative ***seismic*** moment release during this period of inflation indicates a potential stored surplus of 1.5X10 (super 25) dyne-cm of elastic strain energy, which could be released in a single M 6 event, possibly on the relatively quiescent South Moat fault.

Publication Year 1992

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1999-058827

158. Database GeoRef

Title **Recent results from local earthquake attenuation tomography studies at *Long Valley*, California**

Author Sanders, Chris O; Nixon, Lesley D; Ponko, Stefan C

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, suppl., pp.343, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014029

159. Database GeoRef

Title **S-wave attenuation structure of *Long Valley* Caldera, using three-component S/P amplitude ratio data**

Author Nixon, Lesley D; Sanders, Chris O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, suppl., pp.347, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014055

160. Database GeoRef

Title **Inversion for P and S wave differential attenuation structure using the spectral ratio technique, *Long Valley*, California**

Author Ponko, Stefan C; Sanders, Chris O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, suppl., pp.347, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014056

161. Database GeoRef

Title **Three-dimensional velocity structure of the *Long Valley* region, eastern California from the inversion of local earthquakes**

Author Romero, A E, Jr; McEvilly, T V; Majer, E L

Affiliation University of California at Berkeley, Department of Geology and Geophysics, Berkeley, CA, United States (USA)

Affiliation Lawrence Berkeley Laboratory, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.25, Suppl., pp.59-60, 23 Jun 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-022954

162. Database GeoRef

Title **Frequency-dependent site amplification factors using the S-wave coda for the Island of Hawaii**

Author Koyanagi, Stuart; Mayeda, Kevin; Aki, Keiiti

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.82, no.3, pp.1151-1185, Jun 1992

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The coda method has been utilized to determine the ***seismic*** response at various sites on the island of Hawaii using data from the Hawaiian Volcano Observatory (HVO) ***seismic*** network. Site amplification factors are calculated using spectral ratios of S-wave coda amplitude measured for many events and lapse times between 33 and 59 sec for frequencies between 1.5 and 15.0 Hz. We find that these site amplification factors vary by factors of as much as 12 for a given frequency due to differences in absorption and/or impedance properties beneath the site. Similar to results from Japan, central California, and ***Long Valley***, the coda site amplification factors showed strong correlation with station residuals for magnitude determined by Johnson (unpublished results) for the HVO network between 1.5 and 6.0 Hz. Johnson (unpublished results) made an independent determination of event magnitudes and station site corrections by measuring averaged windowed amplitudes of the S wave and its coda using a method previously tested with data from the southern California ***seismic*** network (Johnson, 1979). Station calibrations were simultaneously determined and included the effects of instrument gain and site effect. After correcting Johnson's (unpublished) results for the instrument gain provided by HVO, we obtain correlations similar to the previous works, with the best correlation appearing at 3.0 Hz. Despite the complex subsurface structures on the island of Hawaii, the frequency dependence of our coda site amplification factors displays a remarkable regional trend. In some cases, plausible causes related to the underlying geologic structures can explain the similar frequency dependence; in other cases, the similarity cannot be explained or may be coincidental. Similar frequency dependences among stations accompanied by a large variability in the absolute level of the site effect may be due to inaccurate instrument calibrations.

Publication Year 1992

Publication Type Serial; Analytic

Accession Number 1992-070366

163. Database GeoRef

Title **A comparative study of scattering, intrinsic and coda Q (super -1) for Hawaii, *Long Valley*, and Central California between 1.5 and 15.0 Hz**

Author Mayeda, Kevin; Koyanagi, Stuart; Hoshiba, Mitsuyuki; Aki, Keiiti; Zeng, Yuehua

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Affiliation Meteorol. Res. Inst., Japan (JPN)

Source Journal of Geophysical Research, vol. 97, no. B5, pp.6643-6659, 10 May 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A new method recently developed by Hoshiba et al. (1991) was used to separate the effects of scattering Q (super -1) and intrinsic Q (super -1) from an analysis of the S wave and its coda in Hawaii, ***Long Valley***, and central California. Unlike the method of Wu (1985), which involves integration of the entire S wave energy, the new method relies on the integration of the S wave energy for three successive time windows as a function of hypocentral distance. Using the fundamental separability of source, site, and path effects for coda waves, we normalized the energy in each window for many events recorded at many stations to a common site and source. We plotted the geometric spreading-corrected normalized energy as a function of hypocentral distance. The data for all three time windows were then simultaneously fit to Monte Carlo simulations assuming isotropic body wave scattering in a medium of randomly and uniformly distributed scatterers and uniform intrinsic Q (super -1) . In general, for frequencies less than or equal to 6.0 Hz, scattering Q (super -1) was greater than intrinsic Q (super -1) , whereas above 6.0 Hz the opposite was true. Model fitting was quite good for frequencies greater than or equal to 6.0 Hz at all distances, despite the model's simplicity. The small range in energy values for any particular time window demonstrates that the site effect can be effectively stripped away using the coda method. Though the model fitting generally worked for 1.5 and 3.0 Hz, the model has difficulty in fitting the whole distance range simultaneously, especially at short distances. Despite the poor fit at low frequency, the results generally support that in all three regions the scattering Q (super -1) is strongly frequency dependent, decreasing proportional to frequency or faster, whereas intrinsic Q (super -1) is considerably less frequency dependent. This suggests that the scale length of heterogeneity responsible for scattering is at least comparable to the wavelength for the lowest frequencies studied, of the order of a few kilometers. The lithosphere studied in all three regions can be characterized as a random medium with velocity fluctuation characterized by exponential or Gaussian autocorrelation functions which predict scattering. Q (super -1) decreasing proportional to frequency or faster. For all frequencies the observed coda Q (super -1) is intermediate between the total Q (super -1) and expected coda Q-1 in contrast with theoretical results for an idealized case of uniform distribution of scatterers and homogeneous absorption which predict that coda Q (super -1) should be close to the intrinsic Q (super -1) . We will discuss possible causes for this discrepancy. Copyright 1992 by the American Geophysical Union.

Publication Year 1992

Publication Type Serial; Analytic

Accession Number 1992-031730

164. Database GeoRef

Title **Low-frequency RMS S to P spectral ratios; evidence for nonshear components in microearthquakes near *Long Valley* Caldera, California**

Author Peppin, William A; Johnson, Peggy A

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Publication Year 1992

Publication Type Report; Monographic

Accession Number 2000-044845

165. Database GeoRef

Title **A comparative study of scattering, intrinsic and coda Q (super -1) for Hawaii, *Long Valley* and Central California between 1.5 and 15.0 Hz**

Author Mayeda, K; Koyanagi, S; Aki, K

Affiliation Lawrence Livermore National Laboratory, Livermore, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); University of Southern California, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.63, no.1, pp.71, Mar 1992

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-048227

166. Database GeoRef

Title **Analysis of behavior of earth dam using strong-motion earthquake records**

Author Zeghal, Mourad; Abdel-Ghaffar, Ahmed M

Affiliation Univ. South. Calif., Civ. Eng. Dep., Los Angeles, CA, United States (USA)

Source Journal of Geotechnical Engineering, vol.118, no.2, pp.266-277, Feb 1992

Publisher American Society of Civil Engineers, New York, NY, United States (USA)

Publication Year 1992

Publication Type Serial; Analytic

Accession Number 1992-013693

167. Database GeoRef

Title **Use of multiple data sets in geophysical modeling; application to delineation and interpretation of the *Long Valley*, California, magma chamber**

Author Iyer, H M; Dawson, P B

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source International Geological Congress, Abstracts --Congres Geologique Internationale, Resumes, vol.29, pp.966, 1992

Publisher [International Geological Congress], [location varies], International (VVV)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-006620

168. Database GeoRef

Title **S-wave attenuation structure of *Long Valley* Caldera, California, using three- component S/P amplitude ratio data**

Author Nixon, Lesley D

Publication Year 1992

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 2010-041341

169. Database GeoRef

Title **Site amplification from S-wave coda in the *Long Valley* Caldera region, California**

Author Mayeda, Kevin; Koyanagi, Stuart; Aki, Keiiti

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.81, no.6, pp.2194-2213, Dec 1991

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1992-004798

170. Database GeoRef

Title **Simplified *seismic* analysis of embankment dams; canyon-wall configuration**

Author Prato, Carlos A; Matheu, Enrique E

Affiliation Natl. Univ. Cordoba, Cordoba, Argentina (ARG)

Source Journal of Geotechnical Engineering, vol.117, no.11, pp.1802-1808, Nov 1991

Publisher American Society of Civil Engineers, New York, NY, United States (USA)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1992-010186

171. Database GeoRef

Title **Two-phase elasto-plastic *seismic* response of earth dams: applications**

Author Yiagos, A N; Prevost, J H

Affiliation Princeton Univ., Dep. Civ. Eng., Princeton, NJ, United States (USA)

Source Soil Dynamics and Earthquake Engineering (1984), vol.10, no.7, pp.371-381, Oct 1991

Publisher CML Publications, Southampton, International (III)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1995-042154

172. Database GeoRef

Title **The effects of site response on source parameters deduced for the 1980 *Long Valley*, California earthquake sequence**

Author Peppin, William A

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Geophysical Research Letters, vol. 18, no. 10, pp.1905-1908, Oct 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Data taken from the University of Nevada (UNR) array of surface-located wideband, digital, displacement seismographs placed over the 1980 ***Long Valley*** earthquake sequence show very strong site effects, which control spectral parameters and hence inferred source parameters, up to M (sub L) 5.0. Observations from 4,000 seismograms show that differences in site effects can lead to inferred ***seismic*** moments at least a factor of two lower than previously reported. Observed S-wave spectral corner frequencies show upper- bound cutoffs which are widely disparate at different sites (e.g., 15 Hz at MG1 and 6 Hz at WT1), thus f (sub max) is quite variable by site. This high- frequency cutoff, clearly a site effect at WT1, could be misinterpreted as an apparent departure from source similarity for ***seismic*** moments below 10 (super 21) dyn-cm. Estimates of ***seismic*** moment and source duration from the UNR "rock" sites may be more accurate than those previously published, both because the UNR instrumentation has greater resolution at longer periods (0.1 to 1.0 Hz) and because of less near-site signal distortion at high frequencies. Copyright 1991 by the American Geophysical Union.

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1991-056239

173. Database GeoRef

Title **A 3-D raytracer for teleseismic body-wave arrival times**

Author Steck, Lee K; Prothero, William A, Jr

Affiliation Univ. Calif. at Santa Barbara, Santa Barbara, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.81, no.4, pp.1332-1339, Aug 1991

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract In this article, we present a method for determining the minimum time ray path from a planar wavefront at depth to a fixed point at the surface through a 3-D heterogeneous velocity structure. The program is based on the two point raytracer of Prothero et al. (1988), with a modification to use odd quarter-cycles of sinusoids to distort the rays. These functions produce zero displacement at the fixed receiver but non zero displacement at the wavefront. This allows the raytracer to explore a wide variety of ray paths starting at different points on

the wavefront, while the rays leaving the wavefront remain normal to it. To find the minimum time path, amplitudes of these functions are systematically perturbed using the simplex algorithm. The approach is analogous to using a Fourier series to fit a curve with specific properties at each end. Development of this raytracer was motivated by the desire to model our observations of large perturbations in the bearings and phase velocities of teleseismic P waves recorded in ***Long Valley*** caldera, California. These observations clearly show the inadequacy of 1-D raytracing in regions having complex, three-dimensionally varving velocity structure. This raytracer provides a basic tool with which to study the effects of ray bending on tomographic results from these kinds of environments.

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1992-055909

174. Database GeoRef

Title **A comparative study of scattering, intrinsic and coda Q- (super -1) for Hawaii, *Long Valley* and Central California regions between 1.5 and 15.0 Hz**

Author Mayeda, Kevin; Koyanagi, Stuart; Hoshiba, Mitsuyuki; Aki, Keiiti

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Affiliation Meteorol. Res. Inst., Japan (JPN)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.72, no.17, pp.198, 23 Apr 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-030627

175. Database GeoRef

Title **Possible tectonomagnetic effect observed from mid-1989, to mid-1990, in *Long Valley* Caldera, California**

Author Mueller, R J; Johnston, M J S; Langbein, J O

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Geophysical Research Letters, vol. 18, no. 4, pp.601-604, Apr 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Precise measurements of local magnetic fields have been obtained with a differentially connected array of three proton magnetometers in the ***Long Valley*** caldera region since 1984. Two magnetometers are located inside the caldera with a third reference magnetometer located 26km southeast of the caldera. After correction for secular variation, it is apparent that an anomalous 2 nT decrease in the magnetic field occurred from mid-1989 to mid-1990 at the magnetometer located closest to the center of the resurgent dome inside the caldera. During this period a significant increase in geodetic strain rate of 8.5 ppm/a was observed on the two-color geodimeter network within the caldera from October, 1989, to mid-1990 and a dramatic increase in ***seismic*** activity occurred from December, 1989 to July, 1990. A simple dilatational point-source model with pressure increasing by 52 Mpa from October 1989 to August 1990 at a depth of about 7km beneath the center of the resurgent dome can be fit to the strain data. If this same model is used to calculate piezomagnetic fields in the caldera, the results obtained agree with the observed local magnetic field data provided the Curie point isotherm is at a depth of < or =5km. Taken together, these magnetic, ***seismic*** and geodetic data suggest that an episode of active magmatic intrusion occurred from late 1989 to mid-1990 at a depth of about 7-8km beneath the resurgent dome within the ***Long Valley*** caldera. Other indications of this intrusion should be evident in measurements of leveling, local gravity, and ***seismic*** imaging data. Copyright 1991 by the American Geophysical Union.

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1991-029259

176. Database GeoRef

Title ***Seismic* reflection studies in *Long Valley* Caldera, California**

Author Black, Ross A; Deemer, Sharon J; Smithson, Scott B

Affiliation Univ. Wyo., Program Crustal Stud., Laramie, WY, United States (USA)

Source Journal of Geophysical Research, vol. 96, no. B3, pp.4289-4300, 10 Mar 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Seismic*** reflection studies in ***Long Valley*** caldera, California, indicate that ***seismic*** methods may be successfully employed to image certain types of features in young silicic caldera environments. However, near-surface geological conditions within these environments severely test the ***seismic*** reflection method. Data quality are degraded by static, reverberation, and band-limiting problems due to these near-surface conditions. In ***Long Valley***, ***seismic*** reflection and refraction methods were used to image both the shallow and deep geothermal aquifers within the area. The deep geothermal aquifer, the welded Bishop Tuff, was imaged as a fairly continuous reflector across the western moat of the caldera. Near-surface refraction information indicates that there may be a buried paleochannel system or horst and graben system that could control the shallow geothermal flow pattern. High-amplitude events observed in a wide-angle survey were originally interpreted as reflections from a contemporary magma body. However, a migration of the events utilizing the new generalized cellular migration algorithm indicates that these events are probably reflections from the faults of the caldera ring fracture system. The reflections may be caused by the high acoustic impedance contrast associated with the juxtaposition of relatively low-velocity, low-density, caldera fill against the granite plutons and metasediments of the Sierran basement along this fault system. Copyright 1991 by the American Geophysical Union.

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1991-019073

177. Database GeoRef

Title **Crustal velocity structure beneath *Long Valley* Caldera from array analysis and 3-dimensional raytracing of teleseismic P-waves**

Author Steck, Lee K; Prothero, W A, Jr

Affiliation Univ. Calif., Santa Barbara, CA, United States (USA)

Author Wong, Ivan G (chairperson); Sullivan, Ray (chairperson)

Source Seismological Research Letters, vol.62, no.1, pp.31, Mar 1991

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-046674

178. Database GeoRef

Title **Frequency-dependent site amplification derived from S-wave coda and comparison with T-phase amplifications observed in the Kilauea Volcano region, Island of Hawaii**

Author Koyanagi, Stuart K; Mayeda, Kevin; Aki, Keiiti

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Author Wong, Ivan G (chairperson); Sullivan, Ray (chairperson)

Source Seismological Research Letters, vol.62, no.1, pp.49, Mar 1991

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Abstract As an extension to work done by Phillips (1985) and Mayeda et al. (1990), who tested the viability of isolating the site effect using the coda method (Aki, 1980), we have calculated relative site amplification factors for 6 frequency bands in the Kilauea volcano region on the island of Hawaii. Frequency bands were centered at 1.5, 3.0, 6.0, 9.0, 12.0, and 15.0 Hz with bandwidths of +/- 0.75 Hz for the 1.5 Hz band and +/- 2.0 Hz for the remaining frequency bands, identical to Mayeda et al's (1990) study for the ***Long Valley*** Caldera region. Despite the lack of differing surficial geology, relative site amplifications still varied by factors of 5 to 7 within a 22-station sub-array of the Hawaii Volcano Observatory's short- period ***seismic*** network. A number of stations near and within the main caldera (Halemaumau) showed consistently low amplifications over all frequency bands, yet nearby stations displayed high amplifications and showed different frequency-dependent behavior. Most of the stations along Kilauea's east rift zone showed moderate to high amplifications over all frequencies, but there was great variation in both the degree of amplification and frequency-dependent behavior. Stations to the north of Halemaumau generally showed similar frequency dependencies and high amplification at high frequencies. Near-site

complexities probably account for the behavior seen at certain sites. Results of this study are compared to Biswas et. al's (1990) T-phase amplitude observations in the Kilauea region. The large variations of observed site amplifications and frequency dependence should bring to attention the need for more sophisticated monitoring and study of the site behavior on the island.

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-049343

179. Database GeoRef

Title **Site amplification from S-wave coda in the *Long Valley* Caldera region, California**

Author Mayeda, Kevin; Koyanagi, Stuart K; Aki, Keiiti

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Author Wong, Ivan G (chairperson); Sullivan, Ray (chairperson)

Source Seismological Research Letters, vol.62, no.1, pp.49, Mar 1991

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-049344

180. Database GeoRef

Title **High-frequency scattered S-waves in the lithosphere; application of the coda method to the study of source, site and path effects**

Author Mayeda, Kevin Mitsuo

Publication Year 1991

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1992-058639

181. Database GeoRef

Title **Array analysis of three-component teleseismic P and P-coda waves for crustal structure at *Long Valley* Caldera, California**

Author Steck, Lee Karl

Publication Year 1991

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1992-070868

182. Database GeoRef

Title **Simultaneous observations of teleseismic shear waves in *Long Valley* Caldera and Sierra Nevada, California and the Penokean Orogen, Wisconsin**

Author Jefferson, T J; Shih, X R; Meyer, R P

Affiliation Univ. Wis., Dep. Geol. and Geophys., Madison, WI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1443, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-017061

183. Database GeoRef

Title **Temporal correlation between coda Q (super --1) and extension rate in the *Long Valley* Caldera, California**

Author Mayeda, Kevin; Koyanagi, Stuart; Aki, Keiiti

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1466, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-025314

184. Database GeoRef

Title **The relationship between mapped faults, fault plane solutions, and 3-point planes obtained from aftershock data at *Long Valley***

Author Johnson, Paul A; Fehler, Michael C

Affiliation Los Alamos Natl. Lab., Los Alamos, NM, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1467, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-025317

185. Database GeoRef

Title **Comparison of shear-wave splitting from teleseismic and local earthquakes in *Long Valley* Caldera**

Author Shih, X R; Meyer, R P

Affiliation Univ. Wis., Dep. Geol. and Geophys., Madison, WI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1467, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-025318

186. Database GeoRef

Title **Possible models of *Long Valley* Caldera from 3-D raytracing of teleseismic waves**

Author Steck, Lee K; Prothero, W A, Jr

Affiliation Univ. Calif. at Santa Barbara, Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.28, pp.961, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-033664

187. Database GeoRef

Title **Teleseismic tomography of the compressional wave velocity structure beneath the *Long Valley* region, California**

Author Dawson, P B; Evans, J R; Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,021-11,050, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract In 1982 and 1984 the U.S. Geological Survey used several ***seismic*** networks, totaling over 90 stations, to record teleseismic P waves and measure travel time residuals in an area centered on the ***Long Valley*** caldera. We inverted the travel time residuals to obtain a three- dimensional image of the velocity structure with resolution of 5-6 km to depths of 70 km beneath the array. Direct inversion of these data indicates that the 2- to 4-km-thick low- velocity caldera fill contaminates the signal from any midcrustal velocity anomalies beneath the caldera. Thus two methods were used to strip the effects of the upper crust from the travel time residuals: (1) ray tracing through upper crustal velocity models provided by ***seismic***

refraction experiments and gravity surveys, and (2) an iterative stripping scheme using the inversion itself. The methods produce essentially identical results and adequately remove the effects of the shallowest crustal structures, including the caldera fill and hydrothermal alteration effects. The resulting "stripped" models show two well-resolved midcrustal low-velocity bodies in the ***Long Valley*** region. The first body is centered between 7 and 20 km depth beneath the resurgent dome of the ***Long Valley*** caldera and has a volume of 150-600 km (super 3) . The second, with a similar volume, is centered between 10 and 20 km depth beneath the Mono Craters, about 10 km north of ***Long Valley***. Velocity contrasts in both of these bodies are about 6-10%, and the features are interpreted as silicic magma chambers. This experiment does not preclude the presence of additional pockets of magma smaller than 5 km across in the upper crust, particularly beneath the resurgent dome of the caldera (which would be removed with the stripping methods). It is likely that the midcrust anomaly beneath the resurgent dome is a remnant of the caldera forming magma chamber. Upper mantle velocities are lower than average beneath Mono Craters and higher than average beneath ***Long Valley***. We tentatively interpret these anomalies as mantle partial melt beneath the Mono Craters and refractory upper mantle residuum beneath ***Long Valley***. The high eruptive rate of the Mono Craters and these upper mantle structures suggest that the focus of volcanism is shifting north from ***Long Valley*** to the Mono Craters. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1990-049546

188. Database GeoRef

Title **Shear wave anisotropy and stress direction in and near *Long Valley* Caldera, California, 1979-1988**

Author Savage, M K; Peppin, W A; Vetter, U R

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,165-11,177, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We observed shear wave splitting (birefringence) for two temporary surface deployments of three-component, digital seismographs, that were in place before and after M=6+ earthquakes near the ***Long Valley*** caldera, California. In one of these deployments, the data sample precedes the large events of the May 1980 Mammoth Lakes earthquake sequence by 6 months and cover the two most active months of the May 1980 aftershock sequence; one of the stations (WIT) from this deployment was reoccupied with identical instrumentation in 1988. Another deployment preceded the 1986 Chalfant ***Valley*** mainshock by 2 days and recorded events for 6 days. The polarization of the faster shear wave changes from N30 degrees W at Mammoth to due north at Chalfant ***Valley*** and in both cases is parallel to the strike of nearby surface faults and to the mean direction of P axes determined from focal mechanism groupings. Observations from nearby stations yield fast directions nearly at 23 degrees from each other, and time separations of fast and slow shear waves show considerable station-to-station variation, showing no correlation with earthquake - station distance or earthquake depth. These observations suggest that the

observed anisotropy results primarily from near-station (presumably shallow) effects rather than from widespread aligned microcracks. The records at ***Long Valley*** station WIT show a slight variation of average fast shear wave polarization from 1979 to 1980, but with the limited amount of data available, this difference is not statistically significant. Time separation measurements of up to 0.48 s at station WIT yield estimates of 15-30% velocity anisotropy, among the highest reported for local earthquakes. Secular variation in the time separation of fast and slow shear waves between events recorded at station WIT in 1979 and 1980 is swamped by the scatter in the data, if it is present. The five events recorded in 1988 showed similar S wave polarizations and time separations to those in 1980, but there are not enough events for a statistical comparison. Unlocated events at ***Long Valley*** station MRS show a slight increase in time separation after the May 1980 M=6.0+ earthquakes, but the increase is not statistically significant. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1990-049556

189. Database GeoRef

Title **Observation of shear wave splitting from natural events; south moat of *Long Valley* Caldera, California, June 29 to August 12, 1982**

Author Shih, Xiao R; Meyer, Robert P

Affiliation Univ. Wis.-Madison, Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,179-11,195, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Three-component seismograms from local earthquakes recorded by three University of Wisconsin stations in the south moat of ***Long Valley*** caldera in 1982 have been analyzed for shear wave splitting. The average polarization direction of the first-arriving shear waves observed at the two stations south of the resurgent dome is NNW-SSE. Time delays between the fast and slow shear waves are proportional to hypocentral distances, and the maximum velocity anisotropy inferred is 6.4%. The average shear wave polarization observed at the station above the resurgent dome is north-south. The time delays there are not a function of

hypocentral distance, and the normalized time delays (ms/km) from events at the southwest boundary of the caldera are larger than those at other azimuths, indicating maximum 9.6% velocity anisotropy. The east- west to ENE-WSW variation of the tensional stress fields implied by the shear wave polarizations indicates the interaction between the inflating caldera and the Sierra Nevada range-front faults under the generally WNW-ESE tension expected from the regional tectonics. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1990-049557

190. Database GeoRef

Title **The 1989 earthquake swarm beneath Mammoth Mountain, California; an initial look at the 4 May through 30 September activity**

Author Hill, D P; Ellsworth, William L; Johnston, M J S; Langbein, John O; Oppenheimer, David H; Pitt, A M; Reasenberg, Paul A; Sorey, M L; McNutt, S R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Calif. Div. Mines and Geol., United States (USA)

Source Bulletin of the Seismological Society of America, vol.80, no.2, pp.325-339, Apr 1990

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1990-029042

191. Database GeoRef

Title **Differences in magma storage in different volcanic environments as revealed by *seismic* tomography; silicic volcanic centers and subduction-related volcanoes**

Author Iyer, H M; Evans, J R; Dawson, P B; Stauber, D A; Achauer, Ulrich

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Publisher John Wiley & Sons, Chichester, United Kingdom (GBR)

Publication Year 1990

Publication Type Book; Conference document; Analytic

Accession Number 1991-018466

192. Database GeoRef

Title ***Seismic* imaging in *Long Valley* Caldera and generalized cellular migration**

Author Black, Ross Allen

Publication Year 1990

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1991-003829

193. Database GeoRef

Title **The Magma Energy Research Program**

Author Chu, T Y; Dunn, J C; Finger, J T; Rundle, J B; Westrich, H R

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Author Combs, Jim (chairperson)

Affiliation Geotherm. Resour. Counc., Davis, CA, United States (USA)

Source Transactions - Geothermal Resources Council, vol.14, no.1-2, pp.567-577, 1990

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1991-014818

194. Database GeoRef

Title ***Seismic* anisotropy in the Earth's crust inferred from shear-wave splitting**

Author Shih, Xiao Rung

Publication Year 1990

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1991-021101

195. Database GeoRef

Title **Two-dimensional two-phase elasto-plastic *seismic* response of earth dams**

Author Yiagos, Alexandros N

Publication Year 1990

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1991-021160

196. Database GeoRef

Title **An S-to-P converted phase recorded near *Long Valley*/Mono Craters region, California**

Author Ammon, Charles J; Zucca, John; Kasameyer, Paul W

Affiliation Pa. State Univ., Dep. Geosci., University Park, PA, United States (USA)

Affiliation Lawrence Livermore Natl. Lab., United States (USA)

Source Journal of Geophysical Research, vol. 94, no. B12, pp.17,721-17,727, 10 Dec 1989

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We examine and model the arrival time of a large secondary ***seismic*** arrival recorded in the ***Long Valley***/Mono Craters region of east central California. Zucca et al. (1987) and Peppin (1987) both previously reported on different features of this same arrival. Using both arrays of sources and receivers, we demonstrate that the arrival in an S-to-P converted phase as first suggested by Lewis and Peppin (1988). Back projection of the observed travel times allows us to constrain the location of the converting material to somewhere within a southeast dipping zone between 7 and 16 km depth and within 5 km on either side of the northwest topographic margin of the caldera. The analysis demonstrates the power of source and receiver array combinations when analyzing ***seismic*** arrivals in complicated environments. Copyright 1989 by the American Geophysical Union.

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1990-020190

197. Database GeoRef

Title **Pre-S observations at station SLK, NW of *Long Valley* Caldera, California, and their relation to possible magma bodies**

Author Peppin, William A; Delaplain, Thomas W; Lewis, J Scott

Affiliation Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Source Bulletin of the Seismological Society of America, vol.79, no.6, pp.1894-1904, Dec 1989

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1990-007028

198. Database GeoRef

Title ***Seismic* calibration using the Simplex algorithm**

Author Steck, Lee K; Prothero, William A, Jr

Affiliation Univ. Calif., Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.79, no.5, pp.1618-1628, Oct 1989

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-073332

199. Database GeoRef

Title **Pre-S phases recorded north of *Long Valley* Caldera; an investigation into their nature and geologic significance**

Author Lewis, John Scott

Abstract A 3-dimensional ***seismic*** array was set up to record pre-S phases which have been previously observed on a vertical component station located about 20 km northwest of ***Long Valley*** Caldera. Previous work by Peppin and others (1989) demonstrated a parallelism between the travel time curves of the S and pre-S phases with an average time offset of 1.7

seconds. Previous least squares modelling limited possible explanations to 2 models. Records were timed in the frequency domain by determining the phase offset of the cross- spectrum. Relative arrival times were then fit to planewaves in order to determine the back azimuth and dip. Three-component seismograms were analyzed visually and analytically, in complex space, by a modified method of Vidale (1987) to determine wave type, polarity, and other characteristics. Results indicate that the pre-S phase is a compressional wave approaching from the same azimuth and dip as the P phase. The pre-S phase possessed the most consistently similar spectral character, with its peak centered around 5 Hz. Amplitudes from greatest to least: S, pre-S, P. The pre-S phase is interpreted as possibly being the result of an S to P conversion in a molten, dike-like body northwest of the caldera.

Publication Year 1989

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1990-060964

200. Database GeoRef

Title **Analysis of earthquake spectra from *Long Valley*, California, using the NEWT *seismic* system**

Author McNutt, Stephen R

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Source Open File Report - California Geological Survey, Report: 89-6, 27 pp., Jul 1989

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Report; Monographic

Accession Number 1991-047787

201. Database GeoRef

Title **Deriving source-time functions using principal component analysis**

Author Vasco, D W

Affiliation Hanscom Air Force Base, Air Force Geophys. Lab., Earth Sci. Div., Bedford, MA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.79, no.3, pp.711-730, Jun 1989

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-053398

202. Database GeoRef

Title **The case for a shallow-crustal anomalous zone (magma body?) near the south end of Hilton Creek Fault, California, including new evidence from an interpretation of pre-S arrivals**

Author Peppin, William A; Honjas, William; Delaplain, Thomas W; Vetter, Ute R

Affiliation Univ. Nev., MacKay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Source Bulletin of the Seismological Society of America, vol.79, no.3, pp.805-812, Jun 1989

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-053403

203. Database GeoRef

Title **Geophysical constraints on magmatism and crustal structure**

Author Eaton, G P

Affiliation Iowa State Univ., Ames, IA, United States (USA)

Author Anonymous

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, Report: 131, pp.80, Apr 1989

Resource Location http://geoinfo.nmt.edu/publications/home.html

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Abstract Applications of geophysical measurements in the study of molten or partially molten bodies of magma, as well as of cooler masses of in situ magmatic rocks, of complex subvolcano systems, and of the crustal structure of regions of active magmatism have increased significantly in the past 25 years. A brief review of the successes and failures of such efforts is presented, based on published case studies, on theoretical considerations of the geophysical properties of magma and magmatic rocks (in terms both of the absolute values of such properties and relative to those of the country rocks in which the magma was emplaced), and on the viability of different geophysical techniques applied in attempts to answer specific questions raised by geologists engaged in the study of volcanoes or magmatic systems. The ultimate success of geophysical interpretation in such studies is dependent on the ability to detect, sort and correctly interpret signals arising from, or affected by, a variety of phenomena: the actual presence of magma, itself; the geometric configuration of the magma body; properties of the magma owing to its physical state (e.g.,cooling, thermally stable, or warming; moving, or at rest; convecting or non-convecting; etc.); the presence or absence of vigorous hydrothermal circulation in the region around and above the magma mass; the presence or absence of a rock alteration shroud around the body, which may be present whether the body is hot or has cooled to an ambient regional temperature; and the presence or absence of emplacement-related, localized fracture systems in the country rock nearby or deformation in the region of the body arising from the added effect of far-field stresses. Much of what can be detected geophysically at the surface is thus significantly influenced by processes and phenomena in the shallow crust. These phenomena have the potential to screen, distort, mimic or reinforce signals deriving from a magma body or from the lower crust. In the case of those magmatic systems in which a constructional volcanic edifice is present at the surface, part of the difficulty of interpretation relates to the ability to effect a proper separation of surface or near-surface geologic signals from those arising at the depth of interest and target of relevance. In most cases, the task is not a simple one and the certainty of interpretation is sometimes a function of the availability of a variety of other information bearing on the specific problem that is to be solved. Some convincing case histories are presented in which the viability of the use of geophysical data is demonstrated and its interpretation independently confirmed. Studies examined here include gravity investigations, magnetics, active and passive ***seismic*** studies and ***seismic*** signal delays, electrical methods, thermal gradient measurements and heat flow calculations, and surface deformation studies. Example sites include the Cascade Range of western North America; Hawaii Volcanoes National Park, Hawaii; ***Long Valley***, California; San Juan Mountains, Colorado; Rio Grande ***Valley***, New Mexico; Yellowstone National Park, Wyoming; as well as several active volcanoes in Japan and ancient magmatic complexes in the British Isles.

Publication Year 1989

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Accession Number 1990-022795

204. Database GeoRef

Title **Volcanic tremor from around the world**

Author McNutt, S R

Affiliation Calif. Dep. Conserv., Div. Mines and Geol., Sacramento, CA, United States (USA)

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, vol. 131, pp.183, Apr 1989

Resource Location http://geoinfo.nmt.edu/publications/home.html

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Abstract Volcanic tremor or related phenomena have been recorded at more than 120 volcanic areas worldwide. A comprehensive literature search of over 560 references covering 105 volcanoes was made to determine quantitative relationships between different tremor parameters. Unpublished data from 5 volcanoes were added to the compilation. Preliminary results show that more than 240,000 episodes of tremor are reported in the literature. Analyses of subsets of these data show that approximately 65% of tremor episodes accompany eruptions of gases or lava, and 35% occurred with no eruption. Volcanic tremor preceded eruptions on a time scale of minutes to hours in approximately 20% of the cases studied, and followed eruptions in about 15% of the cases. Durations of individual tremor episodes range from minutes to years: 62% from 1-59 minutes: 17% from 1-23 hours; 10% from 1-6 days: and 3% weeks or longer No data on durations were given for 8% of the episodes. Continuous tremor episodes with durations longer than one year have occurred at Etna, Stromboli, Arenal, Kilauea, and Oshima volcanoes. Based on data from 55 volcanoes for which it was reported, the mean frequency of volcanic tremor is 3.8 Hz, and the median value is 3.2 Hz (Figure 1 below). The range of frequencies reported for tremor extends from 0.12 Hz to 15 Hz. The higher values are typical of station distances of less than 1 km and active geothermal systems, while the lower values are typical of distances on the order of 5- 10 km and magmatic activity. Observations of

tremor depend critically on ***seismic*** stations, and data on ***seismic*** stations are readily available for 78 volcanoes. Of these, 25 volcanoes have at least one ***seismic*** station within 1 km of the vent. While the most distant station to record tremor is 430 km away (Hydrophones have recorded T-phases from submarine eruptions up to 8,600 km away.) Detection thresholds, normalized to reduced displacement, could be calculated for 43 volcanoes. Twelve volcanoes have detection thresholds less than 1.0 cm (super 2) ; the lowest thresholds are 0.02 cm (super 2) at Kilauea and 0.05 cm (super 2) at Ruiz. Estimates of the maximum amplitude of tremor, again normalized to reduced displacement, were calculated for 22 volcanoes. These range from 0.56 cm (super 2) to approximately 100,000 cm (super 2) , the latter value accompanying the great Vesuvius eruption of 1906. All of the values over 100 cm (super 2) except one occurred when large eruptions were in progress. The dynamic range of tremor at individual volcanoes varies from 14 to 75 dB, with a mean of 38 dB and a median of 37 dB (Figure 2 below). Felt tremor has been reported at 10 volcanoes: Paricutin, Lamington, Etna, Api Siau, Sierra Negra, Vesuvius, Ruiz, Pacaya, Surtsey, and Kilauea Deep (>10 km) tremor or low-frequency events have occurred at 3 volcanoes: Kilauea, Oshima, and Lassen. Banded tremor -- periodic episodes separated in time at regular intervals -- has occurred at 6 volcanoes: Karkar, Ruiz, Pavlof, Suwanose-jima. Ulawun. Klyuchevskoy, and at Old Faithful geyser.

Spasmodic tremor has occurred at Kilauea, Mount St. Helens, Fuego, Klyuchevskoy, ***Long Valley***, and Vesuvius.

Publication Year 1989

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Accession Number 1990-027507

205. Database GeoRef

Title **I; Geophysical problems in nuclear waste disposal**

Author Craig, Richard G

Affiliation Kent State Univ., Kent, OH, United States (USA)

Source Geophysics: The Leading Edge of Exploration, vol.8, no.1, pp.20-23, Jan 1989

Publisher Society of Exploration Geophysicists, Tulsa, OK, United States (USA)

Abstract Geophysicists contribute their knowledge to the solution of many societal problems--***seismic*** and volcanic risk, exploration and mapping, to name a few. A field of special demand which has recently grown important is nuclear waste disposal. To effectively contribute to this project, the geophysicist must be well versed in the underlying issues. This article summarizes the background of the nuclear waste disposal problem and how geophysicists are contributing to its solution. The emphasis is on the high-level nuclear waste generated in the commercial sector. An accompanying article by Larry Irons illustrates some of the tools that have proved useful in hazardous waste investigations. Many of these techniques have been applied to the characterization of the site for high-level nuclear waste. The repository program is an enormous one, perhaps the largest concentrated application of geologic knowledge ever made to a single question. There is a significant need for geophysical expertise because those techniques satisfy some special concerns at the repository site.

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-038085

206. Database GeoRef

Title **System identification of earth dams using *seismic* records**

Author Zeghal, Mourad; Abdel-Ghaffar, Ahmed M

Affiliation Princeton Univ., Civ. Eng. Dep., Princeton, NJ, United States (USA)

Affiliation Univ. Calif. at Berkeley, United States (USA); Univ. South. Calif., United States (USA)

Affiliation Jack Benjamin and Assoc., Mountain View, CA, United States (USA)

Publisher Am. Soc. Civ. Eng., New York, NY, United States (USA)

Publication Year 1989

Publication Type Book; Conference document; Analytic

Accession Number 1992-014654

207. Database GeoRef

Title **Differences in magma storage in different volcanic environments as revealed by *seismic* tomography**

Author Iyer, H M; Evans, J R; Dawson, P B

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source International Geological Congress, Abstracts--Congres Geologique Internationale, Resumes, vol.28, Vol. 2,

pp.2.106, 1989

Publisher [International Geological Congress], [location varies], International (VVV)

Publication Year 1989

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-071061

208. Database GeoRef

Title **Absence of evidence for a shallow magma chamber beneath *Long Valley* Caldera, California, in downhole and surface seismograms**

Author Hauksson, Egill

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 93, no. B11, pp.13,251-13,264, 10 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A downhole seismometer at 900-m depth and a temporary network of surface stations were deployed to use rays from local microearthquakes to study the upper and middle crust beneath the ***Long Valley*** caldera. The downhole seismograms show S waves with high apparent amplitudes from earthquakes located 2-20 km to the south of the downhole seismometer. In contrast, S waves from earthquakes located in the distance range 20-30 km to the south have low apparent amplitudes. If P and S amplitudes are normalized relative to the respective coda amplitudes, the S to coda amplitude ratios appear to remain constant but the P to coda amplitude ratios vary significantly with takeoff angle. A comparison of the calculated radiation patterns for a double couple in a uniform halfspace and focal mechanisms of the recorded earthquakes suggest that the observed variations in P and S amplitudes are caused by radiation pattern effects. Reanalysis of possible travel time delays found by Elbring and Rundle (1986), who used a subset of the borehole data analyzed in this study, shows that they underestimated the epicentral distances to three of the earthquakes and hence generated an artificial kink in the reduced travel time versus depth curve. Synthetic calculations of reduced travel time versus depth suggest that an apparent velocity of 5.7 km/s gives less scatter than 6.0 km/s used by Elbring and Rundle (1986). Plots of ts/tp versus depth show that contrary to the findings of Elbring and Rundle (1986), the Vp/Vs ratio stays fairly constant with depth and a small (<3-km diameter) magma chamber cannot easily be resolved. Furthermore, combined analysis of downhole and surface data shows that neither data set requires a low-velocity zone or a zone of anomalously high Vp/Vs at depth below the Casa Diablo area.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-010882

209. Database GeoRef

Title **Stress measurements in the *Long Valley* Caldera, California; comparison of focal mechanisms, stress tensors, and shear-wave splitting**

Author Savage, M K; Vetter, U R; Peppin, W A

Affiliation Univ. Nev., Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1462, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-013121

210. Database GeoRef

Title **Velocity structure of the crust and upper mantle beneath the *Long Valley* Caldera, California**

Author Dawson, P B; Evans, J R; Iyer, H M; Achauer, Ulrich

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Fridericiana Karlsruhe, Federal Republic of Germany (DEU)

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1472, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-013192

211. Database GeoRef

Title **Analysis of time-varying earthquake spectra from the *Long Valley*, California, region using data from the NEWT *seismic* system**

Author McNutt, S R; Maclean, J

Affiliation Calif. Dep. Conserv., Div. Mines and Geol., Sacramento, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1301, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-017087

212. Database GeoRef

Title ***Seismic* calibration using the simplex algorithm**

Author Prothero, William A, Jr; Steck, Lee

Affiliation Univ. Calif., Dep. Geol. Sci. and Mar. Sci. Inst., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1320, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-023726

213. Database GeoRef

Title **Array analysis of teleseismic P and P-S converted waves at *Long Valley* Caldera, California**

Author Steck, Lee; Prothero, William A, Jr

Affiliation Univ. Calif., Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1324-1325, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-023760

214. Database GeoRef

Title **Interpretation of bright reflection events within *Long Valley* Caldera utilizing a new probabilistic migration algorithm**

Author Black, R A; Smithson, Scott B

Affiliation Kans. Univ., Kans. Geol. Surv., Dep. Geol., Lawrence, KS, United States (USA)

Affiliation Univ. Wyo. at Laramie, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.69, no.44, pp.1327, 01 Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-023782

215. Database GeoRef

Title **P to S converted wave observations at *Long Valley* Caldera**

Author Steck, Lee K; Prothero, William A, Jr

Affiliation Univ. Calif., Dep. Geol., Santa Barbara, CA, United States (USA)

Source Geophysical Research Letters, vol. 15, no. 12, pp.1433-1436, Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We report observations of P to S converted teleseismic body waves recorded with ***seismic*** stations located on the resurgent dome of ***Long Valley*** caldera. We observe strong conversions occurring at boundaries that could be the tops of small magma bodies at depths of 4-9 kilometers beneath the resurgent dome. This technique could prove to be an extremely powerful tool in the search for magma bodies for geothermal energy development. Our results from a two month deployment of triggered, digital teleseismic recorders are discussed.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-004148

216. Database GeoRef

Title **Evidence for multiple boundary faults beneath the northwest moat of *Long Valley* Caldera; magnetotelluric results**

Author Hermance, John F; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Geophysical Research Letters, vol. 15, no. 12, pp.1437-1440, Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The boundaries of ***Long Valley*** Caldera, in Eastern California, are sharply delineated by steeply dipping normal faults which, for the most part, are buried and obscured by recent volcanic and sedimentary cover. The only evidence for their presence is from their geophysical signatures on regional gravity, ***seismic*** and electromagnetic surveys. Recently, a surge of interest has focused studies in the western moat, where the volcanism is most recent, and where many workers feel that the geothermal potential is highest. A detailed, narrow-band (20-80 s) magnetotelluric profile in that area has delineated a parallel set of buried high angle normal faults which have virtually no expression at the surface. The outermost fault has a throw of approximately 500 m, while the innermost has a throw of approximately 2 km; neither has an expression in the surface morphology. Moreover, based on a relatively low resistivity contrast between the basement and the basin fill, we infer a relatively high fracture porosity in the Sierran basement, which suggests that there may be considerable lateral and vertical migration of meteoric water; a result which has considerable significance to understanding the regional hydrology.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-004149

217. Database GeoRef

Title **Geotomography with local earthquake data**

Author Kissling, Edi

Affiliation ETH Inst. Geophys., Zurich, Switzerland (CHE)

Source Reviews of Geophysics, vol. 26, no. 4, pp.659-698, Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The inversion of local earthquake data (LED) for three-dimensional velocity structure requires the simultaneous solution of the coupled hypocenter-model problem. The Aki- Christoffersson-Husebye method (ACH) involves the inversion of large matrices, a task that is often performed by approximative solutions when the matrices become too big, as is the case for most LED, considering the coupled inverse problem. Such an approximate method (herein referred to as approximate geotomographic method) is used to perform tests with LED to obtain the best suited inversion parameters, such as velocity damping and number of iteration steps. The ACH method has been proposed for use of teleseismic data. Several adjustments to the original ACH method, which are necessary for use of LED, have been developed and are discussed. Such adjustments are the separation of the unknown hypocentral from the velocity model parameters for the inversion, the use of geometric weighting and step length weighting, the calculation of a minimum one-dimensional (1D) model as the starting three-dimensional (3D) model for the model inversion, and the display of an approximate resolution matrix (ray density tensors) before the inversion is performed. The ray density tensors allow the block cutting, e.g., the definition of the 3D velocity grid, to better correspond with the resolution capability of the specific data set. The adjustments to the method are tested by inversion of realistic LED of known variance. Synthetic LED are also used to demonstrate the effects of systematic errors, such as mislocations of ***seismic*** stations, on the resulting velocity field. Using the data sets from ***Long Valley***, California, Yellowstone National Park, Wyoming, and Borah Peak, Idaho, the effects

of improvements to the ACH method and of the data filtering process are shown. The use of the minimum 1D models for routine earthquake location improves this location procedure, as shown with the relocation of shots for the ***Long Valley*** and Yellowstone areas. The three-dimensional velocity fields obtained by the ACH method for the ***Long Valley*** and Yellowstone areas show local anomalies in the p velocity that can be correlated with tectonic and volcanic features. A pronounced anomaly of low p velocity below the Yellowstone caldera can be interpreted as a large magma chamber. However, the bulk of the paper addresses problems of the inversion method. The LED from the areas mentioned above are used to numerically and theoretically tune the inversion method for the defects that all real data contain. It is shown that one of the most important steps for any inversion of LED is the selection of the data for quality and for geometrical distribution.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-035603

218. Database GeoRef

Title **A three-dimensional structural model for the *Long Valley* Caldera, California**

Author Carle, Steven F; Goldstein, N E

Source LBL - Lawrence Berkeley Laboratory, Report: 24200, pp.99-103, Sep 1988

Publisher Lawrence Berkeley Laboratory, University of California, Berkeley, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic

Accession Number 1990-030186

219. Database GeoRef

Title **Three-dimensional interpretation of magnetotelluric data in *Long Valley*, California**

Author Park, S K; Torres-Verdin, C; Morrison, H F

Source LBL - Lawrence Berkeley Laboratory, Report: 24200, pp.125-129, Sep 1988

Publisher Lawrence Berkeley Laboratory, University of California, Berkeley, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic

Accession Number 1990-030193

220. Database GeoRef

Title **Two- and three-dimensional dynamic finite element analyses of the *Long Valley* Dam**

Author Griffiths, D V; Prevost, J H

Affiliation Princeton Univ., Dep. Civ. Eng. and Oper. Res., Princeton, NJ, United States (USA)

Source Technical Report - National Center for Earthquake Engineering Research, Report: NCEER-88-0015, variously paginated, 17 Jun 1988

Publisher National Center for Earthquake Engineering Research, State University of New York at Buffalo, Buffalo, NY, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Monographic

Accession Number 1989-038168

221. Database GeoRef

Title **Processing and interpretation of a *seismic* line across the resurgent dome of *Long Valley* Caldera, California**

Author Berg, Richard M, Jr

Publication Year 1988

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1989-050152

222. Database GeoRef

Title **Results from converted wave studies in the *Long Valley* Caldera**

Author Steck, Lee K; Prothero, William A

Affiliation Univ. Calif., Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.59, no.1, pp.31, Mar 1988

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-017652

223. Database GeoRef

Title **Locating sources of scattering in magmatic regions**

Author Doll, W E; Zucca, J J

Affiliation Colby Coll., Dep. Geol., Waterville, ME, United States (USA)

Affiliation Lawrence Livermore Natl. Lab., United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.59, no.1, pp.40, Mar 1988

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1988

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-020407

224. Database GeoRef

Title **The geophysics of a restless caldera; *Long Valley*, California**

Author Rundle, John B; Hill, David P

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Annual Review of Earth and Planetary Sciences, vol.16, pp.251-271, 1988

Resource Location http://arjournals.annualreviews.org/loi/earth

Publisher Annual Reviews, Palo Alto, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-066038

225. Database GeoRef

Title **Seismological detection and delineation of magma chambers beneath intraplate volcanic centers in western USA**

Author Iyer, H M

Author Anonymous

Publisher Friedrick Vieweg und Sohn, Braunschweig, Federal Republic of Germany (DEU)

Abstract In this review I describe results from experiments conducted by the U.S. Geological Survey in diverse volcanic environments to image velocity anomalies in the crust and upper mantle using teleseismic P-wave residuals. The linear least-squares inversion technique of Aki et. al. (1976, 1977) is extensively used in these studies. The ***seismic*** models thus obtained are synthesized with available geologic and geophysical data to infer plausible models of magma genesis in these regions. The three-dimensional velocity model beneath Yellowstone Plateau shows a large low-velocity body of approximately 100 km diameter centered on the caldera and extending from the crust to a depth of about 250 km. This is interpreted to be a massive magma body which is responsible for the volcanism during the past 2 m.y. in Yellowstone. Teleseismic S-wave residuals, Raleigh-wave dispersion data, heat-flow, gravity, Curie isotherm depths, and magnetotelluric data, all support the existence of a temperature near granite solidus beginning at a depth of 5-10 km beneath the Yellowstone caldera floor. In the Eastern Snake River Plain (ESRP) a low-velocity anomaly is present in the upper mantle but not in the crust, leading to the speculation that ESRP is the healed track of a northeast propagating volcanic center whose present position is Yellowstone. The ***seismic*** model for the ESRP-Yellowstone volcanic system, though unable to distinguish between different models of origin of the system,

clearly shows that basaltic magma rises from the mantle, melts the lithosphere and yields massive quantities of rhyolitic magma. The ***seismic*** velocity structure beneath Hawaii, an oceanic hot spot, shows a complex crustal structure with no evidence for a large magma chamber in the crust. However, in the upper mantle there is an elongate north-south trending low-velocity zone, 200 km wide and traceable to a depth of 165 km. Thus, similar hot-spot generation models in the asthenosphere may be applicable to Yellowstone and Hawaii, though the chemistry and volume of surface volcanism is greatly different in the two areas. In all the six intra-plate silicic volcanic centers which we have probed using the teleseismic-residual technique, low-velocity anomalies, inferred as crustal magma chambers have been found. In at least one such volcanic center, ***Long Valley*** in California, uplift and S-wave attenuation measurements support that the magma chamber delineated by teleseismic residuals is real. The suggestion of a root to the magma chamber extending into the upper mantle supports the geologic model for magma genesis in these centers, namely, infusion of basaltic magma from the asthenosphere into the lithosphere and crust, and resulting partial melting. In contrast to the silicic volcanic centers, none of the andesitic Cascade volcanoes show evidence for crustal magma chambers detectable using the teleseismic technique. Teleseismic-residual data in two volcanoes, Newberry in Oregon, and Medicine Lake in California, show massive high-velocity intrusions in the crust beneath the volcano edifice. A high-resolution ***seismic*** imaging experiment has revealed the presence of a low-velocity anomaly which could be a dike-like molten magma pocket within the high-velocity intrusive in Newberry volcano. On a regional scale, the teleseismic residual experiments using ***long*** profiles have successfully delineated high-velocity anomalies, possibly related to subduction, in the Oregon Cascades, and a low-velocity anomaly due to asthenospheric upwarp
beneath the Rio Grande Rift.

Publication Year 1988

Publication Type Book; Analytic

Accession Number 2001-076429

226. Database GeoRef

Title **Elastic stress and deformation near a finite spherical magma body; resolution of the point source paradox**

Author McTigue, D F

Affiliation Sandia Natl. Lab., Fluid Mech. and Heat Transfer Div. I, Albuquerque, NM, United States (USA)

Source Journal of Geophysical Research, vol. 92, no. B12, pp.12,931-12,940, 10 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Approximate solutions are obtained for the stress and displacement fields due to a

pressurized spherical cavity in an elastic half-space. The solutions take the form of series expansions in powers of epsilon = a/d, where a is the cavity radius and d is the depth. The leading-order term in the expression for the surface uplift, which arises at O(epsilon (super 3)), recovers the well-known result of Mogi for the response to a point dilatation. The first higher-order correction accounts for a cavity of finite size and thus offers the possibility of fitting leveling data for not only the depth but also the radius and pressure increment. However, this correction is of O(epsilon (super 6)) and, consequently, is weak. The result provides a formal explanation for the success of the point dilatation model in representing uplift data even when it is known independently that epsilon is not small. The higher-order correction causes the surface uplift to fall off more rapidly in the radial direction, implying that a fit of the point source solution tends to underestimate the depth d. In contrast to the surface displacement, the stress field near the cavity is affected profoundly by the proximity of the free surface. Three higher-order corrections to the stress field are obtained, which result in a uniformly valid approximation to O(epsilon (super 5)). The hoop stress at the cavity exhibits a tensile maximum at the circle of tangency with a cone with its apex at the free surface. This result appears to be consistent with the locus of fractures radiating outward from the magma body inferred by ***seismic*** methods in ***Long Valley***, California.

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1988-010473

227. Database GeoRef

Title **Analysis of earthquake spectra from *Long Valley*, California, using an automatic, real-time computer system**

Author McNutt, S R

Affiliation Calif. Dep. Conserv., Div. Mines and Geol., Sacramento, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1363, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1989-078070

228. Database GeoRef

Title **Anomalous arrivals recorded in the *Long Valley* Caldera region, CA**

Author Ammon, Charles W; Zucca, J; Kasameyer, P W

Affiliation Pa. State Univ., Dep. Geosci., University Park, PA, United States (USA)

Affiliation Lawrence Livermore Natl. Lab., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1475, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-019438

229. Database GeoRef

Title **Preliminary array analysis and coherence of 3-component teleseismic data recorded on short aperture arrays in *Long Valley*, California**

Author Steck, Lee; Prothero, William A, Jr; Zandt, G

Affiliation Univ. Calif., Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Affiliation Lawrence Livermore Natl. Lab., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1475, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-019439

230. Database GeoRef

Title ***Seismic* reflection experiments in *Long Valley*, California**

Author Black, R A; Berg, R A; Smithson, S B

Affiliation Univ. Wyo., Progr. Crustal Stud., Laramie, WY, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1475, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-019440

231. Database GeoRef

Title **Observation of a reflection from the base of a magma chamber in *Long Valley* Caldera, California**

Author Zucca, John J; Kasameyer, Paul W; Mills, Joseph M, Jr

Affiliation Lawrence Livermore National Laboratory, Livermore, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.77, no.5, pp.1674-1687, 01 Oct 1987

Resource Location http://bssa.geoscienceworld.org/cgi/reprint/77/5/1674

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1987

Publication Type Serial; Analytic

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232. Database GeoRef

Title **Temporal change in coda Q associated with the Round *Valley*, California, earthquake of November 23, 1984**

Author Peng, Jenn-Yih; Aki, Keiiti; Chouet, Bernard; Johnson, P; Lee, Willie H K; Marks, S; Newberry, J T; Ryall, A S; Stewart, S W; Tottingham, D M

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Sierra Geophys., United States (USA); Cent. Seism. Stud., United States (USA)

Source Journal of Geophysical Research, vol. 92, no. B5, pp.3507-3526, 10 Apr 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Seven thousand seismograms of small earthquakes in the Mammoth Lakes-Bishop area were used to measure values of Q from the decay of the earthquake coda. These measurements were compared between events that occurred before and after the Round ***Valley*** earthquake (M = 5.7). We found that in regions near the main shock epicenter, measurements of coda Q (super -1) for earthquakes that occurred after the main shock were higher than for those earthquakes that occurred prior to the main shock. The opposite behavior was found for regions farther away from the main shock, namely, lower coda Q (super -1) after the main shock than before. Measurements of coda Q (super -1) in the ***Long Valley*** Caldera, outside of the immediate source region of the earthquake, were higher than in surrounding areas before the main shock, but the difference disappeared after the occurrence of the main shock. This indicates that the temporal variation in coda Q (super -1) is comparable to its spatial variation. The doughnut model (seismicity quiescence surrounded by a zone of activity) which was invoked for explaining the precursory seismicity pattern appears to be similar with the observed coda Q (super -1) variation associated with the Round ***Valley*** earthquake. The observed spatial variations in coda Q (super -1) also help to

reconcile conflicting results published in previous studies of the coda Q (sub -1) precursor. -- Journal abstract.

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1987-049567

233. Database GeoRef

Title **Fracture instabilities accompanying dike intrusion**

Author Sammis, Charles G; Julian, Bruce R

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Journal of Geophysical Research, vol. 92, no. B3, pp.2597-2605, 10 Mar 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The recent suggestion that earthquakes at ***Long Valley*** caldera, California, are caused by rapid tensile failure under high fluid pressure contradicts the assumption that the speed of propagation of a fluid-driven tensile crack is limited by the speed of motion of the fluid within the crack, so that such cracks cannot radiate ***seismic*** waves. In this paper we analyze fluid-driven cracks of various geometries and find examples of both stable and catastrophic propagation. For an isolated crack in a homogeneous medium with remotely applied compressive stresses the stress intensity decreases as the crack tip extends beyond the driving fluid (assumed stationary), so that crack propagation is stable and limited by the rate of fluid flow. On the other hand, for two cracks approaching each other, initially stable behavior gives way to unstable propagation, and the cracks join catastrophically even if the fluid is stationary. A crack approaching a free surface also exhibits a transition from stable to unstable propagation, with the final episode occurring catastrophically. A crack emanating from a pressurized reservoir of cylindrical or spherical shape can also undergo an episode of catastrophic propagation. Propagation begins when the reservoir pressure rises to a critical value, which depends on the regional stress field, the fracture toughness of the rock, and the size of the largest flaw at the surface of the reservoir. This flaw propagates catastrophically until it reaches a certain size and thereafter propagates stably. Microearthquakes caused by hydraulic fracturing have dimensions of at most a few tens of borehole radii and therefore probably are difficult to detect. Volcanic earthquakes can have source dimensions comparable to the radius of the associated magma chamber, so earthquakes as large as those at ***Long Valley*** caldera (source dimensions congruent to 10 km) could be caused by tensile failure.

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1987-057198

234. Database GeoRef

Title **Laterally-variable crustal models for pre-S observations at Station SLK, NW of *Long Valley* Caldera, California**

Author Delaplain, Thomas W; Peppin, W A

Affiliation Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.34, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028589

235. Database GeoRef

Title **Preliminary results from converted wave studies in the *Long Valley* Caldera**

Author Steck, Lee; Prothero, William A

Affiliation Univ. Calif. at Santa Barbara, Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.35, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028590

236. Database GeoRef

Title **Teleseismic P-Su wave form modeling for crustal structure beneath Mina, Nevada and beneath *Long Valley* and Calden, California**

Author Mangino, Stephen George

Publication Year 1987

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1992-053904

237. Database GeoRef

Title **Estimates of extension in the Basin & Range Province**

Author Boyer, Steven E; Allison, M Lee

Affiliation Univ. Wash., Dep. Geol. Sci., Seattle, WA, United States (USA)

Author Dickinson, William R (chairperson)

Source Abstracts with Programs - Geological Society of America, vol.19, no.7, pp.597, 1987

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-022802

238. Database GeoRef

Title **Inversion of teleseismic travel time residuals to investigate the three- dimensional P-velocity structure of the crust and upper mantle, the *Long Valley*, California, region**

Author Dawson, P B; Iyer, H M; Evans, J R; Achauer, Ulrich

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Fridericiana Karlsruhe, Federal Republic of Germany (DEU)

Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.19, Vol. 1, pp.55, 1987

Publisher International Union of Geodesy and Geophysics (IUGG), Vancouver, BC, Canada (CAN)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-048106

239. Database GeoRef

Title **Exotic *seismic* phases recorded near Mammoth Lakes and their use in the delineation of shallow-crustal (magma?) anomalies**

Author Peppin, William A

Affiliation Mackay School of Mines, Seismological Laboratory, Reno, NV, United States (USA)

Author Okal, E A

Source Pure and Applied Geophysics, vol. 125, no. 6, pp.1009-1023, 1987

Publisher Birkhaeuser Verlag, Basel, Switzerland (CHE)

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1990-046467

240. Database GeoRef

Title **Analysis of borehole seismograms from *Long Valley*, California; implications for caldera structure**

Author Elbring, Gregory J; Rundle, John B

Affiliation Sandia Natl. Lab., Geophys. Div., Albuquerque, NM, United States (USA)

Source Journal of Geophysical Research, vol. 91, no. B12, pp.12,651-12,660, 10 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A three-component seismometer was emplaced in a borehole in ***Long Valley*** Caldera for a period of 2 months to record local earthquakes to the south, mostly in the Sierra Nevada. The ***seismic*** records were plotted in depth versus time sections to produce "vertical hypocentral profiles" for both the vertical and horizontal components. The data collected and displayed in this way provide good resolution of the crustal structure at depth and avoid the attenuation and complications introduced by the near-surface caldera fill. The record sections were then modeled with two-dimensional ray tracing to match the observed travel times. Although nonreversal of the profiles and uncertainties in hypocentral locations introduce ambiguities, the final interpretation reveals two separate low-velocity bodies which we have tentatively identified as magma beneath the resurgent dome in ***Long Valley***. The first of these is a small (2 km by 6 km) body with a depth to top of approximately 3.7 km beneath the surface at the southern end of the resurgent dome. The other body appears larger and lies at a depth of 5.5 km beneath the northern end of the resurgent dome.-- Journal abstract.

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1987-016633

241. Database GeoRef

Title **Scattering and attenuation of high-frequency (1-25 Hz) *seismic* waves in the lithosphere with application to earthquake prediction**

Author Peng, Jenn-Yih; Aki, Keiiti; Lee, Willie H K

Affiliation Univ. South. Calif., Dep. Geol. Sci., Los Angeles, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1086, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-040442

242. Database GeoRef

Title **Spatial variation of crustal coda Q in California**

Author Phillips, W Scott; Lee, W H K; Newberry, James

Affiliation Los Alamos Natl. Lab., Los Alamos, NM, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Sierra Geophys., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1093, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-043922

243. Database GeoRef

Title **Preliminary results from teleseismic traveltime residuals in the *Long Valley*, California, region**

Author Dawson, P B; Evans, J R; Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1101, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-046967

244. Database GeoRef

Title **A new constraint on lateral variations of crustal structure at Mammoth Lakes, California**

Author Peppin, William A; Delaplain, Thomas W

Affiliation Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1108, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-049409

245. Database GeoRef

Title **A note on the teleseismic body waves from the 23 November 1984 Round *Valley*, California, earthquake**

Author Barker, Jeffrey S; Wallace, Terry C

Affiliation Woodward-Clyde Consult., Pasadena, CA, United States (USA)

Affiliation Univ. Ariz., Dep. Geosci., United States (USA)

Source Bulletin of the Seismological Society of America, vol.76, no.3, pp.883-888, Jun 1986

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-058062

246. Database GeoRef

Title **The major boundary faults in eastern *Long Valley* Caldera; magnetotelluric and gravity constraints**

Author Hermance, John F; Karlsdottir, Ragna

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Affiliation Natl. Energy Auth., Iceland (ISL)

Source Geophysical Research Letters, vol. 13, no. 5, pp.479-482, May 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geophysical studies of the major boundary fault(s) in eastern ***Long Valley*** caldera have led to significantly different models being proposed for the subsurface structure of this area. Pakiser originally interpreted gravity data to propose a steep vertical offset across the eastern boundary fault(s) which may be as great as 5 km. On the other hand, Hill employing ***seismic*** refraction data, and Abers, who reinterpreted the available gravity data in the light of the "hard" ***seismic*** constraints of Hill, suggested that the offset across this fault may be much more gentle. However, new magnetotelluric data may call for a revision of these models. Based on these recent MT results, offsets along the eastern boundary fault appear to be somewhat steeper than recent models would suggest. Our current thinking would favor a model more in keeping with the one originally envisaged by Pakiser, but with less throw (approximately 2 km) across the faults.

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-067523

247. Database GeoRef

Title ***Seismic* reflection profiling in the *Long Valley* Caldera**

Author Johnson, R A; Deemer, S; Berg, R; Burke, M; Smithson, Scott B; Rundle, John B

Affiliation Univ. Wyo., Dep. Geol. and Geophys., Laramie, WY, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.313, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-045338

248. Database GeoRef

Title **Crustal structure beneath *Long Valley*, California, determined from analysis of borehole seismograms**

Author Elbring, Gregory J; Rundle, John B

Affiliation Sandia Natl. Lab., Geophys. Res. Div., Albuquerque, NM, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.313, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-045339

249. Database GeoRef

Title ***Seismic* investigation of structures associated with the intrusion of the 600- year-old dike under Inyo Domes**

Author Burkhard, Norman R; Kasameyer, Paul W

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.402, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-038987

250. Database GeoRef

Title **NEWT System**

Author McNutt, Steve

Affiliation Calif. Dep. Conserv., Div. Mines and Geol., Sacramento, CA, United States (USA)

Source California Geology, vol.39, no.3, pp.51-55, Mar 1986

Publisher California Division of Mines and Geology, San Francisco, CA, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-035262

251. Database GeoRef

Title **CALCRUST wide-angle reflection survey, Mammoth Lakes, CA**

Author Murphy, W; Malin, P; Rundle, J; McEvilly, T; Okaya, David A

Affiliation Univ. Calif., Dep. Geol. Sci., CALCRUST, Santa Barbara, CA, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.18, no.2, pp.162-163, Feb 1986

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-013017

252. Database GeoRef

Title **Q structure beneath the Mono Craters-*Long Valley* region**

Author Steck, Lee Karl

Publication Year 1986

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1987-049233

253. Database GeoRef

Title **Spectral classification and interpretation of earthquakes near *Long Valley* Caldera, Sierra Nevada, California**

Author Zhu Chuanzhen; Uhrhammer, R A; Bolt, B A

Affiliation University of California, USA, (United States)

Source Revista de Geofisica (Madrid), vol.42, no.2, pp.217-226, 1986

Publisher Consejo Superior de Investigaciones Cientificas, Madrid, Spain (ESP)

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1992-081608

254. Database GeoRef

Title **New evidence for magma bodies south of *Long Valley* Caldera, Mammoth Lakes, California**

Author Peppin, William A

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.959, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-030422

255. **Database** GeoRef

Title **The 1985 Mammoth wide-angle *seismic* reflection survey**

Author Murphy, William J; Renaker, E; Robertson, M; Martin, A; Malin, P

Affiliation Univ. Calif., Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.960, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-030423

256. **Database** GeoRef

Title **Q structure beneath Mono Craters, California**

Author Steck, Lee; Scheimer, Jim; Prothero, William A, Jr

Affiliation Univ. Calif., Dep. Geol., Santa Barbara, CA, United States (USA)

Affiliation Lawrence Livermore Natl. Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.960, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-030424

257. **Database** GeoRef

Title **Active tectonic and magmatic processes beneath *Long Valley* Caldera, eastern California; an overview**

Author Hill, David P; Bailey, Roy A; Ryall, Alan S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,111-11,120, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geological, chronological, and structural studies of the ***Long Valley***-Mono/Inyo Craters area document a ***long*** history of related volcanic eruptions and earthquakes controlled by regional extensional tectonics of the Basin and Range province. This activity has persisted for hundreds of thousands of years and is likely to continue. The ***Long Valley*** magma chamber had a volume approaching 3000 km (super 3) prior to its climatic caldera-forming eruption 0.7 m.y. ago but has been reduced to less than a third of this volume by cooling, eruption, and crystallization. ***Seismic*** evidence indicates that the main mass of the present ***Long Valley*** magma chamber is about 10 km in diameter and that its roof is 8-10 km deep with smaller cupolas as shallow as 4-5 km. Although a chamber of this size is probably capable of producing an eruption approaching 30 km (super 3) of lava, the record over the past 0.5 m.y. suggests that eruptions of 1 km (super 3) or less are far more likely. Models proposed for the current ground uplift and seismicity within the caldera require inflation of 0.1-0.2 km (super 3) by additional magma since mid-1979, and some models suggest that inflation was accompanied by injection of a thin dike or dikes (probably of silicic magma) into the ring fracture zone beneath the south moat. Several of the M 5.8-6.2 earthquakes that occurred in the region beginning in 1978 had non-double-couple focal mechanisms. Whether these unusual mechanisms indicate injection of mafic (low-viscosity) magma at midcrustal depths in the Sierra Nevada block south of the caldera remains debatable. Studies of calderas of various ages throughout the world indicate that episodes of unrest are relatively common and do not invariably culminate in eruptions. Although current unrest is concentrated in the south moat of ***Long Valley*** caldera, the Inyo/Mono Craters probably hold a greater potential for producing an eruption in the foreseeable future. The Inyo/Mono Craters have erupted at 500-year intervals over the

past 2000-3000 years, whereas the ***Long Valley*** magma chamber has erupted at about 200,000-year intervals over the past 700,000 years. In either case, a major earthquake near the caldera could strongly influence the course of volcanic activity.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082041

258. Database GeoRef

Title **Constraints on the upper crustal structure of the *Long Valley*-Mono Craters volcanic complex, eastern California, from *seismic* refraction measurements**

Author Hill, David P; Kissling, E; Luetgert, J H; Kradolfer, U

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,135-11,150, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract During the summers of 1982 and 1983, field work was completed on 10 new ***seismic*** refraction profiles in the ***Long Valley***-Mono Craters region located within the technically active zone between the eastern Sierra Nevada and the Basin and Range province. The four profiles presented here sample the upper 7-10 km of the crust within the western half of ***Long Valley*** cladera, the Mono craters ring fracture system, and the "normal" crust north and northeast of ***Long Valley***. The entire area shares a common crystalline basement consisting primarily of Mesozoic granitic rocks. At a depth of 2 km beneath the topographic surface, the P wave velocity is uniformly 5.6 km/s beneath which the velocity increases with a gradient of about 0.1 s (super -1) . Clear secondary arrivals observed on a profile crossing the west part of the caldera support evidence from 1972 ***seismic*** refraction profiles for a reflecting boundary at a depth of 7-8 km beneath the west margin of the resurgent dome, which may represent the top of a magma chamber. Structural details resolved in the upper 2 km of the crust lead to the following conclusions: (1) P wave velocities in the crystalline basement at depths shallower than 2 km vary from 3.6 to 5.0 km/s. This variation reflects differences in the degree of fracturing of the upper portion of the basement. (2) An apparently homogeneous basement in the upper 7-10 km beneath the Mono Craters ring fracture system indicates that any extensive magma chamber must be at least 10 km deep there. (3) The downdropped crystalline basement beneath the western half of ***Long Valley*** caldera dips genty (5 degrees -10 degrees) to the northeast. Apparent offsets along steeply dipping caldera-bounding faults are 1.0-1.7 km along the northern, western, and southern sides of the caldera with largest offsets in the north. (4) Rocks forming the caldera fill fall into essentially three P wave velocity groups. From the surface downward these velocity groups are 100-400 of 1.2-1.8 km/s
material corresponding to unconsolidated fluvial or lacustrine deposits or highly fractured rhyolite flows, 200-400 m of 2.8-3.1 km/s material corresponding

to sparsely jointed postcaldera rhyolite, rhyodacite and basalt flows, and approximately 1000 m of 3.9-4.4 km/s material corresponding to deposits of Bishop Tuff.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082044

259. Database GeoRef

Title **Earthquake processes in the *Long Valley* Caldera area, California**

Author Julian, Bruce R; Sipkin, Stuart A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,155-11,169, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract At least three large earthquakes in 1978 and 1980 near ***Long Valley*** caldera have unusual non-double-couple mechanisms, unlike those appropriate for shear faulting. This conclusion is supported by short- period P first motions, ***long***-period P and SH first motions, surface wave spectral amplitudes and initial phases, and ***long***-period P and SH waveforms. Two explanations for these anomalous mechanisms have been proposed: (1) simultaneous strike slip and normal motion on separate faults and (2) tensile failure under high fluid pressure. To evaluate these conflicting hypotheses, we have inverted P and SH waveforms recorded by the Global Digital Seismograph Network (GDSN) to obtain moment tensors for the earthquakes and have also generated broadband seismograms by deconvolving short- and ***long***-period GDSN data. The largest event (1633:44 UTC, May 25, 1980) has a duration of about 20 s and can be resolved into three events, separated by intervals of about 7 and 10s, each having a non-double-couple mechanism. This contrasts with previously reported inversion results for other complex earthquakes, all of which have double-couple subevents.

Furthermore, the earthquake of 1450:56 UTC May 27, 1980, appears to be simple and not composed of smaller events. Thus the non-double-couple mechanisms are probably intrinsic to the source process and not artifacts caused by misinterpretation of multiple ruptures as single events. Rapid opening of cracks under high fluid pressure is a likely possibility for this process, although its dynamics are complex and not yet fully understood.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082046

260. Database GeoRef

Title **A reexamination of the moment tensor solutions of the 1980 Mammoth Lakes earthquakes**

Author Wallace, Terry C

Affiliation Univ. Ariz., Dep. Geosci., Tucson, AZ, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,171-11,176, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The moment tensor solutions determined from both ***long***-period body and surface waves for most of the large earthquakes in the 1980 Mammoth Lakes sequence have substantial deviations from a pure double-couple mechanism. Julian (1983) and Aki (1984) argue that these deviations require nonshear faulting ***seismic*** sources such as a compensated linear vector dipole (CLVD) which could represent magmatic dike injection. Here we reexamine the moment tensor solutions and investigate the effects of the non-double-couple source on body wave synthetics. An error function which is based on the cross correlation of a synthetic and an observed waveform was used to assess the difference in fit between the complete moment tensor solution and one constrained to be a double couple. For the main shock (May 25, 1980; 1633) the sum of the errors differed by less than 5% for the two models. Similarly, the errors differed by only 3% for the aftershock on May 27, 1980. The conclusion is that the CLVD mechanism is not resolved in the ***long***-period data. In addition, the complete moment tensor solution has an extra parameter; a chi (super 2) test was applied to normalize the number of parameters, and it was found that the complete solution

was slightly less significant than the double-couple solution. Finally, the complete solution was compared to a pure CLVD solution; for all the events examined, the total moment tensor is as far removed from a CLVD as it is a double couple. Although this does not rule out the possibility of dike injection, it strongly suggests that faulting can account for the ***long***-period ***seismic*** observations in the 1980 swarm.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082047

261. Database GeoRef

Title **Surface wave excitation and source mechanisms of the Mammoth Lakes earthquake sequence**

Author Priestley, Keith F; Brune, James N; Anderson, John G

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Affiliation Scripps Inst. Oceanogr., United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,177-11,185, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Spectral amplitudes for 24 events of the Mammoth Lakes earthquake sequence have been determined for the frequency range 0.1-10.0 Hz. The M (sub L) 6 earthquake that occurred at 1450 UT on May 27, 1980, is of particular interest because of the controversy surrounding its mechanism. A comparison of spectral levels determined from analysis of locally recorded strong motion and broadband digital data and spectral levels from regionally recorded surface waves extrapolated back to the source yields consistent results, indicating flat spectra in the band 0.1-1.0 Hz. The spectra observed in this study do not show pronounced spectral peaks predicted by theoretical studies of ground motion due to the jerky extension of a fluid-driven tensile crack containing a low-viscosity fluid. We have found nothing in the spectra of the M (sub L) 6 event that occurred at 1450 UT, on May 27, 1980, nor in the spectra of the aftershocks to distinguish them from spectra of "tectonic" earthquakes. However, the spectra themselves do not distinguish between various possible explanations for the non-double-couple source mechanism observed in moment tensor inversion and first motion data for the largest events of the Mammoth Lakes earthquake sequence.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082048

262. **Database** GeoRef

Title **Dynamics of an expanding fluid-filled crack**

Author Chouet, Bernard; Julian, Bruce R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,187-11,198, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The dike intrusion mechanism proposed recently by B. R. Julian and his colleagues for several large earthquakes at ***Long Valley*** caldera has stimulated new interest in the mechanics of fluid injection. This study is an attempt to resolve some of the questions raised by this interpretation by numerically simulating the dynamics of a propagating fluid-filled crack. The computations are based on the two-dimensional finite difference method applied by Aki and coworkers to a similar problem of a fluid-driven crack. We extend this earlier study by improving the boundary conditions applied in the plane of the crack and by analyzing a crack containing a viscous fluid that supports acoustic wave propagation. The problem has two time scales: the duration of the rupture, which is proportional to the distance the crack propagates, and the period of the acoustic resonance of the fluid, which is a function of the length of the crack and the acoustic velocity in the fluid. For a small extension of a ***long*** crack containing a fluid of low bulk modulus, these time scales are markedly different. The initial motion of the walls near the propagating crack tip is directed

outward, so the radiated first motion is compressive everywhere. The increase of the crack tip volume, however, induces a pressure drop in the fluid which propagates over the length of the crack with the velocity of the acoustic wave, causing a partial collapse of the wall radiated as a ***long***-period dilatation. The dilatation following the short compressional first arrival is well marked in the vicinity of the crack plane, and for a buried vertical crack it is a conspicuous feature of the near-field vertical ground motion close to the crack trace. These properties of the signal suggest that first motion studies of this frequency-dependent source may be delicate without broadband instruments. Inhomogeneous waves propagating at the liquid-solid interface produce high-frequency vibrations which are observed only in the immediate vicinity of the crack. The source duration depends strongly on the fluid viscosity and associated viscous damping at the crack wall; damping of the motion by the radiation of elastic waves is a comparatively small effect.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082049

263. **Database** GeoRef

Title **Deformation of *Long Valley* Caldera between August 1982 and August 1983**

Author Denlinger, Roger P; Riley, Francis S; Boling, James K; Carpenter, Michael C

Affiliation Cascade Volcano Obs., Vancouver, WA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,199-11,209, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geodetic and ***seismic*** data collected between July 1982 and August 1983 document an important event in the recent evolution of ***Long Valley*** caldera. In January 1983 a substantial change in the pattern of deformation was associated with the most intense ***seismic*** swarm since May 1980. The earthquake hypocenters of the January 1983 swarm formed a vertical, roughly tabular zone beneath the south moat of the caldera. Analysis of extensive intracaldera horizontal control data indicates that the shear strain distributed throughout this zone could not all be attributed to slip along any single fault plane. The surface deformation of the resurgent dome and caldera floor is temporally associated with the swarm and was caused by an expansion of the upper levels of the residual magma chamber; analysis of the 1983 data indicates a pressure distribution 2-5 km shallower than could be fit by analysis of the 1979-1982 caldera deformation. The volume of this shallow expansion is 10-15% of the whole chamber expansion that occurred between 1979 and 1982. Most of the 1983 deformation occurred between December 14, 1982, and January 20,
1983, and thus was associated with the January 6-7, 1983, swarm, though right-lateral shear strain continued to accumulate in the south moat through 1983. We conclude that a shallow pressure increase probably occurred within the upper levels of the residual magma chamber of ***Long Valley*** caldera during the 5-week period following December 14, 1982. It is not clear, however, whether this pressure increase preceded or accompanied the January 1983 earthquake swarm.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082050

264. Database GeoRef

Title **A transient model of the geothermal system of the *Long Valley* Caldera, California**

Author Blackwell, David D

Affiliation South. Method. Univ., Dep. Geol. Sci., Dallas, TX, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,229-11,241, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The present -day geothermal system underlying the southern one third of the ***Long Valley*** caldera is discussed, based on interpretation of the complex shapes of temperature-depth curves and the correlation of this interpretation with hydrologic and geologic data. The temperature-depth curves are interpreted using a simple analytical model for transient flow of hot water in a confined aquifer. The results give information on the transient nature of the geothermal system operating in the ***Long Valley*** caldera and on the application of the analytical model to a complex geothermal system. At the present time there is major west- east flow of hot fluid in two aquifers. The first aquifer occurs at a depth of 20-120 m. The aquifer is charged with water at a temperature greater than 175 degrees C west of Casa Diablo Hot Springs which then flows eastward at a velocity of the order of 100-200 m/yr to exit in the hot springs along Hot Creek and at the edge of Lake Crowley. Temperatures systematically decrease eastward in the shallow aquifer. In order to interpret the temperature data in ***Long Valley*** caldera a model of the thermal effects of flow in a shallow aquifer is discussed, and the results are found to be consistent with geologic and hydrologic information. The shapes of inversions of temperature versus depth curves indicate that the age of this aquifer ranges between 50 and 700 years; the best estimate is 500-700 years. The initiation of hot water flow in the shallow aquifer coincides with extrusive activity associated with the Mono/Inyo craters chain of rhyolitic centers, which was active over a linear distance of about 40 km during the period 500-600 years ago. A second aquifer occurs just below the top of the Bishop Tuff at a depth of approximately 700 m in hole Mammoth 1. Less is known about the flow velocity and other characteristics of this aquifer. Modeling of the temperature-depth curve in Mammoth 1 suggests that this aquifer is of the order of 3000 years old. Temperatures associated with both aquifers are evidence for transient events which caused a sudden input of hot water along the west side of the caldera into an existing geothermal system that was circulating at temperatures below 120 degrees C. Apparently, previous to the input of hot water into these aquifers, the geothermal system in the caldera was in a waning phase. The waning of the system may have been due to loss of porosity and permeability by mineral deposition in the circulation pathways and/or cooling of the caldera and subjacent intrusive rocks and a consequent decrease in the thermal drive. There is no evidence at the present time of a large-scale, high-temperature geothermal system associated with the magma chamber identified by ***seismic*** studies beneath the resurgent dome. Whether the high temperatures in the current geothermal system reflect cooling of magma associated with Mono/Inyo craters or merely fracturing and reconnection of a preexisting source of hot water to the shallow subsurface is not known. Although the direction of flow of hot water is from west to east, deep temperature data suggest return flow of cold water from east to west in the lower half of the caldera fill (in the eastern part of the caldera at least). The velocity of this return flow is probably of the order of a meter per year, or two orders of magnitude below the velocity of flow in the shallow aquifers.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082053

265. Database GeoRef

Title **Dynamic response of *Long Valley* Dam in the Mammoth Lake earthquake series of May 25-27, 1980**

Author Lai, S S; Seed, H Bolton

Affiliation Woodward-Clyde Consultants, Santa Ana, CA, United States (USA)

Affiliation Univ. Calif. at Berkeley, Dep. Civ. Eng., United States (USA)

Source Report - Earthquake Engineering Research Center, College of Engineering, University of California, Berkeley, vol. 85/12, 71 pp., Nov 1985

Publisher Earthquake Engineering Research Center, College of Engineering, University of California, Berkeley, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-029941

266. Database GeoRef

Title **Mammoth Lakes, California, earthquakes, May 1980; *seismic* response of *Long Valley* Dam**

Author Anonymous

Source News - University of California, Earthquake Engineering Research Center, vol. 9, no. 2-3, pp.1-3, Sep 1985

Publisher Earthquake Engineering Research Center, [Richmond, CA], United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1987-078437

267. Database GeoRef

Title **Imaging of earthquake sources in *Long Valley* Caldera, California, 1983**

Author McMechan, George A; Luetgert, J H; Mooney, Walter D

Affiliation Univ. Tex. at Dallas, Cent. Lithospheric Stud., Richardson, TX, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Bulletin of the Seismological Society of America, vol.75, no.4, pp.1005-1020, Aug 1985

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-002413

268. Database GeoRef

Title **Aftershocks of the May 1980 Mammoth Lakes, California, earthquakes**

Author Lide, Chester S; Ryall, Alan S, Jr

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Publication Year 1985

Publication Type Report; Monographic

Accession Number 1991-035977

269. Database GeoRef

Title ***Seismic* imaging in *Long Valley*, California**

Author Rundle, J B; Ellsworth, W L; Malin, P; McEvilly, T V; Smithson, S B; Henyey, T L

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.301, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-010685

270. Database GeoRef

Title **Structure of the *Long Valley* Caldera interpreted from *seismic* reflection data**

Author Deemer, S; Humphreys, M C; Johnson, R A; Smithson, S B; Ellsworth, W L; Hill, David P

Affiliation Univ. Wyo., Dep. Geol. and Geophys., Laramie, WY, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.301-302, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-010686

271. Database GeoRef

Title **Observation of a P to P reflection from the base of a low velocity layer in the *Long Valley* region of California from an earthquake profile**

Author Zucca, J J; Mills, J M

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.392, 30 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-049100

272. Database GeoRef

Title **The subsurface structure of *Long Valley* Caldera, Mono County, California; a preliminary synthesis of gravity, *seismic*, and drilling information**

Author Abers, Geoffrey

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Journal of Geophysical Research, vol. 90, no. B5, pp.3627-3636, 10 Apr 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** Caldera is a 0.7 m.y. old volcanic eruptive center associated with an elliptical collapse structure on the eastern margin of the Sierra Nevada. Two-dimensional models of caldera fill are presented in this study resulting in structures compatible with existing ***seismic*** refraction and gravity data. Modifications to previous ***seismic*** models include shifting the north caldera rim to the south and decreasing the dip of the west and south boundaries. Densities in the model are not varied independently but are based on empirical velocity-density relationships and measured densities from surface outcrops and drill cores. These density values are adequate to account for observed gravity anomalies, indicating that the assumed subsurface lithologies are approximately correct. The large gravity anomaly in the shallow eastern caldera is modeled by assuming that the area is underlain by a layer of exceptionally low density.

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1985-057409

273. Database GeoRef

Title **Microseismicity near *Long Valley* Caldera, California, June 29 to August 12, 1982**

Author Boone, William J

Publication Year 1985

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1986-046917

274. **Database** GeoRef

Title **Crustal refraction profile of the *Long Valley* Caldera, California, from the January 1983 Mammoth Lakes earthquake swarm**

Author Luetgert, James H; Mooney, Walter D

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.75, no.1, pp.211-221, Feb 1985

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-035563

275. **Database** GeoRef

Title **Mapping coda Q(w) in California using the USGS Earthquake Data Archiving and Processing System**

Author Lee, W H K; Aki, Keiiti; Chouet, Bernard; Newberry, J T; Tottingham, D M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. South. Calif., United States (USA)

Author Bollinger, G A (chairperson)

Affiliation Va. Polytech. Inst. and State Univ., Dep. Geol. Sci., Blacksburg, VA, United States (USA)

Source Earthquake Notes, vol.56, no.1, pp.15, Jan 1985

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-071462

276. **Database** GeoRef

Title **Local constraints on magma location in *Long Valley*, California, from short-period local data**

Author McLaren, James P; Savage, W U; Barker, Jeffrey Scott

Affiliation Woodward-Clyde Consultants, Pasadena, CA, United States (USA)

Author Bollinger, G A (chairperson)

Affiliation Va. Polytech. Inst. and State Univ., Dep. Geol. Sci., Blacksburg, VA, United States (USA)

Source Earthquake Notes, vol.56, no.1, pp.30, Jan 1985

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-071551

277. **Database** GeoRef

Title **Data report for the July-August 1983 *seismic*-refraction experiment in the Mono Craters-*Long Valley* region, California**

Author Meador, Patricia J; Hill, David P; Luetgert, James H

Affiliation U. S. Geol. Surv., USA, (United States)

Source Open-File Report - U. S. Geological Survey, Report: OF 85-0708, 70 pp., 1985

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1985

Publication Type Serial; Report; Map; Monographic

Accession Number 1986-043382

278. Database GeoRef

Title ***Seismic*** **reflection profiling in the** ***Long Valley*** **Caldera, California; data acquisition, processing, and interpretation**

Author Deemer, Sharon J

Publication Year 1985

Publication Type Thesis or dissertation; Map; Master's; Monographic

Accession Number 1986-077095

279. Database GeoRef

Title **Volcano hazards program in the United States**

Author Tilling, R I; Bailey, R A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Author Fedotov, S A; Yokoyama, I

Affiliation Inst. Volcanol., Petropavlovsk-Kamchatsky, USSR (SUN)

Source Journal of Geodynamics, vol. 3, no. 3-4, pp.425-446, 1985

Publisher Pergamon Press, Oxford - New York, International (III)

Abstract Volcano monitoring and volcanic-hazards studies have received greatly increased attention in the United States in the past few years. Before 1980, the Volcanic Hazards Program was primarily focused on the active volcanoes of Kilauea and Mauna Loa, Hawaii, which have been monitored continuously since 1912 by the Hawaiian Volcano Observatory. After the reawakening and catastrophic eruption of Mount St. Helens in 1980, the program was substantially expanded as the government and general public became aware of the potential for eruptions and associated hazards within the conterminous United States. Integrated components of the expanded program include: volcanic-hazards assessment; volcano monitoring; fundamental research; and, in concert with federal, state, and local authorities, emergency-response planning. In 1980 the David A. Johnston Cascades Volcano Observatory was established in Vancouver, Washington, to systematically monitor the continuing activity of Mount St. Helens, and to acquire baseline data for monitoring the other, presently quiescent, but potentially dangerous Cascade volcanoes in the Pacific Northwest. Since June 1980, all of the eruptions of Mount St. Helens have been predicted successfully on the basis of ***seismic*** and geodetic monitoring. The largest volcanic eruptions, but the least probable statistically, that pose a threat to western conterminous United States are those from the large Pleistocene -Holocene volcanic systems, such as ***Long Valley*** caldera (California) and Yellowstone caldera (Wyoming), which are underlain by large magma chambers still potentially capable of producing catastrophic caldera-forming eruptions. In order to become better prepared for possible future hazards associated with such historically unprecedented events, detailed studies of these, and similar, large volcanic systems should be intensified to gain better insight into caldera- forming processes and to recognize, if possible, the precursors of caldera-forming eruptions.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1987-068399

280. Database GeoRef

Title ***Seismic*** **reflection profiling through the** ***Long Valley*** **Caldera**

Author Deemer, S; Humphreys, M C; Johnson, R A; Smithson, Scott B; Ellsworth, W L; Hill, D P

Affiliation Univ. Wyo., Dep. Geol. and Geophys., Laramie, WY, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.985, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-028227

281. **Database** GeoRef

Title **Imaging of earthquake sources**

Author Luetgert, James H; McMechan, George A; Mooney, W D

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Tex., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.990, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-028268

282. Database GeoRef

Title **Three-dimensional central structure of *Long Valley*-Mono Lake region, eastern California, from *seismic* refraction data**

Author Kissling, E; Kradolfer, U; Hill, D P; Luetgert, J H

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1116, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046284

283. Database GeoRef

Title **Evidence for a low-velocity body under Inyo/Mono craters from the study of teleseismic P-wave traveltime residuals**

Author Achauer, Ulrich; Greene, Lizbeth; Evans, John R; Iyer, H M

Affiliation Univ. Karlsruhe, Inst. Geophys., Karlsruhe, Federal Republic of Germany (DEU)

Affiliation U. S. Geol. Surv., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1116, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046285

284. Database GeoRef

Title **Mechanisms for deformation of *Long Valley* Caldera during the *seismic* swarm of January 1983**

Author Riley, Francis, S; Denlinger, Roger P

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Affiliation Cascades Volcano Obs., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1117, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046287

285. **Database** GeoRef

Title ***Seismic* moments of Mammoth Lakes earthquakes; data from close-in displacement seismograms**

Author Peppin, W A

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046294

286. Database GeoRef

Title **Location and configuration of magma bodies beneath *Long Valley*, California, determined from anomalous earthquake signals**

Author Sanders, Christopher O

Affiliation Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 89, no. B10, pp.8287-8302, 30 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Recordings of 281 small earthquakes which occurred recently near the southern edge of ***Long Valley*** caldera at depths from 1 to 15 km are used to map the subsurface geometry of shear wave attenuating bodies in the caldera. Signatures of these events recorded northwest, north, northeast, and east of ***Long Valley*** with ray paths through the caldera are

often anomalous in that S wave arrivals have very low amplitudes, and high frequency P and S wave energy is missing for the same station-event combinations. The volcanic and geothermal history of the region suggests that ray paths for these anomalous signals have passed through magma which absorbed much of the S wave energy and also attenuated the higher frequencies. With over 1200 normal and anomalous ray paths through the caldera we have located two apparently massive magma bodies in the central and northwest caldera as well as two more dispersed magma areas in the southern caldera and beneath Crowley Lake. The central magma body extends from 4.5 to at least 13 km beneath the surface, and the northwest body is as shallow as 5.5 km. These two magma bodies are probably connected below about 8 km. Secondary arrivals seen on select seismograms are tentatively interpreted as reverberations inside the central magma chamber and are consistent with the interpreted lateral extent of the magma. The northwest and central magma bodies lie beneath the northwest and southeast corners of the caldera's resurgent dome and probably connect beneath the dome's center. Also the shallower parts of these magma bodies and the southern anomalous area lie beneath the surface expression of the medial graben faults suggesting that structural features seen at the surface of the ***valley*** may be related to magma location at depth.

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Accession Number 1985-038347

287. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; a preliminary magnetotelluric and magnetic variation interpretation**

Author Hermance, John F; Slocum, Warren M; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 89, no. B10, pp.8325-8337, 30 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The ***Long Valley***/Mono Basin volcanic complex in eastern California is one of the few major silicic caldera systems in western North America which have exhibited volcanic activity so recently that they may still be potentially active. Whereas, in principle, magnetotelluric measurements offer a significant opportunity to study such systems through mapping subsurface electrical features associated with hydrothermal and magmatic processes in the crust, our studies in this area indicate that such techniques are profoundly affected by the highly three-dimensional structures associated with these complicated volcanic terranes. We argue that while simple plane-layered (one-dimensional) interpretations are likely to be misleading in such a complicated three-dimensional environment, magnetotelluric observations can delineate important physical features associated with caldera structures; in particular, the method can closely determine the location and magnitude of major boundary faults. Because of the high resistivity contrast between basin fill and crystalline basement, these techniques are very useful for characterizing the subsurface hydrologie regime as well. In addition, sites have been occupied in the southwest moat of ***Long Valley*** caldera, an area that is currently exhibiting a variety of tectonic activity. Both the telluric field and magnetic induction arrows imply the presence of a structurally controlled east-west electric current system at relatively shallow depth in the crust. This elongated east-west zone is aligned along the belt of recent ***seismic*** activity in the southwest moat, a zone of ***seismic*** shear wave attenuation, and a zone of known hydrothermal alteration at the surface. Finally, we summarize observations from the vicinity of Pumice ***Valley*** (adjacent to Mono Craters) which has been thought to be an active incipient caldera. Since our present data do not indicate an observable decrease in resistivity at shallow depths beneath the ***valley***, we are led to conclude that the parent magma body feeding Mono Craters (and perhaps Inyo domes) is either too thin or too deep to be resolved or is significantly displaced from a position beneath the center of the inferred ring fractures.

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Accession Number 1985-038350

288. Database GeoRef

Title **Deformation in the White Mountain *seismic* gap, California-Nevada, 1972-1982**

Author Savage, J C; Lisowski, M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 89, no. B9, pp.7671-7687, 10 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Trilateration network crosses the east end of the ***Long Valley*** caldera. Vertical deformation is largely accounted for by 0.10- to 0.15-km (super 3) expansion of a spherical magma chamber 8-10 Km beneath the resurgent dome within the ***Long Valley*** Caldera sometime between July 1979 and September 1980 with an additional expansion of perhaps 0.05 km (super 3) between September 1980 and July 1982. Some additional sources of deformation within the aftershock zone of the Mammoth Lakes earthquakes seem to be required to explain the horizontal deformation. Right-lateral slip on vertical faults extending WNW from each of the three largest earthquakes in the Mammoth Lakes sequence provides the required additional deformation.

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1985-021646

289. Database GeoRef

Title **Imaging the *Long Valley*, California crustal structure using *seismic* refraction and local earthquake data**

Author Kissling, E; Hill, D P; Ellsworth, W L

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.16, no.6, pp.560, Sep 1984

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-046041

290. Database GeoRef

Title **Source mechanism, surface wave excitation and m (sub b) -M (sub S) analysis of a volcanic earthquake sequence, Mammoth Lakes, California, U.S.A.**

Author Priestley, Keith F; Brune, James N; Anderson, John

Affiliation Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Affiliation Maharshi Dayanand Univ., India (IND); Univ. Calif. at San Diego, United States (USA)

Author Brune, James N (convener); Singh, Sarva Jit (convener)

Affiliation Scripps Inst. Oceanogr., Inst. Geophys. and Planet. Phys., USA, (United States)

Publisher Natl. Geophys. Res. Inst., Hyderabad, India (IND)

Publication Year 1984

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 1988-070034

291. Database GeoRef

Title **Changing mercury anomalies in *Long Valley*, California; indication for magma movement or *seismic* activity**

Author Varekamp, Johan C; Buseck, Peter R

Affiliation Ariz. State Univ., Dep. Geol. and Chem., Tempe, AZ, United States (USA)

Source Geology (Boulder), vol.12, no.5, pp.283-286, May 1984

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mercury anomalies in soils in geothermal areas form as a result of vapor transport. Comparison of the Hg distribution measured in 1975, and again in 1982, indicates that a new Hg anomaly formed in the Inyo crater zone in the intervening period. Two models can explain this new anomaly: (1) geothermal water has reached shallow levels as a result of increased permeability created by ***seismic*** activity, or (2) addition of a CO (sub 2) -rich, magnetic vapor to the geothermal system at depth caused vapor exsolution in zones where it did not occur before. If the Hg anomaly in the Inyo crater zone is related to the addition of magmatic vapors, the site of the new anomaly may overlie young, intruding magma.--Modified journal abstract.

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1984-029746

292. Database GeoRef

Title ***Seismic* imaging in *Long Valley*, California, by surface and borehole techniques; an investigation of active tectonics**

Author Rundle, John B; Elbring, Gregory Jay; Striker, Richard P; Finger, John T; Carson, Charles C; Walck, Marianne C; Ellsworth, William L; Hill, David P; Malin, Peter; Tono, Enrique; Robertson, Michelle; Kuhlman, Steve; McEvilly, Tom; Clymer, Richard; Smithson, Scott B; Deemer, Sharon; Johnson, Roy; Henyey, Tom; Hauksson, Egill; Leary, Peter; McCraney, John; Kissling, Edi

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Univ. Calif., United States (USA); Lawrence Berkeley Lab., United States (USA); Univ. Wyo., United States (USA); Univ. South. Calif., United States (USA); Eidg. Tech. Hochsch., Switzerland (CHE)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.194-201, 30 Apr 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1985-062626

293. Database GeoRef

Title **Instrument comparison test performed during the 1983 *Long Valley* refraction experiment**

Author Nigbor, R L; Patraw, G W; Moser, M A

Affiliation Kinematrics, Pasadena, CA, United States (USA)

Author Anonymous

Source Earthquake Notes, vol.55, no.1, pp.11, Mar 1984

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-020867

294. Database GeoRef

Title **Shallow magma bodies related to lithospheric extension in the western Great Basin, western Nevada and eastern California**

Author Ryall, Alan S; Ryall, F D

Affiliation Univ. Nev., Seismolog. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Earthquake Notes, vol.55, no.1, pp.11 -12, Mar 1984

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-020872

295. Database GeoRef

Title **Constraints on the upper crustal structure of the *Long Valley* - Mono Craters volcanic complex, eastern California, from *seismic* refraction measurements**

Author Hill, David P; Kissling, Edy; Luetgert, James H; Kradolfer, Urs

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.151-187, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059726

296. Database GeoRef

Title **Three-dimensional structure of the *Long Valley* Caldera, California, region by geotomography**

Author Kissling, Edy; Ellsworth, William L; Cockerham, Robert S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.188-220, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059727

297. Database GeoRef

Title **Location and configuration of magma bodies beneath *Long Valley*, California, determined from anomalous earthquake signals**

Author Sanders, Christopher

Affiliation Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.221-247, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059728

298. Database GeoRef

Title **A re-examination of the moment tensor solution of the 1980 Mammoth Lakes earthquakes**

Author Wallace, Terry C

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.409-439, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059734

299. Database GeoRef

Title ***Seismic* activity in *Long Valley* Caldera area, California; June 1982 through July 1984**

Author Cockerham, Robert S; Pitt, A M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.493-526, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059738

300. **Database** GeoRef

Title **High-resolution microseismicity study of possible magmatic intrusion in the *Long Valley* Caldera**

Author Smith, Albert T

Affiliation Lawrence Livermore Lab., Livermore, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.527-540, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract During August 1982, a dense network of 14 ***seismic*** stations was deployed. Ten sites used three component seismometers, and all sites used digital event recorders sampling at 200 samples/s with an array trigger criterion to reject local noise and to ensure accurate relative timing. Hypocenters, station corrections, and velocity structure were simultaneously determined using all this data. The analysis concentrated on a swarm of earthquakes which occurred during August 9, along a vertical plane which was tangent to the resurgent dome. The events occurred along a 0.5 km segment of the plane between depths of 2.5 to 3.5 km. Additional events occurred to depths of 9 km. but not directly beneath the swarm: the deeper events are located from 0.5 to 1.0 km from the swarm epicenters. The configuration suggests intrusion of magma or volatiles: the shallow swarm was above the intrusion; the deeper events occurred along the perimeter of the upwelling. Focal mechanisms of events with the swarm support this interpretation, and indicate that the tensional axis is perpendicular to the plane of seismicity.--Modified author abstract.

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059739

301. **Database** GeoRef

Title **Source mechanism of Mammoth Lake earthquakes; further support for magma intrusion**

Author Aki, Keiiti

Affiliation Mass. Inst. Technol., Dep. Earth, Atmos. and Planet. Sci., Cambridge, MA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.16, pp.242, 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-031229

302. **Database** GeoRef

Title **Monitoring *Long Valley* seismicity on line and in real time with the ASP**

Author Peterson, J; Majer, Ernest L; McEvilly, Thomas V

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Source Earth Sciences (Berkeley, Calif.), vol.6, no.3, pp.1, 5-8, Dec 1983

Publisher University of California, Lawrence Berkeley Laboratory, Berkeley, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1985-007621

303. **Database** GeoRef

Title **Conductivity anomalies within *Long Valley* Caldera and the Southwest Moat**

Author Slocum, W; Neumann, G A; Hermance, J F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.693, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-040634

304. Database GeoRef

Title **Faulting and crustal structure complexity; a possible explanation for the moment tensor solutions of the 1980 Mammoth Lakes earthquakes**

Author Wallace, Terry C; Burdick, Larry J; Kanamori, Hiroo

Affiliation Calif. Inst. Technol., Seismol. Lab., Pasadena, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.769, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-078296

305. Database GeoRef

Title **Location and configuration of magma bodies beneath *Long Valley*, California, determined from anomalous earthquake signals**

Author Sanders, Chris O

Affiliation Univ. Nev. at Reno, Seismol. Lab., Reno, NV, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016553

306. Database GeoRef

Title **Structure of the *Long Valley* Caldera region as interpreted from *seismic* data**

Author Kissling, E; Cockerham, R S; Ellsworth, William L

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016555

307. Database GeoRef

Title **Correlation of hydrogen gas emissions and *seismic* activity at *Long Valley* Caldera, California**

Author McGee, K A; Sutton, A J; Sato, Motoaki; Casadevall, T J

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Affiliation U. S. Geol. Surv., Cascades Volcano Obs., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016563

308. Database GeoRef

Title **Geometry of magma bodies beneath *Long Valley*, California, determined from anomalous earthquake signals**

Author Sanders, Chris O; Ryall, Flori

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Geophysical Research Letters, vol. 10, no. 8, pp.690-692, Aug 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract One hundred and ninety-two small earthquakes are used to map subsurface geometry. Seismograms of these events are often anomalous in that S-wave arrivals are absent and high frequency P-wave energy is missing. These anomalous ray paths intersect in an area of the south-central caldera which appears to be a region of molten or partially molten rock. This magma body lies between about 4 1/2 and at least 13 km depth and is 10 km ***long*** by 5 km wide beneath 7 km.--Modified journal abstract.

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-058385

309. Database GeoRef

Title **Evidence for dyke intrusion earthquake mechanisms near *Long Valley* Caldera, California**

Author Julian, Bruce R

Affiliation U. S. Geol. Surv., Menlo Park, CA 94025, United States (USA)

Source Nature (London), vol.303, no.5915, pp.323-325, 26 May 1983

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1986-062054

310. Database GeoRef

Title **Evidence for dyke intrusion earthquake mechanisms near *Long Valley* Caldera, California**

Author Julian, Bruce R

Affiliation U. S. Geol. Surv., Menlo Park, CA 94025, United States (USA)

Source Nature (London), vol.303, no.283, pp.323-325, 26 May 1983

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1997-026837

311. Database GeoRef

Title **Moment tensor solutions of Mammoth Lake earthquakes**

Author Ekstroem, Goeran; Dziewonski, Adam M

Affiliation Harvard Univ., Dep. Geol. Sci., Cambridge, MA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.18, pp.262, 03 May 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-039500

312. Database GeoRef

Title **Spasmodic tremor and possible magma injection in *Long Valley* caldera, eastern California**

Author Ryall, Alan S, Jr; Ryall, Floriana

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Science, vol.219, no.4591, pp.1432-1433, 25 Mar 1983

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-034810

313. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; a rationale for a program of intermediate depth scientific drilling**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.15, no.5, pp.434-435, Mar 1983

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-038982

314. Database GeoRef

Title **Data report for the August 1982 *seismic*-refraction experiment in the Mono Craters-*Long Valley* region, California**

Author Meador, P J; Hill, D P

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 83-0708, 55 pp., 1983

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1983

Publication Type Serial; Report; Map; Monographic

Accession Number 1984-020250

315. Database GeoRef

Title **Geophysical studies of active geothermal systems in the northern Basin and Range**

Author Ward, Stanley H

Affiliation Univ. Utah Res. Inst., Earth Sci. Lab., Salt Lake City, UT, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.121-157, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1984-044706

316. Database GeoRef

Title **Seismological investigations of volcanic and tectonic processes in the western Great Basin, Nevada and eastern California**

Author Vetter, Ute R; Ryall, Alan S; Sanders, Christopher O

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.333-343, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1984-044721

317. Database GeoRef

Title **Kinemetrics/Caltech participation in the *Long Valley* tests of July 1983**

Author Rihn, Bill

Affiliation Kinemetrics, Pasadena, CA, United States (USA)

Affiliation Univ. West. Ont., London, ON, United States (USA)

Author Meyer, Robert P (convener); Mereu, Robert F (convener)

Affiliation Univ. Wis., Dep. Geol. and Geophys., Madison, WI, United States (USA)

Publisher Int. Assoc. Seismol. and Phys. Earth's Int., Comm. Controlled Source Seismol., United States (USA)

Publication Year 1983

Publication Type Book; Conference document; Analytic

Accession Number 1984-051583

318. Database GeoRef

Title **Seismological investigations of volcanic and tectonic processes in the western Great Basin, Nevada and eastern California**

Author Vetter, Ute R; Ryall, Alan S; Sanders, Christopher O

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.333-343, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic

Accession Number 1985-045894

319. Database GeoRef

Title **A short-term seismicity study at Mammoth Lakes using in-field automated *seismic* processing**

Author Peterson, J E, Jr; Majer, E L

Affiliation Univ. Calif. at Berkeley, Seismogr. Stn., Berkeley, CA, United States (USA)

Affiliation Lawrence Berkeley Lab., Earth Sci. Div., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1029, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-078063

320. Database GeoRef

Title **Seismicity and magma injection near Mammoth Lakes, California, in the context of regional tectonics**

Author Ryall, A S

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012948

321. Database GeoRef

Title **Mammoth Lakes volcanic hazards workshop**

Author Martin, Roger C

Affiliation Calif. Div. Mines Geol., USA, (United States)

Source California Geology, vol.35, no.11, pp.244-245, Nov 1982

Publisher California Division of Mines and Geology, San Francisco, CA, United States (USA)

Publication Year 1982

Publication Type Serial; Analytic

Accession Number 1983-028036

322. Database GeoRef

Title **A discrepancy between *long*- and short-period mechanisms of earthquakes near the *Long Valley* Caldera**

Author Wallace, Terry C; Given, Jeff; Kanamori, Hiroo

Affiliation Calif. Inst. Technol., Seismol. Lab., Pasadena, CA, United States (USA)

Source Geophysical Research Letters, vol. 9, no. 10, pp.1131-1134, Oct 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The largest events in the 1980 Mammoth Lakes earthquake sequence show a discrepancy between fault mechanisms which are determined on the basis of the local short-period first motions and those determined by modeling of ***long***-period regional and teleseismic waveforms. The short-period solutions are left-lateral strike-slip on north-striking, near vertical planes. The ***long***-periods invariably require a much more moderately dipping fault plane with a significant dip-slip (normal) component. Persistence of disagreements between short- and ***long***-period polarities to teleseismic distances suggests that the source-time functions are complicated and may be responsible for at least part of the discrepancy. In addition, there seems to be a systematic difference between local short-period polarities and teleseismic ***long***-period polarities that is related to travel paths across portions of ***Long Valley*** Caldera. It is possible that a low velocity zone related to recent magmatic activity is causing the deflection of local ***seismic*** rays, thus distorting the fault plane projection.-- Journal abstract.

Publication Year 1982

Publication Type Serial; Analytic

Accession Number 1983-008177

323. Database GeoRef

Title **Waiting for the volcano**

Author Overbye, Dennis

Source Discover, vol. 3, no. 10, pp.18-22, 24, Oct 1982

Publisher Walt Disney Co., Palm Coast, FL, United States (USA)

Publication Year 1982

Publication Type Serial; Analytic

Accession Number 1983-003241

324. Database GeoRef

Title **Teleseismic analysis of the 1980 Mammoth Lakes earthquake sequence**

Author Given, Jeffrey W; Wallace, Terry C; Kanamori, Hiroo

Affiliation Calif. Inst. Tech., Seismol. Lab., Pasadena, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.72, no.4, pp.1093-1109, Aug 1982

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1982

Publication Type Serial; Analytic

Accession Number 1983-027527

325. Database GeoRef

Title **Mechanisms of the May 1980 earthquakes near *Long Valley* Caldera, California; evidence for dike injection**

Author Julian, B R; Cockerham, R S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.88-89, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054456

326. Database GeoRef

Title **High resolution recording of aftershocks of the January 1983 Mammoth Lakes, California earthquakes**

Author Leutgert, J; Mooney, W D

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.91, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054460

327. Database GeoRef

Title **Properties of Mammoth Lakes, California, earthquakes from digital seismograph data**

Author Meyer, Robert P; Boone, William J

Affiliation Univ. Wis., Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.91, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054461

328. Database GeoRef

Title ***Seismic* profiling using earthquake sources near Mammoth Lakes, California**

Author Boone, William J; Meyer, Robert P

Affiliation Univ. Wis., Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.92, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054462

329. Database GeoRef

Title **Use of the cone penetrometer to differentiate and correlate subsurface sediments for geological and geotechnical purposes**

Author Sarmiento, John; Bennett, Michael J

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.14, no.4, pp.230, Mar 1982

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-016238

330. Database GeoRef

Title **Tilt measurements at *Long Valley* caldera, California, May-August 1982**

Author Dzurisin, Daniel; Cashman, Katherine; Johnston, D A; Sylvester, A G

Affiliation U. S. Geol. Surv., Vancouver, WA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 82-0893, 34 pp., 1982

Resource Location http://vulcan.wr.usgs.gov/Volcanoes/LongValley/Publications/OFR82-893/framework. html

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Recurrent ***seismic*** swarms. Monitoring by USGS Volcanic Hazards Program, network of nine tilt sites established near Mammoth Lakes.--Modified author abstract.

Publication Year 1982

Publication Type Serial; Report; Monographic

Accession Number 1983-060354

331. Database GeoRef

Title **Evidence for S-wave anomaly in the *Long Valley* caldera from *long*-period regional body waves**

Author Wallace, Terry C; Helmberger, Donald V

Affiliation Calif. Inst. Technol., Seismol. Lab., Pasadena, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.62, no.45, pp.970, 10 Nov 1981

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1981

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-062309

332. Database GeoRef

Title **Attenuation of P and S waves in a magma chamber in *Long Valley* Caldera, California**

Author Ryall, Floriana; Ryall, Alan S

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Geophysical Research Letters, vol. 8, no. 6, pp.557-560, Jun 1981

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Shallow earthquakes around the southwest boundary of ***Long Valley*** caldera, west of the Hilton Creek fault, are characterized by lack of S-waves at regional ***seismic*** network stations to the northwest, north and northeast, and P-waves for these same station-event combinations are deficient in frequencies higher than

about 2-3 Hz. Earthquakes east of the Hilton Creek fault and southeast of the caldera have normal P- and S -wave signatures at the same stations. These effects are explained by propagation through a magma chamber in the south-central part of ***Long Valley*** caldera, at depth greater than 7-8 km.

Publication Year 1981

Publication Type Serial; Analytic

Accession Number 1982-003803

333. Database GeoRef

Title **Magma chambers and geothermal energy**

Author Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Technical Papers - Society of Exploration Geophysicists. International Meeting and Exposition, no.50, pp.3485-3508, 1980

Publisher [Society of Exploration Geophysicists], [Houston, TX], United States (USA)

Publication Year 1980

Publication Type Serial; Conference document; Analytic

Accession Number 1982-048820

334. Database GeoRef

Title **Mapping *seismic* activity in geothermal regions**

Author Page, E A

Affiliation Ensco/Seismic Exploration, USA, (United States)

Author Anonymous

Publisher Geothermal Resour. Counc., Davis, Calif., United States (USA)

Publication Year 1977

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 1979-022806

335. Database GeoRef

Title **Teleseismic technique to locate magma in the crust and upper mantle**

Author Iyer, H M; Stewart, R M

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Bulletin - Oregon, Department of Geology and Mineral Industries, no.96, pp.281-299, 1977

Publisher Oregon Department of Geology and Mineral Industries, Portland, OR, United States (USA)

Publication Year 1977

Publication Type Serial; Conference document; Analytic

Accession Number 1978-029447

336. Database GeoRef

Title **Search for geothermal *seismic* noise in the East Mesa area, Imperial *Valley*, California [modified]**

Author Katz, L J; Wagner, W D; Iyer, H M

Affiliation Seismic Explor. Inc., Salt Lake City, Utah, United States (USA)

Affiliation U. S. Geol. Surv., United States

Source Geophysics, vol. 41, no. 3, pp.542-543, Jun 1976

Resource Location http://www.segdl.org/geophysics/

Publisher Society of Exploration Geophysicists, Tulsa, OK, United States (USA)

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-041967

337. Database GeoRef

Title **Structure of *Long Valley* Caldera, California, from a *seismic* refraction experiment**

Author Hill, D P

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.745-753, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Two ***seismic*** refraction profiles crossing the ***Long Valley*** caldera in approximately east and north directions indicate that the crystalline basement with P wave velocities of 6.0 + or - 0.4 km/s has been downdropped by 2.5-3 km across normal faults along the north and northwest sides of the caldera and 1-2 km along the south and east sides. Basement depths beneath the caldera floor range from between 3 and 4 km in the north and east sections to about 2 km in the central and south sections. Relief on the basement within the caldera suggests that the caldron block was partially disrupted during collapse, although a steplike offset in the eastern part of the basement may be due in part to precollapse displacement along the Hilton Creek fault. The distribution of P wave velocities in the caldera fill suggests that the Glass Mountain rhyolite and Bishop tuff have velocities of 4.0-4.4 km/s and the postcollapse rhyolite, rhyodacite, and basalt flows have velocities of 2.7-3.4 km/s. Domelike relief on the 4.0- to 4.4-km/s horizon indicates that postcollapse resurgence elevated the west central part of the caldera by about 1 km. Evidence for the roof of the magma chamber is contained in later arrivals tentatively identified as reflections from a low-velocity horizon at a depth of 7-8 km. Evidence for anomalous scattering or absorption properties associated with the region of shallow hydrothermal alteration and hot spring activity is contained in relative attenuation of high frequencies in a guided wave propagating through this region.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031714

338. Database GeoRef

Title ***Seismic* noise survey in *Long Valley*, California**

Author Iyer, H M; Hitchcock, T

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.821-840, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract In June 1973, ***seismic*** noise measurements were made in ***Long Valley***, California, as part of the U.S. Geological Survey's geothermal investigations. Spatial variation of the average noise power shows high levels of noise extending over most of the eastern half of the ***Long Valley*** caldera. Since the noise high is almost similar in extent to the soft sedimentary Owens River basin, it is possible that ground amplification of ***seismic*** waves is at least partially responsible for the noise anomaly. Two lines of evidence indicate that geothermal noise may be present in ***Long Valley***. (1) Relative amplification of teleseismic waves over soft ground, with respect to a reference station on hard rock, is about 12 dB. The noise anomaly, however, is at least 12 dB higher than this value. It is therefore difficult to explain the anomaly by postulating ground amplification of regional noise, thus indicating that a noise source may be present in the area of the anomaly. At wave frequencies below 2 Hz, river and cattle noise do not contribute much to the anomaly. (2) Group velocities of ***seismic*** noise, measured by using arrays, are in general quite low except at a few stations along the southern edge of the noise anomaly. The wave azimuths in the low-velocity areas show random propagation, whereas azimuths associated with the high-velocity waves point to the area where surface geothermal phenomena are found. The high-velocity waves also have frequencies below 2 Hz. If a noise source is present under the southern edge of the sedimentary basin, it could excite the basin much more than it does the hard ground directly above it and thus produce the observed noise anomaly.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031722

339. Database GeoRef

Title **Low-velocity zone under *Long Valley* as determined from teleseismic events**

Author Steeples, D W; Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.849-860, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A temporary seismograph station network was used to estimate teleseismic P wave residuals in the vicinity of ***Long Valley*** geothermal area, California. Relative P wave delays of 0.3 s persist at stations in the west central part of the ***Long Valley*** caldera after regional and near-surface effects have been removed. Ray

tracing indicates that low-velocity material exists beneath the caldera at depths greater than 7 km and less than 40 km, probably less than 25 km. The velocity contrast with normal crust must be at least 5% to satisfy the data and is probably in the range 10-15%. We believe that the low velocity indicates anomalously hot rock at depth and that relative teleseismic P residuals may be useful for investigation of sources of geothermal energy.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031724

340. Database GeoRef

Title **Heat anomaly estimation from teleseismic P-delays**

Author Steeples, D W

Affiliation Kans. Geol. Surv., Lawrence, Kans., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.56, no.12, Fall annual meeting, pp.1020, Dec 1975

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1975

Publication Type Serial; Analytic

Accession Number 1977-013516

341. Database GeoRef

Title ***Seismic* noise as a geothermal exploration tool; techniques and results**

Author Iyer, H M; Hitchcock, Tim

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source U. N. Symp. Dev. Use Geotherm. Resour., Abstr., no.2, unpaginated, 29 May 1975

Publication Year 1975

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1975-029066

342. Database GeoRef

Title **Location and estimation of volumes of anomalously hot material beneath some geothermal areas from teleseismic P-delays**

Author Steeples, Don W; Iyer, H M

Affiliation U.S. Geol. Surv., Menlo Park, Calif., United States (USA)

Source U. N. Symp. Dev. Use Geotherm. Resour., Abstr., no.2, unpaginated, 29 May 1975

Publication Year 1975

Publication Type Serial; Conference document; Analytic

Accession Number 1975-029103

343. Database GeoRef

Title **Teleseismic P-delays in geothermal exploration with application to *Long Valley*, California**

Author Steeples, D W

Publication Year 1975

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1976-025533

344. Database GeoRef

Title **A compilation of data from the 1973 *Long Valley*, Calif., *seismic*-refraction experiment**

Author Hill, D P; McHugh, Stuart

Source Open-File Report - U. S. Geological Survey, Report: OF 75-0581, 21 pp., 1975

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1975

Publication Type Serial; Report; Monographic

Accession Number 1985-017131

345. **Database** GeoRef

Title **Teleseismic evidence for low-velocity material beneath *Long Valley* geothermal area, California**

Author Steeples, Don W; Iyer, H M

Affiliation U.S. Geol. Surv., Natl. Center Earthquake Res., Menlo Park, Calif., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.55, no.12, pp.1146, 1974

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1974

Publication Type Serial; Analytic; Abstract only

Accession Number 1975-025066

346. **Database** GeoRef

Title ***Seismic* noise surveys in geothermal areas**

Author Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, Calif., United States (USA)

Publisher Sandia Lab., Albuquerque, N. M., United States (USA)

Publication Year 1974

Publication Type Book; Map; Analytic

Accession Number 1976-005328

347. **Database** GeoRef

Title **Structure of the *Long Valley* Caldera from Detailed *Seismic*-Refraction Measurements**

Author Hill, David P; McHugh, Stuart; Pakiser, L C

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038968

348. **Database** GeoRef

Title **A *Seismic* Noise Survey in *Long Valley*, California**

Author Iyer, H M; Hitchcock, Tim

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1212, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038976

349. **Database** GeoRef

Title ***Seismic* evidence for the thickness of Cenozoic deposits in Mono Basin, California**

Author Pakiser, L C

Source Geological Society of America Bulletin, vol.79, no.12, pp.1833-1838, 1968

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract In Mono Basin the thickness of Cenozoic deposits required to account for a 1.43-second delay in recorded ***seismic*** waves is estimated to be 5+ or -1 km. The delay of ***seismic*** waves emerging in ***Long Valley*** was less than expected, indicating that they were propagated into ***Long Valley*** mainly through high-velocity rocks.

Publication Year 1968

Publication Type Serial; Analytic

Accession Number 1968-056781

350.Database GeoRef

Title **Structural geology and volcanism of Owens *Valley* region, California; a geophysical study**

Author Pakiser, L C; Kane, M F; Jackson, W H

Source U. S. Geological Survey Professional Paper, Report: P 0438, 68 pp., 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Gravity and ***seismic*** measurements in Owens ***Valley***, ***Long Valley***, and Mono Basin, which are directly east of the Sierra Nevada, Calif., show these depressions to be downdropped blocks filled with thousands of feet of Cenozoic deposits. Magnetic measurements suggest locations of buried volcanic rocks. A theory relating volcanism to stress reduction associated with faulting is presented. ***Long Valley*** and Mono Basin are identified as volcano-tectonic depressions.

Publication Year 1964

Publication Type Serial; Report; Monographic

Accession Number 1964-013239

351.Database GeoRef

Title **Anomalous gravity field in east-central California**

Author Oliver, Howard W; Mabey, Don R

Source Geological Society of America Bulletin, vol.74, no.10, pp.1293-1298, 1963

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Bouguer gravity values at about 11,000 stations in E.-central California range from -14 mgal near Merced to -274 mgal in ***Long Valley***. Gravity lows in the W. and S. parts of the San Joaquin ***Valley*** and over local basins S. and E. of the Sierra Nevada are produced by large thicknesses of Upper Cretaceous and Cenozoic deposits. A large regional gravity low over the Sierra Nevada can be explained by isostatic compensation of the range together with the effect of the relatively low-density rocks of the Sierra Nevada batholith. A broad gravity ridge along the E. side of the San Joaquin ***Valley*** shows excellent correlation with a similar magnetic ridge where the 2 sets of data are available, suggesting that both anomalies are caused by a dense, magnetic mass buried at an estimated depth of 5-10 mi. ***Seismic*** refraction measurements further indicate that the thickness of the earth's crust under the ***valley*** is less than 12 mi. Thus, the anomalous mass is in the lower part of the earth's crust and is conceivably related to the more mafic rocks of the earth's upper mantle.

Publication Year 1963

Publication Type Serial; Analytic

Accession Number 1963-010483

352.Database GeoRef

Title **Gravity anomalies in the central Sierra Nevada, California**

Author Oliver, Howard William; Pakiser, Louis Charles, Jr; Kane, Martin Francis

Source Journal of Geophysical Research, vol.66, no.12, pp.4265-4271, 1961

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract More than 1000 measurements of gravity in the central Sierra Nevada and adjacent regions to the E. show a decrease in regional Bouguer gravity values from -75 mgal. at the western edge of the mountains to a minimum of about -235 mgal. just W. of the Sierra crest, a distance of only 100 km. Farther E., a positive regional gradient of about 0.6 mgal./km. continues into the Inyo-White Mountains for a distance of at least 600 km. Local gravity lows are associated with Cenozoic sediments in Owens ***Valley***, ***Long Valley***, and Mono Basin to the E. of the Sierra Nevada and with a thick, narrow deposit of Pleistocene sediments in Yosemite ***Valley***. Local gravity highs are associated with roof pendants of metavolcanic rocks which extend down into the Sierra Nevada batholith to depths of more than 2 km. The variation in the regional Bouguer gravity values of about 160 mgal. can be explained by a thickening of the earth's crust from 35 to 52 km. beneath the central sierra Nevada, combined with an eastward decrease in the density of the Sierra Nevada batholith from 2.76 to 2.64 g./cm. (super 3) . Gravity data support Romney's conclusion, based on ***seismic*** evidence, that a local mountain root exists under the central and southern parts of the Sierra Nevada and not under the lower northern part, in general accordance with regional isostasy.

Publication Year 1961

Publication Type Serial; Analytic

Accession Number 1961-011248

353. **Database** GeoRef

Title **Earthquake relocations and stress inversions in the *Long Valley* Caldera, California**

Author Prejean, Stephanie G; Ellsworth, William L; Waldhauser, Felix; Zoback, Mark D

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1323, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073909

354. **Database** GeoRef

Title **Role of static stress transfer in earthquake-magmatic interactions at *Long Valley* Caldera, eastern California, 1978-2000**

Author Thatcher, Wayne R

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1384-1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074121

355. **Database** GeoRef

Title **Earthquake swarms and accompanying phenomena in intraplate regions; a review**

Author Spicak, Ales

Affiliation Academy of Sciences of the Czech Republic, Geophysical Institute, Prague, Czech Republic (CZE)

Source Studia Geophysica et Geodetica, vol.44, no.2, pp.89-106, 2000

Resource Location http://www.springerlink.com/(gei43545lhkbqafqptkgoqfy)/app/home/journal.asp?referrer=parent&backto=linkingpublicationresults,1:109194,1

Publisher Academy of Sciences of the Czech Republic, Geophysical Institute, Prague, Czech Republic (CZE)

Abstract The western part of the Bohemian Massif has played an exceptional role in recent

geodynamic activity of the region. It is characterised by repeated occurrences of earthquake swarms and by other manifestations of deep tectonic processes (CO (sub 2) emissions, anomalous (super 3) He content, mineral waters, mofettes, etc.). The purpose of this paper is to introduce some other intraplate regions with earthquake swarm occurrence (French Massif Central; Colli Albani and Vulsini Mts., central Italy; Southern Apennines, Italy; the Danville and ***Long Valley*** regions, California; central Arkansas), and with artificially induced earthquake swarms (Larderello, Italy, geothermal field; Coso, California, geothermal field; NE Bavaria, Germany, deep drilling project). Although these areas represent different tectonic environments, the manifestations of recent geodynamic and/or man-made activity are similar in many aspects. This coincidence most probably issues from a common cause of both tectonic and artificially induced earthquake swarms - intrusions/injections of fluids. the regions with earthquake swarm occurrence of tectonic origin are situated as a rule in the close neighbourhood of Quaternary volcanoes, the intruding fluids seem to be derived from magma recently transported to upper crustal layers.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2003-063462

356. **Database** GeoRef

Title **Geodetic and seismic constraints on Recent activity and shallow magmatic properties at *Long Valley* Caldera, CA, USA**

Author Newman, Andrew V; Dixon, Jacqueline E; Dixon, Timothy H

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation University of Miami, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.100, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068061

357. **Database** GeoRef

Title **Using airborne laser altimetry to detect topographic change of *Long Valley* Caldera, CA**

Author Hofton, M A; Minster, J B; Ridgway, J R; Williams, N P; Blair, J B; Bufton, J L; Rabine, D L

Affiliation Scripps Institution of Oceanography, Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation NASA, Goddard Space Flight Center, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.799, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-001401

358. **Database** GeoRef

Title **Reanalysis of S-to-P amplitude ratios for gross attenuation structure, *Long Valley* Caldera, California**

Author Sanders, Christopher O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 98, no. B12, pp.22,069-22,079, 10 Dec 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Because of the strong interest in the magmatism and ***volcanism*** at ***Long Valley*** caldera, eastern California, and because of recent significant improvements in our knowledge of the caldera velocity structure and earthquake locations, I have reanalyzed the local-earthquake S-to-P amplitude-ratio data of Sanders (1984) for the gross three-dimensional attenuation structure of the upper 10 km of ***Long Valley*** caldera. The primary goals of the analysis are to provide more accurate constraints on the depths of the attenuation anomalies using improved knowledge of the ray locations and an objective inversion procedure. The new image of the high S wave attenuation anomaly in the west-central caldera suggests that the top of the principal anomaly is at 7-km depth, which is 2 km deeper than previously determined. Because of poor resolution in much of the region, some of the data remain unsatisfied by the final attenuation model. This unmodeled data may imply unresolved attenuation anomalies, perhaps small anomalies in the kilometer or two just above the

central-caldera anomaly and perhaps a larger anomaly at about 7-km depth in the northwest caldera or somewhere beneath the Mono Craters. The central-caldera S wave attenuation anomaly has a location similar to mapped regions of low teleseismic P wave velocity, crustal inflation, reduced density, and aseismicity, strongly suggesting magmatic association. Copyright 1993 by the American Geophysical Union.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-024600

359. **Database** GeoRef

Title **Review of evidence on the potential for major earthquakes and *volcanism* in the *Long Valley*-Mono Craters-White Mountains regions of eastern California**

Author Hill, David P; Wallace, Robert E; Cockerham, Robert S

Affiliation U. S. Geol. Sur., Menlo Park, CA, United States (USA)

Affiliation Niron Univ., Japan (JPN)

Affiliation Univ. Colo., Boulder, CO, United States (USA)

Source Earthquake Prediction Research, vol. 3, no. 3-4, pp.571-594, 1985

Publisher D. Reidel Publishing Company, Dordrecht, Netherlands (NLD)

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-011776

360. **Database** GeoRef

Title **Mono Craters, *Long Valley* Caldera; seismicity, *volcanism*, and engineering geology; Field trip II roadlog**

Author Bailey, Roy A; Harp, Edwin L; Keefer, David K; Bennett, M J; Miller, C Dan; Wood, Spencer H; Steine, S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Boise State Univ., United States (USA); Univ.Calif., Berkeley, United States (USA)

Affiliation Univ. Nev., Dep. Geol. Sci., Reno, NV, United States (USA)

Publisher Univ. Nev. at Reno, Dep. Geol. Sci., Reno, NV, United States (USA)

Publication Year 1984

Publication Type Book; Analytic

Accession Number 1985-041364

361. **Database** GeoRef

Title **Spectral character of "tremor" in *Long Valley*, CA, during 1980-1983**

Author Real, C R; Cramer, C H; Chouet, B

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Affiliation Mass. Inst. Technol., Dep. Earth and Planet. Sci., United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.89, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054457

SURFACE PROCESSES BIBLIOGRAPHY

1. Database GeoRef

Title **Hydrologic events related to earthquakes in *Long Valley* Caldera, California**

Author Armstrong, Denise L

Abstract The ***Long Valley*** caldera in Eastern California is the site of recent volcanic and tectonic unrest. To better understand and predict this unrest, water level data collected between 1989 and 1990 from two observation wells (CH 10B and LKT) were studied to determine if aseismic precursory strain was recorded in the water levels. Hydrographs from the two wells were compared with seismic events, barometric pressure, rainfall, and runoff, and in CH 10B's case, flow rate data from the near by Casa Diablo Geothermal Power Plant. Water level data from CH 10B showed a number of inconsistencies and was difficult to interpret, probably in part because its shallow depth made it more susceptible to ***surface processes***. Water levels from well LKT showed no precursory anomalies, however, the water levels did respond coseismically to large earthquakes as distant as 450 km, but not to small local events. These data show that it is extremely difficult using water levels in wells to predict earthquakes. Though some workers believe they have detected
precursory signals in water level data from other parts of the world, none have been able to predict consistently the location, size, and timing of a future earthquake.

Pages 83

Publication Year 2000

Publication Type Thesis or dissertation; Master's; Monographic

Organization Name California State University at Hayward, Hayward, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2002-037496

2. Database GeoRef

Title **Microseismicity and hydrothermal circulation in *Long Valley* Caldera, CA**

Author von Damm, Gina Katharine

Abstract In late 1994, a small high density seismic array was deployed in ***Long Valley*** Caldera, CA. Its purpose was to better constrain the locations of the shallow microseismicity associated with the active hydrothermal system in the caldera. The array was able to record a number of small earthquakes that were not recorded by the US Geological Survey's (USGS) regional network. The earthquakes' small size and proximity to the array indicates that they may be related to near-***surface processes***, and this suggests that small,
high-density arrays may indeed prove valuable in describing such ***processes***. However, the correlation between microseismicity and hydrothermal circulation proved weak for a number of reasons, including one or more of the following hypotheses: 1) the significant hydrothermal plumbing system may have been too far away from the array, 2) microseismicity does not play a fundamental role in the dynamics of the hydrothermal system or 3) the water levels from the hydrologic monitoring well did not reflect the changes in the hydrothermal system that the seismic array was recording. Earthquakes not correlated with the USGS were all located within 4 km of the array which suggests that the array has a limited range of detection for these very small events. Earthquakes that were correlated with the USGS were significantly larger, and most were consistent with activity on the Hilton Creek fault, the Mammoth Embayment
or fluid movement from the west moat toward Lake Crowley.

Pages 78

Publication Year 1996

Publication Type Thesis or dissertation; Master's; Monographic

Organization Name University of California at Davis, Davis, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 1998-040539

TECTONICS BIBLIOGRAPHY

1. Database GeoRef

Title **Transtensional analyses of fault patterns and strain provinces of the Eastern California shear zone; Walker Lane on the eastern margin of the Sierra Nevada microplate, California and Nevada**

Author Taylor, Tatia R; Dewey, John F

Affiliation University of California, Davis, Davis, CA, United States (USA)

Affiliation University College Galway, United Kingdom (GBR)

Monograph Title Rise and fall of the Nevadaplano; Part II

Editor Ernst, W. Gary

Source International Geology Review, vol. 51, no. 9-11, pp.843-872, Nov 2009

Resource Location http://www.ingentaconnect.com/content/bell/

Publisher Winston & Son, Silver Spring, MD, United States (USA)

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2009-095028

2. Database GeoRef

Title **A general model for tectonic control of magmatism; examples from *Long Valley* Caldera (USA) and El Chichon (Mexico)**

Author Bursik, M

Affiliation State University of New York at Buffalo, Department of Geology, Buffalo, NY, United States (USA)

Source Geofisica Internacional, vol. 48, no. 1, pp.171-183, Mar 2009

Resource Location http://serpiente.dgsca.unam.mx/serv_hem/revistas/fisica/

Publisher Instituto de Geofisica, UNAM, Mexico, D.F., Mexico (MEX)

Abstract The relationship of volcanoes to regional tectonic setting and earthquake dynamics is intimate. We know that eruptions are often triggered by earthquakes, and that volcanoes generally lie along or near major faults or within faulted provinces. It has been generally found that bimodal basaltic-rhyolitic volcanism is associated with extensional settings, presumably because of the creation of accommodating space. For intermediate arc volcanoes, tectonic settings are generally compressional or transpressional. The spatial pattern of faulting indicates that ***Long Valley*** was focussed by a releasing bend in the transtensional, Sierran range-front fault system. The temporal pattern of offset rates suggests that the zone of greatest activity has migrated to the NW through time, and is now focussed at the Mono-Inyo Craters. The southern Mexican volcanic arc presents an example of the coexistence of regional compressional and transpressional structures with volcanoes. On an event basis, slip on regional structures creates opportunities for magma movement and eruption, in a type of dynamic fault pumping of fluids. Both kinematically and dynamically, volcanic activity may be completely dependent on tectonic factors for accumulation, storage and eruption of magma.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication Mexico (MEX)

Accession Number 2009-064699

3. Database GeoRef

Title **Caldera types and collapse styles**

Author Aguirre-Diaz, G J

Affiliation Universidad Nacional de Autonoma de Mexico, Centro de Geosciencias, Queretaro, Mexico (MEX)

Monograph Title AGU 2008 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 89, no. 53, Suppl., Abstract V11C-2068, Dec 2008

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2008

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2010-036148

4. Database GeoRef

Title **Lithospheric control on the initiation of the Yellowstone Hotspot; chronic reactivation of lithospheric scars**

Author Tikoff, Basil; Benford, B; Giorgis, S

Affiliation University of Wisconsin-Madison, Department of Geology and Geophysics, Madison, WI, United States (USA)

Affiliation State University of New York at Geneseo, United States (USA)

Monograph Title Lithospheric-scale transtension

Editor Dewey, John F.

Source International Geology Review, vol. 50, no. 3, pp.305-324, Mar 2008

Resource Location http://www.ingentaconnect.com/content/bell/

Publisher Winston & Son, Silver Spring, MD, United States (USA)

Abstract The Yellowstone hotspot is generally interpreted to have resulted from a mantle plume that initiated beneath the Idaho-Oregon-Nevada region at approximately 18 Ma. We explore an alternative model in which the initiation of Yellowstone magmatism is a result of lithospheric-scale processes -- transtensional reactivation of the western Idaho shear zone -- rather than a mantle plume. This model is based on both spatial and temporal correlations with deformation in the U.S. West. The first-order observation is that hotspot-related magmatism occurs as a linear N-S feature, which exploits the mantle portion of the inactive western Idaho shear zone and a deep crustal feature along the future Northern Nevada rift. The location for initiation of the McDermitt caldera, the interpreted initiation site of the Yellowstone hotspot, is spatially coincident with the southernmost known extent of the western Idaho shear zone in the lithospheric mantle. In contrast, the feeder zones of the voluminous magmatism of the Columbia River basalts intruded farther north, facilitated by the better-developed fabrics of the northern segment of the western Idaho shear zone. The timing of initial Yellowstone magmatism and Columbia River basalts is coincident with the coupling of western California and the North American plate to the Pacific plate. The kinematics of this coupling suggest oblique divergence and transtensional deformation. Previous numerical modeling of vertical fabrics in the lithospheric mantle show preferential reactivation by transtensional deformation. Thus, the mantle lithosphere rather than deeper portions of the mantle appears to exert a fundamental control on the initiation of the Yellowstone hotspot.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2008-111602

5. Database GeoRef

Title **Geological and hydrological history of the paleo-Owens River drainage since the late Miocene**

Author Phillips, Fred M

Affiliation New Mexico Institute of Mining and Technology, Department of Earth & Environmental Science, Socorro, NM, United States (USA)

Affiliation Smithsonian Institution, United States (USA)

Monograph Title Late Cenozoic drainage history of the southwestern Great Basin and lower Colorado River region; geologic and biotic perspectives

Editor Reheis, Marith C; Hershler, Robert; Miller, David M

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Special Paper - Geological Society of America, vol. 439, pp.115-150, 2008

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract From the late Miocene to the middle Pliocene, the current drainage basin of the Owens River probably consisted of a broad, moderate-elevation, low-relief plateau with radiating drainage toward the Pacific Ocean, the northwestern Great Basin (now Lahontan drainages), and the Mojave and Colorado drainages. This plateau probably contained shallow basins, created by an extensional pulse at 12-11 Ma, at the present locations of major valleys. Between 4 and 3 Ma, this plateau was disrupted by a rapid westward step of extensional Basin and Range Province tectonism, which reactivated the Miocene faults and resulted in a linear north-south ***valley*** (the Owens ***Valley***) with high mountain ranges on each side. This tectonic event resulted in geographic isolation and fragmentation of aquatic habitats and may have been a critical driver for speciation of aquatic organisms. Subsequent to this remarkable transformation of the landscape, the predominant influence on aquatic habitats has been very large, climate-driven fluctuations in the regional water balance that have resulted in the repeated interconnection and disconnection of the various basins that make up the paleo-Owens system. The magnitude of these fluctuations appears to have increased markedly since the early Pleistocene. Searles Lake has generally been the terminus of the Owens River, but at least once, probably at ca. 150 and/or ca. 70 ka, the system overflowed into Death ***Valley***. During the last interglacial (marine isotope stage 5) and the Holocene, Owens Lake has been the terminus, but apparently not frequently before. These very large fluctuations in the water balance undoubtedly produced large shifts in the nature and distribution of aquatic habitats over geologically short periods of time, as well as repeatedly creating and severing connections between various parts of the larger drainage basin. This dynamic hydrological system provided the setting, and no doubt much of the impetus, for speciation, extinction, and distribution of aquatic species within the paleo-Owens system, but any paleohydrological causes will have to be extracted from a complex history.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2008-111786

6. Database GeoRef

Title **Ground deformation of *Long Valley* Caldera and Mono Basin, eastern California, mapped by satellite radar interferometry**

Author Tizzani, P; Berardino, P; Casu, F; Euillades, P; Manzo, M; Ricciardi, G P; Zeni, G; Lanari, R

Affiliation National Research Council, Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Universita di Cagliari, Italy (ITA); Universidad Nac de Cuyo, Argentina (ARG); Universita della Basilicata, Italy (ITA); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Source International Journal of Remote Sensing, vol. 29, no. 1-2, pp.439-441, Jan 2008

Resource Location http://www.tandf.co.uk/journals/titles/01431161.asp

Publisher Taylor & Francis, London, United Kingdom (GBR)

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2009-073976

7. Database GeoRef

Title **Active geothermal systems and Pliocene and younger gold deposits of the Great Basin, USA; regional controls and selenium concentrations as a clue to ore environment**

Author Coolbaugh, Mark F; Arehart, Greg B; Faulds, James E; Vikre, Peter G; John, David A

Affiliation AuEx Ventures, Reno, NV, United States (USA)

Affiliation University of Nevada, Reno, United States (USA); Nevada Bureau of Mines and Geology, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2007 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol. 39, no. 6, pp.197, Oct 2007

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Pliocene and younger Au deposits in the Great Basin, USA contain >10 Moz Au. Many of these deposits occur near active geothermal systems with >180 degrees C fluids, suggesting that subsurface Au deposition may be continuing today at some locations. The young Au deposits and geothermal systems can be classed as either magmatically heated or amagmatic depending on whether there is evidence of coeval silicic magmatism. The magmatically heated deposits and systems (e.g., ***Long Valley*** caldera, CA; Roosevelt, UT) are limited to the margins of the Great Basin whereas young amagmatic Au deposits (e.g., Sulphur (Crofoot- Lewis) and Florida Canyon, NV) and systems, currently producing >100 megawatts electricity, cluster in NW Nevada. Amagmatic epithermal Au deposits and electricity -producing amagmatic geothermal systems are scarce globally, and their abundance in NW NV is attributed to a combination of high heat flow and active transtensional ***tectonics***. The greatest concentration of such deposits/systems is found where strike-slip faulting of the Walker Lane splays outward into NE-striking extensional faults in the Great Basin interior. Individual deposits and systems formed in structurally complex zones that facilitate deep fluid circulation, such as en echelon step-overs in normal faults, pull-apart blocks, and boundaries between zones of opposite-dipping normal faults. In such environments, Au mineralization and geothermal fluid flow preferentially occur along structures oriented approximately orthogonal to the current crustal extension direction. Compared to magmatically heated systems, the amagmatic geothermal systems have lower fluid concentrations of As, Li, B, and Cs, lower 3He/4He ratios, and lower overall vertical temperature gradients. The related young Au deposits are of the shallow hot-springs type, with steam-heated advanced argillic alteration, adularia, marcasite, cinnabar, native sulfur, and high concentrations of Sb and As. Limited data indicates that some young amagmatic gold systems have high Se concentrations, similar to many Miocene epithermal Au deposits in NV. High ratios of Se/Ag suggest that, in contrast to the Miocene deposits, Ag minerals may not be the major host of Se. Differences in the level of exposure of the Pliocene vs. Miocene Au deposits may explain host mineral differences.

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-017975

8. Database GeoRef

Title **Exotic seismic sources; nearly identically repeating events and non-double-couple earthquakes**

Author Templeton, Dennise Christine

Pages 171

Publication Year 2007

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Berkeley, Berkeley, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2008-103584

9. Database GeoRef

Title **Temporal variations in slip rate of the White Mountain fault zone, eastern California**

Author Kirby, Eric; Burbank, Douglas W; Reheis, Marith; Phillips, Fred

Affiliation Pennsylvania State University, Department of Geosciences, University Park, PA, United States (USA)

Affiliation University of California at Santa Barbara, United States (USA); U. S. Geological Survey, United States (USA); New Mexico Institute of Mining and Technology, United States (USA)

Source Earth and Planetary Science Letters, vol. 248, no. 1-2, pp.168-185, 15 Aug 2006

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The evolution of fault slip through time may yield insight into the geodynamics of deforming lithosphere. Precise determination of temporal variations in fault slip is often hindered, however, by a dearth of markers of varying age from which to reconstruct fault slip. Here we determine slip rates across the White Mountain Fault Zone over the past ca. 0.8 Ma from displaced alluvial deposits preserved along the flank of the White Mountains. Displacement histories inferred from deposits containing the approximately 760 ka Bishop Tuff contrast strongly with those inferred from Late Pleistocene alluvial fans dated by cosmogenic (super 36) Cl, indicating that the fault has experienced significant temporal variations in slip rate. Oblique-slip rates over the past approximately 760 ky are determined to have been >0.9 m/ky parallel to a net slip vector plunging shallowly (<20 degrees) toward 340 degrees -350 degrees . Displacement of markers in Late Pleistocene alluvial deposits, in contrast, yield slip rates between 0.3 and 0.4 m/ky parallel to a vector plunging somewhat more steeply (20 degrees -40 degrees) toward 320 degrees -340 degrees . These variations in slip rate appear to have operated over timescales >ca. 70 ky, yet occurred on a well-established fault system. Moreover, the timing and magnitude of slip rate variation mimics behavior documented for the northern Fish Lake ***Valley*** fault zone. Together, our data provide evidence for coordinated slip rate variations across the Eastern California Shear Zone during the Pleistocene.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2008-016313

11. Database GeoRef

Title **Improving earthquake locations in Northern California using waveform based differential time measurements**

Author Waldhauser, Felix (investigator); Schaff, David (investigator)

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Corporate Author Lamont-Doherty Earth Observatory, Palisades, NY, United States, performer (USA)

Abstract We relocated the earthquake catalog of the Northern California Seismic Network (NCSN), using a recently computed comprehensive database of cross-correlation differential times for earthquakes between 1984-2003. The correlation data base includes approximately 3 billion P-and S-wave differential times that are calculated from pairs of waveforms recorded at common stations with cross correlation coefficients of 0.7 or greater, for events separated by less than 5 km. The cross-correlation data is combined with differential times computed from NCSN phase picks to relocate the hypocenters with the double-difference algorithm. All event pairs with at least 6 pair-wise observed phases are relocated (311,273 events). The relocated catalog has a root mean square (RMS) of the weighted pick based differential-time residuals of 0.017 s, compared to 0.124 s before relocation. The weighted RMS of the cross-correlation data is 0.004 s after relocation. Location precisions range from tens to hundreds of meter. The double-difference locations reveal a focused view of the complex distribution of seismicity in northern California. Discrete faults are imaged with unprecedented detail in tectonic regions as diverse as the San Andreas Fault system (SAF), the Mendocino Triple Junction (MTJ), the ***Long Valley*** Caldera (LVC), and the region of induced earthquakes at the Geysers Geothermal Field (GGF). We find that 90% of the earthquakes have correlated P- and S-wave trains at common stations. The occurrence of correlated earthquakes is widespread across northern California with some of the highest concentrations being observed along the transform faults within the SAF system, in the LVC region, at the GGF, and at the MTJ, indicating the general applicability of these methods to improve hypocenter locations. Using repeating earthquakes we find that, at the 95% confidence level, network locations are mislocated on average by 0.7 km horizontally, and 2 km vertically. This study shows that consistent ***long***-term seismic monitoring practices and data archiving policies, as is the case at the Northern California Seismic Network, are key to improve catalogued hypocenters obtained from standard single- event location methods using phase picks, and to determine accurate location of future events within the framework of earthquake monitoring.

Pages 10

Publication Year 2006

Publication Type Report; Monographic

Country of Publication United States (USA)

Accession Number 2008-109508

12. Database GeoRef

Title **Hydrothermal fault zone mapping using seismic and electrical measurements**

Author Onacha, Stephen Alumasa

Pages 226

Publication Year 2006

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Duke University, Durham, NC, United States (USA)

Country of Publication United States (USA)

Accession Number 2008-109644

13. Database GeoRef

Title **Non-double-couple earthquakes in the *Long Valley* volcanic region**

Author Templeton, Dennise C; Dreger, Douglas S

Affiliation University of California at Berkeley, Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.96, no.1, pp.69-79, Feb 2006

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract To better understand the connection between earthquake production and geothermal/magmatic systems, we studied the extent of fluid-influenced faulting in the ***Long Valley*** volcanic region. We focused on a 100-km-wide circular area centered at the ***Long Valley*** caldera that also encompassed the Mono-Inyo Craters to the north and the Sierra Nevada Mountain block to the south. We performed a comprehensive search for events greater than M 3.5 since 1993 with significant coseismic volume changes in their source region. Using three-component broadband digital waveforms at regional distances, we solved for four different source models:

double couple (DC), deviatoric DC + isotropic, and full moment tensor. Using the F-test as a statistical aid, we determined which of the four models was most appropriate for each event. We then conducted stability tests to determine the robustness of the focal mechanism solutions and isotropic components. Our results show that fluid-influenced earthquakes in the magnitude range studied are quite rare in the ***Long Valley*** volcanic region. Of 33 high-quality events, 28 are best characterized by a simple DC source model, 4 by a DC + isotropic source model, and 1 by a full moment tensor model.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-030986

14. Database GeoRef

Title **Quartz microstructures in nature and experiment; evidence of rapid plastic deformation and subsequent annealing**

Author Trepmann, Claudia A; Stoeckhert, Bernhard; Dorner, Dorothee; Kuester, Martina; Roeller, Klaus

Affiliation Ruhr-Universitaet Bochum, Institut fuer Geologie, Mineralogie und Geophysik, Bochum, Federal Republic of Germany (DEU)

Affiliation Max-Planck-Institut fuer Eisenforschung, Federal Republic of Germany (DEU)

Monograph Title 11. Symposium "Tektonik, Struktur- und Kristallingeologie"; Zusammenfassungen der Tagungsbeitraege. 11th symposium on ***Tectonics***, structural geology and crystallography; abstracts of the conference proceedings

Editor Philipp, Sonja L; Leiss, Bernd; Vollbrecht, Axel; Tanner, David C; Gudmundsson, Agust

Affiliation Universitaet Goettingen, Geowissenschaftliches Zentrum, Gottingen, Federal Republic of Germany (DEU)

Source Symposium "Tektonik, Struktur- und Kristallingeologie", vol.11, pp.232-233, 2006

Publisher [publisher varies], [varies], International (III)

Publication Year 2006

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2007-016489

15. Database GeoRef

Title **Unrest in *Long Valley* Caldera, California, 1978-2004**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University College London, United Kingdom (GBR)

Monograph Title Mechanisms of activity and unrest at large calderas

Editor Troise, Claudia; De Natale, Giuseppe; Kilburn, Christopher R J

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, ITA, (Italy)

Source Geological Society Special Publications, vol.269, pp.1-24, 2006

Publisher Geological Society of London, London, United Kingdom (GBR)

Abstract ***Long Valley*** Caldera and the Mono-Inyo Domes volcanic field in eastern California lie in a left-stepping offset along the eastern escarpment of the Sierra Nevada, at the northern end of the Owens ***Valley*** and the western margin of the Basin and Range Province. Over the last 4 Ma, this volcanic field has produced multiple volcanic eruptions, including the caldera-forming eruption at 760 000 a BP and the recent Mono-Inyo Domes eruptions 500-660 a BP and 250 a BP. Beginning in the late 1970s, the caldera entered a sustained period of unrest that persisted through the end of the century without culminating in an eruption. The unrest has included recurring earthquake swarms; tumescence of the resurgent dome by nearly 80 cm; the onset of diffuse magmatic carbon dioxide emissions around the flanks of Mammoth Mountain on the southwest margin of the caldera; and other indicators of magma transport at mid- to upper-crustal depths. Although we have made substantial progress in understanding the processes driving this unrest, many key questions remain, including the distribution, size, and relation between magma bodies within the mid-to-upper crust beneath the caldera. Mammoth Mountain, and the Inyo Mono volcanic chain, and how these magma bodies are connected to the roots of the magmatic system in the lower crust or upper mantle.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-040462

16. Database GeoRef

Title **Waveform cross-correlation-based differential travel-time measurements at the Northern California seismic network**

Author Schaff, David P; Waldhauser, Felix

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Source Bulletin of the Seismological Society of America, vol.95, no.6, pp.2446-2461, Dec 2005

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract We processed the complete digital seismogram database for northern California to measure accurate differential travel times for correlated earthquakes observed at common stations. Correlated earthquakes are earthquakes that occur within a few kilometers of one another and have similar focal mechanisms, thus generating similar waveforms, allowing measurements to be made via cross-correlation analysis. The waveform database was obtained from the Northern California Earthquake Data Center and includes about 15 million seismograms from 225,000 local earthquakes between 1984 and 2003. A total of 26 billion cross-correlation measurements were performed on a 32-node (64 processor) Linux cluster, using improved analysis tools. All event pairs with separation distances of 5 km or less were processed at all stations that recorded the pair. We computed a total of about 1.7 billion P-wave differential times from pairs of waveforms that had cross-correlation coefficients (CC) of 0.6 or larger. The P-wave differential times are often on the order of a factor of ten to a hundred times more accurate than those obtained from routinely picked phase onsets. 1.2 billion S-wave differential times were measured with CC> or =0.6, a phase not routinely picked at the Northern California Seismic Network because of the noise level of remaining P coda. We found that approximately 95% of the seismicity includes events that have cross-correlation coefficients of CC> or =0.7 with at least one other event recorded at four or more stations. At some stations more than 40% of the recorded events are similar at the CC> or =0.9 level, indicating the potential existence of large numbers of repeating earthquakes. Large numbers of correlated events occur in different tectonic regions, including the San Andreas Fault, ***Long Valley*** caldera, Geysers geothermal field and Mendocino triple junction. Future research using these data may substantially improve earthquake locations and add insight into the velocity structure in the crust.

Publication Year 2005

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-019262

19. Database GeoRef

Title **Overview of recent seismicity in the western Great Basin and Walker Lane region**

Author Smith, K D

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Monograph Title SSA 2005; abstracts of the annual meeting

Author Anderson, John G (chairperson); von Seggern, David (chairperson)

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Source Seismological Research Letters, vol. 76, no. 2, pp.244, Apr 2005

Resource Location http://www.seismosoc.org/publications/srl.html

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034686

20. Database GeoRef

Title **The Idaho-Nevada-California refraction experiment; developing a central Walker Lane and Sierra Nevada crustal model**

Author Heimgartner, M; Scott, J B; Thelen, W A.; Louie, J N; Miller, P

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Affiliation New Mexico Institute of Mining and Technology, United States (USA)

Monograph Title SSA 2005; abstracts of the annual meeting

Author Anderson, John G (chairperson); von Seggern, David (chairperson)

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Source Seismological Research Letters, vol. 76, no. 2, pp.250, Apr 2005

Resource Location http://www.seismosoc.org/publications/srl.html

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034716

21. Database GeoRef

Title **Volcanic geology, volcanology and natural resources of the *Long Valley* Caldera, California**

Author Hill, Dave (leader); Farrar, Chris (leader); Lipshie, Steve (leader); Steininger, Roger (leader); Sullivan, Bob (leader); Harmon, Richard (leader)

Affiliation U. S. Geological Survey, USA, (United States)

Source Special Publication - Geological Society of Nevada, vol.41, 213 pp., 4 sheets, 2005

Publisher Geological Society of Nevada, [Reno, NV], United States (USA)

Pages 213, 4 sheets

Publication Year 2005

Publication Type Serial; Map; Monographic

Country of Publication United States (USA)

Accession Number 2006-084936

22. Database GeoRef

Title **Integrated gravity and magnetic interpretations yield new insights to Basin and Range structures**

Author Lisle, G L

Affiliation Lisle Gravity, Denver, CO, United States (USA)

Monograph Title AAPG Rocky Mountain Section, abstracts

Author George, Lyn (chairperson)

Source Abstracts - AAPG Meeting, Rocky Mountain Section, vol.2005, unpaginated, 2005

Resource Location http://www.searchanddiscovery.net/documents/abstracts/2005rocky/RMlis.htm

Publisher American Association of Petroleum Geologists, Rocky Mountain Section, Tulsa, OK, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-009105

23. Database GeoRef

Title **Geothermal energy; Canada, Mexico and the United States**

Author Renner, Joel L

Affiliation Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID, United States (USA)

Monograph Title AAPG 2005 annual convention; abstracts volume

Author Anonymous

Source Abstracts: Annual Meeting - American Association of Petroleum Geologists, vol. 14, pp.A116, 2005

Publisher American Association of Petroleum Geologists and Society for Sedimentary Geology, Tulsa, OK, United States (USA)

Abstract World-wide, geothermal resources are most commonly associated with volcanic arcs (Indonesia, Japan, and Philippines) spreading centers (Salton Trough and East African Rift) and with hot spots (Hawaii, Iceland, Yellowstone). Near the margins of the Basin and Range in the U. S. geothermal activity is commonly associated with young Volcanism (***Long Valley*** and Coso volcanic fields). Additional production is associated with deep fluid circulation in the Basin and Range thought to be localized by recent faulting and the higher than average crustal heat flow in much of the Basin and Range. Geothermal energy is an important energy resource in
Mexico and the western United States. Commission Federal de Electricidad produces electricity at Cerro Prieto (just south of Imperial ***Valley***, California), Los Azufres and Tres Virgenes. In the U. S. about 2020 MWe of electrical generation capacity is on-line in California (7 fields), Hawaii (1 field), Nevada (9 fields) and Utah (2 fields). At Meager Creek, British Columbia an electrical generation project is under development. In general, fluids with temperatures of greater than 150 degrees C are used to produce electricity, and above 30 degrees C are used for direct applications such as space heating, crop drying, aquaculture, etc. The U. S. Geological Survey has identified about 23,000 MWe of hydrothermal resources capable of electrical production in the U. S. Mexico is actively exploring for additional production in Baja California and the Central Mexico Volcanic Belt. Canadian activity is currently focused on Meager Mountain, British Columbia.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-055691

24. Database GeoRef

Title **Deep borehole receiver functions in *Long Valley* Caldera, California**

Author Chavarria, J; Julia, J; Malin, P

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract S13B-1043, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034473

27. Database GeoRef

Title **Non-double-couple microearthquakes at *Long Valley* Caldera, California, provide evidence for hydraulic fracturing**

Author Foulger, G R; Julian, B R; Hill, D P; Pitt, A M; Malin, P E; Shalev, E **Affiliation** U.
S. Geological Survey, Menlo Park, CA, United States (USA) **Affiliation** Duke University,
United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.132, no.1, pp.45-71, 15 Apr 2004

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Most of 26 small (0.4< or =M< or =3.1) microearthquakes at ***Long Valley*** caldera in mid-1997, analyzed using data from a dense temporary network of 69 digital three-component seismometers, have significantly non-double-couple focal mechanisms, inconsistent with simple shear faulting. We determined their mechanisms by inverting P- and S-wave polarities and amplitude ratios using linear-programming methods, and tracing rays through a three-dimensional Earth model derived using tomography. More than
80% of the mechanisms have positive (volume increase) isotropic components and most have compensated linear-vector dipole components with outward-directed major dipoles. The simplest interpretation of these mechanisms is combined shear and extensional faulting with a volume-compensating process, such as rapid flow of water, steam, or CO (sub 2) into opening tensile cracks. Source orientations of earthquakes in the south moat suggest extensional faulting on ESE-striking subvertical planes, an orientation consistent with planes defined by earthquake hypocenters. The focal mechanisms show that clearly defined hypocentral planes in different locations result from different source processes. One such plane in the eastern south moat is consistent with extensional faulting, while one near Casa Diablo Hot Springs reflects en echelon right-lateral shear faulting. Source orientations at Mammoth Mountain vary systematically with location, indicating that the volcano influences the local stress field. Events in a "spasmodic burst" at Mammoth Mountain have practically identical mechanisms that indicate nearly pure compensated tensile failure and high fluid mobility. Five earthquakes had mechanisms involving small volume decreases, but these may not be significant. No mechanisms have volumetric moment fractions larger than that of a force dipole, but the reason for this fact is unknown.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-076504

29. Database GeoRef

Title **Transport of injected isobutane by thermal groundwater in *Long Valley* Caldera, California, USA**

Author Evans, W C; Lorenson, T D; Sorey, M L; Bergfeld, D

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title Proceedings of the Eleventh international symposium on Water-rock interaction

Editor Wanty, Richard B; Seal, Robert R , II

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Proceedings - International Symposium on Water-Rock Interaction, vol. 11, pp.125-129, 2004

Publisher International Association of Geochemistry and Cosmochemistry and Alberta Research Council, Sub-Group on Water-Rock Interaction, Toronto, ON, International (III)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 2007-026949

30. Database GeoRef

Title **Episodic deformation and related phase separation in an active hydrothermal system**

Author Kuester, Martina; Stoeckhert, Bernhard; Roeller, Klaus; Fischer, Miriam; McConnell, Vicki Sue

Affiliation Ruhr-Universitaet Bochum, Institute of Geology, Mineralogy and Geophysics, Bochum, Federal Republic of Germany (DEU)

Affiliation GeoForschungsZentrum Potsdam, Federal Republic of Germany (DEU); Department of Geology and Mineral Industries, United States (USA)

Monograph Title ***Tectonics*** on human time scales

Editor Stoeckhert, Bernhard; Dresen, Georg

Affiliation Ruhr-Universitaet Bochum, Institut fuer Geologie, Mineralogie und Geophysik, Bochum, Federal Republic of Germany (DEU)

Source Bochumer Geowissenschaftliche Arbeiten, vol. 3, pp.174, 2004

Publisher Institut fuer Geologie, Mineralogie und Geophysik der Ruhr-Universitaet Bochum, Bochum, Federal Republic of Germany (DEU)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication Federal Republic of Germany (DEU)

Accession Number 2009-032910

31. Database GeoRef

Title **Applying massive waveform cross correlation and double-difference location to Northern California and China**

Author Schaff, David P; Waldhauser, Felix; Richards, Paul G

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.84, no.46, Suppl., Abstract S21D-0328, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-093488

32. Database GeoRef

Title **Seismic character of an active silicic volcanic system; *Long Valley* Caldera, California**

Author John, Barbara E; Fountain, David M

Affiliation University of Wyoming, Department of Geology and Geophysics, Laramie, WY, United States (USA)

Affiliation NSF, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52B-0441, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005227

33. Database GeoRef

Title **Distributed source model for deformation caused by magma reservoirs**

Author Mann, Doerte; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52E-06, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005248

34. Database GeoRef

Title **Towards a 4D viscoelastic model for deformation of the *Long Valley* Caldera 1997 inflation episode**

Author Newman, Andrew V; Dixon, Timothy H; Gourmelen, Noel

Affiliation Los Alamos National Laboratory, Earth and Environmental Sciences, Los Alamos, NM, United States (USA)

Affiliation University of Miami, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52E-08, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005250

35. Database GeoRef

Title **Transtensional fault patterns of the Walker Lane-Eastern California shear zone, eastern margin, Sierra Nevada microplate**

Author Taylor, Tatia R; Dewey, John F

Affiliation University of California at Davis, Department of Geology, Davis, CA, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.346-347, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Transtension is the primary structural mechanism governing active deformation at the eastern margin of the Sierra Nevada Microplate. Analysis of this corridor clarifies the role of transtensional kinematics in the formation of discrete, seemingly heterogeneous, structural provinces within the Walker Lane-Eastern California Shear Zone (WL-ECSZ). Fault types and patterns are determined by the dominance of the coaxial vs. noncoaxial component of strain, derived from the geometry of the deformation zone boundary (zb, eastern Sierra) and transport direction (TD, of the Microplate). Rotation and associated size reduction of fault blocks in transtension explains the observed westward encroachment of deformation in the eastern Sierra. The map-view instantaneous strain patterns predicted are demonstrated from N-S by the observed active normal and wrench fault arrays. The Honey Lake-Pyramid Lake domain has zb striking 310 degrees to 330 degrees , and TD of approximately 298 degrees , indicating noncoaxial strain dominance (Honey Lake, Warm Springs Faults), transitioning to coaxial dominance (Pyramid Lake, normal faults to the west). The Lake Tahoe region is coaxially dominated, as indicated by zb approximately 341 degrees and TD of 303 degrees . Predicted structures correspond to the Genoa, Donner Pass, and other mapped and inferred faults. The Mono Lake-***Long Valley*** province has zb 330 degrees and TD approximately 308 degrees , indicating a coaxially dominated system that corresponds to numerous normal faults across both basins, at their margins, and along the Sierran rangefront. The Owens ***Valley***-Fish Lake ***Valley*** region has zb oriented 344 degrees and TD varies 310 degrees to 314 degrees from N-S, respectively. Faulting north of Bishop is dominantly coaxial, whereas faulting in the central and southern regions is dominantly noncoaxial as indicated by the change in TD. In Coso-China Lake, zb is oriented 344 degrees and TD is 316 degrees , indicating a dominantly coaxial system with predicted structures similar to observed faults (Wild Horse Mesa, Coso Wash, Airport Lake, Little Lake). Active fault patterns in these distinct provinces present a snapshot of instantaneous transtensional strain. Local partitioning, in response to zone boundary variation by the inherent shape of the Sierra Nevada and systematic rotation of its transport direction, explains the variation in dominant structural deformational styles along the length of the WL-ECSZ.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-040854

36. Database GeoRef

Title **Hydrothermal discharge from volcanic areas in the Western United States**

Author Ingebritsen, S E; Mariner, R H; Evans, W C; Hurwitz, S; Schmidt, M E **Affiliation** U. S. Geological Survey, Menlo Park, CA, United States (USA) **Affiliation** Oregon State University, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.487, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Except in the MOR environment, voluminous, high-temperature hydrothermal discharge is commonly associated with silicic volcanism and a shallow regional water table (e.g. Yellowstone, Kamchatka, Taupo volcanic zone). In the Western U.S., hydrothermal heat discharge ranges up to 6 GW (Yellowstone) and values in the 100 MW range are not uncommon (***Long Valley***, Lassen, Austin Hot Springs). Such large heat discharges likely imply mining of magmatic heat and, as pointed out by Clive Lister (1974), may require active fluid circulation near or within recently crystallized magma. The average hydrothermal heat discharge from some silicic magmatic systems is fairly constant on a multidecadal scale. For instance, measurements at Yellowstone and Lassen suggest relatively steady heat discharge since the early 20th century. Large seasonal variations observed at some localities over the past 30 years are due mainly to interaction with the shallow, cold hydrologic system. Mining of heat from subaerial deposits (Katmai, Loowit Hot Springs at Mt. St. Helens) can temporarily generate comparably large (100s of MW) values of hydrothermal discharge, but pronounced declines in heat output are observed on decadal scales. Relative to silicic systems, focused basaltic magmatism can provide similarly large heat inputs (e.g. 5-6 GW at Kilauea), but depth to water table tends to be greater in basaltic terranes, and hydrothermal discharge tends to be weaker and less conspicuous (e.g. a maximum of approximately 1 GW of subaerial hydrothermal discharge at Kilauea, mainly as low-temperature, dilute discharge near the coast). Andesitic arcs worldwide exhibit a range of length- normalized hydrothermal - discharge rates. The most important factors controlling hydrothermal discharge may be the rate of magmatic heat input and depth to water table. In the central Oregon Cascade Range, perhaps the most active part of a relatively "weak" andesitic arc (intrusion rate approximately 9-50 cubic km/m.y./km arc length), hydrothermal discharge (approximately 2 MW/km arc length) is relatively hot and visible west of the arc, where the water table is shallow, and relatively cool, dilute, and inconspicuous east of the arc, where the water table is deep. Current length-normalized rates of hydrothermal heat discharge from the Cascade arc are approximately 10 times lower than those in the Taupo volcanic zone, an arc segment analogous to the more- silicic Miocene Cascades.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-039274

37. Database GeoRef

Title **Water-level changes induced by local and distant earthquakes at *Long Valley* Caldera, California**

Author Roeloffs, Evelyn; Sneed, Michelle; Galloway, Devin L; Sorey, Michael L; Farrar, Christopher D; Howle, James F; Hughes, Jennifer

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Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.269-303, 15 Oct 2003

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Distant as well as local earthquakes have induced groundwater-level changes persisting for days to weeks at ***Long Valley*** caldera, California. Four wells open to formations as deep as 300 m have responded to 16 earthquakes, and responses to two earthquakes in the 3-km-deep ***Long Valley*** Exploratory Well (LVEW) show that these changes are not limited to weathered or unconsolidated near - surface rocks. All five wells exhibit water-level variations in response to earth tides, indicating they can be used as low -resolution strainmeters. Earthquakes induce gradual water-level changes that increase in amplitude for as ***long*** as 30 days, then return more slowly to pre-earthquake levels. The gradual water-level changes are always drops at wells LKT, LVEW, and CH-10B, and always rises at well CW-3. At a dilatometer just outside the caldera, earthquake -induced strain responses consist of either a step followed by a contractional strain-rate increase, or a transient contractional signal that reaches a maximum in about seven days and then returns toward the pre-earthquake value. The sizes of the gradual water-level changes generally increase with earthquake magnitude and decrease with hypocentral distance. Local earthquakes in ***Long Valley*** produce coseismic water-level steps; otherwise the responses to local earthquakes and distant earthquakes are indistinguishable. In particular, water-level and strain changes in ***Long Valley*** following the 1992 M7.3 Landers earthquake, 450 km distant, closely resemble those initiated by a M4.9 local earthquake on November 22, 1997, during a seismic swarm with features indicative of fluid involvement. At the LKT well, many of the response time histories are identical for 20 days after each earthquake, and can be matched by a theoretical solution giving the pore pressure as a function of time due to diffusion of a nearby, instantaneous, pressure drop. Such pressure drops could be produced by accelerated inflation of the resurgent dome by amounts too small to be detected by the two-color electronic distance-measuring network.
Opening-mode displacement in the south moat, inferred to have followed a M4.9 earthquake on November 22, 1997, could also create extensional strain on the dome and lead to water-level changes similar to those following dome inflation. Contractional strain that could account for earthquake -induced water-level rises at the CW-3 well is inconsistent with geodetic observations. We instead attribute these water-level rises to diffusion of elevated fluid pressure localized in the south moat thermal aquifer. For hydraulic diffusivities appropriate to the upper few hundred meters at ***Long Valley***, an influx of material at temperatures of 300 degrees C can thermally generate pressure of 6 m of water or more, an order of magnitude larger than needed to account for the CW-3 water-level rises. If magma or hot aqueous fluid rises to within 1 km of the surface in the eastern part of the south moat, then hydraulic diffusivities are high enough to allow fluid pressure to propagate to CW-3 on the time scale observed. The data indicate that seismic waves from large distant earthquakes can stimulate upward movement of fluid in the hydrothermal system at ***Long Valley***.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016381

38. Database GeoRef

Title **Deformation near the Casa Diablo geothermal well field and related processes *Long Valley* Caldera, Eastern California, 1993-2000**

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Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.365-390, 15 Oct 2003

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Regional first-order leveling lines, which extend from Lee Vining, CA, to Tom's Place, CA, have been surveyed periodically since 1957 by the U.S. Geological Survey (USGS), the National Geodetic Survey (NGS), and Caltrans. Two of the regional survey lines, or leveling networks, intersect at the Casa Diablo geothermal well field. These leveling networks, referenced to a distant bench mark (C916) near Lee Vining, provide time-series vertical control data of land-surface deformation that began around 1980. These data are also useful for delineating localized subsidence at Casa Diablo related to reservoir pressure and temperature changes owing to geothermal development that began in 1985. A comparison of differences in bench-mark elevations for five time periods between

1983 and 1997 shows the development and expansion of a subsidence bowl at Casa Diablo. The subsidence coincides spatially with the geothermal well field and temporally with the increased production rates and the deepening of injection wells in 1991, which resulted in an increase in the rate of pressure decline. The subsidence, superimposed on a broad area of uplift, totaled about 310 mm by 1997. The USGS established orthogonal tilt arrays in 1983 to better monitor deformation across the caldera. One tilt array (DBR) was established near what would later become the Casa Diablo geothermal well field. This array responded to magmatic intrusions prior to geothermal development, tilting away from the well field. With the start of geothermal fluid extraction in 1985, tilt at the DBR array reversed direction and began tilting into the well field. In 1991, geothermal power production was increased by a factor of four, and reservoir pressures began a period of steep decline. These changes caused a temporary three-fold increase in the tilt rate. The tilt rate became stable in 1993 and was about 40% lower than that measured in 1991-1992, but still greater than the rates measured during 1985-1990. Data from the local leveling networks spanning the well field and the bounding graben were analyzed for several 2-year periods (1993-1995, 1995-1997, and 1997-1999). Annual rates of change across the normal faults bounding the graben have steadily decreased for each 2-year period between 1993 and 1999, reflecting the slowing decline in geothermal reservoir pressure. Horizontal control data from a two-color electronic distance meter (EDM) defined the lateral extent of subsidence at Casa Diablo. The EDM and leveling data elucidate the localized effect of the shallow source of subsidence and the broader effect of the deeper magmatic inflation source. Data from bench marks common to both the vertical and the horizontal control networks were used to assess the effect of subsidence on the EDM base station (CASA). Modeling of geodetic data collected during periods of little or no magmatic inflation indicated that the CASA two-color EDM station is being drawn toward the well field at a rate of 3-5 mm/yr.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016385

39. Database GeoRef

Title **A volcanotectonic cascade; activation of range front faulting and eruptions by dike intrusion, Mono Basin-*Long Valley* Caldera, California**

Author Bursik, M; Renshaw, C; McCalpin, J; Berry, M

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Source Journal of Geophysical Research, vol.108, no.B8, 14 pp., 10 Aug 2003

Resource Location http://www.agu.org/journals/jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 14

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-012144

40. Database GeoRef

Title **Effect of stress fields of magma chamber stability and the formation of collapse calderas**

Author Bosworth, William; Burke, Kevin; Strecker, Manfred

Affiliation Marathon International Petroleum, London, United Kingdom (GBR)

Affiliation Univeristy of Houston, United States (USA); Universitaet Potsdam, Federal Republic of Germany (DEU)

Source Tectonics, vol.22, no.4, 21 pp., Aug 2003

Resource Location http://www.agu.org/journals/tc/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 21

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-071075

41. Database GeoRef

Title **Quaternary exhumation rate central Panamint Range, California from U-Pb zircon ages**

Author Vogel, Marilyn Browning; Jayko, Angela S; Wooden, Joseph L; Smith, R S U

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2002 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.249, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Seven samples from four tuffaceous layers ranging from 5 cm to 3 m thick were collected from an 180 m alluvial section near Ballarat and dated using the SHRIMP-RG. The alluvial section underlies a late Pleistocene abrasion surface and is faulted at its base near the Panamint Range front where it apparently both structurally overlies and is truncated by one of the major range bounding faults along an east step in the Panamint fault zone. One sample collected in the lower part of the alluvial section contains abundant Pleistocene zircons ranging in age from 0.6 to 1.1 Ma with a statistically significant weighted mean age of 0.9 Ma. These ages overlap with the ***Long Valley*** magmatic events and provide a minimum age for the deposition for the section. They also could reflect contribution from tephra units such as Upper Glass Mountain tuffs. A minimum ***long*** term vertical slip rate of approximately 0.345 mm/yr for the Panamint ***Valley*** fault zone can be estimated from the separation of dated horizons in the alluvial section and previous work on 36Cl dating of salt horizons from nearby core (Jannik and others, 1991). Detrital zircon populations indicate that tuffs interbedded in alluvial deposits in Panamint ***Valley*** are Pleistocene age and include reworked clasts from Precambrian basement, Mesozoic plutons, and Tertiary volcanics. The majority of zircons appear to be mixture of reworked sediment derived from approximately 1.3 Ga

Precambrian basement rocks, plutons from the Panamints ranging in age between approximately 154 and 80 Ma, Miocene and Pleistocene volcanic sources. Some samples include smaller sub-populations of Permian and Triassic aged zircons. Zircons of Miocene age range from approximately 6 to 35 Ma and may have been derived from units such as the Immigrant Canyon Tuff, approximately 8 Ma and the Coso Ash, approximately 6 Ma. Extensive Tertiary volcanics in the southern Panamints could also be a source, however Tertiary volcanics are not present in the watersheds that presently feed this alluvial deposit suggesting material has been denuded from the range. Preliminary results suggest an inverse age relation of reworked Tertiary zircons within the stratigraphic section, with younger tuffs in the alluvial section dominated by older reworked Tertiary zircons.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-057031

42. Database GeoRef

Title **Is *Long Valley* Caldera part of the Eastern California shear zone? Some answers from hyperspectral imaging**

Author Martini, Brigette A; Silver, Eli A

Affiliation University of California at Santa Cruz, Earth Science Department, Santa Cruz, CA, United States (USA)

Monograph Title Geological Society of America, 2002 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.512, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** Caldera sits on the western edge of Basin and Range extensional deformation and the eastern edge of the Sierra Nevada. We suggest that ***Long Valley*** is accumulating strain imposed on it from the Eastern California Shear Zone (ECSZ). Recent hyperspectral-based mineral mapping in the caldera confirms the presence of a set of contentious NE-trending faults in the western caldera; Suemnicht and Varga's Discovery Fault Zone. The presence of these faults is consistent with right-lateral shear imposed by the Eastern California Shear Zone of Dokka and Travis, 1990a. Resurgent dome normal faults may also be accommodating some of this right lateral shear. Conflict between geologic and gps/strain determined slip rates in the region could be resolved by allowing the crust of ***Long Valley*** to accumulate some of the regional 11+1 mm/yr measured slip. Northward propagation of the ECSZ into this latitude roughly coincides with the inception of widespread volcanic activity in this region (approximately 3 Ma). We suggest that ECSZ strain localizes along northwest trending normal faults (Hilton Creek Fault, Hartley Springs Fault, Resurgent Dome Faults). Such faults now experience right lateral offset in addition to normal movement from Basin and Range imposed deformation. In addition, several reactivated NE-trending faults act as zones of strain transfer across the caldera from east to west. These mapped fault patterns are consistent with those seen farther south along the ECSZ, and help to explain the origin of this massive caldera.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-013275

43. Database GeoRef

Title **Very-*long*-period volcanic earthquakes beneath Mammoth Mountain, California**

Author Hill, David P; Dawson, Phillip B; Johnston, Malcolm J S; Pitt, A M; Biasi, Glenn P; Smith, Kenneth

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Nevada, United States (USA)

Source Geophysical Research Letters, vol.29, no.10, 4 pp., 15 May 2002

Resource Location http://www.agu.org/journals/gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 4

Publication Year 2002

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2003-024091

44. Database GeoRef

Title **Post-3Ma deformation along the Sierra Nevada-Basin and Range transition zone near Reno, Nevada**

Author Cashman, Patricia H; Trexler, J H; Perkins, Michael E; Kelly, T S

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Affiliation University of Utah, United States (USA); Natural History Museum of Los Angeles County, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 98th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.5, pp.100, Apr 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Exhumation and faulting of Neogene sedimentary rocks records the deformation history of the Sierra Nevada-Basin and Range transition zone near Reno, NV in the last 3 Ma. Tephras and mammal fossils high in the Neogene Verdi basin section constrain the timing of the deformation. Deposition in the Verdi basin was terminated by tectonism that produced dramatic down-cutting, an abrupt shift in paleocurrent direction, and unroofing of crystalline source rocks. This uplift/arroyo-cutting event was followed by eastward tilting and broad synclinal folding of both the Neogene section and the coarse clastic arroyo fill. Some faulting within the section accompanied tilting, but most appears to have post-dated the tilting event. Several fault sets cut the tilted Neogene section. The dominant ones are: NW-striking dextral faults, NE-striking sinistral faults, and N-striking normal or normal-dextral oblique faults. Strike-slip faults with m- to 10m-scale offset are broadly distributed; those with the largest slip are most commonly dextral faults. Mutually cross-cutting relationships between the strike-slip fault sets are observed locally. Several NNE-striking faults with 10s to
100s of m of down-to-the-east offset repeat the Neogene section and appear to be some of the most recent structures in the area. The distributed strike-slip faulting in the Verdi basin is anomalous for post-depositional deformation of Neogene basins along the eastern boundary of the Sierra in northern Nevada. In the Gardnerville basin to the south and ***Long Valley*** basin to the north, the sedimentary section is preserved in a west-tilted half-graben and internal deformation is normal faulting. The pre-3 Ma record is also unlike its neighbors--the Verdi basin records a relatively stable depocenter with little active tectonism from 11 to 3 Ma.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-023901

45. Database GeoRef

Title **Active tectonism since 8 Ma in the Sierra Nevada- Basin and Range transition zone, Lassen County, California**

Author TenBrink, Andrew L; Cashman, Patricia H; Trexler, James H; John, Louie; Shane, Smith

Affiliation University of Nevada at Reno, Department of Geological Sciences, Reno, NV, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 98th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.5, pp.100, Apr 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Late Miocene fluvial, fluvial-deltaic, and lacustrine sediments of the Hallelujah Formation record the depositional and deformational history in the ***Long Valley***, CA (Hallelujah Junction) area. Deposition of Hallelujah Formation started before 8.0 Ma and continued into the Blancan (5.03-2.68) Ma. Age control for the Hallelujah Formation is based on tephrochronology and mammalian fossils. Granitic boulder conglomerates within the section are monolithologic and immature. They record significant periods of active tectonism during deposition. The ***Long Valley*** section dips west and is bounded by faults to both the east and west. The Diamond Mountain fault, on the west, is a north-striking, east-dipping normal fault. The eastern basin boundary is an unnamed north-striking fault with dextral-normal displacement. This suggests that post-depositional deformation occurred in a transtensional setting. Gravity profiles across the basin constrain the thickness of the Neogene section and the offset on basin-bounding faults. Modeling based on gravity and borehole data suggests a total stratigraphic thickness of approximately 3500 meters. The Diamond Mountain fault is modeled to have a total displacement of up to 2500 meters. The unnamed fault bounding Petersen Mountain shows at least 500
meters of west-side-down offset. This indicates as much as 550 meters of section could be present below the 8 Ma tephrochronology date within the lower member of the Hallelujah Formation. The tectonic record in the Neogene sedimentary rocks in ***Long Valley*** differs from nearby Neogene basins in the Sierra Nevada-Basin and Range transition zone. Boulder sheets within the section reveal
2-3 distinct periods of active tectonism between 8.0 and (5.03-2.68) Ma. Correlation of paleocurrent data with volumetric distribution of the boulder sheets suggests a northwest source direction for boulders in the upper section. Boulder sheets in the lower section depict an ambiguous east-west source direction. This suggests geographic distribution of faulting with time. Although ***Long Valley*** appears to be a west- tilted half graben, there is significant faulting along its eastern edge as well, and this faulting includes both strike-slip and dip-slip components.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-023902

47. Database GeoRef

Title **New insights into the structural, hydrothermal, and biological systems of the *Long Valley* Caldera using hyperspectral imaging**

Author Martini, Brigette Ann

Pages 291

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Santa Cruz, Santa Cruz, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2004-002915

48. Database GeoRef

Title **The interaction of tectonic and magmatic processes in the *Long Valley* Caldera, California**

Author Prejean, Stephanie Gail

Pages 131

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Stanford University, Stanford, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2005-007409

50. Database GeoRef

Title **Geodetic and seismic constraints on the 1997 inflation event at *Long Valley* Caldera**

Author Newman, Andrew V; Dixon, Timothy H; Ofoegbu, Goodluck I; Dixon, Jacqueline E

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Affiliation University of Miami, United States (USA); Southwest Research Institute, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-074122

51. Database GeoRef

Title **An airborne scanning laser altimetry survey of *Long Valley*, California**

Author Hofton, M A; Blair, J B; Minster, J B; Ridgway, J R; Williams, N P; Bufton, J L; Rabine, D L

Affiliation Scripps Institution of Oceanography, Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation NASA, United States (USA)

Source International Journal of Remote Sensing, vol.21, no.12, pp.2413-2437, 15 Aug 2000

Resource Location http://www.tandf.co.uk/journals/ titles/01431161.asp

Publisher Taylor & Francis, London, United Kingdom (GBR)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2002-050345

52. Database GeoRef

Title **Faulting in the 1986 Chalfant, California, sequence; local *tectonics* and earthquake source parameters**

Author Smith, Kenneth D; Priestley, Keith F

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Affiliation University of Cambridge, United Kingdom (GBR)

Source Bulletin of the Seismological Society of America, vol.90, no.4, pp.813-831, Aug 2000

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The July 1986, moment magnitude (M (sub w)) 6.3 Chalfant, California, earthquake is the largest of a recent series (1978-present) of moderate-sized earthquakes near the ***Long Valley*** volcanic region of east-central California. The sequence consists primarily of three moderate-sized strike-slip events. High-quality aftershock relocations and short-period focal mechanisms define the temporal and spatial development of the foreshock - mainshock- aftershock periods of these three events. Faulting during the M (sub w) 5.7 (event I; July 20) and the M (sub w) 6.3 (event II; 21 July) events constitute a set of conjugate strike-slip faults. Event I involved predominantly left-lateral motion on a NE-striking fault plane initiating at shallow depth (7 km). Event II initiated at 10.5 km depth exhibiting right-lateral strike-slip motion on a NW-striking fault dipping moderately to the southwest. An M (sub L) 5.5 strike- slip event on 31 July (event III) extended the aftershock sequence to the south into the White Mountains fault zone. P-wave pulse-width stress drops are determined for 185 M (sub L) 2.7-4.0 earthquakes that sample the entire sequence. Higher stress drops are observed near the intersection of event I and II fault planes and at the northern and southern ends of the aftershock zone. The moving-window b-value of the temporal average stress drop level and the b-value preceding event III. The average aftershock stress drop tends to increase as the sequence progresses suggesting that the faulted volume is equilibrating to the regional stress. Source parameters have been determined for the principal earthquakes from teleseismic body waves, local strong-motion records, and the extent of aftershock activity. The Chalfant sequence appears to be transferring strike-slip motion away from the White Mountains front, contributing to the observed increase in the relative normal offset, from south to north, along the White Mountains and the opening of the White Mountains relative to the Sierra Nevada Range front north of Owens ***Valley***.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2003-006251

53. Database GeoRef

Title **A study of microseismotectonics and earthquake sources in *Long Valley* Caldera, California**

Author Stroujkova, Anastasia Felixovna

Publication Year 2000

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 2003-038332

54. Database GeoRef

Title **Temporal gravity investigations at *Long Valley* Caldera, California**

Author Battaglia, M; Roberts, C W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Geophysical Research Abstracts, vol.2, 2000

Publisher European Geophysical Society, Katlenburg -Lindau, Federal Republic of Germany (DEU)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-064791

55. Database GeoRef

Title **Cenozoic deformation in the vicinity of the Salmon River suture zone, Idaho; gravity, geologic, and paleomagnetic data**

Author Markley, Michelle J; Kelso, P; Tikoff, Basil; Gillaspy, J; Manduca, C; Minott, J

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Affiliation Lake Superior State University, United States (USA); University of Wisconsin-Madison, United States

(USA); Carleton College, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.107, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Miocene-Recent Basin and Range deformation occurs in west-central Idaho, and extension concentrates along the Cretaceous Salmon River suture zone. Domino-style normal faulting occurred on E -dipping normal faults, which parallel the Cretaceous foliation. Normal faulting rotated both the underlying Cretaceous amphibolite facies basement rocks of the western

Idaho shear zone and the overlying Miocene Columbia River basalt flows. We present results from a new gravity survey of ***Long Valley*** with 250 measurements. The topographical expression of NS-trending ***Long Valley*** does not correlate directly to the basin at depth. Instead, a 25 mGal negative Bouguer anomaly is centered in the NW part of the ***valley***. No gravity anomaly occurs under the S end of the ***valley***, indicating the presence of bedrock immediately below Quaternary surficial deposits. In the N end of the ***valley***, inversion of the gravity data suggests ca. 1200 m of Miocene-recent basin fill in a relatively narrow (<10 km) ***valley***. The anomaly is consistent with an asymmetric Miocene graben that is deepest on the W side of the ***valley***. The normal faults that bound the graben on the W side parallel Cretaceous basement foliation. Tilted Miocene Columbia River basalts act as critical marker horizons. Paleomagnetic data show that Miocene rotation of crustal blocks occurred about a horizontal axis. Reconstruction of the basalt flows to a sub-horizontal position suggests that the original orientation of both the Late Cretaceous basement foliation and the Miocene normal faults was sub-vertical. Each block contains a distinctive part of the Late Cretaceous shear zone, as defined by petrology, geochemistry, and structures. These observations indicate that basement contacts and fabrics controlled the regional Miocene structural style.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-049947

56. Database GeoRef

Title **Are the Sierras overriding a deep volcanic source at *Long Valley*?**

Author Smith, Ken; Biasi, Glenn P

Affiliation University of Nevada-Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.461, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract A synthesis of tectonic, geologic and geophysical evidence supports the hypothesis that the Sierran Mountain block in east central California is overriding the deep volcanic source responsible for ***Long Valley*** Caldera (LVC). For 12 mm/yr of NW motion of the Sierran block relative to a fixed volcanic source at depth, at least 10 km of southerly offset would have accumulated since the 0.75 Ma caldera forming event at ***Long Valley***. The modern period of earthquake activity (1978-present), extends 15-20 km south into the Sierran block and 20-30 km east and southeast of the current expression of LVC. This distribution of earthquake activity is difficult to reconcile with a crustal volcanic source associated exclusively with resurgence of the central caldera. Teleseismic P-wave tomography of the lower crust and upper mantle shows a region of decreased velocities extending south of LVC into the Sierran lithosphere. The largest earthquakes, the distributed seismicity and the anomalous local orientation of stress axes from earthquake focal mechanisms that appear to be related to the upper mantle feature implies that the velocity contrast is also a lithospheric strength boundary. Although Mono Craters represent a northward extension of volcanism since the formation of ***Long Valley***, several lines of evidence also suggest the evolution of a deeper volcanic source south of the caldera. Magmatic intrusion into the Sierran block has been inferred from modeling deformation dominated by uplift in the central caldera (Langbein and others, 1995), attenuation of shear waves (Sanders and Nixon, 1995), reflections from potential magma sources from local earthquakes (Peppin and others, 1989) and anomalous signatures from modeling earthquake dislocations (Julian, 1983; Dreger and others, 2000). The most plausible deep source for volcanism south of LVC is the continued dewatering of upper mantle originally hydrated by post-20 Ma subduction. Caldera-forming volcanism implies the original presence of huge quantities of volatiles including water and CO2. These quantities would be hard to concentrate in the small area of LVC through purely crustal tectonic mechanisms.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-014856

57. Database GeoRef

Title **Analysis of geodetic measurements of crustal deformation at *Long Valley***

Caldera

Author Simons, Mark; Fialko, Yuri; Chapin, Elaine; Hensley, Scott; Rosen, Paul A; Shaffer, Scott; Webb, Frank

Affiliation California Institute of Technology, Seismological Laboratory, Pasadena, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1194, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-061451

58. Database GeoRef

Title **Seismicity and strain in the Sierra Nevada south of *Long Valley* Caldera**

Author Owen, Susan E; Mills, Suzanne; Higbee, Peter; Buergmann, Roland

Affiliation University of Southern California, Earth Sciences Department, Los Angeles, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.960, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-021329

59. Database GeoRef

Title **Borehole strain measurements and volcanic activity**

Author Linde, Alan T; Sacks, Selwyn

Affiliation Carnegie Institution of Washington, Washington, DC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.972-973, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-021395

60. Database GeoRef

Title **Stress drops, apparent stresses, and tectonic driving stress in the *Long Valley* Caldera, California**

Author Prejean, Stephanie G; Ellsworth, William L

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.682, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004613

61. Database GeoRef

Title **Why the Sierras are so stressed-out; the effect of *Long Valley* Caldera inflation on faulting in the eastern Sierra Nevada**

Author Higbee, Peter; Burgmann, Roland; Owen, Susan; Dreger, Douglas

Affiliation University of California at Berkeley, Department of Geology and Geophysics, Berkeley, CA, United States (USA)

Affiliation University of Southern California, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.981, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004776

62. Database GeoRef

Title **Are the eastern Sierras overriding a deep heat/fluid source at *Long Valley*? A tectonic model for the west central Great Basin**

Author Smith, Kenneth D; Biasi, Glenn P

Affiliation University of Nevada Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.981, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004777

63. Database GeoRef

Title **Can stress field orientation be estimated from the ellipticity of collapse calderas?**

Author Bosworth, William; Burke, Kevin; Strecker, Manfred

Affiliation Marathon Oil Company, Houston, TX, United States (USA)

Affiliation University of Houston, United States (USA); Universitaet Potsdam, Federal Republic of Germany (DEU)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.982, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004782

64. Database GeoRef

Title **Frequency-magnitude statistics and spatial correlation dimensions of earthquakes at *Long Valley* Caldera, California**

Author Barton, D J; Foulger, G R; Henderson, J R; Julian, B R

Affiliation University of Durham, Department of Geological Sciences, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA)

Source Geophysical Journal International, vol.138, no.2, pp.563-570, Aug 1999

Resource Location http://www.blackwellpublishing.com/ journal.asp?ref=0956-540X

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Publication Year 1999

Publication Type Serial; Analytic

Accession Number 1999-057787

65. Database GeoRef

Title **Seismic evidence for a complex magmatic system beneath *Long Valley* Caldera, California**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.222, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056553

66. Database GeoRef

Title **Holocene faulting on the Sierra Nevada frontal fault between Mono Lake and June Lake, eastern California**

Author McCalpin, J P; Berry, M E

Affiliation GEO-HAZ, Estes Park, CO, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.31, no.7, pp.482, 1999

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract In 1997 we trenched scarps across Tioga or younger deposits at three places along the Sierra Nevada frontal fault, north of ***Long Valley*** caldera. East of June Lake on the Hartley Springs fault zone, a 2 m-high scarp records 50 cm displacement at 1.3 ka. However, most of the relief of the fault scarp was created in earlier, pre-pumice (1.8 ka) event(s) that displaced Tioga till down-to-the-east at least 2.5 m. Due to the 1.5-5 m thickness of pumice

and tephra deposits that mantle this landscape, deeper trenches will be required to confidently reconstruct the pre-tephra, post-Tioga history of paleoearthquakes. At the mouth of Lee Vining Canyon, three trenches into the Mono Lake fault zone revealed evidence for two surface-faulting events younger than the formation of latest Pleistocene fan-delta terraces graded to falling stands of Pleistocene Lake Russell. The most recent event occurred about 1.6 ka and had a vertical displacement of 2-2.2 m. An earlier Holocene event had a vertical displacement of ca. 1.6 m; TL dates are pending. Even older events were recorded in one trench, but due to erosion associated with strath terrace cutting, our measured displacements of 0.5-1.6 m are considered minima.Our trenches demonstrate that standard paleoseismic techniques will have to be modified somewhat to study the paleoearthquake chronology of the Sierra Nevada frontal fault in the Mono Lake-***Long Valley*** area. First, in areas mantled by thick, loose pumice deposits, trenches will have to be 1.5-5 m deeper than usual to expose pre-tephra colluvial wedges, yet the looseness of the pumice makes such deep trenches very dangerous. Location of the main fault cannot be inferred from surface morphology of the scarp. Second, due to the multiple step-faulting in relatively dense tills, few fault strands have enough displacement to create a decent debris- facies colluvial wedge.

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-053960

67. Database GeoRef

Title **Collaborative research with GEO-HAZ Consulting, Inc., and U. S. Geological Survey; interaction of volcanic and tectonic processes in the past 40,000 years near *Long Valley* Caldera**

Author McCalpin, James P (investigator); Berry, Margaret E (investigator); Sarna-Wojcicki, Andrei M (investigator)

Affiliation GEO-HAZ Consulting, Estes Park, CO, United States (USA)

Publication Year 1998

Publication Type Report; Monographic

Accession Number 2000-063207

68. Database GeoRef

Title **1998 SSA meeting; Presidental address; Science, geologic hazards, and public in a large, restless caldera**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Seismological Research Letters, vol. 69, no. 5, pp.400-404, Oct 1998

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-039319

69. Database GeoRef

Title **Peak ground accelerations recorded at *Long Valley* Caldera, California and at Guerrero, Mexico; the effects of site versus the effects of differing tectonic environments**

Author Peppin, William A

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Publication Year 1998

Publication Type Report; Monographic

Accession Number 2000-044882

70. Database GeoRef

Title **Scientific drilling in *Long Valley*, California; what will we learn?**

Author Priest, Susan S; Sass, John H; Ellsworth, W L; Farrar, Christopher D; Sorey, Michael L; Hill, David P; Bailey, Roy A; Jacobson, Ronald D; Finger, John T; McConnell, Vicki Sue; Zoback, Mark D

Affiliation U. S. Geological Survey, USA, (United States)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0077-98, 2 pp., 1998

Resource Location http://quake.wr.usgs.gov/VOLCANOES/LongValley/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1998

Publication Type Serial; Report; Monographic

Accession Number 1998-060421

71. Database GeoRef

Title **The 1997 Mammoth Wave Propagation Experiment; S-wave splitting, fault- guided waves, seismotectonics, and exotic sources in the Casa Diablo area**

Author Malin, P; Shalev, E; Schleupner, D; Stroujkova, A; Boyd, L; Newman, A; Alvarez, M; Lyster, D

Affiliation Duke University, Durham, NC, United States (USA)

Affiliation Northwestern University, United States (USA); Stanford University, United States (USA); Mono County Energy Management Department, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.443, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037809

72. Database GeoRef

Title **The 1997 Mammoth Wave Propagation Experiment; high-resolution relative microearthquake locations in the Casa Diablo area**

Author Stroujkova, A; Shalev, E; Malin, P; Got, J L

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Affiliation Universite de Savoie, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.444, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037810

73. Database GeoRef

Title **Source processes of small earthquakes, M 1-5; studies of the San Andreas Fault at Parkfield and *Long Valley* Caldera, California**

Author Johnson, Peggy Ann

Publication Year 1997

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1999-047617

74. Database GeoRef

Title **A conceptual model for hydrothermal convection in the western Atlanta Lobe of the Idaho Batholith**

Author Zimmer, Michael A; Rosenberg, Phillip E

Affiliation 3725 SE Francis, Portland, OR, United States (USA)

Affiliation Washington State University, Pullman, WA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.29, no.6, pp.333, 1997

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The Idaho batholith contains a large number of hydrothermal convection systems manifested at the surface as hot springs. Detailed geologic investigations were conducted at a series of hot spring vents discharging

along the northern portion of the Middle Fork Payette River in west-central Idaho. In every case, hot spring discharge occurs at or near the intersection of
a major fracture zone, identified as the South Fork of the Salmon River Lineament (SFSL), with several smaller fracture zones oriented approximately perpendicular to it. The SFSL is a NNE trending structure characterized in the field as a dense set of brittle fractures and identifiable on aerial photographs as a prominent lineament. Particularly good exposures of hydrothermal discharge from fracture zones are evident at Boiling Springs, where discharge is controlled by a single narrow fracture zone, and at Dash Creek, where vents discharge from closely spaced orthogonal fractures across a wider area. The SFSL is recognized as part of the ***Long Valley*** Fault System (LVFS), a seismically active zone of branching, high angle normal faults localized along the western border of the Atlanta lobe. It is believed to represent a northward migration of the Basin and Range beginning in the Miocene. Geothermal waters were analyzed for Si, Na, Ca, K and Mg; specific conductance, pH, temperature and discharge rate were measured on site. Chemical geothermometers yielded estimated reservoir temperatures ranging from 114 to 138 degrees C. Current heat flow maps of the region reveal only a slightly elevated geothermal gradient of 20-27 degrees C/km, thus the maximum depth of the hydrothermal system is approximately 4-7 km. Depths of groundwater circulation this deep are possible in the region because of the presence of a seismically active system of hydraulically connected fractures. A conceptual model in the form of a vertical cross section shows that convective groundwater circulation within the ***Long Valley*** Fault System is primarily attributed to substantial topographic relief in the region, as meteoric water moves from high elevation recharge areas to lower elevation discharge areas. This convective movement is possibly enhanced by thermal gradients in the system produced by density contrasts between cooler meteoric recharge water and hotter water circulating in the deepest depths of the system.

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-009700

75. Database GeoRef

Title **Tectonic strain rate as the control parameter for earthquake interactions**

Author Scotti, O; Grasso, J R; Bossu, R; Cotton, F

Affiliation LGIT-IRIGM, Grenoble, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.516, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-010301

76. Database GeoRef

Title **Satellite radar interferometic constraints on rate and extent of deformation at *Long Valley* Caldera, California, 1992-1995**

Author Thatcher, Wayne; Massonnet, Didier; Vadon, Helene; Langbein, John H; Hill, David P; Dzurisin, Dan

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Centre National d'Etudes Spatiales, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.F50, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-018120

77. Database GeoRef

Title **Late Quaternary faulting and seismotectonics of east-central Oregon and west-central Idaho**

Author Knudsen, K L; Simpson, G D; Sawyer, T L; Wong, I G; Bott, J D; Lettis, William R

Affiliation William Lettis & Associates, Walnut Creek, CA, United States (USA)

Affiliation Woodward-Clyde Federal Services, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.28, no.5, pp.82, Apr 1996

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-064990

78. Database GeoRef

Title **Possible dike opening beneath the Mono volcanic chain, eastern California, suggested by GPS and leveling surveys since 1988**

Author Marshall, Grant; Langbein, John; Stein, Ross S; Lisowski, Michael

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.156, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-029350

79. Database GeoRef

Title **Inflation of *Long Valley* Caldera from one year of continuous GPS observations**

Author Webb, Frank H; Bursik, Marcus; Dixon, Timothy; Farina, Frederic; Marshall, Grant; Stein, Ross S

Affiliation California Institute of Technology, Jeb Propulsion Laboratory, Pasadena, CA, United States (USA)

Affiliation State University of New York at Buffalo, United States (USA); Rosenstiel School of Marine and Atmospheric Science, United States (USA); U. S. Geological Survey, United States (USA)

Source Geophysical Research Letters, vol. 22, no. 3, pp.195-198, 01 Feb 1995

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A permanent Global Positioning System receiver at Casa Diablo Hot Springs, ***Long Valley*** Caldera, California was installed in January, 1993, and has operated almost continuously since then. The data have been transmitted daily to the Jet Propulsion Laboratory for routine analysis with data from the Fiducial Laboratories for an International Natural sciences Network (FLINN) by the JPL FLINN analysis center. Results from these analyses have been used to interpret the on going deformation at ***Long Valley***, with data excluded from periods when the antenna was covered under 2.5 meters of snow and from some periods when Anti Spoofing was enforced on the GPS signal. The remaining time series suggests that uplift of the resurgent dome of ***Long Valley*** Caldera during 1993 has been 2.5 + or - 1.1 cm/yr and horizontal motion has been 3.0 + or - 0.7 cm/yr at S53W in a no-net-rotation global
reference frame, or 1.5 + or - 0.7 cm/yr at S14W relative to the Sierra Nevada block. These rates are consistent with uplift predicted from frequent horizontal strain measurements. Spectral analysis of the observations suggests that tidal forcing of the magma chamber is not a source of the variability in the 3 dimensional station location. These results suggest that remotely operated, continuously recording GPS receivers could prove to be a reliable tool for volcano monitoring throughout the world. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-033007

80. Database GeoRef

Title **Airborne laser altimeter survey of *Long Valley*, California**

Author Ridgway, J R; Minster, J B; Williams, N P; Bufton, J; Krabill, W; Rabine, D; Vaughn, C **Affiliation** University of California at San Diego, IGPP, La Jolla, CA, United States (USA) **Affiliation** NASA, Goddard Space Flight Center, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.160-161, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-037709

81. Database GeoRef

Title **Helium isotope and gas discharge variations associated with crustal unrest in *Long Valley* Caldera, California, 1989-1993**

Author Sorey, M L

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.26, no.7, pp.453, 1994

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-014759

82. Database GeoRef

Title **Mitigating volcanic hazards through active tectonic research**

Author Fink, Jonathan H; Delaney, Paul T; Moore, James G; Glazner, Allen F

Affiliation Arizona State University, Geology Department, Tempe, AZ, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); University of North Carolina, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.26, no.7, pp.383, 1994

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-031571

83. Database GeoRef

Title **The U.S.A. Continental Scientific Drilling Program (CSDP)**

Author Luth, William; MacGregor, Ian; Russ, David

Affiliation U. S. Department of Energy, Washington, DC, United States (USA)

Affiliation National Science Foundation, United States (USA); U. S. Geological Survey, United States (USA)

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 19, pp.69, 1994

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-054264

84. Database GeoRef

Title **Deep exploration of an active silicic caldera; a search for magma in the crust beneath *Long Valley*, California**

Author Rundle, John B; Sass, John H; Finger, John; Eichelberger, John C

Affiliation University of Colorado, Department of Geological Sciences, Boulder, CO, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Sandia National Laboratories, United States (USA); University of Alaska at Fairbanks, United States (USA)

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.59 -62, 1994

Publisher [varies], [location varies], International (III)

Abstract While the deep structure and physical state of active silicic calderas have until now been clouded with uncertainty, a unique opportunity presently exists to make direct observations in deep drill hole within the ***Long Valley*** caldera of eastern California. For the first time, it will be possible to obtain hard data on the physical existence of juvenile magma within the basement rock of ***Long Valley***. To critically test the hypothesis that magma does indeed exist at relatively shallow depth, we need to obtain qualitatively new information on the structure of the basement, on the physical conditions leading to the sudden cessation of earthquakes below approximately 4 km depth at the well site, and on the patterns and thermal efficiency of deep fluid circulation within the basement rock beneath the caldera. These fundamental issues can all be addressed by continuing the ***Long Valley*** Exploration Well that currently extends to a depth of 2.3 km beneath the center of the resurgent dome. We propose to deepen the well to 4.3 km in a third phase of drilling. In contrast to the previous drilling that employed conventional oilfield technology, Phase III will be continuously cored to allow unambiguous characterization of lithology, as well as systematic measurements of physical and chemical properties with depth. The target is the base of the seismogenic zone above the current center of inflation. We expect to resolve the paradox posed by surface geophysical evidence of shallow magma but subdued heat flow at moderate depth. Models for the caldera system can be critically tested only by observing the qualitatively new information given by the depth dependence of physical and chemical properties.

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Accession Number 2010-044460

85. Database GeoRef

Title **Potassic volcanism near Mono Basin, California; evidence for high water and oxygen fugacities inherited from subduction**

Author Lange, Rebecca A; Carmichael, Ian S E; Renne, Paul R

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA); Institute of Human Origins, Berkeley, CA, United States (USA)

Source Geology (Boulder), vol.21, no.10, pp.949-952, Oct 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Exposed around the margins of Mono basin and the periphery of ***Long Valley*** caldera are approximately 100 km (super 3) of potassic, basic to intermediate lavas that record high water and oxygen fugacities. Most eruptions occurred between 4 and 2 Ma, although sporadic potassic volcanism continued into the Quaternary with a pulse between 0.1 and 0.5 Ma, approximately 15 km northeast of Mono basin. The lava types include absarokite, minette, hornblende lamprophyre, trachybasalt, and trachyandesite. Estimated water contents for lavas without hydrous

phenocrysts range between 2 and 3 wt%, considerably more than mid-ocean ridge, oceanic island, or back- arc magmas. Calculated f O (sub 2) values fall between -0.4 and +1.2 log units of the Ni-NiO buffer. Although this potassic suite was erupted in an extensional tectonic setting at the western margin of the Basin and Range province, its high K (sub 2) O/TiO (sub 2) and low Zr/Ba ratios suggest a subduction - modified mantle source. If subduction was the process that enriched the lithospheric mantle in large-ion lithophile elements (K, Ba, etc.), it was also a mechanism for mantle oxidation and hydration. October 1993

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-038104

86. Database GeoRef

Title **Crustal deformation in eastern *Long Valley* Caldera, California during the last 600,000 yrs**

Author Foster, Jacob G; Reid, John B, Jr

Affiliation Hampshire College, School of Natural Science, Amherst, MA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.25, no.6, pp.72, Oct 1993

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-024104

87. Database GeoRef

Title **Late Cenozoic structure and correlations to seismicity along the Olympic- Wallowa Lineament, Northwest United States**

Author Mann, Gary M; Meyer, Charles E

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Geological Society of America Bulletin, vol.105, no.7, pp.853-871, Jul 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Late Cenozoic fault geometry, structure, paleoseismicity, and patterns of recent seismicity at two seismic zones along the Olympic-Wallowa lineament (OWL) of western Idaho, Northeast Oregon, and Southeast Washington indicate limited right-oblique slip displacement along multiple northwest -striking faults that constitute the lineament. The southern end of the OWL originates in the ***Long Valley*** fault system and western Snake River Plain in western Idaho, where it accommodates basin-and - range extension. Several kilometers west of the ***Long Valley*** fault system, post-middle Miocene displacement along the OWL has resulted in adjacent areas of uplift and subsidence. The OWL in Northeast Oregon consists of a wide zone of northwest -striking faults and is associated with several large, inferred, pull-apart basins. The OWL then emerges from the Blue Mountain uplift as a much narrower zone of faults in the Columbia Plateau known as the Wallula fault zone (WFZ). Structural relationships in the WFZ strongly suggest that it is a right-slip extensional duplex. An ash horizon that correlates with the Mount St. Helens "J" composition (10.7 Ka) is displaced vertically 5 m by a normal fault along a segment of the WFZ. The intensity center for a damaging M = 6.1 earthquake in 1936 is located in the WFZ only a few kilometers northeast of this Holocene fault. Other youthful -appearing, strike-slip and thrust faults are located farther northwest along the OWL and may pose a seismic hazard to adjacent population centers and critical facilities.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-023430

88. Database GeoRef

Title ***Long Valley* triggered strain and seismicity; can bubbles do it?**

Author Linde, Alan T; Sacks, I Selwyn; Johnston, Malcolm J S; Hill, David P

Affiliation Carnegie Institution of Washington, DTM, Washington, DC, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.16, Suppl., pp.317, May 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-007315

89. Database GeoRef

Title **Constraints on deformation of the resurgent dome, *Long Valley* Caldera, California from space geodesy**

Author Dixon, Timothy H; Bursik, Marcus; Wolf, Susan Kornreich; Heflin, Michael; Webb, Frank; Farina, Frederic; Robaudo, Stefano

Affiliation University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Affiliation State University of New York, United States (USA); California Institute of Technology, United States (USA)

Affiliation NASA/Goddard Space Flight Center, Greenbelt, MD, United States (USA)

Source Geodynamics Series, vol.23, pp.193-214, 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-017720

90. Database GeoRef

Title **How to predict an eruption at *Long Valley* Caldera**

Author Bursik, Marcus

Affiliation State University New York, Department of Geology, Buffalo, NY, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, suppl., pp.343, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014028

91. Database GeoRef

Title **Abrupt change in tectonic style along the northeastern front of the Sierra Nevada uplift at Constantia, CA**

Author Grose, T L T

Affiliation Colorado School of Mines, Department of Geology and Geological Engineering, Golden, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, Suppl., pp.549, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-021793

92. Database GeoRef

Title **Stresses in the *Long Valley* Caldera, California, from analysis of wellbore breakouts in geothermal exploratory wells**

Author Moos, D; Zoback, M D

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, Suppl., pp.559, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-021869

93. Database GeoRef

Title **Tectonic geomorphology and earthquake hazard of the northern Owens *Valley*, California**

Author Pinter, Nicholas

Publication Year 1992

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1994-033311

94. Database GeoRef

Title **Structural evolution of the Mesozoic section of the Mount Morrison roof pendant**

Author Bergeron, Louis K

Publication Year 1992

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1996-025148

95. Database GeoRef

Title **Response of the hot bubbling pool hydrothermal system of the *Long Valley* Caldera, California, to earthquakes and tectonism**

Author Diment, W H; Urban, T C

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.72, no.17, pp.115-116, 23 Apr 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-001685

96. Database GeoRef

Title **Ground-water basins along the eastern Sierra Nevada; *tectonics*, water, and politics**

Author Danskin, Wesley R; Farrar, Christopher D; Dreiss, Shirley J

Affiliation U. S. Geol. Surv., San Diego, CA, United States (USA)

Affiliation Univ. Calif. at Santa Cruz, United States (USA)

Publisher San Diego State Univ., San Diego, CA, United States (USA)

Publication Year 1991

Publication Type Book; Map; Analytic

Accession Number 1992-040488

97. Database GeoRef

Title **Volcanoes; old new, and--perhaps--yet to be**

Author Kerr, Richard A

Affiliation Am. Assoc. Adv. Sci., Washington, DC, United States (USA)

Source Science, vol.250, no.4988, pp.1660-1661, 21 Dec 1990

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-001507

98. Database GeoRef

Title **Magmatic unrest at *Long Valley* Caldera, California, 1980-1990**

Author Bailey, Roy A; Hill, David P

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Author Hickson, Catherine J (prefacer); Peterson, Donald W (prefacer)

Affiliation Geol. Surv. Can., Vancouver, BC, Canada (CAN)

Source Geoscience Canada, vol.17, no.3, pp.175-179, Sep 1990

Publisher Geological Association of Canada, Toronto, ON, Canada (CAN)

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1991-013512

99. Database GeoRef

Title **Observation of shear wave splitting from natural events; south moat of *Long Valley* Caldera, California, June 29 to August 12, 1982**

Author Shih, Xiao R; Meyer, Robert P

Affiliation Univ. Wis.-Madison, Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,179-11,195, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Three-component seismograms from local earthquakes recorded by three University of Wisconsin stations in the south moat of ***Long Valley*** caldera in 1982 have been analyzed for shear wave splitting. The average polarization direction of the first-arriving shear waves observed at the two stations south of the resurgent dome is NNW-SSE. Time delays between the fast and slow shear waves are proportional to hypocentral distances, and the maximum velocity anisotropy inferred is 6.4%. The average shear wave polarization observed at the station above the resurgent dome is north-south. The time delays there are not a function of hypocentral distance, and the normalized time delays (ms/km) from events at the southwest boundary of the caldera are larger than those at

other azimuths, indicating maximum 9.6% velocity anisotropy. The east-west to ENE-WSW variation of the tensional stress fields implied by the shear wave polarizations indicates the interaction between the inflating caldera and the Sierra Nevada range-front faults under the generally WNW-ESE tension expected from the regional ***tectonics***. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1990-049557

100. **Database** GeoRef

Title **Soil-geomorphic analysis of late Quaternary glaciation and faulting, eastern escarpment of the central Sierra Nevada, California**

Author Berry, Margaret Elaine

Publication Year 1990

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1991-051676

101. **Database** GeoRef

Title **Normal faults and volcanoes**

Author Ellis, Michael; King, Geoffrey

Affiliation Cent. Earthquake Res. and Inf., Memphis, TN, United States (USA)

Affiliation Univ. Colo., United States (USA)

Author Anonymous

Affiliation United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.22, no.7, pp.273, 1990

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-066972

102. **Database** GeoRef

Title **Range front faulting and volcanism in the Mono Basin, eastern California**

Author Bursik, Marcus; Sieh, Kerry E

Affiliation Calif. Inst. Technol., Dep. Geol. and Planet. Sci., Pasadena, CA, United States (USA)

Source Journal of Geophysical Research, vol. 94, no. B11, pp.15,587-15,609, 10 Nov 1989

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The spatial and temporal pattern of range front normal faulting and volcanism in the Mono Basin of eastern California suggests that dikes are being intruded underneath the Mono Craters in response to crustal stretching and are now accommodating strain that was once taken up by range front faulting. The section of the Sierra Nevadan range front near the craters accommodated as much as 1 mm/yr of extension as recently as about 40,000 years ago. For the past 40,000 years, this section of range front has been inactive, even though range front extension to the north and south has continued at up to 0.9 mm/yr. For the past 40,000 years, dikes, intruding underneath the Mono Craters, seem to have been accommodating the 1 mm/yr of extension that was previously taken up by faulting. Since the basin is extending obliquely to the trend of the frontal faults, there is a component of dextral shear to their motion, so that the Mono Craters may be forming on an extensional boundary of a pull-apart basin. If the craters represent incipient caldera formation, then calderas such as ***Long Valley*** may also have formed in pull-apart zones. Copyright 1989 by the American Geophysical Union.

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1990-004570

103. **Database** GeoRef

Title **On restless calderas**

Author Smith, Peter J

Affiliation Open Univ., Dep. Earth Sci., Milton Keynes, United Kingdom (GBR)

Source Geology Today, vol.5, no.5, pp.171-174, Oct 1989

Publisher Blackwell, Oxford, United Kingdom (GBR)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-075540

104. Database GeoRef

Title **Review of magnetic and electric field effects near active faults and volcanoes in the U.S.A.**

Author Johnston, M J S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Affiliation CNRS, L.P.C.E., Orleans, France (FRA)

Source Physics of the Earth and Planetary Interiors, vol.57, no.1-2, pp.47 -63, Oct 1989

Resource Location http://www.sciencedirect.com/ science/journal/00319201

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1989

Publication Type Serial; Conference document; Analytic

Accession Number 1989-082289

105. Database GeoRef

Title **Precise master-event locations of aftershocks of the 4 October 1978 Wheeler Crest earthquake sequence near *Long Valley*, California**

Author Peppin, William A; Honjas, William; Somerville, Malcolm; Vetter, Ute R

Affiliation Univ. Nev., Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Source Bulletin of the Seismological Society of America, vol.79, no.1, pp.67 -76, Feb 1989

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-017466

106. Database GeoRef

Title **Differences in magma storage in different volcanic environments as revealed by seismic tomography**

Author Iyer, H M; Evans, J R; Dawson, P B

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source International Geological Congress, Abstracts --Congres Geologique Internationale, Resumes, vol.28, Vol. 2, pp.2.106, 1989

Publisher [International Geological Congress], [location varies], International (VVV)

Publication Year 1989

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-071061

107. **Database** GeoRef

Title **Structural geology and petroleum potential of *Long Valley*, White Pine County, Nevada**

Author Pekarek, Alfred H

Affiliation Basin and Range Explor. Co., Englewood, CO, United States (USA)

Source The Mountain Geologist, vol.25, no.4, pp.171-180, Oct 1988

Publisher Rocky Mountain Association of Geologists (RMAG), Denver, CO, United States (USA)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-013410

108. **Database** GeoRef

Title **Processing and interpretation of a seismic line across the resurgent dome of *Long Valley* Caldera, California**

Author Berg, Richard M, Jr

Publication Year 1988

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1989-050152

109. **Database** GeoRef

Title **The geophysics of a restless caldera; *Long Valley*, California**

Author Rundle, John B; Hill, David P

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Annual Review of Earth and Planetary Sciences, vol.16, pp.251-271, 1988

Resource Location http://arjournals.annualreviews.org/loi/earth

Publisher Annual Reviews, Palo Alto, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-066038

110. **Database** GeoRef

Title **Focal mechanisms of earthquakes in the Mammoth Lakes-Bishop area, eastern California**

Author Cockerham, Robert S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.19, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028500

111. **Database** GeoRef

Title **Static and dynamic strain during the July 21, 1986, Chalfant earthquake near the *Long Valley* Caldera, California**

Author Johnston, M J S; Borcherdt, R D; Glassmoyer, G M; Linde, A T **Affiliation** U. S. Geol. Surv., Menlo Park, CA, United States (USA) **Affiliation** Carnegie Inst. Washington, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.20, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028504

112. **Database** GeoRef

Title **Repeated precise leveling of fault crossing arrays reveals no nearfield vertical fault movement in Southern California in 1986**

Author Sylvester, A G

Affiliation Univ. Calif. at Santa Barbara, Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.20, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028506

113. **Database** GeoRef

Title **Estimates of extension in the Basin & Range Province**

Author Boyer, Steven E; Allison, M Lee

Affiliation Univ. Wash., Dep. Geol. Sci., Seattle, WA, United States (USA)

Author Dickinson, William R (chairperson)

Source Abstracts with Programs - Geological Society of America, vol.19, no.7, pp.597, 1987

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-022802

114. **Database** GeoRef

Title **Tectonic overview of Owens *Valley* region**

Author Sheehan, Jack R

Affiliation Consultant, Cypress, CA, United States (USA)

Source Annual Field Trip Guidebook. South Coast Geological Society, vol.15, pp.138-144, 1987

Publisher South Coast Geological Society, Santa Ana, CA, United States (USA)

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1993-010030

115. Database GeoRef

Title **Constraints on volume expansion in *Long Valley* Caldera, California derived from vertical displacements, 1975 to 1985**

Author Vasco, D W; Goldstein, N E

Affiliation Univ. Calif., Earth Sci. Div., Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1107, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-047373

116. Database GeoRef

Title **GPS-based differential measurements between *Long Valley* Caldera and Owens *Valley* Radio Observatory**

Author Blewitt, G; Dixon, T H; Hager, Bradford H; Sovers, O J; Stephens, S A

Affiliation Calif. Inst. Technol., Jet Propul. Lab., Pasadena, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.262, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic; Abstract only

Accession Number 1986-077317

117. Database GeoRef

Title **Effect of magma chamber shape on ground deformations; application to uplift at *Long Valley*, California**

Author Wu, M; Wang, H F

Affiliation Univ. Wis., Dep. Geol. and Geophys., Madison, WI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.402, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-038986

118. Database GeoRef

Title **Seismic investigation of structures associated with the intrusion of the 600- year-old dike under Inyo Domes**

Author Burkhard, Norman R; Kasameyer, Paul W

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.402, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-038987

119. Database GeoRef

Title **Geothermal systems in the Mono Basin-*Long Valley* region, eastern California and western Nevada**

Author Higgins, C T; Chapman, R H; Chase, G R; Bacon, C F; Flynn, T; Trexler, D T; Ghusn, G, Jr

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.1146, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1989-034855

120. Database GeoRef

Title **Special section on *Long Valley* Caldera, California [modified]**

Author Anonymous

Source Journal of Geophysical Research, vol.90, no.B13, pp.11,111-11,288, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Monographic

Accession Number 1986-082040

121. Database GeoRef

Title **Active tectonic and magmatic processes beneath *Long Valley* Caldera, eastern California; an overview**

Author Hill, David P; Bailey, Roy A; Ryall, Alan S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,111-11,120, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geological, chronological, and structural studies of the ***Long Valley***-Mono/Inyo Craters area document a ***long*** history of related volcanic eruptions and earthquakes controlled by regional extensional ***tectonics*** of the Basin and Range province. This activity has persisted for hundreds of thousands of years and is likely to continue. The ***Long Valley*** magma chamber had a volume approaching 3000 km (super 3) prior to its climatic caldera-forming eruption 0.7 m.y. ago but has been reduced to less than a third of this volume by cooling, eruption, and crystallization. Seismic evidence indicates that the main mass of the present ***Long Valley*** magma chamber is about 10 km in diameter and that its roof is 8-10 km deep with smaller cupolas as shallow as 4-5 km. Although a chamber of this size is probably capable of producing an eruption approaching 30 km (super 3) of lava, the record over the past 0.5 m.y. suggests that eruptions of 1 km (super 3) or less are far more likely. Models proposed for the current ground uplift and seismicity within the caldera require inflation of 0.1-0.2 km (super 3) by additional magma since mid-1979, and some models suggest that inflation was accompanied by injection of a thin dike or dikes (probably of silicic magma) into the ring fracture zone beneath the south moat. Several of the M 5.8-6.2 earthquakes that occurred in the region beginning in 1978

had non-double -couple focal mechanisms.
Whether these unusual mechanisms indicate injection of mafic (low -viscosity) magma at midcrustal depths in the Sierra Nevada block south of the caldera remains debatable.
Studies of calderas of various ages throughout the world indicate that episodes of unrest are relatively common and do not invariably culminate in eruptions. Although current unrest is concentrated in the south moat of ***Long Valley*** caldera, the Inyo/Mono Craters probably hold a greater potential for producing an eruption in the foreseeable future. The Inyo/Mono
Craters have erupted at 500 -year intervals over the past 2000-3000 years, whereas the
Long Valley magma chamber has erupted at about 200,000-year intervals over the past
700,000 years. In either case, a major earthquake near the caldera could strongly influence the course of volcanic activity.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082041

122. Database GeoRef

Title **Implications of silicic vent patterns for the presence of large crustal magma chambers**

Author Bacon, Charles R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,243-11,252, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract On the basis of the distribution of silicic vents, many volcanic fields can be grouped with (1) igneous systems that may be small and whose vent locations are controlled by regional ***tectonics***, (2) those that include sizable crustal magma bodies which erupt at sites determined by their anomalous local stress fields, or (3) relatively small volume systems that are transitional between categories 1 and 2. Linear vent patterns that are aligned normal to the regional least principal stress (sigma (sub 3)) commonly are associated with absence of evidence for large, shallow magma bodies. The Coso volcanic field and the Inyo-Mono domes in California and probably the South Sister area in Oregon are examples of such systems. The 1960 dacitic fissure eruption at Cordon Caulle in southern Chile evidently is linked to tectonic stress relaxation associated with the great earthquake that occurred 48 hours before the eruption began. Large, shallow magma
chambers are thought to perturb
the local stress field so that areal patterns of silicic vents are diffuse, radial, or arcuate. Such systems may erupt great volumes of pyroclastic material catastrophically and produce large calderas. Well-preserved examples of late precaldera leaks of silicic magma occur at ***Long Valley***, California, and Mount Mazama (Crater Lake), Oregon. Other possible examples are noted. Some of these, those which formed calderas smaller than Crater Lake, apparently were preceded by silicic eruptions from aligned vents. Bearing in mind that there exists a transitional group between tectonically controlled small systems and very large magma chambers, vent distributions can be useful in evaluating potential volcanic hazards for silicic volcanic fields.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082054

123. Database GeoRef

Title **Links between magma-tectonic rate balances, plutonism, and volcanism**

Author Shaw, Herbert R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,275-11,288, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract With Smith's (1979) model of ash flow magmatism as the point of departure, quantitative regimes of crustal magmatic evolution are outlined. The average extrusive regime of ash flow magmatism operates at a rate of about 0.001 km (super 3) /yr; progressively larger episodes of increasing repose times characterize the evolution of caldera-forming eruptions. The intrusive regime operates at an inferred average rate of about 0.01 km (super 3) /yr expressed in terms of the volumetric influx of mafic magma from the mantle, based on the record of silicic rates of extrusion and a 10:1 intrusive to extrusive ratio derived from
evidence of zoned silicic systems. This rate is almost identical with the mean cumulative rate for the Hawaiian-Emperor system of basaltic volcanism, which is determined to be 0.015 km (super 3) /yr.
Fluctuations about a mean rate of 10 (super -2) km (super 3) /yr lead to a threefold classification of magmatic regimes in terms of source power, depending on
whether they are persistently greater than (HHER regime), about equal to (MHER regime), or lower than

(LHER regime) the mean Hawaiian-Emperor rate. Ash flow magmatism correlates with the MHER regime, averaged over a sufficiently ***long*** time. Thus the conditions of Hawaiian-Emperor magmatism are identified with a characteristic power of magma transfer rates that optimize mechanisms for creation of high-level chambers of derivative and fractionated silicic magma (terminology of Smith (1979)) within sufficiently localized regions of high residence times. These conditions represent a balance point, and a bifurcation, in dynamic paths of magmatic evolution leading to widely divergent types of plutonic-volcanic associations. Categorical examples of the principal types of igneous path are discussed relative to continental basalt, silicic ash flow, batholithic granite, and intrusive porphyry systems. The Henry Mountains, Utah, are thought to represent an example of an intrusive porphyry generated in the LHER regime of a mafic source system lacking sufficient power for volcanic expression or significant mineralization. ***Long Valley***, California (and possibly other systems along the eastern front of the Sierra Nevada), is an example operating at the mean rate with transient excursions to higher and lower rates. In regions of rapid extension and/or volcanic propagation (whether linear or areal) these regimes give rise to basaltic eruptions ranging from isolated cinder cones to flood basalts.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082058

124. Database GeoRef

Title **Aftershocks of the May 1980 Mammoth Lakes, California, earthquakes**

Author Lide, Chester S; Ryall, Alan S, Jr

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Publication Year 1985

Publication Type Report; Monographic

Accession Number 1991-035977

125. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; a preliminary magnetotelluric and magnetic variation interpretation**

Author Hermance, John F; Slocum, Warren M; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 89, no. B10, pp.8325-8337, 30 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The ***Long Valley***/Mono Basin volcanic complex in eastern California is one of the few major silicic caldera systems in western North America which have exhibited volcanic activity so recently that they may still be potentially active. Whereas, in principle, magnetotelluric measurements offer a significant opportunity to study such systems through mapping subsurface electrical features associated with hydrothermal and magmatic processes in the crust, our studies in this area indicate that such techniques are profoundly affected by the highly three-dimensional structures associated with these complicated volcanic terranes. We argue that while simple plane-layered (one-dimensional) interpretations are likely to be misleading in such a complicated three-dimensional environment, magnetotelluric observations can delineate important physical features associated with caldera structures; in particular, the method can closely determine the location and magnitude of major boundary faults. Because of the high resistivity contrast between basin fill and crystalline basement, these techniques are very useful for characterizing the subsurface hydrologie regime as well. In addition, sites have been occupied in the southwest moat of ***Long Valley*** caldera, an
area that is currently exhibiting a variety of tectonic activity. Both the telluric field and magnetic induction arrows imply the presence of a structurally controlled east-west electric current system at relatively shallow depth in the crust. This elongated east-west zone is aligned along the belt of recent seismic activity in the southwest moat, a zone of seismic shear wave attenuation, and a zone of known hydrothermal alteration at the surface. Finally, we summarize observations from the vicinity of Pumice ***Valley*** (adjacent to Mono Craters) which has been thought to be an active incipient caldera. Since our present data do not indicate an observable decrease in resistivity at shallow depths beneath the ***valley***, we are led to conclude that the parent magma body feeding Mono Craters (and perhaps Inyo domes) is either too thin or too deep to be resolved or is significantly displaced from a position beneath the center of the inferred ring fractures.

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Accession Number 1985-038350

126. **Database** GeoRef

Title **Seismic imaging in *Long Valley*, California, by surface and borehole techniques; an investigation of active *tectonics***

Author Rundle, John B; Elbring, Gregory Jay; Striker, Richard P; Finger, John T; Carson, Charles C; Walck, Marianne C; Ellsworth, William L; Hill, David P; Malin, Peter; Tono, Enrique; Robertson, Michelle; Kuhlman, Steve; McEvilly, Tom; Clymer, Richard; Smithson, Scott B; Deemer, Sharon; Johnson, Roy; Henyey, Tom; Hauksson, Egill; Leary, Peter; McCraney, John; Kissling, Edi

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Univ. Calif., United States (USA); Lawrence Berkeley Lab., United States (USA); Univ. Wyo., United States (USA); Univ. South. Calif., United States (USA); Eidg. Tech. Hochsch., Switzerland (CHE)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.194-201, 30 Apr 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1985-062626

127. **Database** GeoRef

Title **Mono Craters, *Long Valley* Caldera; seismicity, volcanism, and engineering geology; Field trip II roadlog**

Author Bailey, Roy A; Harp, Edwin L; Keefer, David K; Bennett, M J; Miller, C Dan; Wood, Spencer H; Steine, S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Boise State Univ., United States (USA); Univ.Calif., Berkeley, United States (USA)

Affiliation Univ. Nev., Dep. Geol. Sci., Reno, NV, United States (USA)

Publisher Univ. Nev. at Reno, Dep. Geol. Sci., Reno, NV, United States (USA)

Publication Year 1984

Publication Type Book; Analytic

Accession Number 1985-041364

128. **Database** GeoRef

Title **Proceedings of Workshop XIX; Active tectonic and magmatic processes beneath *Long Valley* Caldera, eastern California**

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, 952 pp., 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Monographic

Accession Number 1985-059718

129. **Database** GeoRef

Title **Summary**

Author Hill, David P; Ryall, Alan S; Bailey, Roy A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA); Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.4-23, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059719

130. Database GeoRef

Title **The *Long Valley*/Mono Craters volcanic complex; a preliminary interpretation based on telluric field patterns**

Author Hermance, John F; Slocum, Warren M; Neumann, Gregory A **Affiliation** Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA) **Affiliation** Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.281-318, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059731

131. Database GeoRef

Title **Historical unrest at large Quaternary calderas of the world, with special reference to *Long Valley*, California**

Author Newhall, Christopher G; Dzurisin, Daniel; Mullineaux, L S

Affiliation U. S. Geol. Surv., Vancouver, WA, United States (USA)

Affiliation Univ. Nev., United States (USA); Scripps Inst. Oceanogr., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.714-742, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Historical seismicity, ground deformation, thermal activity, and eruptions at large Quaternary calderas of the world are: (a) common, (b) typically ***long***-lived, (c) complex in their spatial and temporal patterns, and (d) caused by combinations of tectonic, magmatic, and hydrothermal processes. Three fundamental causes of caldera unrest are regional tectonic strain, magmatic intrusion, and change in a hydrothermal system beneath a caldera. Possible responses include expansion and deformation of a magma body, and expansion of (water-saturated) country rock above the magma reservoir. Recent unrest at ***Long Valley*** caldera can be plausibly explained as a regional extension event, followed by slight in-situ expansion or deformation of the caldera's large silicic magma body. An intrusion of basaltic magma near the base of that silicic magma body, in 1980, is possible but not required by
the data. Large magma bodies beneath calderas are dynamic systems, in delicate balance between quiet and unrest. The stimuli for unrest need not be large; most often, the stimuli are common geological processes such as regional tectonic strain and small magmatic intrusions from depth.--Modified author abstract.

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059745

132. Database GeoRef

Title **Structure of the Tertiary Questa Caldera, New Mexico; an eroded analog for current activity at *Long Valley***

Author Lipman, Peter W

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.851-885, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract The late Oligocene Questa Caldera, eroded to levels where deep caldera structures and cogenetic batholithic intrusions are exposed, displays structures that may be analogous to features associated with current unrest at ***Long Valley*** Caldera. Features common to both calderas include: (1) orientation and distribution of mapped or inferred caldera-related dikes that are strongly influenced by regional structural trends, (3) complex deformation along segments of the caldera boundary that truncak region structural trends; (4) structurally highest portions of the postcollapse magma chamber underlie the apical graben on the resurgent dome, and (5) postcollapse magmatic activity has been sustained by addition of new magma to the high-level system, in the case of Questa for 3-4 m.y. after collapse.-- Modified author abstract.

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059749

133. Database GeoRef

Title **A note on links between magma-tectonic rate-balances, plutonism and volcanism**

Author Shaw, Herbert R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.886-942, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059750

134. Database GeoRef

Title **A new model for deformation in *Long Valley* Caldera, 1980-1983**

Author Rundle, John B; Whitcomb, James H

Affiliation Sandia Natl. Lab., Div. 1541, Albuquerque, NM, United States (USA)

Affiliation Univ. Colo., CIRES, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016560

135. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex in eastern California; status of present knowledge and future research needs**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Reviews of Geophysics and Space Physics, vol. 21, no. 7, pp.1545-1565, Aug 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Silicic complexes. Metallogenesis, mitigation of volcanic and earthquake hazards, and development of conventional and nonconventional forms of geothermal energy. One research technique that has not been exploited is scientific drilling to intermediate depths (2-3 km). If magma has intruded the upper crust of this area, surface geophysics and limited borehole observations may be employed to monitor tectonic and magmatic activity associated with such a phenomenon. A surprising result of commercial drilling for geothermal energy in this area is the failure to detect directly high-temperature hydrothermal reservoirs. Their presence can be inferred from other studies, particularly those using geochemical indicators in thermal fluids.--Modified journal abstract.

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-058112

136. Database GeoRef

Title **Moment tensor solutions of Mammoth Lake earthquakes**

Author Ekstroem, Goeran; Dziewonski, Adam M

Affiliation Harvard Univ., Dep. Geol. Sci., Cambridge, MA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.18, pp.262, 03 May 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-039500

137. Database GeoRef

Title **Seismological investigations of volcanic and tectonic processes in the western Great Basin, Nevada and eastern California**

Author Vetter, Ute R; Ryall, Alan S; Sanders, Christopher O

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.333-343, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1984-044721

138. Database GeoRef

Title **Seismological investigations of volcanic and tectonic processes in the western Great Basin, Nevada and eastern California**

Author Vetter, Ute R; Ryall, Alan S; Sanders, Christopher O

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.333-343, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic

Accession Number 1985-045894

139. Database GeoRef

Title **Selected earthquake swarms near Mammoth Lakes, Mono Co., CA 1980-1982 and their relationship to local seismicity and *tectonics***

Author Cramer, Chris; Real, Charles P P; Naramore, Sharon; Johnson, Peggy

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1029-1030, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-078066

140. Database GeoRef

Title **Seismicity and magma injection near Mammoth Lakes, California, in the context of regional *tectonics***

Author Ryall, A S

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012948

141. Database GeoRef

Title **Uplift of the *Long Valley*, California, caldera between 1975 and 1982**

Author Messing, J; Riley, F S; Denlinger, R P

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012950

142. Database GeoRef

Title **Horizontal strain within the *Long Valley*, California, caldera between 1975 and 1982**

Author Riley, F S; Massey, B L; Boling, J K; Denlinger, R P; Carpenter, M C

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Affiliation U. S. Bur. Land Manage., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012952

143. Database GeoRef

Title **A simple model for deformation of the *Long Valley*, California, caldera between 1978 and 1982**

Author Denlinger, R P; Riley, F S

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1133, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012953

144. Database GeoRef

Title **Waiting for the volcano**

Author Overbye, Dennis

Source Discover, vol. 3, no. 10, pp.18 -22, 24, Oct 1982

Publisher Walt Disney Co., Palm Coast, FL, United States (USA)

Publication Year 1982

Publication Type Serial; Analytic

Accession Number 1983-003241

145. Database GeoRef

Title **Ground tilt since May 1982 at *Long Valley* Caldera, California**

Author Dzurisin, Daniel; Sylvester, Arthur G; Cashman, Katharine V

Affiliation U. S. Geol. Surv., David A. Johnston Cascades Volcano Obs., Vancouver, WA, United States (USA)

Affiliation Univ. Calif., Santa Barbara, Dep. Geol. Sci., United States (USA); Johns Hopkins Univ., Dep. Earth and Planet. Sci., United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.75, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054428

146. Database GeoRef

Title **Spectral character of "tremor" in *Long Valley*, CA, during 1980-1983**

Author Real, C R; Cramer, C H; Chouet, B

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA) **Affiliation** Mass. Inst. Technol., Dep. Earth and Planet. Sci., United States (USA) **Affiliation** Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.89, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054457

147. Database GeoRef

Title **Seismic profiling using earthquake sources near Mammoth Lakes, California**

Author Boone, William J; Meyer, Robert P

Affiliation Univ. Wis., Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.92, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054462

148. Database GeoRef

Title **Record of late Quaternary faulting along the Hilton Creek Fault in the Sierra Nevada, California**

Author Clark, Malcolm M; Gillespie, Alan R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Earthquake Notes, vol.52, no.1, pp.46, Mar 1981

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1981

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1982-014312

149. Database GeoRef

Title **Geology of *Long Valley*, Lassen County, California, and Washoe County, Nevada**

Author Mergner, Marcia

Publication Year 1978

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1982-006692

150. Database GeoRef

Title **Owens *Valley*; a major rift between the Sierra Nevada Batholith and Basin and**

Range Province, U.S.A.

Author Sheridan, M F

Affiliation Arizona State Univ., Dep. Geol., Tempe, Ariz., United States (USA)

Source NATO Advanced Study Institutes Series. Series C: Mathematical and Physical Sciences, vol. 37, pp.81 -88, 1978

Publisher D. Reidel Publishing Company, Dordrecht-Boston, International (III)

Publication Year 1978

Publication Type Serial; Conference document; Analytic

Accession Number 1980-015321

151. **Database** GeoRef

Title **On the mechanisms of postsubsidence central doming and volcanism in resurgent cauldrons**

Author Bailey, R A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.8, no.5, Rocky Mountain Section 29th annual meeting, pp.567, Apr 1976

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1977-021127

152. **Database** GeoRef

Title **Volcanism, structure, and geochronology of *Long Valley* Caldera, Mono County, California**

Author Bailey, R A; Dalrymple, G B; Lanphere, M A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.725-744, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** caldera, a 17- by 32-km elliptical depression on the east front of the Sierra Nevada, formed 0.7 m.y. ago during eruption of the Bishop tuff. Subsequent intracaldera volcanism included eruption of (1) aphyric rhyolite 0.68-0.64 m.y. ago during resurgent doming of the caldera floor, (2) porphyritic hornblende -biotite rhyolite from centers peripheral to the resurgent dome at 0.5, 0.3, and 0.1 m.y. ago, and (3) porphyritic hornblende -biotite rhyodacite from outer ring fractures 0.2 m.y. ago to 50,000 yr ago, a sequence that apparently records progressive crystallization of a subjacent chemically zoned magma chamber. Holocene rhyolitic and phreatic eruptions suggest that residual magma was present in the chamber as recently as 450 yr ago. Intracaldera hydrothermal activity began at least 0.3 m.y. ago and was widespread in the caldera moat; it has since declined due to self-sealing of near -surface caldera sediments by zeolitization, argillization, and silicification and has become localized on recently reactivated north-west-trending Sierra Nevada frontal faults that tap hot water at depth.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031713

153. **Database** GeoRef

Title **A gravity study of *Long Valley***

Author Pakiser, Louis C

Author Rinehart, C D; Ross, D C

Source U. S. Geological Survey Professional Paper, Report: P 0385, pp.85 -89, 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Clastic and volcanic deposits of Cenozoic age, filling ***Long Valley*** to a depth of 12,000 feet, have a much

lower average density than crystalline rocks of surrounding mountains, and somewhat higher than the muds of Searles Lake basin. The gravity relief rivals great minimum anomalies found in basins between the Coast Ranges. The gravity map suggests a crescentic structural basin bounded on all sides by nearly vertical faults along which it subsided. A pronounced high near the center could represent a mass of dense rock within
the pre-Cenozoic bedrock, or a volcanic neck.

Publication Year 1964

Publication Type Serial; Report; Analytic

Accession Number 1964-005751

154. Database GeoRef

Title **Structural geology and volcanism of Owens *Valley* region, California; a geophysical study**

Author Pakiser, L C; Kane, M F; Jackson, W H

Source U. S. Geological Survey Professional Paper, Report: P 0438, 68 pp., 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Gravity and seismic measurements in Owens ***Valley***, ***Long Valley***, and Mono Basin, which are directly east of the Sierra Nevada, Calif., show these depressions to be downdropped blocks filled with thousands of feet of Cenozoic deposits. Magnetic measurements suggest locations of buried volcanic rocks. A theory relating volcanism to stress reduction associated with faulting is presented. ***Long Valley*** and Mono Basin are identified as volcano-tectonic depressions.

Publication Year 1964

Publication Type Serial; Report; Monographic

Accession Number 1964-013239

155. Database GeoRef

Title **Gravity, volcanism, and crustal deformation in *Long Valley*, California; Article 106**

Author Pakiser, L C

Source U. S. Geological Survey Professional Paper, Report: P 0424-B, pp.B250-B253, 1961

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract A large gravity low, flanked by steep gravity gradients, in the ***Long Valley*** area, can be explained by an ellipse-shaped subsided block, bounded on all sides by a vertical fault zone and the depression filled with 18,000 + or - 5000 ft. of low-density Cenozoic deposits. The structural feature may be a volcano-tectonic depression similar to Mono Basin, California.

Publication Year 1961

Publication Type Serial; Report; Analytic

Accession Number 1961-011933

TECTONICS BIBLIOGRAPHY

1. Database GeoRef

Title **Transtensional analyses of fault patterns and strain provinces of the Eastern California shear zone; Walker Lane on the eastern margin of the Sierra Nevada microplate, California and Nevada**

Author Taylor, Tatia R; Dewey, John F

Affiliation University of California, Davis, Davis, CA, United States (USA)

Affiliation University College Galway, United Kingdom (GBR)

Monograph Title Rise and fall of the Nevadaplano; Part II

Editor Ernst, W. Gary

Source International Geology Review, vol. 51, no. 9-11, pp.843-872, Nov 2009

Resource Location http://www.ingentaconnect.com/content/bell/

Publisher Winston & Son, Silver Spring, MD, United States (USA)

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2009-095028

2. Database GeoRef

Title **A general model for tectonic control of magmatism; examples from *Long Valley* Caldera (USA) and El Chichon (Mexico)**

Author Bursik, M

Affiliation State University of New York at Buffalo, Department of Geology, Buffalo, NY, United States (USA)

Source Geofisica Internacional, vol. 48, no. 1, pp.171-183, Mar 2009

Resource Location http://serpiente.dgsca.unam.mx/serv_hem/revistas/fisica/

Publisher Instituto de Geofisica, UNAM, Mexico, D.F., Mexico (MEX)

Abstract The relationship of volcanoes to regional tectonic setting and earthquake dynamics is intimate. We know that eruptions are often triggered by earthquakes, and that volcanoes generally lie along or near major faults or within faulted provinces. It has been generally found that bimodal basaltic-rhyolitic volcanism is associated with extensional settings, presumably because of the creation of accommodating space. For intermediate arc volcanoes, tectonic settings are generally compressional or transpressional. The spatial pattern of faulting indicates that ***Long Valley*** was focussed by a releasing bend in the transtensional, Sierran range-front fault system. The temporal pattern of offset rates suggests that the zone of greatest activity has migrated to the NW through time, and is now focussed at the Mono-Inyo Craters. The southern Mexican volcanic arc presents an example of the coexistence of regional compressional and transpressional structures with volcanoes. On an event basis, slip on regional structures creates opportunities for magma movement and eruption, in a type of dynamic fault pumping of fluids. Both kinematically and dynamically, volcanic activity may be completely dependent on tectonic factors for accumulation, storage and eruption of magma.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication Mexico (MEX)

Accession Number 2009-064699

3. Database GeoRef

Title **Caldera types and collapse styles**

Author Aguirre-Diaz, G J

Affiliation Universidad Nacional de Autonoma de Mexico, Centro de Geosciencias, Queretaro, Mexico (MEX)

Monograph Title AGU 2008 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 89, no. 53, Suppl., Abstract V11C-2068, Dec 2008

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2008

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2010-036148

4. Database GeoRef

Title **Lithospheric control on the initiation of the Yellowstone Hotspot; chronic reactivation of lithospheric scars**

Author Tikoff, Basil; Benford, B; Giorgis, S

Affiliation University of Wisconsin-Madison, Department of Geology and Geophysics, Madison, WI, United States (USA)

Affiliation State University of New York at Geneseo, United States (USA)

Monograph Title Lithospheric-scale transtension

Editor Dewey, John F.

Source International Geology Review, vol. 50, no. 3, pp.305-324, Mar 2008

Resource Location http://www.ingentaconnect.com/content/bell/

Publisher Winston & Son, Silver Spring, MD, United States (USA)

Abstract The Yellowstone hotspot is generally interpreted to have resulted from a mantle plume that initiated beneath the Idaho-Oregon-Nevada region at approximately 18 Ma. We explore an alternative model in which the initiation of Yellowstone magmatism is a result of lithospheric-scale processes -- transtensional reactivation of the western Idaho shear zone -- rather than a mantle plume. This model is based on both spatial and temporal correlations with deformation in the U.S. West. The first-order observation is that hotspot-related magmatism occurs as a linear N-S feature, which exploits the mantle portion of the inactive western Idaho shear zone and a deep crustal feature along the future Northern Nevada rift. The location for initiation of the McDermitt caldera, the interpreted initiation site of the Yellowstone hotspot, is spatially coincident with the southernmost known extent of the western Idaho shear zone in the lithospheric mantle. In contrast, the feeder zones of the voluminous magmatism of the Columbia River basalts intruded farther north, facilitated by the better-developed fabrics of the northern segment of the western Idaho shear zone. The timing of initial Yellowstone magmatism and Columbia River basalts is coincident with the coupling of western California and the North American plate to the Pacific plate. The kinematics of this coupling suggest oblique divergence and transtensional deformation. Previous numerical modeling of vertical fabrics in the lithospheric mantle show preferential reactivation by transtensional deformation. Thus, the mantle lithosphere rather than deeper portions of the mantle appears to exert a fundamental control on the initiation of the Yellowstone hotspot.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2008-111602

5. Database GeoRef

Title **Geological and hydrological history of the paleo-Owens River drainage since the late Miocene**

Author Phillips, Fred M

Affiliation New Mexico Institute of Mining and Technology, Department of Earth & Environmental Science, Socorro, NM, United States (USA)

Affiliation Smithsonian Institution, United States (USA)

Monograph Title Late Cenozoic drainage history of the southwestern Great Basin and lower Colorado River region; geologic and biotic perspectives

Editor Reheis, Marith C; Hershler, Robert; Miller, David M

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Special Paper - Geological Society of America, vol. 439, pp.115-150, 2008

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract From the late Miocene to the middle Pliocene, the current drainage basin of the Owens River probably consisted of a broad, moderate-elevation, low-relief plateau with radiating drainage toward the Pacific Ocean, the northwestern Great Basin (now Lahontan drainages), and the Mojave and Colorado drainages. This plateau probably contained shallow basins, created by an extensional pulse at 12-11 Ma, at the present locations of major valleys. Between 4 and 3 Ma, this plateau was disrupted by a rapid westward step of extensional Basin and Range Province tectonism, which reactivated the Miocene faults and resulted in a linear north-south ***valley*** (the Owens ***Valley***) with high mountain ranges on each side. This tectonic event resulted in geographic isolation and fragmentation of aquatic habitats and may have been a critical driver for speciation of aquatic organisms. Subsequent to this remarkable transformation of the landscape, the predominant influence on aquatic habitats has been very large, climate-driven fluctuations in the regional water balance that have resulted in the repeated interconnection and disconnection of the various basins that make up the paleo-Owens system. The magnitude of these fluctuations appears to have increased markedly since the early Pleistocene. Searles Lake has generally been the terminus of the Owens River, but at least once, probably at ca. 150 and/or ca. 70 ka, the system overflowed into Death ***Valley***. During the last interglacial (marine isotope stage 5) and the Holocene, Owens Lake has been the terminus, but apparently not frequently before. These very large fluctuations in the water balance undoubtedly produced large shifts in the nature and distribution of aquatic habitats over geologically short periods of time, as well as repeatedly creating and severing connections between various parts of the larger drainage basin. This dynamic hydrological system provided the setting, and no doubt much of the impetus, for speciation, extinction, and distribution of aquatic species within the paleo-Owens system, but any paleohydrological causes will have to be extracted from a complex history.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2008-111786

6. Database GeoRef

Title **Ground deformation of *Long Valley* Caldera and Mono Basin, eastern California, mapped by satellite radar interferometry**

Author Tizzani, P; Berardino, P; Casu, F; Euillades, P; Manzo, M; Ricciardi, G P; Zeni, G; Lanari, R

Affiliation National Research Council, Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Universita di Cagliari, Italy (ITA); Universidad Nac de Cuyo, Argentina (ARG); Universita della Basilicata, Italy (ITA); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Source International Journal of Remote Sensing, vol. 29, no. 1-2, pp.439-441, Jan 2008

Resource Location http://www.tandf.co.uk/journals/titles/01431161.asp

Publisher Taylor & Francis, London, United Kingdom (GBR)

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2009-073976

7. Database GeoRef

Title **Active geothermal systems and Pliocene and younger gold deposits of the Great Basin, USA; regional controls and selenium concentrations as a clue to ore environment**

Author Coolbaugh, Mark F; Arehart, Greg B; Faulds, James E; Vikre, Peter G; John, David A

Affiliation AuEx Ventures, Reno, NV, United States (USA)

Affiliation University of Nevada, Reno, United States (USA); Nevada Bureau of Mines and Geology, United States (USA); U. S. Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2007 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol. 39, no. 6, pp.197, Oct 2007

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Pliocene and younger Au deposits in the Great Basin, USA contain >10 Moz Au. Many of these deposits occur near active geothermal systems with >180 degrees C fluids, suggesting that subsurface Au deposition may be continuing today at some locations. The young Au deposits and geothermal systems can be classed as either magmatically heated or amagmatic depending on whether there is evidence of coeval silicic magmatism. The magmatically heated deposits and systems (e.g., ***Long Valley*** caldera, CA; Roosevelt, UT) are limited to the margins of the Great Basin whereas young amagmatic Au deposits (e.g., Sulphur (Crofoot- Lewis) and Florida Canyon, NV) and systems, currently producing >100 megawatts electricity, cluster in NW Nevada. Amagmatic epithermal Au deposits and electricity -producing amagmatic geothermal systems are scarce globally, and their abundance in NW NV is attributed to a combination of high heat flow and active transtensional ***tectonics***. The greatest concentration of such deposits/systems is found where strike-slip faulting of the Walker Lane splays outward into NE-striking extensional faults in the Great Basin interior. Individual deposits and systems formed in structurally complex zones that facilitate deep fluid circulation, such as en echelon step-overs in normal faults, pull-apart blocks, and boundaries between zones of opposite-dipping normal faults. In such environments, Au mineralization and geothermal fluid flow preferentially occur along structures oriented approximately orthogonal to the current crustal extension direction. Compared to magmatically heated systems, the amagmatic geothermal systems have lower fluid concentrations of As, Li, B, and Cs, lower 3He/4He ratios, and lower overall vertical temperature gradients. The related young Au deposits are of the shallow hot-springs type, with steam-heated advanced argillic alteration, adularia, marcasite, cinnabar, native sulfur, and high concentrations of Sb and As. Limited data indicates that some young amagmatic gold systems have high Se concentrations, similar to many Miocene epithermal Au deposits in NV. High ratios of Se/Ag suggest that, in contrast to the Miocene deposits, Ag minerals may not be the major host of Se. Differences in the level of exposure of the Pliocene vs. Miocene Au deposits may explain host mineral differences.

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-017975

8. Database GeoRef

Title **Exotic seismic sources; nearly identically repeating events and non-double-couple earthquakes**

Author Templeton, Dennise Christine

Pages 171

Publication Year 2007

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Berkeley, Berkeley, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2008-103584

9. Database GeoRef

Title **Temporal variations in slip rate of the White Mountain fault zone, eastern California**

Author Kirby, Eric; Burbank, Douglas W; Reheis, Marith; Phillips, Fred

Affiliation Pennsylvania State University, Department of Geosciences, University Park, PA, United States (USA)

Affiliation University of California at Santa Barbara, United States (USA); U. S. Geological Survey, United States (USA); New Mexico Institute of Mining and Technology, United States (USA)

Source Earth and Planetary Science Letters, vol. 248, no. 1-2, pp.168-185, 15 Aug 2006

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The evolution of fault slip through time may yield insight into the geodynamics of deforming lithosphere. Precise determination of temporal variations in fault slip is often hindered, however, by a dearth of markers of varying age from which to reconstruct fault slip. Here we determine slip rates across the White Mountain Fault Zone over the past ca. 0.8 Ma from displaced alluvial deposits preserved along the flank of the White Mountains. Displacement histories inferred from deposits containing the approximately 760 ka Bishop Tuff contrast strongly with those inferred from Late Pleistocene alluvial fans dated by cosmogenic (super 36) Cl, indicating that the fault has experienced significant temporal variations in slip rate. Oblique-slip rates over the past approximately 760 ky are determined to have been >0.9 m/ky parallel to a net slip vector plunging shallowly (<20 degrees) toward 340 degrees -350 degrees . Displacement of markers in Late Pleistocene alluvial deposits, in contrast, yield slip rates between 0.3 and 0.4 m/ky parallel to a vector plunging somewhat more steeply (20 degrees -40 degrees) toward 320 degrees -340 degrees . These variations in slip rate appear to have operated over timescales >ca. 70 ky, yet occurred on a well-established fault system. Moreover, the timing and magnitude of slip rate variation mimics behavior documented for the northern Fish Lake ***Valley*** fault zone. Together, our data provide evidence for coordinated slip rate variations across the Eastern California Shear Zone during the Pleistocene.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2008-016313

11. Database GeoRef

Title **Improving earthquake locations in Northern California using waveform based differential time measurements**

Author Waldhauser, Felix (investigator); Schaff, David (investigator)

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Corporate Author Lamont-Doherty Earth Observatory, Palisades, NY, United States, performer (USA)

Abstract We relocated the earthquake catalog of the Northern California Seismic Network (NCSN), using a recently computed comprehensive database of cross-correlation differential times for earthquakes between 1984-2003. The correlation data base includes approximately 3 billion P-and S-wave differential times that are calculated from pairs of waveforms recorded at common stations with cross correlation coefficients of 0.7 or greater, for events separated by less than 5 km. The cross-correlation data is combined with differential times computed from NCSN phase picks to relocate the hypocenters with the double-difference algorithm. All event pairs with at least 6 pair-wise observed phases are relocated (311,273 events). The relocated catalog has a root mean square (RMS) of the weighted pick based differential-time residuals of 0.017 s, compared to 0.124 s before relocation. The weighted RMS of the cross-correlation data is 0.004 s after relocation. Location precisions range from tens to hundreds of meter. The double-difference locations reveal a focused view of the complex distribution of seismicity in northern California. Discrete faults are imaged with unprecedented detail in tectonic regions as diverse as the San Andreas Fault system (SAF), the Mendocino Triple Junction (MTJ), the ***Long Valley*** Caldera (LVC), and the region of induced earthquakes at the Geysers Geothermal Field (GGF). We find that 90% of the earthquakes have correlated P- and S-wave trains at common stations. The occurrence of correlated earthquakes is widespread across northern California with some of the highest concentrations being observed along the transform faults within the SAF system, in the LVC region, at the GGF, and at the MTJ, indicating the general applicability of these methods to improve hypocenter locations. Using repeating earthquakes we find that, at the 95% confidence level, network locations are mislocated on average by 0.7 km horizontally, and 2 km vertically. This study shows that consistent ***long***-term seismic monitoring practices and data archiving policies, as is the case at the Northern California Seismic Network, are key to improve catalogued hypocenters obtained from standard single- event location methods using phase picks, and to determine accurate location of future events within the framework of earthquake monitoring.

Pages 10

Publication Year 2006

Publication Type Report; Monographic

Country of Publication United States (USA)

Accession Number 2008-109508

12. Database GeoRef

Title **Hydrothermal fault zone mapping using seismic and electrical measurements**

Author Onacha, Stephen Alumasa

Pages 226

Publication Year 2006

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Duke University, Durham, NC, United States (USA)

Country of Publication United States (USA)

Accession Number 2008-109644

13. Database GeoRef

Title **Non-double-couple earthquakes in the *Long Valley* volcanic region**

Author Templeton, Dennise C; Dreger, Douglas S

Affiliation University of California at Berkeley, Berkeley Seismological Laboratory, Berkeley, CA, United States (USA)

Source Bulletin of the Seismological Society of America, vol.96, no.1, pp.69-79, Feb 2006

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract To better understand the connection between earthquake production and geothermal/magmatic systems, we studied the extent of fluid-influenced faulting in the ***Long Valley*** volcanic region. We focused on a 100-km-wide circular area centered at the ***Long Valley*** caldera that also encompassed the Mono-Inyo Craters to the north and the Sierra Nevada Mountain block to the south. We performed a comprehensive search for events greater than M 3.5 since 1993 with significant coseismic volume changes in their source region. Using three-component broadband digital waveforms at regional distances, we solved for four different source models:

double couple (DC), deviatoric DC + isotropic, and full moment tensor. Using the F-test as a statistical aid, we determined which of the four models was most appropriate for each event. We then conducted stability tests to determine the robustness of the focal mechanism solutions and isotropic components. Our results show that fluid-influenced earthquakes in the magnitude range studied are quite rare in the ***Long Valley*** volcanic region. Of 33 high-quality events, 28 are best characterized by a simple DC source model, 4 by a DC + isotropic source model, and 1 by a full moment tensor model.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-030986

14. Database GeoRef

Title **Quartz microstructures in nature and experiment; evidence of rapid plastic deformation and subsequent annealing**

Author Trepmann, Claudia A; Stoeckhert, Bernhard; Dorner, Dorothee; Kuester, Martina; Roeller, Klaus

Affiliation Ruhr-Universitaet Bochum, Institut fuer Geologie, Mineralogie und Geophysik, Bochum, Federal Republic of Germany (DEU)

Affiliation Max-Planck-Institut fuer Eisenforschung, Federal Republic of Germany (DEU)

Monograph Title 11. Symposium "Tektonik, Struktur- und Kristallingeologie"; Zusammenfassungen der Tagungsbeitraege. 11th symposium on ***Tectonics*** , structural geology and crystallography; abstracts of the conference proceedings

Editor Philipp, Sonja L; Leiss, Bernd; Vollbrecht, Axel; Tanner, David C; Gudmundsson, Agust

Affiliation Universitaet Goettingen, Geowissenschaftliches Zentrum, Gottingen, Federal Republic of Germany (DEU)

Source Symposium "Tektonik, Struktur- und Kristallingeologie", vol.11, pp.232-233, 2006

Publisher [publisher varies], [varies], International (III)

Publication Year 2006

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2007-016489

15. Database GeoRef

Title **Unrest in *Long Valley* Caldera, California, 1978-2004**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University College London, United Kingdom (GBR)

Monograph Title Mechanisms of activity and unrest at large calderas

Editor Troise, Claudia; De Natale, Giuseppe; Kilburn, Christopher R J

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, ITA, (Italy)

Source Geological Society Special Publications, vol.269, pp.1-24, 2006

Publisher Geological Society of London, London, United Kingdom (GBR)

Abstract ***Long Valley*** Caldera and the Mono-Inyo Domes volcanic field in eastern California lie in a left-stepping offset along the eastern escarpment of the Sierra Nevada, at the northern end of the Owens ***Valley*** and the western margin of the Basin and Range Province. Over the last 4 Ma, this volcanic field has produced multiple volcanic eruptions, including the caldera-forming eruption at 760 000 a BP and the recent Mono-Inyo Domes eruptions 500-660 a BP and 250 a BP. Beginning in the late 1970s, the caldera entered a sustained period of unrest that persisted through the end of the century without culminating in an eruption. The unrest has included recurring earthquake swarms; tumescence of the resurgent dome by nearly 80 cm; the onset of diffuse magmatic carbon dioxide emissions around the flanks of Mammoth Mountain on the southwest margin of the caldera; and other indicators of magma transport at mid- to upper-crustal depths. Although we have made substantial progress in understanding the processes driving this unrest, many key questions remain, including the distribution, size, and relation between magma bodies within the mid-to-upper crust beneath the caldera. Mammoth Mountain, and the Inyo Mono volcanic chain, and how these magma bodies are connected to the roots of the magmatic system in the lower crust or upper mantle.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-040462

16. Database GeoRef

Title **Waveform cross-correlation-based differential travel-time measurements at the Northern California seismic network**

Author Schaff, David P; Waldhauser, Felix

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Source Bulletin of the Seismological Society of America, vol.95, no.6, pp.2446-2461, Dec 2005

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract We processed the complete digital seismogram database for northern California to measure accurate differential travel times for correlated earthquakes observed at common stations. Correlated earthquakes are earthquakes that occur within a few kilometers of one another and have similar focal mechanisms, thus generating similar waveforms, allowing measurements to be made via cross-correlation analysis. The waveform database was obtained from the Northern California Earthquake Data Center and includes about 15 million seismograms from 225,000 local earthquakes between 1984 and 2003. A total of 26 billion cross-correlation measurements were performed on a 32-node (64 processor) Linux cluster, using improved analysis tools. All event pairs with separation distances of 5 km or less were processed at all stations that recorded the pair. We computed a total of about 1.7 billion P-wave differential times from pairs of waveforms that had cross-correlation coefficients (CC) of 0.6 or larger. The P-wave differential times are often on the order of a factor of ten to a hundred times more accurate than those obtained from routinely picked phase onsets. 1.2 billion S-wave differential times were measured with CC> or =0.6, a phase not routinely picked at the Northern California Seismic Network because of the noise level of remaining P coda. We found that approximately 95% of the seismicity includes events that have cross-correlation coefficients of CC> or =0.7 with at least one other event recorded at four or more stations. At some stations more than 40% of the recorded events are similar at the CC> or =0.9 level, indicating the potential existence of large numbers of repeating earthquakes. Large numbers of correlated events occur in different tectonic regions, including the San Andreas Fault, ***Long Valley*** caldera, Geysers geothermal field and Mendocino triple junction. Future research using these data may substantially improve earthquake locations and add insight into the velocity structure in the crust.

Publication Year 2005

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-019262

19. Database GeoRef

Title **Overview of recent seismicity in the western Great Basin and Walker Lane region**

Author Smith, K D

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Monograph Title SSA 2005; abstracts of the annual meeting

Author Anderson, John G (chairperson); von Seggern, David (chairperson)

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Source Seismological Research Letters, vol. 76, no. 2, pp.244, Apr 2005

Resource Location http://www.seismosoc.org/publications/srl.html

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034686

20. Database GeoRef

Title **The Idaho-Nevada-California refraction experiment; developing a central Walker Lane and Sierra Nevada crustal model**

Author Heimgartner, M; Scott, J B; Thelen, W A.; Louie, J N; Miller, P

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Affiliation New Mexico Institute of Mining and Technology, United States (USA)

Monograph Title SSA 2005; abstracts of the annual meeting

Author Anderson, John G (chairperson); von Seggern, David (chairperson)

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Source Seismological Research Letters, vol. 76, no. 2, pp.250, Apr 2005

Resource Location http://www.seismosoc.org/publications/srl.html

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034716

21. Database GeoRef

Title **Volcanic geology, volcanology and natural resources of the *Long Valley* Caldera, California**

Author Hill, Dave (leader); Farrar, Chris (leader); Lipshie, Steve (leader); Steininger, Roger (leader); Sullivan, Bob (leader); Harmon, Richard (leader)

Affiliation U. S. Geological Survey, USA, (United States)

Source Special Publication - Geological Society of Nevada, vol.41, 213 pp., 4 sheets, 2005

Publisher Geological Society of Nevada, [Reno, NV], United States (USA)

Pages 213, 4 sheets

Publication Year 2005

Publication Type Serial; Map; Monographic

Country of Publication United States (USA)

Accession Number 2006-084936

22. Database GeoRef

Title **Integrated gravity and magnetic interpretations yield new insights to Basin and Range structures**

Author Lisle, G L

Affiliation Lisle Gravity, Denver, CO, United States (USA)

Monograph Title AAPG Rocky Mountain Section, abstracts

Author George, Lyn (chairperson)

Source Abstracts - AAPG Meeting, Rocky Mountain Section, vol.2005, unpaginated, 2005

Resource Location http://www.searchanddiscovery.net/documents/abstracts/2005rocky/RMlis.htm

Publisher American Association of Petroleum Geologists, Rocky Mountain Section, Tulsa, OK, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-009105

23. Database GeoRef

Title **Geothermal energy; Canada, Mexico and the United States**

Author Renner, Joel L

Affiliation Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID, United States (USA)

Monograph Title AAPG 2005 annual convention; abstracts volume

Author Anonymous

Source Abstracts: Annual Meeting - American Association of Petroleum Geologists, vol. 14, pp.A116, 2005

Publisher American Association of Petroleum Geologists and Society for Sedimentary Geology, Tulsa, OK, United States (USA)

Abstract World-wide, geothermal resources are most commonly associated with volcanic arcs (Indonesia, Japan, and Philippines) spreading centers (Salton Trough and East African Rift) and with hot spots (Hawaii, Iceland, Yellowstone). Near the margins of the Basin and Range in the U. S. geothermal activity is commonly associated with young Volcanism (***Long Valley*** and Coso volcanic fields). Additional production is associated with deep fluid circulation in the Basin and Range thought to be localized by recent faulting and the higher than average crustal heat flow in much of the Basin and Range. Geothermal energy is an important energy resource in
Mexico and the western United States. Commission Federal de Electricidad produces electricity at Cerro Prieto (just south of Imperial ***Valley***, California), Los Azufres and Tres Virgenes. In the U. S. about 2020 MWe of electrical generation capacity is on-line in California (7 fields), Hawaii (1 field), Nevada (9 fields) and Utah (2 fields). At Meager Creek, British Columbia an electrical generation project is under development. In general, fluids with temperatures of greater than 150 degrees C are used to produce electricity, and above 30 degrees C are used for direct applications such as space heating, crop drying, aquaculture, etc. The U. S. Geological Survey has identified about 23,000 MWe of hydrothermal resources capable of electrical production in the U. S. Mexico is actively exploring for additional production in Baja California and the Central Mexico Volcanic Belt. Canadian activity is currently focused on Meager Mountain, British Columbia.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-055691

24. Database GeoRef

Title **Deep borehole receiver functions in *Long Valley* Caldera, California**

Author Chavarria, J; Julia, J; Malin, P

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract S13B-1043, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034473

27. Database GeoRef

Title **Non-double-couple microearthquakes at *Long Valley* Caldera, California, provide evidence for hydraulic fracturing**

Author Foulger, G R; Julian, B R; Hill, D P; Pitt, A M; Malin, P E; Shalev, E **Affiliation** U.
S. Geological Survey, Menlo Park, CA, United States (USA) **Affiliation** Duke University,
United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.132, no.1, pp.45-71, 15 Apr 2004

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Most of 26 small (0.4< or =M< or =3.1) microearthquakes at ***Long Valley*** caldera in mid-1997, analyzed using data from a dense temporary network of 69 digital three-component seismometers, have significantly non-double-couple focal mechanisms, inconsistent with simple shear faulting. We determined their mechanisms by inverting P- and S-wave polarities and amplitude ratios using linear-programming methods, and tracing rays through a three-dimensional Earth model derived using tomography. More than
80% of the mechanisms have positive (volume increase) isotropic components and most have compensated linear-vector dipole components with outward-directed major dipoles. The simplest interpretation of these mechanisms is combined shear and extensional faulting with a volume-compensating process, such as rapid flow of water, steam, or CO (sub 2) into opening tensile cracks. Source orientations of earthquakes in the south moat suggest extensional faulting on ESE-striking subvertical planes, an orientation consistent with planes defined by earthquake hypocenters. The focal mechanisms show that clearly defined hypocentral planes in different locations result from different source processes. One such plane in the eastern south moat is consistent with extensional faulting, while one near Casa Diablo Hot Springs reflects en echelon right-lateral shear faulting. Source orientations at Mammoth Mountain vary systematically with location, indicating that the volcano influences the local stress field. Events in a "spasmodic burst" at Mammoth Mountain have practically identical mechanisms that indicate nearly pure compensated tensile failure and high fluid mobility. Five earthquakes had mechanisms involving small volume decreases, but these may not be significant. No mechanisms have volumetric moment fractions larger than that of a force dipole, but the reason for this fact is unknown.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-076504

29. Database GeoRef

Title **Transport of injected isobutane by thermal groundwater in *Long Valley* Caldera, California, USA**

Author Evans, W C; Lorenson, T D; Sorey, M L; Bergfeld, D

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title Proceedings of the Eleventh international symposium on Water-rock interaction

Editor Wanty, Richard B; Seal, Robert R , II

Affiliation U. S. Geological Survey, Denver, CO, United States (USA)

Source Proceedings - International Symposium on Water-Rock Interaction, vol. 11, pp.125-129, 2004

Publisher International Association of Geochemistry and Cosmochemistry and Alberta Research Council, Sub-Group on Water-Rock Interaction, Toronto, ON, International (III)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication International (III)

Accession Number 2007-026949

30. Database GeoRef

Title **Episodic deformation and related phase separation in an active hydrothermal system**

Author Kuester, Martina; Stoeckhert, Bernhard; Roeller, Klaus; Fischer, Miriam; McConnell, Vicki Sue

Affiliation Ruhr-Universitaet Bochum, Institute of Geology, Mineralogy and Geophysics, Bochum, Federal Republic of Germany (DEU)

Affiliation GeoForschungsZentrum Potsdam, Federal Republic of Germany (DEU); Department of Geology and Mineral Industries, United States (USA)

Monograph Title ***Tectonics*** on human time scales

Editor Stoeckhert, Bernhard; Dresen, Georg

Affiliation Ruhr-Universitaet Bochum, Institut fuer Geologie, Mineralogie und Geophysik, Bochum, Federal Republic of Germany (DEU)

Source Bochumer Geowissenschaftliche Arbeiten, vol. 3, pp.174, 2004

Publisher Institut fuer Geologie, Mineralogie und Geophysik der Ruhr-Universitaet Bochum, Bochum, Federal Republic of Germany (DEU)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication Federal Republic of Germany (DEU)

Accession Number 2009-032910

31. Database GeoRef

Title **Applying massive waveform cross correlation and double-difference location to Northern California and China**

Author Schaff, David P; Waldhauser, Felix; Richards, Paul G

Affiliation Lamont-Doherty Earth Observatory, Palisades, NY, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.84, no.46, Suppl., Abstract S21D-0328, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-093488

32. Database GeoRef

Title **Seismic character of an active silicic volcanic system; *Long Valley* Caldera, California**

Author John, Barbara E; Fountain, David M

Affiliation University of Wyoming, Department of Geology and Geophysics, Laramie, WY, United States (USA)

Affiliation NSF, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52B-0441, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005227

33. Database GeoRef

Title **Distributed source model for deformation caused by magma reservoirs**

Author Mann, Doerte; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52E-06, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005248

34. Database GeoRef

Title **Towards a 4D viscoelastic model for deformation of the *Long Valley* Caldera 1997 inflation episode**

Author Newman, Andrew V; Dixon, Timothy H; Gourmelen, Noel

Affiliation Los Alamos National Laboratory, Earth and Environmental Sciences, Los Alamos, NM, United States (USA)

Affiliation University of Miami, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52E-08, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005250

35. Database GeoRef

Title **Transtensional fault patterns of the Walker Lane-Eastern California shear zone, eastern margin, Sierra Nevada microplate**

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Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.346-347, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Transtension is the primary structural mechanism governing active deformation at the eastern margin of the Sierra Nevada Microplate. Analysis of this corridor clarifies the role of transtensional kinematics in the formation of discrete, seemingly heterogeneous, structural provinces within the Walker Lane-Eastern California Shear Zone (WL-ECSZ). Fault types and patterns are determined by the dominance of the coaxial vs. noncoaxial component of strain, derived from the geometry of the deformation zone boundary (zb, eastern Sierra) and transport direction (TD, of the Microplate). Rotation and associated size reduction of fault blocks in transtension explains the observed westward encroachment of deformation in the eastern Sierra. The map-view instantaneous strain patterns predicted are demonstrated from N-S by the observed active normal and wrench fault arrays. The Honey Lake-Pyramid Lake domain has zb striking 310 degrees to 330 degrees , and TD of approximately 298 degrees , indicating noncoaxial strain dominance (Honey Lake, Warm Springs Faults), transitioning to coaxial dominance (Pyramid Lake, normal faults to the west). The Lake Tahoe region is coaxially dominated, as indicated by zb approximately 341 degrees and TD of 303 degrees . Predicted structures correspond to the Genoa, Donner Pass, and other mapped and inferred faults. The Mono Lake-***Long Valley*** province has zb 330 degrees and TD approximately 308 degrees , indicating a coaxially dominated system that corresponds to numerous normal faults across both basins, at their margins, and along the Sierran rangefront. The Owens ***Valley***-Fish Lake ***Valley*** region has zb oriented 344 degrees and TD varies 310 degrees to 314 degrees from N-S, respectively. Faulting north of Bishop is dominantly coaxial, whereas faulting in the central and southern regions is dominantly noncoaxial as indicated by the change in TD. In Coso-China Lake, zb is oriented 344 degrees and TD is 316 degrees , indicating a dominantly coaxial system with predicted structures similar to observed faults (Wild Horse Mesa, Coso Wash, Airport Lake, Little Lake). Active fault patterns in these distinct provinces present a snapshot of instantaneous transtensional strain. Local partitioning, in response to zone boundary variation by the inherent shape of the Sierra Nevada and systematic rotation of its transport direction, explains the variation in dominant structural deformational styles along the length of the WL-ECSZ.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-040854

36. Database GeoRef

Title **Hydrothermal discharge from volcanic areas in the Western United States**

Author Ingebritsen, S E; Mariner, R H; Evans, W C; Hurwitz, S; Schmidt, M E **Affiliation** U. S. Geological Survey, Menlo Park, CA, United States (USA) **Affiliation** Oregon State University, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.487, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Except in the MOR environment, voluminous, high-temperature hydrothermal discharge is commonly associated with silicic volcanism and a shallow regional water table (e.g. Yellowstone, Kamchatka, Taupo volcanic zone). In the Western U.S., hydrothermal heat discharge ranges up to 6 GW (Yellowstone) and values in the 100 MW range are not uncommon (***Long Valley***, Lassen, Austin Hot Springs). Such large heat discharges likely imply mining of magmatic heat and, as pointed out by Clive Lister (1974), may require active fluid circulation near or within recently crystallized magma. The average hydrothermal heat discharge from some silicic magmatic systems is fairly constant on a multidecadal scale. For instance, measurements at Yellowstone and Lassen suggest relatively steady heat discharge since the early 20th century. Large seasonal variations observed at some localities over the past 30 years are due mainly to interaction with the shallow, cold hydrologic system. Mining of heat from subaerial deposits (Katmai, Loowit Hot Springs at Mt. St. Helens) can temporarily generate comparably large (100s of MW) values of hydrothermal discharge, but pronounced declines in heat output are observed on decadal scales. Relative to silicic systems, focused basaltic magmatism can provide similarly large heat inputs (e.g. 5-6 GW at Kilauea), but depth to water table tends to be greater in basaltic terranes, and hydrothermal discharge tends to be weaker and less conspicuous (e.g. a maximum of approximately 1 GW of subaerial hydrothermal discharge at Kilauea, mainly as low-temperature, dilute discharge near the coast). Andesitic arcs worldwide exhibit a range of length- normalized hydrothermal - discharge rates. The most important factors controlling hydrothermal discharge may be the rate of magmatic heat input and depth to water table. In the central Oregon Cascade Range, perhaps the most active part of a relatively "weak" andesitic arc (intrusion rate approximately 9-50 cubic km/m.y./km arc length), hydrothermal discharge (approximately 2 MW/km arc length) is relatively hot and visible west of the arc, where the water table is shallow, and relatively cool, dilute, and inconspicuous east of the arc, where the water table is deep. Current length-normalized rates of hydrothermal heat discharge from the Cascade arc are approximately 10 times lower than those in the Taupo volcanic zone, an arc segment analogous to the more- silicic Miocene Cascades.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-039274

37. Database GeoRef

Title **Water-level changes induced by local and distant earthquakes at *Long Valley* Caldera, California**

Author Roeloffs, Evelyn; Sneed, Michelle; Galloway, Devin L; Sorey, Michael L; Farrar, Christopher D; Howle, James F; Hughes, Jennifer

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Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.269-303, 15 Oct 2003

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Distant as well as local earthquakes have induced groundwater-level changes persisting for days to weeks at ***Long Valley*** caldera, California. Four wells open to formations as deep as 300 m have responded to 16 earthquakes, and responses to two earthquakes in the 3-km-deep ***Long Valley*** Exploratory Well (LVEW) show that these changes are not limited to weathered or unconsolidated near-surface rocks. All five wells exhibit water-level variations in response to earth tides, indicating they can be used as low-resolution strainmeters. Earthquakes induce gradual water-level changes that increase in amplitude for as ***long*** as 30 days, then return more slowly to pre-earthquake levels. The gradual water-level changes are always drops at wells LKT, LVEW, and CH-10B, and always rises at well CW-3. At a dilatometer just outside the caldera, earthquake-induced strain responses consist of either a step followed by a contractional strain-rate increase, or a transient contractional signal that reaches a maximum in about seven days and then returns toward the pre-earthquake value. The sizes of the gradual water-level changes generally increase with earthquake magnitude and decrease with hypocentral distance. Local earthquakes in ***Long Valley*** produce coseismic water-level steps; otherwise the responses to local earthquakes and distant earthquakes are indistinguishable. In particular, water-level and strain changes in ***Long Valley*** following the 1992 M7.3 Landers earthquake, 450 km distant, closely resemble those initiated by a M4.9 local earthquake on November 22, 1997, during a seismic swarm with features indicative of fluid involvement. At the LKT well, many of the response time histories are identical for 20 days after each earthquake, and can be matched by a theoretical solution giving the pore pressure as a function of time due to diffusion of a nearby, instantaneous, pressure drop. Such pressure drops could be produced by accelerated inflation of the resurgent dome by amounts too small to be detected by the two-color electronic distance-measuring network.
Opening-mode displacement in the south moat, inferred to have followed a M4.9 earthquake on November 22, 1997, could also create extensional strain on the dome and lead to water-level changes similar to those following dome inflation. Contractional strain that could account for earthquake-induced water-level rises at the CW-3 well is inconsistent with geodetic observations. We instead attribute these water-level rises to diffusion of elevated fluid pressure localized in the south moat thermal aquifer. For hydraulic diffusivities appropriate to the upper few hundred meters at ***Long Valley***, an influx of material at temperatures of 300 degrees C can thermally generate pressure of 6 m of water or more, an order of magnitude larger than needed to account for the CW-3 water-level rises. If magma or hot aqueous fluid rises to within 1 km of the surface in the eastern part of the south moat, then hydraulic diffusivities are high enough to allow fluid pressure to propagate to CW-3 on the time scale observed. The data indicate that seismic waves from large distant earthquakes can stimulate upward movement of fluid in the hydrothermal system at ***Long Valley***.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016381

38. Database GeoRef

Title **Deformation near the Casa Diablo geothermal well field and related processes *Long Valley* Caldera, Eastern California, 1993-2000**

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Monograph Title Crustal unrest in ***Long Valley*** Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling

Editor Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.365-390, 15 Oct 2003

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Regional first-order leveling lines, which extend from Lee Vining, CA, to Tom's Place, CA, have been surveyed periodically since 1957 by the U.S. Geological Survey (USGS), the National Geodetic Survey (NGS), and Caltrans. Two of the regional survey lines, or leveling networks, intersect at the Casa Diablo geothermal well field. These leveling networks, referenced to a distant bench mark (C916) near Lee Vining, provide time-series vertical control data of land-surface deformation that began around 1980. These data are also useful for delineating localized subsidence at Casa Diablo related to reservoir pressure and temperature changes owing to geothermal development that began in 1985. A comparison of differences in bench-mark elevations for five time periods between

1983 and 1997 shows the development and expansion of a subsidence bowl at Casa Diablo. The subsidence coincides spatially with the geothermal well field and temporally with the increased production rates and the deepening of injection wells in 1991, which resulted in an increase in the rate of pressure decline. The subsidence, superimposed on a broad area of uplift, totaled about 310 mm by 1997. The USGS established orthogonal tilt arrays in 1983 to better monitor deformation across the caldera. One tilt array (DBR) was established near what would later become the Casa Diablo geothermal well field. This array responded to magmatic intrusions prior to geothermal development, tilting away from the well field. With the start of geothermal fluid extraction in 1985, tilt at the DBR array reversed direction and began tilting into the well field. In 1991, geothermal power production was increased by a factor of four, and reservoir pressures began a period of steep decline. These changes caused a temporary three-fold increase in the tilt rate. The tilt rate became stable in 1993 and was about 40% lower than that measured in 1991-1992, but still greater than the rates measured during 1985-1990. Data from the local leveling networks spanning the well field and the bounding graben were analyzed for several 2-year periods (1993-1995, 1995-1997, and 1997-1999). Annual rates of change across the normal faults bounding the graben have steadily decreased for each 2-year period between 1993 and 1999, reflecting the slowing decline in geothermal reservoir pressure. Horizontal control data from a two-color electronic distance meter (EDM) defined the lateral extent of subsidence at Casa Diablo. The EDM and leveling data elucidate the localized effect of the shallow source of subsidence and the broader effect of the deeper magmatic inflation source. Data from bench marks common to both the vertical and the horizontal control networks were used to assess the effect of subsidence on the EDM base station (CASA). Modeling of geodetic data collected during periods of little or no magmatic inflation indicated that the CASA two-color EDM station is being drawn toward the well field at a rate of 3-5 mm/yr.

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2005-016385

39. Database GeoRef

Title **A volcanotectonic cascade; activation of range front faulting and eruptions by dike intrusion, Mono Basin-*Long Valley* Caldera, California**

Author Bursik, M; Renshaw, C; McCalpin, J; Berry, M

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Source Journal of Geophysical Research, vol.108, no.B8, 14 pp., 10 Aug 2003

Resource Location http://www.agu.org/journals/jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 14

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-012144

40. Database GeoRef

Title **Effect of stress fields of magma chamber stability and the formation of collapse calderas**

Author Bosworth, William; Burke, Kevin; Strecker, Manfred

Affiliation Marathon International Petroleum, London, United Kingdom (GBR)

Affiliation Univeristy of Houston, United States (USA); Universitaet Potsdam, Federal Republic of Germany (DEU)

Source Tectonics, vol.22, no.4, 21 pp., Aug 2003

Resource Location http://www.agu.org/journals/tc/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 21

Publication Year 2003

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2005-071075

41. Database GeoRef

Title **Quaternary exhumation rate central Panamint Range, California from U-Pb zircon ages**

Author Vogel, Marilyn Browning; Jayko, Angela S; Wooden, Joseph L; Smith, R S U

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2002 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.249, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Seven samples from four tuffaceous layers ranging from 5 cm to 3 m thick were collected from an 180 m alluvial section near Ballarat and dated using the SHRIMP-RG. The alluvial section underlies a late Pleistocene abrasion surface and is faulted at its base near the Panamint Range front where it apparently both structurally overlies and is truncated by one of the major range bounding faults along an east step in the Panamint fault zone. One sample collected in the lower part of the alluvial section contains abundant Pleistocene zircons ranging in age from 0.6 to 1.1 Ma with a statistically significant weighted mean age of 0.9 Ma. These ages overlap with the ***Long Valley*** magmatic events and provide a minimum age for the deposition for the section. They also could reflect contribution from tephra units such as Upper Glass Mountain tuffs. A minimum ***long*** term vertical slip rate of approximately 0.345 mm/yr for the Panamint ***Valley*** fault zone can be estimated from the separation of dated horizons in the alluvial section and previous work on 36Cl dating of salt horizons from nearby core (Jannik and others, 1991). Detrital zircon populations indicate that tuffs interbedded in alluvial deposits in Panamint ***Valley*** are Pleistocene age and include reworked clasts from Precambrian basement, Mesozoic plutons, and Tertiary volcanics. The majority of zircons appear to be mixture of reworked sediment derived from approximately 1.3 Ga

Precambrian basement rocks, plutons from the Panamints ranging in age between approximately 154 and 80 Ma, Miocene and Pleistocene volcanic sources. Some samples include smaller sub-populations of Permian and Triassic aged zircons. Zircons of Miocene age range from approximately 6 to 35 Ma and may have been derived from units such as the Immigrant Canyon Tuff, approximately 8 Ma and the Coso Ash, approximately 6 Ma. Extensive Tertiary volcanics in the southern Panamints could also be a source, however Tertiary volcanics are not present in the watersheds that presently feed this alluvial deposit suggesting material has been denuded from the range. Preliminary results suggest an inverse age relation of reworked Tertiary zircons within the stratigraphic section, with younger tuffs in the alluvial section dominated by older reworked Tertiary zircons.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-057031

42. Database GeoRef

Title **Is *Long Valley* Caldera part of the Eastern California shear zone? Some answers from hyperspectral imaging**

Author Martini, Brigette A; Silver, Eli A

Affiliation University of California at Santa Cruz, Earth Science Department, Santa Cruz, CA, United States (USA)

Monograph Title Geological Society of America, 2002 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.512, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** Caldera sits on the western edge of Basin and Range extensional deformation and the eastern edge of the Sierra Nevada. We suggest that ***Long Valley*** is accumulating strain imposed on it from the Eastern California Shear Zone (ECSZ). Recent hyperspectral-based mineral mapping in the caldera confirms the presence of a set of contentious NE-trending faults in the western caldera; Suemnicht and Varga's Discovery Fault Zone. The presence of these faults is consistent with right-lateral shear imposed by the Eastern California Shear Zone of Dokka and Travis, 1990a. Resurgent dome normal faults may also be accommodating some of this right lateral shear. Conflict between geologic and gps/strain determined slip rates in the region could be resolved by allowing the crust of ***Long Valley*** to accumulate some of the regional 11+1 mm/yr measured slip. Northward propagation of the ECSZ into this latitude roughly coincides with the inception of widespread volcanic activity in this region (approximately 3 Ma). We suggest that ECSZ strain localizes along northwest trending normal faults (Hilton Creek Fault, Hartley Springs Fault, Resurgent Dome Faults). Such faults now experience right lateral offset in addition to normal movement from Basin and Range imposed deformation. In addition, several reactivated NE-trending faults act as zones of strain transfer across the caldera from east to west. These mapped fault patterns are consistent with those seen farther south along the ECSZ, and help to explain the origin of this massive caldera.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-013275

43. Database GeoRef

Title **Very-*long*-period volcanic earthquakes beneath Mammoth Mountain, California**

Author Hill, David P; Dawson, Phillip B; Johnston, Malcolm J S; Pitt, A M; Biasi, Glenn P; Smith, Kenneth

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation University of Nevada, United States (USA)

Source Geophysical Research Letters, vol.29, no.10, 4 pp., 15 May 2002

Resource Location http://www.agu.org/journals/gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Pages 4

Publication Year 2002

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2003-024091

44. Database GeoRef

Title **Post-3Ma deformation along the Sierra Nevada-Basin and Range transition zone near Reno, Nevada**

Author Cashman, Patricia H; Trexler, J H; Perkins, Michael E; Kelly, T S

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Affiliation University of Utah, United States (USA); Natural History Museum of Los Angeles County, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 98th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.5, pp.100, Apr 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Exhumation and faulting of Neogene sedimentary rocks records the deformation history of the Sierra Nevada-Basin and Range transition zone near Reno, NV in the last 3 Ma. Tephras and mammal fossils high in the Neogene Verdi basin section constrain the timing of the deformation. Deposition in the Verdi basin was terminated by tectonism that produced dramatic down-cutting, an abrupt shift in paleocurrent direction, and unroofing of crystalline source rocks. This uplift/arroyo-cutting event was followed by eastward tilting and broad synclinal folding of both the Neogene section and the coarse clastic arroyo fill. Some faulting within the section accompanied tilting, but most appears to have post-dated the tilting event. Several fault sets cut the tilted Neogene section. The dominant ones are: NW-striking dextral faults, NE-striking sinistral faults, and N-striking normal or normal-dextral oblique faults. Strike-slip faults with m- to 10m-scale offset are broadly distributed; those with the largest slip are most commonly dextral faults. Mutually cross-cutting relationships between the strike-slip fault sets are observed locally. Several NNE-striking faults with 10s to
100s of m of down-to-the-east offset repeat the Neogene section and appear to be some of the most recent structures in the area. The distributed strike-slip faulting in the Verdi basin is anomalous for post-depositional deformation of Neogene basins along the eastern boundary of the Sierra in northern Nevada. In the Gardnerville basin to the south and ***Long Valley*** basin to the north, the sedimentary section is preserved in a west-tilted half-graben and internal deformation is normal faulting. The pre-3 Ma record is also unlike its neighbors--the Verdi basin records a relatively stable depocenter with little active tectonism from 11 to 3 Ma.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-023901

45. Database GeoRef

Title **Active tectonism since 8 Ma in the Sierra Nevada- Basin and Range transition zone, Lassen County, California**

Author TenBrink, Andrew L; Cashman, Patricia H; Trexler, James H; John, Louie; Shane, Smith

Affiliation University of Nevada at Reno, Department of Geological Sciences, Reno, NV, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 98th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.5, pp.100, Apr 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Late Miocene fluvial, fluvial-deltaic, and lacustrine sediments of the Hallelujah Formation record the depositional and deformational history in the ***Long Valley***, CA (Hallelujah Junction) area. Deposition of Hallelujah Formation started before 8.0 Ma and continued into the Blancan (5.03-2.68) Ma. Age control for the Hallelujah Formation is based on tephrochronology and mammalian fossils. Granitic boulder conglomerates within the section are monolithologic and immature. They record significant periods of active tectonism during deposition. The ***Long Valley*** section dips west and is bounded by faults to both the east and west. The Diamond Mountain fault, on the west, is a north-striking, east-dipping normal fault. The eastern basin boundary is an unnamed north-striking fault with dextral-normal displacement. This suggests that post-depositional deformation occurred in a transtensional setting. Gravity profiles across the basin constrain the thickness of the Neogene section and the offset on basin-bounding faults. Modeling based on gravity and borehole data suggests a total stratigraphic thickness of approximately 3500 meters. The Diamond Mountain fault is modeled to have a total displacement of up to 2500 meters. The unnamed fault bounding Petersen Mountain shows at least 500
meters of west-side-down offset. This indicates as much as 550 meters of section could be present below the 8 Ma tephrochronology date within the lower member of the Hallelujah Formation. The tectonic record in the Neogene sedimentary rocks in ***Long Valley*** differs from nearby Neogene basins in the Sierra Nevada-Basin and Range transition zone. Boulder sheets within the section reveal
2-3 distinct periods of active tectonism between 8.0 and (5.03-2.68) Ma. Correlation of paleocurrent data with volumetric distribution of the boulder sheets suggests a northwest source direction for boulders in the upper section. Boulder sheets in the lower section depict an ambiguous east-west source direction. This suggests geographic distribution of faulting with time. Although ***Long Valley*** appears to be a west- tilted half graben, there is significant faulting along its eastern edge as well, and this faulting includes both strike-slip and dip-slip components.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-023902

47. Database GeoRef

Title **New insights into the structural, hydrothermal, and biological systems of the *Long Valley* Caldera using hyperspectral imaging**

Author Martini, Brigette Ann

Pages 291

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name University of California at Santa Cruz, Santa Cruz, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2004-002915

48. Database GeoRef

Title **The interaction of tectonic and magmatic processes in the *Long Valley* Caldera, California**

Author Prejean, Stephanie Gail

Pages 131

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Organization Name Stanford University, Stanford, CA, United States (USA)

Country of Publication United States (USA)

Accession Number 2005-007409

50. Database GeoRef

Title **Geodetic and seismic constraints on the 1997 inflation event at *Long Valley* Caldera**

Author Newman, Andrew V; Dixon, Timothy H; Ofoegbu, Goodluck I; Dixon, Jacqueline E

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Affiliation University of Miami, United States (USA); Southwest Research Institute, United States (USA)

Monograph Title AGU 2000 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2003-074122

51. Database GeoRef

Title **An airborne scanning laser altimetry survey of *Long Valley*, California**

Author Hofton, M A; Blair, J B; Minster, J B; Ridgway, J R; Williams, N P; Bufton, J L; Rabine, D L

Affiliation Scripps Institution of Oceanography, Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation NASA, United States (USA)

Source International Journal of Remote Sensing, vol.21, no.12, pp.2413-2437, 15 Aug 2000

Resource Location http://www.tandf.co.uk/journals/ titles/01431161.asp

Publisher Taylor & Francis, London, United Kingdom (GBR)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2002-050345

52. Database GeoRef

Title **Faulting in the 1986 Chalfant, California, sequence; local *tectonics* and earthquake source parameters**

Author Smith, Kenneth D; Priestley, Keith F

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Affiliation University of Cambridge, United Kingdom (GBR)

Source Bulletin of the Seismological Society of America, vol.90, no.4, pp.813-831, Aug 2000

Resource Location http://www.seismosoc.org/publications/bssa.html

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Abstract The July 1986, moment magnitude (M (sub w)) 6.3 Chalfant, California, earthquake is the largest of a recent series (1978-present) of moderate-sized earthquakes near the ***Long Valley*** volcanic region of east-central California. The sequence consists primarily of three moderate-sized strike-slip events. High-quality aftershock relocations and short-period focal mechanisms define the temporal and spatial development of the foreshock - mainshock- aftershock periods of these three events. Faulting during the M (sub w) 5.7 (event I; July 20) and the M (sub w) 6.3 (event II; 21 July) events constitute a set of conjugate strike-slip faults. Event I involved predominantly left-lateral motion on a NE-striking fault plane initiating at shallow depth (7 km). Event II initiated at 10.5 km depth exhibiting right-lateral strike-slip motion on a NW-striking fault dipping moderately to the southwest. An M (sub L) 5.5 strike- slip event on 31 July (event III) extended the aftershock sequence to the south into the White Mountains fault zone. P-wave pulse-width stress drops are determined for 185 M (sub L) 2.7-4.0 earthquakes that sample the entire sequence. Higher stress drops are observed near the intersection of event I and II fault planes and at the northern and southern ends of the aftershock zone. The moving-window b-value of the temporal average stress drop level and the b-value preceding event III. The average aftershock stress drop tends to increase as the sequence progresses suggesting that the faulted volume is equilibrating to the regional stress. Source parameters have been determined for the principal earthquakes from teleseismic body waves, local strong-motion records, and the extent of aftershock activity. The Chalfant sequence appears to be transferring strike-slip motion away from the White Mountains front, contributing to the observed increase in the relative normal offset, from south to north, along the White Mountains and the opening of the White Mountains relative to the Sierra Nevada Range front north of Owens ***Valley***.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2003-006251

53. Database GeoRef

Title **A study of microseismotectonics and earthquake sources in *Long Valley* Caldera, California**

Author Stroujkova, Anastasia Felixovna

Publication Year 2000

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 2003-038332

54. Database GeoRef

Title **Temporal gravity investigations at *Long Valley* Caldera, California**

Author Battaglia, M; Roberts, C W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Geophysical Research Abstracts, vol.2, 2000

Publisher European Geophysical Society, Katlenburg -Lindau, Federal Republic of Germany (DEU)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-064791

55. Database GeoRef

Title **Cenozoic deformation in the vicinity of the Salmon River suture zone, Idaho; gravity, geologic, and paleomagnetic data**

Author Markley, Michelle J; Kelso, P; Tikoff, Basil; Gillaspy, J; Manduca, C; Minott, J

Affiliation Mount Holyoke College, Department of Earth and Environment, South Hadley, MA, United States (USA)

Affiliation Lake Superior State University, United States (USA); University of Wisconsin-Madison, United States

(USA); Carleton College, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.107, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Miocene-Recent Basin and Range deformation occurs in west-central Idaho, and extension concentrates along the Cretaceous Salmon River suture zone. Domino-style normal faulting occurred on E -dipping normal faults, which parallel the Cretaceous foliation. Normal faulting rotated both the underlying Cretaceous amphibolite facies basement rocks of the western

Idaho shear zone and the overlying Miocene Columbia River basalt flows. We present results from a new gravity survey of ***Long Valley*** with 250 measurements. The topographical expression of NS-trending ***Long Valley*** does not correlate directly to the basin at depth. Instead, a 25 mGal negative Bouguer anomaly is centered in the NW part of the ***valley***. No gravity anomaly occurs under the S end of the ***valley***, indicating the presence of bedrock immediately below Quaternary surficial deposits. In the N end of the ***valley***, inversion of the gravity data suggests ca. 1200 m of Miocene-recent basin fill in a relatively narrow (<10 km) ***valley***. The anomaly is consistent with an asymmetric Miocene graben that is deepest on the W side of the ***valley***. The normal faults that bound the graben on the W side parallel Cretaceous basement foliation. Tilted Miocene Columbia River basalts act as critical marker horizons. Paleomagnetic data show that Miocene rotation of crustal blocks occurred about a horizontal axis. Reconstruction of the basalt flows to a sub-horizontal position suggests that the original orientation of both the Late Cretaceous basement foliation and the Miocene normal faults was sub-vertical. Each block contains a distinctive part of the Late Cretaceous shear zone, as defined by petrology, geochemistry, and structures. These observations indicate that basement contacts and fabrics controlled the regional Miocene structural style.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-049947

56. Database GeoRef

Title **Are the Sierras overriding a deep volcanic source at *Long Valley*?**

Author Smith, Ken; Biasi, Glenn P

Affiliation University of Nevada-Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.461, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract A synthesis of tectonic, geologic and geophysical evidence supports the hypothesis that the Sierran Mountain block in east central California is overriding the deep volcanic source responsible for ***Long Valley*** Caldera (LVC). For 12 mm/yr of NW motion of the Sierran block relative to a fixed volcanic source at depth, at least 10 km of southerly offset would have accumulated since the 0.75 Ma caldera forming event at ***Long Valley***. The modern period of earthquake activity (1978-present), extends 15-20 km south into the Sierran block and 20-30 km east and southeast of the current expression of LVC. This distribution of earthquake activity is difficult to reconcile with a crustal volcanic source associated exclusively with resurgence of the central caldera. Teleseismic P-wave tomography of the lower crust and upper mantle shows a region of decreased velocities extending south of LVC into the Sierran lithosphere. The largest earthquakes, the distributed seismicity and the anomalous local orientation of stress axes from earthquake focal mechanisms that appear to be related to the upper mantle feature implies that the velocity contrast is also a lithospheric strength boundary. Although Mono Craters represent a northward extension of volcanism since the formation of ***Long Valley***, several lines of evidence also suggest the evolution of a deeper volcanic source south of the caldera. Magmatic intrusion into the Sierran block has been inferred from modeling deformation dominated by uplift in the central caldera (Langbein and others, 1995), attenuation of shear waves (Sanders and Nixon, 1995), reflections from potential magma sources from local earthquakes (Peppin and others, 1989) and anomalous signatures from modeling earthquake dislocations (Julian, 1983; Dreger and others, 2000). The most plausible deep source for volcanism south of LVC is the continued dewatering of upper mantle originally hydrated by post-20 Ma subduction. Caldera-forming volcanism implies the original presence of huge quantities of volatiles including water and CO2. These quantities would be hard to concentrate in the small area of LVC through purely crustal tectonic mechanisms.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-014856

57. Database GeoRef

Title **Analysis of geodetic measurements of crustal deformation at *Long Valley***

Caldera

Author Simons, Mark; Fialko, Yuri; Chapin, Elaine; Hensley, Scott; Rosen, Paul A; Shaffer, Scott; Webb, Frank

Affiliation California Institute of Technology, Seismological Laboratory, Pasadena, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1194, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-061451

58. Database GeoRef

Title **Seismicity and strain in the Sierra Nevada south of *Long Valley* Caldera**

Author Owen, Susan E; Mills, Suzanne; Higbee, Peter; Buergmann, Roland

Affiliation University of Southern California, Earth Sciences Department, Los Angeles, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.960, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-021329

59. Database GeoRef

Title **Borehole strain measurements and volcanic activity**

Author Linde, Alan T; Sacks, Selwyn

Affiliation Carnegie Institution of Washington, Washington, DC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.972-973, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-021395

60. Database GeoRef

Title **Stress drops, apparent stresses, and tectonic driving stress in the *Long Valley* Caldera, California**

Author Prejean, Stephanie G; Ellsworth, William L

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.682, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004613

61. Database GeoRef

Title **Why the Sierras are so stressed-out; the effect of *Long Valley* Caldera inflation on faulting in the eastern Sierra Nevada**

Author Higbee, Peter; Burgmann, Roland; Owen, Susan; Dreger, Douglas

Affiliation University of California at Berkeley, Department of Geology and Geophysics, Berkeley, CA, United States (USA)

Affiliation University of Southern California, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.981, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004776

62. Database GeoRef

Title **Are the eastern Sierras overriding a deep heat/fluid source at *Long Valley*? A tectonic model for the west central Great Basin**

Author Smith, Kenneth D; Biasi, Glenn P

Affiliation University of Nevada Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.981, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004777

63. Database GeoRef

Title **Can stress field orientation be estimated from the ellipticity of collapse calderas?**

Author Bosworth, William; Burke, Kevin; Strecker, Manfred

Affiliation Marathon Oil Company, Houston, TX, United States (USA)

Affiliation University of Houston, United States (USA); Universitaet Potsdam, Federal Republic of Germany (DEU)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.982, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004782

64. Database GeoRef

Title **Frequency-magnitude statistics and spatial correlation dimensions of earthquakes at *Long Valley* Caldera, California**

Author Barton, D J; Foulger, G R; Henderson, J R; Julian, B R

Affiliation University of Durham, Department of Geological Sciences, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA)

Source Geophysical Journal International, vol.138, no.2, pp.563-570, Aug 1999

Resource Location http://www.blackwellpublishing.com/ journal.asp?ref=0956-540X

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Publication Year 1999

Publication Type Serial; Analytic

Accession Number 1999-057787

65. Database GeoRef

Title **Seismic evidence for a complex magmatic system beneath *Long Valley* Caldera, California**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.222, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056553

66. Database GeoRef

Title **Holocene faulting on the Sierra Nevada frontal fault between Mono Lake and June Lake, eastern California**

Author McCalpin, J P; Berry, M E

Affiliation GEO-HAZ, Estes Park, CO, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.31, no.7, pp.482, 1999

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract In 1997 we trenched scarps across Tioga or younger deposits at three places along the Sierra Nevada frontal fault, north of ***Long Valley*** caldera. East of June Lake on the Hartley Springs fault zone, a 2 m-high scarp records 50 cm displacement at 1.3 ka. However, most of the relief of the fault scarp was created in earlier, pre-pumice (1.8 ka) event(s) that displaced Tioga till down-to-the-east at least 2.5 m. Due to the 1.5-5 m thickness of pumice

and tephra deposits that mantle this landscape, deeper trenches will be required to confidently reconstruct the pre-tephra, post-Tioga history of paleoearthquakes. At the mouth of Lee Vining Canyon, three trenches into the Mono Lake fault zone revealed evidence for two surface-faulting events younger than the formation of latest Pleistocene fan-delta terraces graded to falling stands of Pleistocene Lake Russell. The most recent event occurred about 1.6 ka and had a vertical displacement of 2-2.2 m. An earlier Holocene event had a vertical displacement of ca. 1.6 m; TL dates are pending. Even older events were recorded in one trench, but due to erosion associated with strath terrace cutting, our measured displacements of 0.5-1.6 m are considered minima.Our trenches demonstrate that standard paleoseismic techniques will have to be modified somewhat to study the paleoearthquake chronology of the Sierra Nevada frontal fault in the Mono Lake-***Long Valley*** area. First, in areas mantled by thick, loose pumice deposits, trenches will have to be 1.5-5 m deeper than usual to expose pre-tephra colluvial wedges, yet the looseness of the pumice makes such deep trenches very dangerous. Location of the main fault cannot be inferred from surface morphology of the scarp. Second, due to the multiple step-faulting in relatively dense tills, few fault strands have enough displacement to create a decent debris- facies colluvial wedge.

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-053960

67. Database GeoRef

Title **Collaborative research with GEO-HAZ Consulting, Inc., and U. S. Geological Survey; interaction of volcanic and tectonic processes in the past 40,000 years near *Long Valley* Caldera**

Author McCalpin, James P (investigator); Berry, Margaret E (investigator); Sarna-Wojcicki, Andrei M (investigator)

Affiliation GEO-HAZ Consulting, Estes Park, CO, United States (USA)

Publication Year 1998

Publication Type Report; Monographic

Accession Number 2000-063207

68. Database GeoRef

Title **1998 SSA meeting; Presidental address; Science, geologic hazards, and public in a large, restless caldera**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Seismological Research Letters, vol. 69, no. 5, pp.400-404, Oct 1998

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-039319

69. Database GeoRef

Title **Peak ground accelerations recorded at *Long Valley* Caldera, California and at Guerrero, Mexico; the effects of site versus the effects of differing tectonic environments**

Author Peppin, William A

Affiliation University of Nevada, Seismological Laboratory, Reno, NV, United States (USA)

Publication Year 1998

Publication Type Report; Monographic

Accession Number 2000-044882

70. Database GeoRef

Title **Scientific drilling in *Long Valley*, California; what will we learn?**

Author Priest, Susan S; Sass, John H; Ellsworth, W L; Farrar, Christopher D; Sorey, Michael L; Hill, David P; Bailey, Roy A; Jacobson, Ronald D; Finger, John T; McConnell, Vicki Sue; Zoback, Mark D

Affiliation U. S. Geological Survey, USA, (United States)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0077-98, 2 pp., 1998

Resource Location http://quake.wr.usgs.gov/VOLCANOES/LongValley/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1998

Publication Type Serial; Report; Monographic

Accession Number 1998-060421

71. Database GeoRef

Title **The 1997 Mammoth Wave Propagation Experiment; S-wave splitting, fault- guided waves, seismotectonics, and exotic sources in the Casa Diablo area**

Author Malin, P; Shalev, E; Schleupner, D; Stroujkova, A; Boyd, L; Newman, A; Alvarez, M; Lyster, D

Affiliation Duke University, Durham, NC, United States (USA)

Affiliation Northwestern University, United States (USA); Stanford University, United States (USA); Mono County Energy Management Department, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.443, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037809

72. Database GeoRef

Title **The 1997 Mammoth Wave Propagation Experiment; high-resolution relative microearthquake locations in the Casa Diablo area**

Author Stroujkova, A; Shalev, E; Malin, P; Got, J L

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Affiliation Universite de Savoie, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.444, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-037810

73. Database GeoRef

Title **Source processes of small earthquakes, M 1-5; studies of the San Andreas Fault at Parkfield and *Long Valley* Caldera, California**

Author Johnson, Peggy Ann

Publication Year 1997

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1999-047617

74. Database GeoRef

Title **A conceptual model for hydrothermal convection in the western Atlanta Lobe of the Idaho Batholith**

Author Zimmer, Michael A; Rosenberg, Phillip E

Affiliation 3725 SE Francis, Portland, OR, United States (USA)

Affiliation Washington State University, Pullman, WA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.29, no.6, pp.333, 1997

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The Idaho batholith contains a large number of hydrothermal convection systems manifested at the surface as hot springs. Detailed geologic investigations were conducted at a series of hot spring vents discharging

along the northern portion of the Middle Fork Payette River in west-central Idaho. In every case, hot spring discharge occurs at or near the intersection of
a major fracture zone, identified as the South Fork of the Salmon River Lineament (SFSL), with several smaller fracture zones oriented approximately perpendicular to it. The SFSL is a NNE trending structure characterized in the field as a dense set of brittle fractures and identifiable on aerial photographs as a prominent lineament. Particularly good exposures of hydrothermal discharge from fracture zones are evident at Boiling Springs, where discharge is controlled by a single narrow fracture zone, and at Dash Creek, where vents discharge from closely spaced orthogonal fractures across a wider area. The SFSL is recognized as part of the ***Long Valley*** Fault System (LVFS), a seismically active zone of branching, high angle normal faults localized along the western border of the Atlanta lobe. It is believed to represent a northward migration of the Basin and Range beginning in the Miocene. Geothermal waters were analyzed for Si, Na, Ca, K and Mg; specific conductance, pH, temperature and discharge rate were measured on site. Chemical geothermometers yielded estimated reservoir temperatures ranging from 114 to 138 degrees C. Current heat flow maps of the region reveal only a slightly elevated geothermal gradient of 20-27 degrees C/km, thus the maximum depth of the hydrothermal system is approximately 4-7 km. Depths of groundwater circulation this deep are possible in the region because of the presence of a seismically active system of hydraulically connected fractures. A conceptual model in the form of a vertical cross section shows that convective groundwater circulation within the ***Long Valley*** Fault System is primarily attributed to substantial topographic relief in the region, as meteoric water moves from high elevation recharge areas to lower elevation discharge areas. This convective movement is possibly enhanced by thermal gradients in the system produced by density contrasts between cooler meteoric recharge water and hotter water circulating in the deepest depths of the system.

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-009700

75. Database GeoRef

Title **Tectonic strain rate as the control parameter for earthquake interactions**

Author Scotti, O; Grasso, J R; Bossu, R; Cotton, F

Affiliation LGIT-IRIGM, Grenoble, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.516, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-010301

76. Database GeoRef

Title **Satellite radar interferometic constraints on rate and extent of deformation at *Long Valley* Caldera, California, 1992-1995**

Author Thatcher, Wayne; Massonnet, Didier; Vadon, Helene; Langbein, John H; Hill, David P; Dzurisin, Dan

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Centre National d'Etudes Spatiales, France (FRA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.F50, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-018120

77. Database GeoRef

Title **Late Quaternary faulting and seismotectonics of east-central Oregon and west-central Idaho**

Author Knudsen, K L; Simpson, G D; Sawyer, T L; Wong, I G; Bott, J D; Lettis, William R

Affiliation William Lettis & Associates, Walnut Creek, CA, United States (USA)

Affiliation Woodward-Clyde Federal Services, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.28, no.5, pp.82, Apr 1996

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-064990

78. Database GeoRef

Title **Possible dike opening beneath the Mono volcanic chain, eastern California, suggested by GPS and leveling surveys since 1988**

Author Marshall, Grant; Langbein, John; Stein, Ross S; Lisowski, Michael

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.156, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-029350

79. Database GeoRef

Title **Inflation of *Long Valley* Caldera from one year of continuous GPS observations**

Author Webb, Frank H; Bursik, Marcus; Dixon, Timothy; Farina, Frederic; Marshall, Grant; Stein, Ross S

Affiliation California Institute of Technology, Jeb Propulsion Laboratory, Pasadena, CA, United States (USA)

Affiliation State University of New York at Buffalo, United States (USA); Rosenstiel School of Marine and Atmospheric Science, United States (USA); U. S. Geological Survey, United States (USA)

Source Geophysical Research Letters, vol. 22, no. 3, pp.195-198, 01 Feb 1995

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A permanent Global Positioning System receiver at Casa Diablo Hot Springs, ***Long Valley*** Caldera, California was installed in January, 1993, and has operated almost continuously since then. The data have been transmitted daily to the Jet Propulsion Laboratory for routine analysis with data from the Fiducial Laboratories for an International Natural sciences Network (FLINN) by the JPL FLINN analysis center. Results from these analyses have been used to interpret the on going deformation at ***Long Valley***, with data excluded from periods when the antenna was covered under 2.5 meters of snow and from some periods when Anti Spoofing was enforced on the GPS signal. The remaining time series suggests that uplift of the resurgent dome of ***Long Valley*** Caldera during 1993 has been 2.5 + or - 1.1 cm/yr and horizontal motion has been 3.0 + or - 0.7 cm/yr at S53W in a no-net-rotation global
reference frame, or 1.5 + or - 0.7 cm/yr at S14W relative to the Sierra Nevada block. These rates are consistent with uplift predicted from frequent horizontal strain measurements. Spectral analysis of the observations suggests that tidal forcing of the magma chamber is not a source of the variability in the 3 dimensional station location. These results suggest that remotely operated, continuously recording GPS receivers could prove to be a reliable tool for volcano monitoring throughout the world. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-033007

80. Database GeoRef

Title **Airborne laser altimeter survey of *Long Valley*, California**

Author Ridgway, J R; Minster, J B; Williams, N P; Bufton, J; Krabill, W; Rabine, D; Vaughn, C **Affiliation** University of California at San Diego, IGPP, La Jolla, CA, United States (USA) **Affiliation** NASA, Goddard Space Flight Center, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.75, no.44, Suppl., pp.160-161, 05 Nov 1994

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-037709

81. Database GeoRef

Title **Helium isotope and gas discharge variations associated with crustal unrest in *Long Valley* Caldera, California, 1989-1993**

Author Sorey, M L

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.26, no.7, pp.453, 1994

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-014759

82. Database GeoRef

Title **Mitigating volcanic hazards through active tectonic research**

Author Fink, Jonathan H; Delaney, Paul T; Moore, James G; Glazner, Allen F

Affiliation Arizona State University, Geology Department, Tempe, AZ, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); University of North Carolina, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.26, no.7, pp.383, 1994

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-031571

83. Database GeoRef

Title **The U.S.A. Continental Scientific Drilling Program (CSDP)**

Author Luth, William; MacGregor, Ian; Russ, David

Affiliation U. S. Department of Energy, Washington, DC, United States (USA)

Affiliation National Science Foundation, United States (USA); U. S. Geological Survey, United States (USA)

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 19, pp.69, 1994

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-054264

84. Database GeoRef

Title **Deep exploration of an active silicic caldera; a search for magma in the crust beneath *Long Valley*, California**

Author Rundle, John B; Sass, John H; Finger, John; Eichelberger, John C

Affiliation University of Colorado, Department of Geological Sciences, Boulder, CO, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Sandia National Laboratories, United States (USA); University of Alaska at Fairbanks, United States (USA)

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.59 -62, 1994

Publisher [varies], [location varies], International (III)

Abstract While the deep structure and physical state of active silicic calderas have until now been clouded with uncertainty, a unique opportunity presently exists to make direct observations in deep drill hole within the ***Long Valley*** caldera of eastern California. For the first time, it will be possible to obtain hard data on the physical existence of juvenile magma within the basement rock of ***Long Valley***. To critically test the hypothesis that magma does indeed exist at relatively shallow depth, we need to obtain qualitatively new information on the structure of the basement, on the physical conditions leading to the sudden cessation of earthquakes below approximately 4 km depth at the well site, and on the patterns and thermal efficiency of deep fluid circulation within the basement rock beneath the caldera. These fundamental issues can all be addressed by continuing the ***Long Valley*** Exploration Well that currently extends to a depth of 2.3 km beneath the center of the resurgent dome. We propose to deepen the well to 4.3 km in a third phase of drilling. In contrast to the previous drilling that employed conventional oilfield technology, Phase III will be continuously cored to allow unambiguous characterization of lithology, as well as systematic measurements of physical and chemical properties with depth. The target is the base of the seismogenic zone above the current center of inflation. We expect to resolve the paradox posed by surface geophysical evidence of shallow magma but subdued heat flow at moderate depth. Models for the caldera system can be critically tested only by observing the qualitatively new information given by the depth dependence of physical and chemical properties.

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Accession Number 2010-044460

85. Database GeoRef

Title **Potassic volcanism near Mono Basin, California; evidence for high water and oxygen fugacities inherited from subduction**

Author Lange, Rebecca A; Carmichael, Ian S E; Renne, Paul R

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA); Institute of Human Origins, Berkeley, CA, United States (USA)

Source Geology (Boulder), vol.21, no.10, pp.949-952, Oct 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Exposed around the margins of Mono basin and the periphery of ***Long Valley*** caldera are approximately 100 km (super 3) of potassic, basic to intermediate lavas that record high water and oxygen fugacities. Most eruptions occurred between 4 and 2 Ma, although sporadic potassic volcanism continued into the Quaternary with a pulse between 0.1 and 0.5 Ma, approximately 15 km northeast of Mono basin. The lava types include absarokite, minette, hornblende lamprophyre, trachybasalt, and trachyandesite. Estimated water contents for lavas without hydrous

phenocrysts range between 2 and 3 wt%, considerably more than mid-ocean ridge, oceanic island, or back- arc magmas. Calculated f O (sub 2) values fall between -0.4 and +1.2 log units of the Ni-NiO buffer. Although this potassic suite was erupted in an extensional tectonic setting at the western margin of the Basin and Range province, its high K (sub 2) O/TiO (sub 2) and low Zr/Ba ratios suggest a subduction - modified mantle source. If subduction was the process that enriched the lithospheric mantle in large-ion lithophile elements (K, Ba, etc.), it was also a mechanism for mantle oxidation and hydration. October 1993

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-038104

86. Database GeoRef

Title **Crustal deformation in eastern *Long Valley* Caldera, California during the last 600,000 yrs**

Author Foster, Jacob G; Reid, John B, Jr

Affiliation Hampshire College, School of Natural Science, Amherst, MA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.25, no.6, pp.72, Oct 1993

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-024104

87. Database GeoRef

Title **Late Cenozoic structure and correlations to seismicity along the Olympic- Wallowa Lineament, Northwest United States**

Author Mann, Gary M; Meyer, Charles E

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Geological Society of America Bulletin, vol.105, no.7, pp.853-871, Jul 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Late Cenozoic fault geometry, structure, paleoseismicity, and patterns of recent seismicity at two seismic zones along the Olympic-Wallowa lineament (OWL) of western Idaho,
Northeast Oregon, and Southeast Washington indicate limited right-oblique slip displacement along multiple northwest -striking faults that constitute the lineament. The southern end of the OWL originates in the ***Long Valley*** fault system and western Snake River Plain in western Idaho, where it accommodates basin-and - range extension. Several kilometers west of the ***Long Valley*** fault system, post-middle Miocene displacement along the OWL has resulted in adjacent areas of uplift and subsidence. The OWL in Northeast Oregon consists of a wide zone of northwest -striking faults and is associated with several large, inferred, pull-apart basins. The OWL then emerges from the Blue Mountain uplift as a much narrower zone of faults in the Columbia Plateau known as the Wallula fault zone (WFZ). Structural relationships in the WFZ strongly suggest that it is a right-slip extensional duplex. An ash horizon that correlates with the Mount St. Helens "J" composition (10.7 Ka) is displaced vertically 5 m by a normal fault along a segment of the WFZ. The intensity center for a damaging M = 6.1 earthquake in 1936 is located in the WFZ only a few kilometers northeast of this Holocene fault. Other youthful -appearing, strike-slip and thrust faults are located farther northwest along the OWL and may pose a seismic hazard to adjacent population centers and critical facilities.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-023430

88. Database GeoRef

Title ***Long Valley* triggered strain and seismicity: can bubbles do it?**

Author Linde, Alan T; Sacks, I Selwyn; Johnston, Malcolm J S; Hill, David P

Affiliation Carnegie Institution of Washington, DTM, Washington, DC, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.16, Suppl., pp.317, May 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-007315

89. Database GeoRef

Title **Constraints on deformation of the resurgent dome, *Long Valley* Caldera, California from space geodesy**

Author Dixon, Timothy H; Bursik, Marcus; Wolf, Susan Kornreich; Heflin, Michael; Webb, Frank; Farina, Frederic; Robaudo, Stefano

Affiliation University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Affiliation State University of New York, United States (USA); California Institute of Technology, United States (USA)

Affiliation NASA/Goddard Space Flight Center, Greenbelt, MD, United States (USA)

Source Geodynamics Series, vol.23, pp.193-214, 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-017720

90. Database GeoRef

Title **How to predict an eruption at *Long Valley* Caldera**

Author Bursik, Marcus

Affiliation State University New York, Department of Geology, Buffalo, NY, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, suppl., pp.343, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014028

91. Database GeoRef

Title **Abrupt change in tectonic style along the northeastern front of the Sierra Nevada uplift at Constantia, CA**

Author Grose, T L T

Affiliation Colorado School of Mines, Department of Geology and Geological Engineering, Golden, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, Suppl., pp.549, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-021793

92. Database GeoRef

Title **Stresses in the *Long Valley* Caldera, California, from analysis of wellbore breakouts in geothermal exploratory wells**

Author Moos, D; Zoback, M D

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, Suppl., pp.559, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-021869

93. Database GeoRef

Title **Tectonic geomorphology and earthquake hazard of the northern Owens *Valley*, California**

Author Pinter, Nicholas

Publication Year 1992

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1994-033311

94. Database GeoRef

Title **Structural evolution of the Mesozoic section of the Mount Morrison roof pendant**

Author Bergeron, Louis K

Publication Year 1992

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1996-025148

95. Database GeoRef

Title **Response of the hot bubbling pool hydrothermal system of the *Long Valley* Caldera, California, to earthquakes and tectonism**

Author Diment, W H; Urban, T C

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.72, no.17, pp.115-116, 23 Apr 1991

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-001685

96. Database GeoRef

Title **Ground-water basins along the eastern Sierra Nevada; *tectonics*, water, and politics**

Author Danskin, Wesley R; Farrar, Christopher D; Dreiss, Shirley J

Affiliation U. S. Geol. Surv., San Diego, CA, United States (USA)

Affiliation Univ. Calif. at Santa Cruz, United States (USA)

Publisher San Diego State Univ., San Diego, CA, United States (USA)

Publication Year 1991

Publication Type Book; Map; Analytic

Accession Number 1992-040488

97. Database GeoRef

Title **Volcanoes; old new, and--perhaps--yet to be**

Author Kerr, Richard A

Affiliation Am. Assoc. Adv. Sci., Washington, DC, United States (USA)

Source Science, vol.250, no.4988, pp.1660-1661, 21 Dec 1990

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-001507

98. Database GeoRef

Title **Magmatic unrest at *Long Valley* Caldera, California, 1980-1990**

Author Bailey, Roy A; Hill, David P

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Author Hickson, Catherine J (prefacer); Peterson, Donald W (prefacer)

Affiliation Geol. Surv. Can., Vancouver, BC, Canada (CAN)

Source Geoscience Canada, vol.17, no.3, pp.175-179, Sep 1990

Publisher Geological Association of Canada, Toronto, ON, Canada (CAN)

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1991-013512

99. Database GeoRef

Title **Observation of shear wave splitting from natural events; south moat of *Long Valley* Caldera, California, June 29 to August 12, 1982**

Author Shih, Xiao R; Meyer, Robert P

Affiliation Univ. Wis.-Madison, Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,179-11,195, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Three-component seismograms from local earthquakes recorded by three University of Wisconsin stations in the south moat of ***Long Valley*** caldera in 1982 have been analyzed for shear wave splitting. The average polarization direction of the first-arriving shear waves observed at the two stations south of the resurgent dome is NNW-SSE. Time delays between the fast and slow shear waves are proportional to hypocentral distances, and the maximum velocity anisotropy inferred is 6.4%. The average shear wave polarization observed at the station above the resurgent dome is north-south. The time delays there are not a function of hypocentral distance, and the normalized time delays (ms/km) from events at the southwest boundary of the caldera are larger than those at

other azimuths, indicating maximum 9.6% velocity anisotropy. The east-west to ENE-WSW variation of the tensional stress fields implied by the shear wave polarizations indicates the interaction between the inflating caldera and the Sierra Nevada range-front faults under the generally WNW-ESE tension expected from the regional ***tectonics***. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Conference document; Analytic

Accession Number 1990-049557

100. **Database** GeoRef

Title **Soil-geomorphic analysis of late Quaternary glaciation and faulting, eastern escarpment of the central Sierra Nevada, California**

Author Berry, Margaret Elaine

Publication Year 1990

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1991-051676

101. **Database** GeoRef

Title **Normal faults and volcanoes**

Author Ellis, Michael; King, Geoffrey

Affiliation Cent. Earthquake Res. and Inf., Memphis, TN, United States (USA)

Affiliation Univ. Colo., United States (USA)

Author Anonymous

Affiliation United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.22, no.7, pp.273, 1990

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-066972

102. **Database** GeoRef

Title **Range front faulting and volcanism in the Mono Basin, eastern California**

Author Bursik, Marcus; Sieh, Kerry E

Affiliation Calif. Inst. Technol., Dep. Geol. and Planet. Sci., Pasadena, CA, United States (USA)

Source Journal of Geophysical Research, vol. 94, no. B11, pp.15,587-15,609, 10 Nov 1989

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The spatial and temporal pattern of range front normal faulting and volcanism in the Mono Basin of eastern California suggests that dikes are being intruded underneath the Mono Craters in response to crustal stretching and are now accommodating strain that was once taken up by range front faulting. The section of the Sierra Nevadan range front near the craters accommodated as much as 1 mm/yr of extension as recently as about 40,000 years ago. For the past 40,000 years, this section of range front has been inactive, even though range front extension to the north and south has continued at up to 0.9 mm/yr. For the past 40,000 years, dikes, intruding underneath the Mono Craters, seem to have been accommodating the 1 mm/yr of extension that was previously taken up by faulting. Since the basin is extending obliquely to the trend of the frontal faults, there is a component of dextral shear to their motion, so that the Mono Craters may be forming on an extensional boundary of a pull-apart basin. If the craters represent incipient caldera formation, then calderas such as ***Long Valley*** may also have formed in pull-apart zones. Copyright 1989 by the American Geophysical Union.

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1990-004570

103. **Database** GeoRef

Title **On restless calderas**

Author Smith, Peter J

Affiliation Open Univ., Dep. Earth Sci., Milton Keynes, United Kingdom (GBR)

Source Geology Today, vol.5, no.5, pp.171-174, Oct 1989

Publisher Blackwell, Oxford, United Kingdom (GBR)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-075540

104. Database GeoRef

Title **Review of magnetic and electric field effects near active faults and volcanoes in the U.S.A.**

Author Johnston, M J S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Affiliation CNRS, L.P.C.E., Orleans, France (FRA)

Source Physics of the Earth and Planetary Interiors, vol.57, no.1-2, pp.47-63, Oct 1989

Resource Location http://www.sciencedirect.com/ science/journal/00319201

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 1989

Publication Type Serial; Conference document; Analytic

Accession Number 1989-082289

105. Database GeoRef

Title **Precise master-event locations of aftershocks of the 4 October 1978 Wheeler Crest earthquake sequence near *Long Valley*, California**

Author Peppin, William A; Honjas, William; Somerville, Malcolm; Vetter, Ute R

Affiliation Univ. Nev., Mackay Sch. Mines, Seismol. Lab., Reno, NV, United States (USA)

Source Bulletin of the Seismological Society of America, vol.79, no.1, pp.67-76, Feb 1989

Publisher Seismological Society of America, Berkeley, CA, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-017466

106. Database GeoRef

Title **Differences in magma storage in different volcanic environments as revealed by seismic tomography**

Author Iyer, H M; Evans, J R; Dawson, P B

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source International Geological Congress, Abstracts --Congres Geologique Internationale, Resumes, vol.28, Vol. 2, pp.2.106, 1989

Publisher [International Geological Congress], [location varies], International (VVV)

Publication Year 1989

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-071061

107. **Database** GeoRef

Title **Structural geology and petroleum potential of *Long Valley*, White Pine County, Nevada**

Author Pekarek, Alfred H

Affiliation Basin and Range Explor. Co., Englewood, CO, United States (USA)

Source The Mountain Geologist, vol.25, no.4, pp.171-180, Oct 1988

Publisher Rocky Mountain Association of Geologists (RMAG), Denver, CO, United States (USA)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-013410

108. **Database** GeoRef

Title **Processing and interpretation of a seismic line across the resurgent dome of *Long Valley* Caldera, California**

Author Berg, Richard M, Jr

Publication Year 1988

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1989-050152

109. **Database** GeoRef

Title **The geophysics of a restless caldera; *Long Valley*, California**

Author Rundle, John B; Hill, David P

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Annual Review of Earth and Planetary Sciences, vol.16, pp.251-271, 1988

Resource Location http://arjournals.annualreviews.org/loi/earth

Publisher Annual Reviews, Palo Alto, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-066038

110. **Database** GeoRef

Title **Focal mechanisms of earthquakes in the Mammoth Lakes-Bishop area, eastern California**

Author Cockerham, Robert S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.19, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028500

111. **Database** GeoRef

Title **Static and dynamic strain during the July 21, 1986, Chalfant earthquake near the *Long Valley* Caldera, California**

Author Johnston, M J S; Borcherdt, R D; Glassmoyer, G M; Linde, A T **Affiliation** U. S. Geol. Surv., Menlo Park, CA, United States (USA) **Affiliation** Carnegie Inst. Washington, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.20, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028504

112. **Database** GeoRef

Title **Repeated precise leveling of fault crossing arrays reveals no nearfield vertical fault movement in Southern California in 1986**

Author Sylvester, A G

Affiliation Univ. Calif. at Santa Barbara, Dep. Geol. Sci., Santa Barbara, CA, United States (USA)

Author Anonymous

Source Seismological Research Letters, vol.58, no.1, pp.20, Mar 1987

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-028506

113. **Database** GeoRef

Title **Estimates of extension in the Basin & Range Province**

Author Boyer, Steven E; Allison, M Lee

Affiliation Univ. Wash., Dep. Geol. Sci., Seattle, WA, United States (USA)

Author Dickinson, William R (chairperson)

Source Abstracts with Programs - Geological Society of America, vol.19, no.7, pp.597, 1987

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-022802

114. **Database** GeoRef

Title **Tectonic overview of Owens *Valley* region**

Author Sheehan, Jack R

Affiliation Consultant, Cypress, CA, United States (USA)

Source Annual Field Trip Guidebook. South Coast Geological Society, vol.15, pp.138-144, 1987

Publisher South Coast Geological Society, Santa Ana, CA, United States (USA)

Publication Year 1987

Publication Type Serial; Analytic

Accession Number 1993-010030

115. Database GeoRef

Title **Constraints on volume expansion in *Long Valley* Caldera, California derived from vertical displacements, 1975 to 1985**

Author Vasco, D W; Goldstein, N E

Affiliation Univ. Calif., Earth Sci. Div., Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1107, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-047373

116. Database GeoRef

Title **GPS-based differential measurements between *Long Valley* Caldera and Owens *Valley* Radio Observatory**

Author Blewitt, G; Dixon, T H; Hager, Bradford H; Sovers, O J; Stephens, S A

Affiliation Calif. Inst. Technol., Jet Propul. Lab., Pasadena, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.262, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic; Abstract only

Accession Number 1986-077317

117. Database GeoRef

Title **Effect of magma chamber shape on ground deformations; application to uplift at *Long Valley*, California**

Author Wu, M; Wang, H F

Affiliation Univ. Wis., Dep. Geol. and Geophys., Madison, WI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.402, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-038986

118. Database GeoRef

Title **Seismic investigation of structures associated with the intrusion of the 600- year-old dike under Inyo Domes**

Author Burkhard, Norman R; Kasameyer, Paul W

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.16, pp.402, 22 Apr 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-038987

119. Database GeoRef

Title **Geothermal systems in the Mono Basin-*Long Valley* region, eastern California and western Nevada**

Author Higgins, C T; Chapman, R H; Chase, G R; Bacon, C F; Flynn, T; Trexler, D T; Ghusn, G, Jr

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.66, no.46, pp.1146, 12 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1989-034855

120. Database GeoRef

Title **Special section on *Long Valley* Caldera, California [modified]**

Author Anonymous

Source Journal of Geophysical Research, vol.90, no.B13, pp.11,111-11,288, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1985

Publication Type Serial; Conference document; Monographic

Accession Number 1986-082040

121. Database GeoRef

Title **Active tectonic and magmatic processes beneath *Long Valley* Caldera, eastern California; an overview**

Author Hill, David P; Bailey, Roy A; Ryall, Alan S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,111-11,120, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Geological, chronological, and structural studies of the ***Long Valley***-Mono/Inyo Craters area document a ***long*** history of related volcanic eruptions and earthquakes controlled by regional extensional ***tectonics*** of the Basin and Range province. This activity has persisted for hundreds of thousands of years and is likely to continue. The ***Long Valley*** magma chamber had a volume approaching 3000 km (super 3) prior to its climatic caldera-forming eruption 0.7 m.y. ago but has been reduced to less than a third of this volume by cooling, eruption, and crystallization. Seismic evidence indicates that the main mass of the present ***Long Valley*** magma chamber is about 10 km in diameter and that its roof is 8-10 km deep with smaller cupolas as shallow as 4-5 km. Although a chamber of this size is probably capable of producing an eruption approaching 30 km (super 3) of lava, the record over the past 0.5 m.y. suggests that eruptions of 1 km (super 3) or less are far more likely. Models proposed for the current ground uplift and seismicity within the caldera require inflation of 0.1-0.2 km (super 3) by additional magma since mid-1979, and some models suggest that inflation was accompanied by injection of a thin dike or dikes (probably of silicic magma) into the ring fracture zone beneath the south moat. Several of the M 5.8-6.2 earthquakes that occurred in the region beginning in 1978

had non-double -couple focal mechanisms.
Whether these unusual mechanisms indicate injection of mafic (low -viscosity) magma at midcrustal depths in the Sierra Nevada block south of the caldera remains debatable.
Studies of calderas of various ages throughout the world indicate that episodes of unrest are relatively common and do not invariably culminate in eruptions. Although current unrest is concentrated in the south moat of ***Long Valley*** caldera, the Inyo/Mono Craters probably hold a greater potential for producing an eruption in the foreseeable future. The Inyo/Mono
Craters have erupted at 500 -year intervals over the past 2000-3000 years, whereas the
Long Valley magma chamber has erupted at about 200,000-year intervals over the past
700,000 years. In either case, a major earthquake near the caldera could strongly influence the course of volcanic activity.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082041

122. Database GeoRef

Title **Implications of silicic vent patterns for the presence of large crustal magma chambers**

Author Bacon, Charles R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,243-11,252, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract On the basis of the distribution of silicic vents, many volcanic fields can be grouped with (1) igneous systems that may be small and whose vent locations are controlled by regional ***tectonics***, (2) those that include sizable crustal magma bodies which erupt at sites determined by their anomalous local stress fields, or (3) relatively small volume systems that are transitional between categories 1 and 2. Linear vent patterns that are aligned normal to the regional least principal stress (sigma (sub 3)) commonly are associated with absence of evidence for large, shallow magma bodies. The Coso volcanic field and the Inyo-Mono domes in California and probably the South Sister area in Oregon are examples of such systems. The 1960 dacitic fissure eruption at Cordon Caulle in southern Chile evidently is linked to tectonic stress relaxation associated with the great earthquake that occurred 48 hours before the eruption began. Large, shallow magma
chambers are thought to perturb
the local stress field so that areal patterns of silicic vents are diffuse, radial, or arcuate. Such systems may erupt great volumes of pyroclastic material catastrophically and produce large calderas. Well-preserved examples of late precaldera leaks of silicic magma occur at ***Long Valley***, California, and Mount Mazama (Crater Lake), Oregon. Other possible examples are noted. Some of these, those which formed calderas smaller than Crater Lake, apparently were preceded by silicic eruptions from aligned vents. Bearing in mind that there exists a transitional group between tectonically controlled small systems and very large magma chambers, vent distributions can be useful in evaluating potential volcanic hazards for silicic volcanic fields.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082054

123. Database GeoRef

Title **Links between magma-tectonic rate balances, plutonism, and volcanism**

Author Shaw, Herbert R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,275-11,288, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract With Smith's (1979) model of ash flow magmatism as the point of departure, quantitative regimes of crustal magmatic evolution are outlined. The average extrusive regime of ash flow magmatism operates at a rate of about 0.001 km (super 3) /yr; progressively larger episodes of increasing repose times characterize the evolution of caldera-forming eruptions. The intrusive regime operates at an inferred average rate of about 0.01 km (super 3) /yr expressed in terms of the volumetric influx of mafic magma from the mantle, based on the record of silicic rates of extrusion and a 10:1 intrusive to extrusive ratio derived from
evidence of zoned silicic systems. This rate is almost identical with the mean cumulative rate for the Hawaiian-Emperor system of basaltic volcanism, which is determined to be 0.015 km (super 3) /yr.
Fluctuations about a mean rate of 10 (super -2) km (super 3) /yr lead to a threefold classification of magmatic regimes in terms of source power, depending on
whether they are persistently greater than (HHER regime), about equal to (MHER regime), or lower than

(LHER regime) the mean Hawaiian-Emperor rate. Ash flow magmatism correlates with the MHER regime, averaged over a sufficiently ***long*** time. Thus the conditions of Hawaiian-Emperor magmatism are identified with a characteristic power of magma transfer rates that optimize mechanisms for creation of high-level chambers of derivative and fractionated silicic magma (terminology of Smith (1979)) within sufficiently localized regions of high residence times. These conditions represent a balance point, and a bifurcation, in dynamic paths of magmatic evolution leading to widely divergent types of plutonic-volcanic associations. Categorical examples of the principal types of igneous path are discussed relative to continental basalt, silicic ash flow, batholithic granite, and intrusive porphyry systems. The Henry Mountains, Utah, are thought to represent an example of an intrusive porphyry generated in the LHER regime of a mafic source system lacking sufficient power for volcanic expression or significant mineralization. ***Long Valley***, California (and possibly other systems along the eastern front of the Sierra Nevada), is an example operating at the mean rate with transient excursions to higher and lower rates. In regions of rapid extension and/or volcanic propagation (whether linear or areal) these regimes give rise to basaltic eruptions ranging from isolated cinder cones to flood basalts.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082058

124. Database GeoRef

Title **Aftershocks of the May 1980 Mammoth Lakes, California, earthquakes**

Author Lide, Chester S; Ryall, Alan S, Jr

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Publication Year 1985

Publication Type Report; Monographic

Accession Number 1991-035977

125. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; a preliminary magnetotelluric and magnetic variation interpretation**

Author Hermance, John F; Slocum, Warren M; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 89, no. B10, pp.8325-8337, 30 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The ***Long Valley***/Mono Basin volcanic complex in eastern California is one of the few major silicic caldera systems in western North America which have exhibited volcanic activity so recently that they may still be potentially active. Whereas, in principle, magnetotelluric measurements offer a significant opportunity to study such systems through mapping subsurface electrical features associated with hydrothermal and magmatic processes in the crust, our studies in this area indicate that such techniques are profoundly affected by the highly three-dimensional structures associated with these complicated volcanic terranes. We argue that while simple plane-layered (one-dimensional) interpretations are likely to be misleading in such a complicated three-dimensional environment, magnetotelluric observations can delineate important physical features associated with caldera structures; in particular, the method can closely determine the location and magnitude of major boundary faults. Because of the high resistivity contrast between basin fill and crystalline basement, these techniques are very useful for characterizing the subsurface hydrologie regime as well. In addition, sites have been occupied in the southwest moat of ***Long Valley*** caldera, an
area that is currently exhibiting a variety of tectonic activity. Both the telluric field and magnetic induction arrows imply the presence of a structurally controlled east-west electric current system at relatively shallow depth in the crust. This elongated east-west zone is aligned along the belt of recent seismic activity in the southwest moat, a zone of seismic shear wave attenuation, and a zone of known hydrothermal alteration at the surface. Finally, we summarize observations from the vicinity of Pumice ***Valley*** (adjacent to Mono Craters) which has been thought to be an active incipient caldera. Since our present data do not indicate an observable decrease in resistivity at shallow depths beneath the ***valley***, we are led to conclude that the parent magma body feeding Mono Craters (and perhaps Inyo domes) is either too thin or too deep to be resolved or is significantly displaced from a position beneath the center of the inferred ring fractures.

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Accession Number 1985-038350

126. **Database** GeoRef

Title **Seismic imaging in *Long Valley*, California, by surface and borehole techniques; an investigation of active *tectonics***

Author Rundle, John B; Elbring, Gregory Jay; Striker, Richard P; Finger, John T; Carson, Charles C; Walck, Marianne C; Ellsworth, William L; Hill, David P; Malin, Peter; Tono, Enrique; Robertson, Michelle; Kuhlman, Steve; McEvilly, Tom; Clymer, Richard; Smithson, Scott B; Deemer, Sharon; Johnson, Roy; Henyey, Tom; Hauksson, Egill; Leary, Peter; McCraney, John; Kissling, Edi

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA); Univ. Calif., United States (USA); Lawrence Berkeley Lab., United States (USA); Univ. Wyo., United States (USA); Univ. South. Calif., United States (USA); Eidg. Tech. Hochsch., Switzerland (CHE)

Source Eos, Transactions, American Geophysical Union, vol.66, no.18, pp.194-201, 30 Apr 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1985-062626

127. **Database** GeoRef

Title **Mono Craters, *Long Valley* Caldera; seismicity, volcanism, and engineering geology; Field trip II roadlog**

Author Bailey, Roy A; Harp, Edwin L; Keefer, David K; Bennett, M J; Miller, C Dan; Wood, Spencer H; Steine, S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Boise State Univ., United States (USA); Univ.Calif., Berkeley, United States (USA)

Affiliation Univ. Nev., Dep. Geol. Sci., Reno, NV, United States (USA)

Publisher Univ. Nev. at Reno, Dep. Geol. Sci., Reno, NV, United States (USA)

Publication Year 1984

Publication Type Book; Analytic

Accession Number 1985-041364

128. **Database** GeoRef

Title **Proceedings of Workshop XIX; Active tectonic and magmatic processes beneath *Long Valley* Caldera, eastern California**

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, 952 pp., 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Monographic

Accession Number 1985-059718

129. **Database** GeoRef

Title **Summary**

Author Hill, David P; Ryall, Alan S; Bailey, Roy A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA); Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.4-23, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059719

130. Database GeoRef

Title **The *Long Valley*/Mono Craters volcanic complex; a preliminary interpretation based on telluric field patterns**

Author Hermance, John F; Slocum, Warren M; Neumann, Gregory A **Affiliation** Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA) **Affiliation** Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.281-318, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059731

131. Database GeoRef

Title **Historical unrest at large Quaternary calderas of the world, with special reference to *Long Valley*, California**

Author Newhall, Christopher G; Dzurisin, Daniel; Mullineaux, L S

Affiliation U. S. Geol. Surv., Vancouver, WA, United States (USA)

Affiliation Univ. Nev., United States (USA); Scripps Inst. Oceanogr., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.714-742, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Historical seismicity, ground deformation, thermal activity, and eruptions at large Quaternary calderas of the world are: (a) common, (b) typically ***long***-lived, (c) complex in their spatial and temporal patterns, and (d) caused by combinations of tectonic, magmatic, and hydrothermal processes. Three fundamental causes of caldera unrest are regional tectonic strain, magmatic intrusion, and change in a hydrothermal system beneath a caldera. Possible responses include expansion and deformation of a magma body, and expansion of (water-saturated) country rock above the magma reservoir. Recent unrest at ***Long Valley*** caldera can be plausibly explained as a regional extension event, followed by slight in-situ expansion or deformation of the caldera's large silicic magma body. An intrusion of basaltic magma near the base of that silicic magma body, in 1980, is possible but not required by
the data. Large magma bodies beneath calderas are dynamic systems, in delicate balance between quiet and unrest. The stimuli for unrest need not be large; most often, the stimuli are common geological processes such as regional tectonic strain and small magmatic intrusions from depth.--Modified author abstract.

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059745

132. Database GeoRef

Title **Structure of the Tertiary Questa Caldera, New Mexico; an eroded analog for current activity at *Long Valley***

Author Lipman, Peter W

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.851-885, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract The late Oligocene Questa Caldera, eroded to levels where deep caldera structures and cogenetic batholithic intrusions are exposed, displays structures that may be analogous to features associated with current unrest at ***Long Valley*** Caldera. Features common to both calderas include: (1) orientation and distribution of mapped or inferred caldera-related dikes that are strongly influenced by regional structural trends, (3) complex deformation along segments of the caldera boundary that truncak region structural trends; (4) structurally highest portions of the postcollapse magma chamber underlie the apical graben on the resurgent dome, and (5) postcollapse magmatic activity has been sustained by addition of new magma to the high-level system, in the case of Questa for 3-4 m.y. after collapse.-- Modified author abstract.

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059749

133. Database GeoRef

Title **A note on links between magma-tectonic rate-balances, plutonism and volcanism**

Author Shaw, Herbert R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.886-942, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059750

134. Database GeoRef

Title **A new model for deformation in *Long Valley* Caldera, 1980-1983**

Author Rundle, John B; Whitcomb, James H

Affiliation Sandia Natl. Lab., Div. 1541, Albuquerque, NM, United States (USA)

Affiliation Univ. Colo., CIRES, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.891, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016560

135. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex in eastern California; status of present knowledge and future research needs**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Reviews of Geophysics and Space Physics, vol. 21, no. 7, pp.1545-1565, Aug 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Silicic complexes. Metallogenesis, mitigation of volcanic and earthquake hazards, and development of conventional and nonconventional forms of geothermal energy. One research technique that has not been exploited is scientific drilling to intermediate depths (2-3 km). If magma has intruded the upper crust of this area, surface geophysics and limited borehole observations may be employed to monitor tectonic and magmatic activity associated with such a phenomenon. A surprising result of commercial drilling for geothermal energy in this area is the failure to detect directly high-temperature hydrothermal reservoirs. Their presence can be inferred from other studies, particularly those using geochemical indicators in thermal fluids.--Modified journal abstract.

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-058112

136. Database GeoRef

Title **Moment tensor solutions of Mammoth Lake earthquakes**

Author Ekstroem, Goeran; Dziewonski, Adam M

Affiliation Harvard Univ., Dep. Geol. Sci., Cambridge, MA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.18, pp.262, 03 May 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-039500

137. Database GeoRef

Title **Seismological investigations of volcanic and tectonic processes in the western Great Basin, Nevada and eastern California**

Author Vetter, Ute R; Ryall, Alan S; Sanders, Christopher O

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.333-343, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1984-044721

138. Database GeoRef

Title **Seismological investigations of volcanic and tectonic processes in the western Great Basin, Nevada and eastern California**

Author Vetter, Ute R; Ryall, Alan S; Sanders, Christopher O

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Special Report - Geothermal Resources Council, vol.13, pp.333-343, 1983

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic

Accession Number 1985-045894

139. Database GeoRef

Title **Selected earthquake swarms near Mammoth Lakes, Mono Co., CA 1980-1982 and their relationship to local seismicity and *tectonics***

Author Cramer, Chris; Real, Charles P P; Naramore, Sharon; Johnson, Peggy

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1029-1030, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-078066

140. Database GeoRef

Title **Seismicity and magma injection near Mammoth Lakes, California, in the context of regional *tectonics***

Author Ryall, A S

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012948

141. Database GeoRef

Title **Uplift of the *Long Valley*, California, caldera between 1975 and 1982**

Author Messing, J; Riley, F S; Denlinger, R P

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012950

142. Database GeoRef

Title **Horizontal strain within the *Long Valley*, California, caldera between 1975 and 1982**

Author Riley, F S; Massey, B L; Boling, J K; Denlinger, R P; Carpenter, M C

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Affiliation U. S. Bur. Land Manage., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012952

143. Database GeoRef

Title **A simple model for deformation of the *Long Valley*, California, caldera between 1978 and 1982**

Author Denlinger, R P; Riley, F S

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1133, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012953

144. Database GeoRef

Title **Waiting for the volcano**

Author Overbye, Dennis

Source Discover, vol. 3, no. 10, pp.18 -22, 24, Oct 1982

Publisher Walt Disney Co., Palm Coast, FL, United States (USA)

Publication Year 1982

Publication Type Serial; Analytic

Accession Number 1983-003241

145. Database GeoRef

Title **Ground tilt since May 1982 at *Long Valley* Caldera, California**

Author Dzurisin, Daniel; Sylvester, Arthur G; Cashman, Katharine V

Affiliation U. S. Geol. Surv., David A. Johnston Cascades Volcano Obs., Vancouver, WA, United States (USA)

Affiliation Univ. Calif., Santa Barbara, Dep. Geol. Sci., United States (USA); Johns Hopkins Univ., Dep. Earth and Planet. Sci., United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.75, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054428

146. Database GeoRef

Title **Spectral character of "tremor" in *Long Valley*, CA, during 1980-1983**

Author Real, C R; Cramer, C H; Chouet, B

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA) **Affiliation** Mass. Inst. Technol., Dep. Earth and Planet. Sci., United States (USA) **Affiliation** Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.89, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054457

147. Database GeoRef

Title **Seismic profiling using earthquake sources near Mammoth Lakes, California**

Author Boone, William J; Meyer, Robert P

Affiliation Univ. Wis., Geophys. and Polar Res. Cent., Madison, WI, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.92, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054462

148. Database GeoRef

Title **Record of late Quaternary faulting along the Hilton Creek Fault in the Sierra Nevada, California**

Author Clark, Malcolm M; Gillespie, Alan R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Earthquake Notes, vol.52, no.1, pp.46, Mar 1981

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1981

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1982-014312

149. Database GeoRef

Title **Geology of *Long Valley*, Lassen County, California, and Washoe County, Nevada**

Author Mergner, Marcia

Publication Year 1978

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1982-006692

150. Database GeoRef

Title **Owens *Valley*; a major rift between the Sierra Nevada Batholith and Basin and**

Range Province, U.S.A.

Author Sheridan, M F

Affiliation Arizona State Univ., Dep. Geol., Tempe, Ariz., United States (USA)

Source NATO Advanced Study Institutes Series. Series C: Mathematical and Physical Sciences, vol. 37, pp.81 -88, 1978

Publisher D. Reidel Publishing Company, Dordrecht-Boston, International (III)

Publication Year 1978

Publication Type Serial; Conference document; Analytic

Accession Number 1980-015321

151. **Database** GeoRef

Title **On the mechanisms of postsubsidence central doming and volcanism in resurgent cauldrons**

Author Bailey, R A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.8, no.5, Rocky Mountain Section 29th annual meeting, pp.567, Apr 1976

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1977-021127

152. **Database** GeoRef

Title **Volcanism, structure, and geochronology of *Long Valley* Caldera, Mono County, California**

Author Bailey, R A; Dalrymple, G B; Lanphere, M A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.725-744, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** caldera, a 17- by 32-km elliptical depression on the east front of the Sierra Nevada, formed 0.7 m.y. ago during eruption of the Bishop tuff. Subsequent intracaldera volcanism included eruption of (1) aphyric rhyolite 0.68-0.64 m.y. ago during resurgent doming of the caldera floor, (2) porphyritic hornblende -biotite rhyolite from centers peripheral to the resurgent dome at 0.5, 0.3, and 0.1 m.y. ago, and (3) porphyritic hornblende -biotite rhyodacite from outer ring fractures 0.2 m.y. ago to 50,000 yr ago, a sequence that apparently records progressive crystallization of a subjacent chemically zoned magma chamber. Holocene rhyolitic and phreatic eruptions suggest that residual magma was present in the chamber as recently as 450 yr ago. Intracaldera hydrothermal activity began at least 0.3 m.y. ago and was widespread in the caldera moat; it has since declined due to self-sealing of near -surface caldera sediments by zeolitization, argillization, and silicification and has become localized on recently reactivated north-west-trending Sierra Nevada frontal faults that tap hot water at depth.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031713

153. **Database** GeoRef

Title **A gravity study of *Long Valley***

Author Pakiser, Louis C

Author Rinehart, C D; Ross, D C

Source U. S. Geological Survey Professional Paper, Report: P 0385, pp.85 -89, 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Clastic and volcanic deposits of Cenozoic age, filling ***Long Valley*** to a depth of 12,000 feet, have a much

lower average density than crystalline rocks of surrounding mountains, and somewhat higher than the muds of Searles Lake basin. The gravity relief rivals great minimum anomalies found in basins between the Coast Ranges. The gravity map suggests a crescentic structural basin bounded on all sides by nearly vertical faults along which it subsided. A pronounced high near the center could represent a mass of dense rock within
the pre-Cenozoic bedrock, or a volcanic neck.

Publication Year 1964

Publication Type Serial; Report; Analytic

Accession Number 1964-005751

154. Database GeoRef

Title **Structural geology and volcanism of Owens *Valley* region, California; a geophysical study**

Author Pakiser, L C; Kane, M F; Jackson, W H

Source U. S. Geological Survey Professional Paper, Report: P 0438, 68 pp., 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Gravity and seismic measurements in Owens ***Valley***, ***Long Valley***, and Mono Basin, which are directly east of the Sierra Nevada, Calif., show these depressions to be downdropped blocks filled with thousands of feet of Cenozoic deposits. Magnetic measurements suggest locations of buried volcanic rocks. A theory relating volcanism to stress reduction associated with faulting is presented. ***Long Valley*** and Mono Basin are identified as volcano-tectonic depressions.

Publication Year 1964

Publication Type Serial; Report; Monographic

Accession Number 1964-013239

155. Database GeoRef

Title **Gravity, volcanism, and crustal deformation in *Long Valley*, California; Article 106**

Author Pakiser, L C

Source U. S. Geological Survey Professional Paper, Report: P 0424-B, pp.B250-B253, 1961

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract A large gravity low, flanked by steep gravity gradients, in the ***Long Valley*** area, can be explained by an ellipse-shaped subsided block, bounded on all sides by a vertical fault zone and the depression filled with 18,000 + or - 5000 ft. of low-density Cenozoic deposits. The structural feature may be a volcano-tectonic depression similar to Mono Basin, California.

Publication Year 1961

Publication Type Serial; Report; Analytic

Accession Number 1961-011933

VOLCANIC BIBLIOGRAPHY

1. Database GeoRef

Title **New (super 40) Ar/ (super 39) Ar ages reveal contemporaneous mafic and silicic eruptions during the past 160,000 years at Mammoth Mountain and *Long Valley* Caldera, California**

Author Mahood, Gail A; Ring, Joshua H; Manganelli, Simone; McWilliams, Michael O

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford, CA, United States (USA)

Source Geological Society of America Bulletin, vol. 122, no. 3-4, pp.396-407, Mar 2010

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract We undertook a (super 40) Ar/ (super 39) Ar study of young mafic and silicic lavas at Mammoth Mountain and the ***Long Valley*** caldera (east-central California) to better understand the frequency of these eruptions and the magmatic plumbing system that drives them. Our results show that most of Mammoth Mountain, a lava-dome complex straddling the southwestern topographic rim of the caldera, consists of trachydacite lavas erupted at ca. 68 ka. These ages and new 29- and 41 ka ages for trachydacite lavas in the northwest quadrant of the caldera indicate that these silicic lavas are considerably younger than previously thought. Mafic lavas vented widely in the western third of the caldera in the past 190,000 years, suggesting that this area has not been underlain by large bodies of silicic magma during this interval, as such magma would have prevented the rise of the denser basaltic magma. We identify four eruptive sequences over the past 190,000 years: the western moat sequence (approximately 190-160 ka), the Mammoth sequence (approximately 120-58 ka), the northwest caldera sequence (approximately 41-29 ka), and the Inyo chain sequence (approximately 9 ka-present). In each eruptive sequence mafic and silicic lavas erupted contemporaneously from spatially associated vents. This suggests that intrusion of alkali basalt into the shallow crust led to the silicic eruptions. If the seismic unrest and deformation of the past three decades is a result of basalt injected beneath Mammoth Mountain and perhaps the western third of the caldera, then there is the possibility of spatially associated small-volume silicic eruptions, which would typically be considerably more explosive. In the past 40,000 years, eruptions have occurred along a N-S linear trend less than 10 km wide, limiting the zone subject to volcanic hazards. Our data bear on Pleistocene glaciation in the region. Ages of 162+ or -2 ka and 99+ or -1 ka for bracketing mafic lava flows better constrain the age of the Casa Diablo till. Our results provide equivocal support for a suggested anticorrelation between ***volcanism*** and glaciation for the past 800,000 years in eastern California (Glazner et al., 1999).

Publication Year 2010

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2010-029009

2. Database GeoRef

Title **A general model for tectonic control of magmatism; examples from *Long Valley* Caldera (USA) and El Chichon (Mexico)**

Author Bursik, M

Affiliation State University of New York at Buffalo, Department of Geology, Buffalo, NY, United States (USA)

Source Geofisica Internacional, vol. 48, no. 1, pp.171-183, Mar 2009

Resource Location http://serpiente. dgsca.unam.mx/serv_hem/revistas/fisica/

Publisher Instituto de Geofisica, UNAM, Mexico, D.F., Mexico (MEX)

Abstract The relationship of volcanoes to regional tectonic setting and earthquake dynamics is intimate. We know that eruptions are often triggered by earthquakes, and that volcanoes generally lie along or near major faults or within faulted provinces. It has been generally found that bimodal basaltic-rhyolitic ***volcanism*** is associated with extensional settings, presumably because of the creation of accommodating space. For intermediate arc volcanoes, tectonic settings are generally compressional or transpressional. The spatial pattern of faulting indicates that ***Long Valley*** was focussed by a releasing bend in the transtensional, Sierran range-front fault system. The temporal pattern of offset rates suggests that the zone of greatest activity has migrated to the NW through time, and is now focussed at the Mono-Inyo Craters. The southern Mexican volcanic arc presents an example of the coexistence of regional compressional and transpressional structures with volcanoes. On an event basis, slip on regional structures creates opportunities for magma movement and eruption, in a type of dynamic fault pumping of fluids. Both kinematically and dynamically, volcanic activity may be completely dependent on tectonic factors for accumulation, storage and eruption of magma.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication Mexico (MEX)

Accession Number 2009-064699

3. Database GeoRef

Title **Uplift and magma intrusion at *Long Valley* Caldera from InSAR and gravity measurements**

Author Tizzani, Pietro; Battaglia, Maurizio; Zeni, Giovanni; Atzori, Simone; Berardino, Paolo; Lanari, Riccardo

Affiliation CNR, Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation University of Rome "La Sapienza", Italy (ITA); Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Source Geology (Boulder), vol. 37, no. 1, pp.63-66, Jan 2009

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The ***Long Valley*** caldera (California) formed approximately 760,000 yr ago following the massive eruption of the Bishop Tuff. Postcaldera ***volcanism*** in the ***Long Valley*** volcanic field includes lava domes as young as 650 yr. The recent geological unrest is characterized by uplift of the resurgent dome in the central section of the caldera (75 cm in the past 33 yr) and earthquake activity followed by periods of relative quiescence. Since the spring of 1998, the caldera has been in a state of low activity. The cause of unrest is still debated, and hypotheses range from hybrid sources (e.g., magma with a high percentage of volatiles) to hydrothermal fluid intrusion. Here, we present observations of surface deformation in the ***Long Valley*** region based on differential synthetic aperture radar interferometry (InSAR), leveling, global positioning system (GPS), two-color electronic distance meter (EDM), and microgravity data. Thanks to the joint application of InSAR and microgravity data, we are able to unambiguously determine that magma is the cause of unrest.

Publication Year 2009

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2009-020469

4. Database ProQuest Deep Indexing: Earth Sciences

Title **Geology, geochronology, and geochemistry of the Miocene-Pliocene Ancestral Cascades arc, northern Sierra Nevada, California and Nevada: The roles of the upper mantle, subducting slab, and the Sierra Nevada lithosphere**

Author Cousens, Brian; Prytulak, Julie; Henry, Christopher; Alcazar, Al; Brownrigg, Tim

Affiliation Department of Earth Sciences, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S5B6, Canada

Source Geosphere [Geosphere]. Vol. 4, no. 5, pp. 829-853. Oct 2008.

Abstract The assemblage of ca. 28-3 Ma volcanic rocks exposed in the Lake Tahoe-Reno region of the northern Sierra Nevada, United States, is interpreted to be part of the Ancestral Cascades volcanic arc. The volcanic rocks are commonly highly porphyritic, including abundant plagioclase with clinopyroxene, amphibole, and rare biotite, and range from basaltic andesite to dacite in composition. Less common are poorly phyric, olivine- and clinopyroxene-bearing basalts and basaltic andesites. Porphyritic lavas dominate composite volcanic centers, whereas the poorly phyric lavas form isolated cinder cone and lava flow complexes. Tahoe-Reno arc lavas are calc-alkaline, enriched in the large ion lithophile elements but depleted in Nb and Ta relative to the light rare earth elements, and have highly variable radiogenic isotopic compositions. Compared to the modern south Cascade arc, Tahoe-Reno region basalts are enriched in the light rare earth and large ion lithophile elements and have higher 87Sr/86Sr and lower 143Nd/144Nd that are consistent with an old, subduction-modified lithospheric mantle source, such as that proposed for lavas of the Western Great Basin. Melting of the lithospheric mantle may be enhanced by fluid flux from the subducting slab if the Juan de Fuca slab dip is shallow. Andesites and dacites evolved from basaltic magmas by a combination of fractional crystallization and assimilation of lower crustal melts. Available geochronological data indicate that the westward sweep of Cenozoic ***volcanism*** through Nevada was associated with steepening of the slab dip, but the dip angle was lower during Miocene-Pliocene arc ***volcanism*** than it is today beneath the modern south Cascades.

Publisher Geological Society of America, 3300 Penrose Place

Publication Type Journal Article

Publication Year 2008

Accession Number 8919904

5. Database GeoRef

Title **Did magma ascent rate control the explosive-effusive transition at the Inyo volcanic chain, California?**

Author Castro, Jonathan M; Gardner, James E

Affiliation Smithsonian Institution, Department of Mineral Sciences, Washington, DC, United States (USA)

Affiliation University of Texas, United States (USA)

Source Geology (Boulder), vol. 36, no. 4, pp.279-282, Apr 2008

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Rhyolitic eruptions often begin explosively and then shift to extrusions of lava. It is widely believed that the style of eruption is dependent on magma flow rate within the conduit, fast ascent leading to explosive eruption and slow ascent favoring effusive behavior. Currently, the velocity of rhyolite magma flowing in a conduit is unknown, and therefore eruption models remain untested against geologic evidence of magma ascent. We show that explosively erupted rhyolite magma from the Inyo volcanic chain ascended slowly (centimeters per second), at same rates as the dome-building phases. We propose that the explosive-effusive transition sub-Plinian rhyolite eruptions is governed by the alleviation of exsolved volatile pressure in the shallow conduit rather than the magma flow rate.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2008-082518

6. Database GeoRef

Title **Supervolcanoes and their explosive supereruptions**

Author Miller, Calvin F; Wark, David A

Affiliation Vanderbilt University, Department of Earth and Environmental Sciences, Nashville, TN, United States (USA)

Affiliation Rensselaer Polytechnic Institute, United States (USA)

Source Elements, vol. 4, no. 1, pp.11-15, Feb 2008

Resource Location http://www.elementsmagazine.org/

Publisher Mineralogical Society of America and Mineralogical Society of Great Britain and Ireland and Mineralogical Association of Canada and Geochemical Society and Clay Minerals Society, International (III)

Abstract Earth's largest volcanic eruptions were an order of magnitude larger than any witnessed by humans since the advent of civilization. These "supereruptions" have played an important role in our species' past and they pose a serious future threat. In this issue of Elements, we consider key issues that reflect both the scientific and social importance of these awe-inspiring phenomena: the products and processes of the eruptions themselves, the nature and evolution of the shallow magma chambers that feed them, the monitoring of active supervolcano systems, and the potential consequences to humans of future supereruptions.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2008-072078

7. Database GeoRef

Title **The magma reservoirs that feed supereruptions**

Author Bachmann, Olivier; Bergantz, George

Affiliation University of Washington, Department of Earth and Space Sciences, Seattle, WA, United States (USA)

Source Elements, vol. 4, no. 1, pp.17-21, Feb 2008

Resource Location http://www.elementsmagazine.org/

Publisher Mineralogical Society of America and Mineralogical Society of Great Britain and Ireland and Mineralogical Association of Canada and

Geochemical Society and Clay Minerals Society, International (III)

Abstract The vigor and size of volcanic eruptions depend on what happens in magma reservoirs in the Earth's crust. When magmatic activity occurs within continental areas, large reservoirs of viscous, gas-rich magma can be generated and cataclysmically discharged into the atmosphere during explosive supereruptions. As currently understood, large pools of explosive magma are produced by extracting interstitial liquid from ***long***-lived "crystal mushes" (magmatic sponges containing >50 vol% of crystals) and collecting it in unstable liquid-dominated lenses.

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2008-072080

8. Database GeoRef

Title **Supervolcanoes and metallic ore deposits**

Author John, David A

Affiliation U. S. Geological Survey, Mineral Resources Program, Menlo Park, CA, United States (USA)

Source Elements, vol. 4, no. 1, pp.22, Feb 2008

Resource Location http://www.elementsmagazine.org/

Publisher Mineralogical Society of America and Mineralogical Society of Great Britain and Ireland and Mineralogical Association of Canada and Geochemical Society and Clay Minerals Society, International (III)

Abstract Do supervolcanoes form metallic ore deposits? If so, what types of deposits do they form and how large are they?

Publication Year 2008

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2008-072081

9. Database GeoRef

Title **Surface deformation of active volcanic areas retrieved with the SBAS-DInSAR technique; an overview**

Author Pepe, Antonio; Manzo, Mariarosaria; Casu, Francesco; Solaro, Giuseppe; Tizzani, Pietro; Zani, Giovanni; Pepe, Susi

Affiliation Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Naples, Italy (ITA)

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Italy (ITA)

Monograph Title Gravity, magnetic, electric and electromagnetic methods in seismology and volcanology

Editor Del Negro, Ciro; Gresta, Stefano; Meloni, Antonio

Source Annals of Geophysics, vol. 51, no. 1, pp.247-263, Feb 2008

Resource Location http://www.ingv.it/~wwwannali/

Publisher Editrice Compositori, Bologna, Italy (ITA)

Abstract This paper presents a comprehensive overview of the surface deformation retrieval capability of the Differential Synthetic Aperture Radar Interferometry (DInSAR) algorithm, referred to as Small BAseline Subset (SBAS) technique, in the context of active volcanic areas. In particular, after a brief description of the algorithm some experiments relevant to three selected case-study areas are presented. First, we concentrate on the application of the SBAS algorithm to a single-orbit scenario, thus considering a set of SAR data composed by images acquired on descending orbits by the European Remote Sensing (ERS) radar sensors and relevant to the ***Long Valley*** caldera (eastern California) area. Subsequently, we address the capability of the SBAS technique in a multiple-orbit context by referring to Mt. Etna volcano (southern Italy) test site, with respect to which two different ERS data set, composed by images acquired both on ascending and descending orbits, are available. Finally, we take advantage of the capability of the algorithm to work in a multi-platform scenario by jointly exploiting two different sets of SAR images collected by the ERS and the Environment Satellite (ENVISAT) radar sensors in the Campi Flegrei caldera (southern Italy) area. The presented results demonstrate the effectiveness of the algorithm to investigate the deformation field in active volcanic areas and the potential of the DInSAR methodologies with in routine surveillance scenario.

Publication Year 2008

Publication Type Serial; Conference document; Analytic

Country of Publication Italy (ITA)

Accession Number 2009-076909

10. Database GeoRef

Title **Converting NAD83 GPS heights into NAVD88 elevations with LVGEOID, a hybrid geoid height model for the *Long Valley* volcanic region, California**

Author Battaglia, Maurizio; Dzurisin, Daniel; Langbein, John; Svarc, Jerry; Hill, David P

Affiliation University of Rome "La Sapienza", Rome, Italy (ITA)

Source Scientific Investigations Report, Report: SIR 2007-5255, 39 pp., 2008

Resource Location http://pubs.usgs.gov/sir/2007/5255/

Report Number SIR 2007-5255

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract A GPS survey of leveling benchmarks done in ***Long Valley*** Caldera in 1999 showed that the application of the National Geodetic Survey (NGS) geoid model GEOID99 to tie GPS heights to historical leveling measurements would significantly underestimate the caldera ground deformation (known from other geodetic measurements). The NGS geoid model was able to correctly reproduce the shape of the deformation, but required a local adjustment to give a realistic estimate of the magnitude of the uplift. In summer 2006, the U.S. Geological Survey conducted a new leveling survey along two major routes crossing the ***Long Valley*** region from north to south (Hwy 395) and from east to west (Hwy 203-Benton Crossing). At the same time, 25 leveling bench marks were occupied with dual frequency GPS receivers to provide a measurement of the ellipsoid heights. Using the heights from these two surveys, we were able to compute a precise geoid height model (LVGEOID) for the ***Long Valley*** volcanic region. Our results show that although the LVGEOID and the latest NGS GEOID03 model practically coincide in areas outside the caldera, there is a difference of up to 0.2 m between the two models within the caldera. Accounting for this difference is critical when using the geoid height model to estimate the ground deformation due to magmatic or tectonic activity in the caldera.

Pages 39

Publication Year 2008

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2008-107933

11. **Database** GeoRef

Title ***Long Valley* Observatory**

Author Venezky, Dina Y; Hill, David

Affiliation U. S. Geological Survey, USA, (United States)

Source U. S. Geological Survey General Information Product, Report: GIP 0078, 2008

Resource Location http://pubs.usgs.gov/gip/78/

Report Number GIP 0078

Publisher U. S. Department of the Interior, U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2008

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2009-040637

12. **Database** GeoRef

Title **Residence times of silicic magmas associated with calderas**

Author Costa, Fidel

Affiliation CSIC, Institut de Ciencies de la Terra Jaume Almera, Barcelona, Spain (ESP)

Monograph Title Abstracts of the 17th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol. 71, no. 15S, pp.A191, Aug 2007

Resource Location http://www.sciencedirect.com/ science/journal/00167037

Publisher Elsevier, New York, NY, International (III)

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2008-069364

13. **Database** GeoRef

Title **Petrologic constraints on eruption triggering at Mammoth Mountain, California**

Author Terpolilli, C; Browne, Brandon

Affiliation California State University, Fullerton, Department of Geological Sciences, Fullerton, CA, United States (USA)

Monograph Title Southern California Academy of Sciences 2007 annual meeting; abstracts of papers

Author Anonymous

Source Bulletin - Southern California Academy of Sciences, vol. 106, no. 2, pp.103-104, Aug 2007

Publisher Southern California Academy of Sciences, Los Angeles, CA, United States (USA)

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-112807

14. **Database** GeoRef

Title **U-Pb dating of zircon crystallization in the Hot Creek Rhyolite, *Long Valley* Caldera, California; no crystal memory of Bishop Tuff magma**

Author Vazquez, J A; Gainer, C

Affiliation California State University, Northridge, Department of Geological Sciences, Northridge, CA, United States (USA)

Monograph Title Southern California Academy of Sciences 2007 annual meeting; abstracts of papers

Author Anonymous

Source Bulletin - Southern California Academy of Sciences, vol. 106, no. 2, pp.104, Aug 2007

Publisher Southern California Academy of Sciences, Los Angeles, CA, United States (USA)

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-112808

15. **Database** GeoRef

Title **Field relationships and mineral abundances of the approximately 5000 year old basalts erupted from Red Cones Volcanoes, California**

Author Martos, A; Louros, M; Browne, Brandon

Affiliation California State University, Fullerton, Department of Geological Sciences, Fullerton, CA, United States (USA)

Monograph Title Southern California Academy of Sciences 2007 annual meeting; abstracts of papers

Author Anonymous

Source Bulletin - Southern California Academy of Sciences, vol. 106, no. 2, pp.106, Aug 2007

Publisher Southern California Academy of Sciences, Los Angeles, CA, United States (USA)

Publication Year 2007

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-112814

16. **Database** GeoRef

Title **Rare sulfur and triple oxygen isotope geochemistry of volcanogenic sulfate aerosols**

Author Bindeman, I N; Eiler, J M; Wing, B A; Farquhar, J

Affiliation University of Oregon, Dept. of Geological Sciences, Eugene, OR, United States (USA)

Affiliation California Institute of Technology, United States (USA); McGill University, Canada (CAN); University of Maryland, College Park, United States (USA)

Source Geochimica et Cosmochimica Acta, vol. 71, no. 9, pp.2326-2343, 01 May 2007

Resource Location http://www.sciencedirect.com/ science/journal/00167037

Publisher Elsevier, New York, NY, International (III)

Abstract We present analyses of stable isotopic ratios (super 17) O/ (super 16) O, (super 18) O/ (super 16) O, (super 34) S/ (super 32) S, and (super 33) S/ (super 32) S, (super 36) S/ (super 32) S in sulfate leached from volcanic ash of a series of well known, large and small volcanic eruptions. We consider eruptions of Mt. St. Helens (Washington, 1980, approximately 1 km (super 3)), Mt. Spurr (Alaska, 1953, <1 km (super 3)), Gjalp (Iceland, 1996, 1998, <1 km (super 3)), Pinatubo (Phillipines, 1991, 10 km (super 3)), Bishop tuff (***Long Valley***, California, 0.76 Ma, 750 km (super 3)), Lower Bandelier tuff (Toledo Caldera, New Mexico, 1.61 Ma, 600 km (super 3)), and Lava Creek and Huckleberry Ridge tuffs (Yellowstone, Wyoming, 0.64 Ma, 1000 km (super 3) and 2.04 Ma 2500 km (super 3), respectively). This list covers much of the diversity of sizes and the character of silicic volcanic eruptions. Particular emphasis is paid to the Lava Creek tuff for which we present wide geographic sample coverage. This global dataset spans a significant range in delta (super 34) S, delta (super 18) O, and Delta (super 17) O of sulfate (29 ppm, 30 ppm, and 3.3 ppm, respectively) with oxygen isotopes recording mass-independent (Delta (super 17) O>0. 2ppm) and sulfur isotopes exhibiting mass-dependent behavior. Products of large eruptions account for most of these isotopic ranges. Sulfate with Delta (super 17) O (super 0.2) ppm is present as 1-10 mu m gypsum crystals on distal ash particles and records the isotopic signature of stratospheric photochemical reactions. Sediments that embed ash layers do not contain sulfate or contain little sulfate with delta (super 17) O near 0 ppm, suggesting that the observed sulfate in ash is of volcanic origin. Mass-dependent fractionation of sulfur isotopic ratios suggests that sulfate-forming reactions did not involve photolysis of SO (sub 2) , like that inferred for pre-2.3 Ga sulfates from Archean sediments or Antarctic ice- core sulfate associated with few dated eruptions. Even though the sulfate sulfur isotopic compositions reflect mass-dependent processes, the products of caldera-forming eruptions display a large delta (super 34) S range and exhibit fractionation relationships that do not follow the expected equilibrium slopes of 0.515 and 1.90 for (super 33) S/ (super 32) S vs. (super 34) S/ (super 32) S and (super 36) S/ (super 32) S vs. (super 34) S/ (super 32) S, respectively. The data presented here are consistent with modification of a chemical mass-dependent fractionation of sulfur isotopes in the volcanic plume by either a kinetic gas phase reaction of volcanic SO (sub 2) with OH and/or a Rayleigh processes involving a residual Rayleigh reactant-volcanic SO (sub 2) gas, rather than a Rayleigh product. These results may also imply at least two removal pathways for SO (sub 2) in volcanic plumes. Above -zero Delta (super 17) O values and their positive correlation with delta (super 18) O in sulfate can be explained by oxidation by high-delta (super 18) O and high-Delta (super 17) O compounds such as ozone and radicals such as OH that result from ozone break down. Large caldera- forming eruptions have the highest Delta (super 17) O values, and the largest range of delta (super 18) O, which can be explained by stratospheric reaction with ozone-derived OH radicals. These results suggest that massive eruptions are capable of causing a temporary depletion of the ozone layer. Such depletion may be many times that of the measured 3-8% depletion following 1991 Pinatubo eruption, if the amount of sulfur dioxide released scales with the amount of ozone depletion.

Publication Year 2007

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2008-044377

17. Database GeoRef

Title **Lead isotopes by LA-MC-ICPMS; tracking the emergence of mantle signatures in an evolving silicic magma system**

Author Simon, J I; Reid, M R; Young, E D

Affiliation University of California, Los Angeles, Department of Earth and Space Sciences, Los Angeles, CA, United States (USA)

Affiliation Northern Arizona University, United States (USA)

Source Geochimica et Cosmochimica Acta, vol.71, no.8, pp.2014-2035, 15 Apr 2007

Resource Location http://www.sciencedirect.com/science/journal/00167037

Publisher Elsevier, New York, NY, International (III)

Abstract At ***Long Valley*** (LV) model Sr isotope phenocryst ages and absolute U-Pb zircon ages from precaldera Glass Mountain (GM) and caldera-related Bishop Tuff (BT) rhyolites show that these crystals track >1 Myr of evolution of a voluminous rhyolite magmatic system. In detail, strong disparities between the different age populations complicate ideas for a unified model for rhyolite generation, differentiation, and storage. To better elucidate the age discrepancies a new in situ Pb isotope technique has been developed to measure the compositions of 113 individual LV feldspars (mainly sanidine) and their host glasses by UV laser ablation MC-ICPMS. Given sufficient signal the accuracy and precision of this technique approaches that of double -spike thermal ionization mass spectrometry. The utility of our technique for many geologic materials is, however, limited to determining Pb isotope ratios that include (super 206) Pb, (super 207) Pb, and (super 208) Pb, but exclude (super 204) Pb. New zircon (super 238) U- (super 206) Pb crystallization ages were also obtained for two older Glass Mountain domes. A >1.5 ppm difference between the Pb isotope compositions of feldspars from older (1.7-2.2 Ma) precaldera Glass Mountain (GM) rhyolites and younger LV rhyolites, including the BT, is found. The Pb isotope data for feldspars and their host glasses lie along a regional trend line between young basalts and evolved crust compositions, spanning approximately 15% of that isotopic difference, and show a secular change towards increasing mantle contribution. Most feldspars have Pb isotope compositions that are similar to their host glasses and, as such, there persists an apparent >100k.y. difference between Sr model feldspar ages and zircon ages for some GM rhyolites. Collectively, the feldspars define a Sr-Pb isotope mixing curve. Evidence for mixing complicates the interpretation that the Sr isotope data solely reflect radiogenic ingrowth. Where isotopically heterogeneous feldspar populations occur, there is greater uncertainty about the veracity of the Sr model ages. Specifically, we find no Pb isotope evidence that BT feldspars grew from older GM-like magmas. The distinct Pb isotope signatures for individual rhyolites and their feldspars support evidence based on zircon dating that LV ***volcanism*** did not erupt from a single ***long***-lived magma chamber but rather tapped a number of different magmas. Moreover, contrary to the conventional model of gradual build-up prior to cataclysmic eruption, secular changes in the U-Pb age constraints on magma residence times and the magmas' distinct Pb isotopic compositions suggest that, at ***Long Valley***, eruptive volumes increase with shorter magma residence time and correlate with greater mantle input. Evidently, the plumbing and therefore activity at ***Long Valley*** was influenced by the evolving interaction between source and crustal magma system.

Publication Year 2007

Publication Type Serial; Analytic

Country of Publication International (III)

Accession Number 2007-098132

18. **Database** GeoRef

Title **Two batholithic magma bodies, Oruanui and Bishop; comparisons and contrasts**

Author Wilson, C J; Liu, Y; Anderson, A T

Affiliation Auckland University, Geology Department, Auckland, New Zealand (NZL)

Affiliation University of Tennessee, United States (USA); University of Chicago, United States (USA)

Monograph Title AGU 2006 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.87, no.Fall Meeting Suppl., Abstract V33C-0679, Dec 2006

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2006

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-075270

19. **Database** GeoRef

Title **Monitoring super-volcanoes; geophysical and geochemical signals at Yellowstone and other large caldera systems**

Author Lowenstern, Jacob B; Smith, Robert B; Hill, David P

Affiliation U. S. Geological Survey, Volcano Hazards Team, Menlo Park, CA, United States (USA)

Affiliation University of Utah, United States (USA)

Monograph Title Extreme natural hazards

Editor Thompson, J Michael T; Heppert, H E; Sparks, R Stephen J

Source Philosophical Transactions - Royal Society. Mathematical, Physical and Engineering Sciences, vol.364, no.1845, pp.2055-2072, 15 Aug 2006

Resource Location http://www.pubs.royalsoc.ac.uk/philtransa.shtml

Publisher Royal Society of London, London, United Kingdom (GBR)

Abstract Earth's largest calderas form as the ground collapses during immense volcanic eruptions, when hundreds to thousands of cubic kilometres of magma are explosively withdrawn from the Earth's crust over a period of days to weeks. Continuing ***long*** after such great eruptions, the resulting calderas often exhibit pronounced unrest, with frequent earthquakes, alternating uplift and subsidence of the ground, and considerable heat and mass flux. Because many active and extinct calderas show evidence for repetition of large eruptions, such systems demand detailed scientific study and monitoring. Two calderas in North America, Yellowstone (Wyoming) and ***Long Valley*** (California), are in areas of youthful tectonic complexity. Scientists strive to understand the signals generated when tectonic, volcanic and hydrothermal (hot ground water) processes intersect. One obstacle to accurate forecasting of large volcanic events is humanity's lack of familiarity with the signals leading up to the largest class of volcanic eruptions. Accordingly, it may be difficult to recognize the difference between smaller and larger eruptions. To prepare ourselves and society, scientists must scrutinize a spectrum of volcanic signals and assess the many factors contributing to unrest and toward diverse modes of eruption.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-020807

20. **Database** GeoRef

Title **Toward "supervolcano" technology**

Author Foulger, Gillian R

Affiliation Durham University, Department of Earth Sciences, Durham, United Kingdom (GBR)

Source Science, vol.313, no.5788, pp.768-769, 11 Aug 2006

Resource Location http://www.sciencemag.org/

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United States (USA)

Accession Number 2006-088243

21. **Database** GeoRef

Title **Volcanic dam hypothesis and possible Sherwin Glaciation age for the McGee Till, *Long Valley* Caldera, Sierra Nevada, California**

Author Stockton, David R

Affiliation P. O. Box 482, Big Pine, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 102nd annual meeting; American Association of Petroleum Geologists, Pacific Section, 81st annual meeting; Society of Petroleum Engineers, Western Region, 76th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.38, no.5, pp.29, May 2006

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Upper McGee Creek Canyon (MCC) is underlain by granodiorite on the east (glacier right), and pendant metasedimentary rock on the west (glacier left). Three high boulder deposits; granitics on a summit flat between Esha Cyn and MCC at 3440 m and on the McGee Mt SE rim at 3260 m, and quartzites on the north shoulder of Mt Aggie at 3320m, define a possible ice surface, and match expected rock types for a MCC glacier. McGee Mt, covered with eroded remnants of a ground moraine, is smoothed and sculpted as if overrun by ice. Distribution of granitic and metasedimentary debris on McGee Mt's west boulder covered ridge and on the rounded ridge between Mt Aggie and McGee Mt, correlate with ice overflowing from MCC into the canyon lying between Mt Aggie and Mt Morrison, draining into Convict Cyn/Tobacco Flat. Existence of the Aggie-McGee Ridge argues against a precaldera MCC emptying into the Convict drainage. Had the ***Long Valley*** Caldera collapse opened a new McGee Creek outlet and captured a McGee-Convict drainage, Aggie-Morrison Cyn would be beheaded and empty into the McGee drainage. Quartzite erratics on the McGee Mt north rim derived from the Convict Lake Formation match quartzite exposures in the cirque between Mt Baldwin and Mt Aggie. MCC glacial detritus from this cirque is glacier-left. North rim quartzites are anomalous in that they lie glacier-right to McGee Mt granitics. This pattern corresponds to metasedimentary laden glacier-left ice exploiting a new course across McGee Mt, followed by granitic laden glacier-center ice pulled into the stream as this new outlet was downcut across the SW McGee Mt plateau and Aggie-McGee Ridge. This could occur if the MCC outlet was unable to accommodate the glacier and ice flow diverted across McGee Mt. Late Quaternary slip rates for Hilton Creek fault at MCC, projected over 760 ky since the Bishop Tuff eruption, account for at least half of current vertical relief of the McGee Mt escarpment above ***Long Valley***. Hildreth and Mahood placed the eruption initiating Plinian phase vent on or near Hilton Creek fault adjacent to McGee Mt. Volcanic activity on Hilton Creek fault, at a time of subdued range-front relief, could obstruct a precaldera MCC outlet, diverting glacier ice across McGee Mt. The upper age constraint upon the McGee Till is that it be precaldera, allowing a possible Sherwin glacial stage designation.

Publication Year 2006

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-030370

22. **Database** GeoRef

Title **Monitoring CO2 gas emissions at Lassen Volcanic National Park**

Author Wilson, Rachel A; Teasdale, Rachel; Senock, Randy

Affiliation California State University, Geological and Environmental Sciences, Chico, CA, United States (USA)

Monograph Title Geological Society of America, Cordilleran Section, 102nd annual meeting; American Association of Petroleum Geologists, Pacific Section, 81st annual meeting; Society of Petroleum Engineers, Western Region, 76th annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.38, no.5, pp.76, May 2006

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Gas emissions are important indicators used to monitor magmatic activity. CO2 gas emission measurements from fumaroles, hot springs, and soil at Lassen Volcanic National Park (LVNP) in northern California marks the first of a three year series of monitoring. The primary sampling site is Sulfur Works (6890 ft elevation), located near the southwest entrance of LVNP. Soil temperatures at Sulfur Works range from 2.8-91.7 C in the top 20 cm. Water in hot springs is as hot as 90 C. CO2 measurements collected at hot springs and in the soil are made using portable CO2 monitors that use infrared gas analyzers (IRGA). Hot springs CO2 emissions range from 260-1400 ppm. Data indicate significant short term variations in near-surface CO2 concentrations,

probably associated with proximity to hydrothermal vents. Diffusion of CO2 through the soil is calculated from the physical properties of soil and CO2 concentrations. The goal for the first stages of monitoring is to determine whether CO2 emissions vary significantly over the monitoring period, and whether there are any periodic changes in gas emission concentrations. Results of this work have potential

use for ***long*** term monitoring similar to that completed at Mammoth Mountain in ***Long Valley*** Caldera

Publication Year 2006

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2007-030463

23. **Database** GeoRef

Title **Unrest in *Long Valley* Caldera, California, 1978-2004**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

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Monograph Title Mechanisms of activity and unrest at large calderas

Editor Troise, Claudia; De Natale, Giuseppe; Kilburn, Christopher R J

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, ITA, (Italy)

Source Geological Society Special Publications, vol.269, pp.1-24, 2006

Publisher Geological Society of London, London, United Kingdom (GBR)

Abstract ***Long Valley*** Caldera and the Mono-Inyo Domes volcanic field in eastern California lie in a left-stepping offset along the eastern escarpment of the Sierra Nevada, at the northern end of the Owens ***Valley*** and the western margin of the Basin and Range Province. Over the last 4 Ma, this volcanic field has produced multiple volcanic eruptions, including the caldera-forming eruption at 760 000 a BP and the recent Mono-Inyo Domes eruptions 500-660 a BP and 250 a BP. Beginning in the late 1970s, the caldera entered a sustained period of unrest that persisted through the end of the century without culminating in an eruption. The unrest has included recurring earthquake swarms; tumescence of the resurgent dome by nearly 80 cm; the onset of diffuse magmatic carbon dioxide emissions around the flanks of Mammoth Mountain on the southwest margin of the caldera; and other indicators of magma transport at mid- to upper-crustal depths. Although we have made substantial progress in understanding the processes driving this unrest, many key questions remain, including the distribution, size, and relation between magma bodies within the mid-to-upper crust beneath the caldera. Mammoth Mountain, and the Inyo Mono volcanic chain, and how these magma bodies are connected to the roots of the magmatic system in the lower crust or upper mantle.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-040462

24. **Database** GeoRef

Title **The search for magma reservoirs in *Long Valley* Caldera; single versus distributed sources**

Author Battaglia, M; Vasco, D W

Affiliation University of Goettingen, Department of Structural Geology and Geodynamics, Goettingen, Federal Republic of Germany (DEU)

Affiliation University College London, United Kingdom (GBR); University of California at Berkeley, United States (USA)

Monograph Title Mechanisms of activity and unrest at large calderas

Editor Troise, Claudia; De Natale, Giuseppe; Kilburn, Christopher R J

Affiliation Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, ITA, (Italy)

Source Geological Society Special Publications, vol.269, pp.173-180, 2006

Publisher Geological Society of London, London, United Kingdom (GBR)

Abstract ***Long Valley*** Caldera and the Mono-Inyo Craters chain form a large volcanic complex in eastern California that has experienced persistent earthquake activity and ground uplift over the past 25 years. The central part of ***Long Valley*** Caldera (an area of more than 100 square km) has been slowly rising since 1980 at an average rate of 3 cm a (super -1) . Inversion of micro-gravimetry and deformation data using a single vertical prolate ellipsoid source has helped to define the existence of a relatively shallow (5-8 km) silicic magma intrusion of 0.11-0.19 km (super 3) beneath the caldera's resurgent dome. We use the information from the single-source inversion to constrain a more general three-dimensional distribution of volume changes in the subsurface. The distributed inversion identifies two main inflation areas beneath the resurgent dome: one following the regional trend of north-south faults, and

another in the dome's southern section, parallel to a strike-slip fault that is responsible for most of the seismic activity in the caldera's south moat.

Publication Year 2006

Publication Type Serial; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2007-040471

25. **Database** GeoRef

Title **From ground deformation to magmatic source processes; why simple elastic models are not enough; examples from *Long Valley* Caldera, California, USA**

Author Newman, Andrew V; Dixon, Timothy H; Gourmelen, N

Affiliation Georgia Institute of Technology, Department of Earth and Atmospheric Sciences, Atlanta, GA, United States (USA)

Affiliation University of Miami, United States (USA)

Monograph Title AGU 2005 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 86, no. 52, Suppl., Abstract G53B-0885, Dec 2005

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-128302

27. **Database** GeoRef

Title **Constraints on evolution and *long*-term slip rates for eastern faults of the San Andreas transform boundary from tephrochronology, new (super 39) Ar/ (super 40) Ar ages, geologic map relations, gravity and magnetic data**

Author McLaughlin, Robert J; Sarna-Wojcicki, Andrei M; Fleck, Robert J; Wagner, David; Clahan, Kevin B; Langenheim, V E; Jachens, Robert C

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation California Geological Survey, United States (USA)

Monograph Title Geological Society of America, 2005 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.37, no.7, pp.181, Oct 2005

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract In Northern California the structural evolution and ***long*** term slip rates of the right-stepping Rodgers Creek -Maacama Fault system during and following Neogene ***volcanism*** along the east side of the wide transform plate boundary are constrained by tephrochronology and (super 39) Ar/ (super 40) Ar dating, integrated with geologic mapping and aeromagnetic and gravity data. Pliocene and younger slip on the Maacama Fault is constrained by offset of a geochemically distinct suite of silicic tephra deposits in the Sonoma Volcanics that erupted at 3.4-2.5 Ma from a caldera centered over Mount St. Helena in NW Napa ***Valley***. (super 39) Ar/ (super 40) Ar ages and tephra geochemistry show that a section of the Mount St. Helena eruptive sequence and underlying gravels exposed on the SW side of the Maacama Fault Zone along the Geysers-Healdsburg Road, is offset right-laterally approximately 17 to 21 km from the Franz ***Valley*** area east of the fault zone, yielding a slip rate of approximately 6.0 + or - 0.7 mm/yr since approximately 3.2 Ma. Stratigraphically high dispersed tephra in synclinally-folded fluvial deposits in the Santa Rosa area correlate with the 1.2-0.8 Ma Bishop-Glass Mountain eruptive sequence of ***Long Valley***. Flat -lying late Pleistocene and Holocene alluvium that overlies the folded strata was deposited in a pull-apart basin in the right step between the Rodgers Creek and Maacama Faults. Slip on the Maacama and Rodgers Creek Faults that accompanied formation of the pull-apart basin (approximately 5 km for the Maacama Fault and approximately 6 km for the Rodgers Creek Fault, as indicated from basin geometry) yields a slip rate of approximately 5.3 + or - 1.1 mm/yr for the Maacama Fault and approximately 6.3 + or - 1.3 mm/yr for the Rodgers Creek Fault since 1.2-0.8 Ma. Possible earlier slip at a slower rate on the Rodgers Creek Fault Zone is suggested by a unique sequence of volcanic and sedimentary rocks, including coarse rhyodacite-sourced fault scarp breccia, deposited along a strike-slip fault basin margin (Cotati Basin). Together with the axis of a prominent antiform, these rocks are offset approximately 28 km right-laterally along the Rodgers Creek Fault Zone. (super 39) Ar/ (super 40) Ar ages of the rhyodacitic rocks are approximately 7.3 to 8.2 Ma, and fluvial deposits (Petaluma Formation) west of the fault that overlie the fault scarp breccia include the 6.26 Ma Roblar Tuff. About 22 km of slip on the fault between 1.2 and
6.3 to 7.3 Ma, yields a slip rate of approximately 4.0 + or - 0.4 mm/yr, much lower than rates since 1.2 Ma.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-050909

28. **Database** GeoRef

Title **Magmatic unrest beneath Mammoth Mountain, California**

Author Hill, D P; Prejean, S

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.146, no.4, pp.257-283, 01 Sep 2005

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Mammoth Mountain, which stands on the southwest rim of ***Long Valley*** caldera in eastern California, last erupted approximately 57,000 years BP. Episodic volcanic unrest detected beneath the mountain since late 1979, however, emphasizes that the underlying volcanic system is still active and capable of producing future volcanic eruptions. The unrest symptoms include swarms of small (M< or =3) earthquakes, spasmodic bursts (rapid-fire sequences of brittle-failure earthquakes with overlapping coda), ***long***- period (LP) and very-***long***-period (VLP) volcanic earthquakes, ground deformation, diffuse emission of magmatic CO (sub 2) , and fumarole gases with elevated (super 3) He/ (super 4) He ratios. Spatial-temporal relations defined by the multi-parameter monitoring data together with earthquake source mechanisms suggest that this Mammoth Mountain unrest is driven by the episodic release of a volume of CO (sub 2) -rich hydrous magmatic fluid derived from the upper reaches of a plexus of basaltic dikes and sills at mid-crustal depths (10-20 km). As the mobilized fluid ascends through the brittle-plastic transition zone and into overlying brittle crust, it triggers earthquake swarm activity and, in the case of the prolonged, 11-month-***long*** earthquake swarm of 1989, crustal deformation and the onset of diffuse CO (sub 2) emissions. Future volcanic activity from this system would most likely involve steam explosions or small -volume, basaltic, strombolian or Hawaiaan style eruptions. The impact of such an event would depend critically on vent location and season.

Publication Year 2005

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2006-030145

29. **Database** GeoRef

Title **Chronologies of magmatic evolution from compositional zoning in allanite**

Author Vazquez, Jorge A; Reid, Mary R

Affiliation California State University, Department of Geological Sciences, Northridge, CA, United States (USA)

Affiliation Northern Arizona University, United States (USA)

Monograph Title Abstracts of the 15th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol.69, no.10, Suppl., pp.17, May 2005

Resource Location http://www.sciencedirect.com/ science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2006-007163

30. **Database** GeoRef

Title **New isotopic measurements of zircon and feldspar constrain the magmatic evolution at *Long Valley* Caldera**

Author Simon, J I; Reid, Mary R; Young, E D

Affiliation University of California at Los Angeles, Los Angeles, CA, United States (USA)

Affiliation NAU Flagstaff, United States (USA)

Monograph Title Abstracts of the 15th annual V. M. Goldschmidt conference

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol.69, no.10, Suppl., pp.234, May 2005

Resource Location http://www.sciencedirect.com/ science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication International (III)

Accession Number 2006-029977

31. **Database** GeoRef

Title **Overview of recent seismicity in the western Great Basin and Walker Lane region**

Author Smith, K D

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Monograph Title SSA 2005; abstracts of the annual meeting

Author Anderson, John G (chairperson); von Seggern, David (chairperson)

Affiliation University of Nevada, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Source Seismological Research Letters, vol. 76, no. 2, pp.244, Apr 2005

Resource Location http://www.seismosoc.org/publications/srl.html

Publisher Seismological Society of America, El Cerrito, CA, United States (USA)

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-034686

32. **Database** GeoRef

Title **Earthquakes and mass transport in the crust beneath the *Long Valley* Caldera-Mammoth Mountain magmatic systems**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Monograph Title Proceedings of the 5th U.S.-Japan natural resources meeting and Parkfield, California fieldtrip

Author Detweiler, Shane T; Ellsworth, William L

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 2005-1131, pp.60, 2005

Resource Location http://pubs.usgs.gov/of/2005/1131/

Report Number OF 2005-1131

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2005

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-019118

33. **Database** GeoRef

Title **Geothermal energy; Canada, Mexico and the United States**

Author Renner, Joel L

Affiliation Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID, United States (USA)

Monograph Title AAPG 2005 annual convention; abstracts volume

Author Anonymous

Source Abstracts: Annual Meeting - American Association of Petroleum Geologists, vol. 14, pp.A116, 2005

Publisher American Association of Petroleum Geologists and Society for Sedimentary Geology, Tulsa, OK, United States (USA)

Abstract World-wide, geothermal resources are most commonly associated with volcanic arcs (Indonesia, Japan, and Philippines) spreading centers (Salton Trough and East African Rift) and with hot spots (Hawaii, Iceland, Yellowstone). Near the margins of the Basin and Range in the U. S. geothermal activity is commonly associated with young ***Volcanism*** (***Long Valley*** and Coso volcanic fields). Additional production is associated with deep fluid circulation in the Basin and Range thought to be localized by recent faulting and the higher than average crustal heat flow in much of the Basin and Range. Geothermal energy is an important energy resource in Mexico and the western United States. Commission Federal de Electricidad produces electricity at Cerro Prieto (just south of Imperial ***Valley***, California), Los Azufres and Tres Virgenes. In the U. S. about 2020 MWe of electrical generation capacity is on-line in California (7 fields), Hawaii (1 field), Nevada (9 fields) and Utah (2 fields). At Meager Creek, British Columbia an electrical generation project is under development. In general, fluids with temperatures of greater than 150 degrees C are used to produce electricity, and above 30 degrees C are used for direct applications such as space heating, crop drying, aquaculture, etc. The U. S. Geological Survey has identified about 23,000 MWe of hydrothermal resources capable of electrical production in the U. S. Mexico is actively exploring for additional production in Baja California and the Central Mexico Volcanic Belt. Canadian activity is currently focused on Meager Mountain, British Columbia.

Publication Year 2005

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-055691

34. **Database** GeoRef

Title **Laser ablation Pb isotopes as tracers of rhyolite evolution and crystal residence times, *Long Valley*, CA**

Author Simon, J I; Reid, M R; Young, E D

Affiliation University of California at Los Angeles, Department of Earth and Space Sciences, Loa Angeles, CA, United States (USA)

Affiliation Northern Arizona University, United States (USA)

Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract V52B-04, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-076660

35. **Database** GeoRef

Title **A new method for measuring volcanic deformation using InSAR persistent scatterers**

Author Hooper, A; Segall, P; Zebker, H

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Monograph Title AGU 2004 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 85, no. 47, Suppl., Abstract G42A-05, Dec 2004

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-079000

36. **Database** GeoRef

Title **Attracting freshmen with field programs; *Long Valley*, Bermuda, Yellowstone**

Author Phinney, Robert A; Sigman, Daniel; Onstott, Tullis C

Affiliation Princeton University, Department of Geosciences, Princeton, NJ, United States (USA)

Monograph Title Geological Society of America, 2004 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.36, no.5, pp.353, Nov 2004

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Field programs have traditionally been taught to mid-level undergraduates, following their commitment to a Geology major and a basic menu of professional coursework. Typically, entering students have virtually no decent background in the earth sciences, and tend to move toward better known majors; even science-inclined students and engineers do not consider Geology. The Princeton program of Freshman Seminars permits us the opportunity of taking 20 applicants on a 9-day field program during fall break. Since most of our freshmen come from an urbanized region in the east, we introduce them to Geology by taking them to the ***Long Valley*** region in California. The course title "Active Geological Processes" is a natural outcome of a trip to this area. ***Volcanism*** ,

earthquakes, faulting, glaciation, landsliding, and rapid geomorphic evolution are evident to the beginner. Salient aspects of the pedagogy are: (1) "knock their socks off" exposure to this area; (2) each day's effort is localized around one site; (3) students keep a field notebook, with observations, discussions, and field sketching combined. The textbook serves as a resource. A great deal of catch-up learning occurs on the outcrop with the active coaching of the instructors. For 20 students, we need 4-5 instructors to keep the student-teacher interactions alive. The main purpose is to offer a course which embodies a pedagogically powerful means of introducing students to the earth sciences--one which is often described as "my best experience at Princeton"--and which can communicate to the University community as a whole the nature of our subject. It is clearly oriented as a recruiting tool, but only as a natural consequence of the course experience. From a 14-year experience with the ***Long Valley*** trip, we have been able to elicit University funding for an Oceanography trip to Bermuda [2003] and a new trip to Yellowstone with a focus on geologically extreme life environments. Conclusions: [1] We strongly recommend an intensive field experience as the introductory stage in geological education, when other constraints permit; [2] Approximately 2-4 of each cadre of 20 go on to become departmental majors; [3] These programs have had an important role in increasing the visibility and positive "buzz" of the department with both students and faculty in the University as a whole.

Publication Year 2004

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-042294

37. **Database** GeoRef

Title **Volcanological perspectives on *Long Valley*, Mammoth Mountain, and Mono Craters; several contiguous but discrete systems**

Author Hildreth, Wes

Affiliation U. S. Geological Survey, Volcano Hazards Team, Menlo Park, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.136, no.3-4, pp.169-198, 15 Sep 2004

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The volcanic history of the ***Long Valley*** region is examined within a framework of six successive (spatially discrete) foci of silicic magmatism, each driven by locally concentrated basaltic intrusion of the deep crust in response to extensional unloading and decompression melting of the upper mantle. A precaldera dacite field (3.5-2.5 Ma) northwest of the later site of ***Long Valley*** and the Glass Mountain locus of >60 high-silica rhyolite vents (2.2-0.79 Ma) northeast of it were spatially and temporally independent magmatic foci, both cold in postcaldera time. Shortly before the 760-ka caldera-forming eruption, the mantle-driven focus of crustal melting shifted approximately 20 km westward, abandoning its ***long***-stable position under Glass Mountain and energizing instead the central ***Long Valley*** system that released 600 km (super 3) of compositionally zoned rhyolitic Bishop Tuff (760 ka), followed by approximately 100 km (super 3) of crystal-poor Early Rhyolite (760-650 ka) on the resurgent dome and later by three separate 5-unit clusters of varied Moat Rhyolites of small volume (527-101 ka). West of the caldera ring-fault zone, a fourth focus started up approximately 160 ka, producing a 10X20-km array of at least 35 mafic vents that surround the trachydacite/alkalic rhyodacite Mammoth Mountain dome complex at its core. This young 70-vent system lies west of the structural caldera and (though it may have locally re-energized the western margin of the mushy moribund ***Long Valley*** Reservoir) represents a thermally and compositionally independent focus. A fifth major discrete focus started up by approximately 50 ka, 25-30 km north of Mammoth Mountain, beneath the center of what has become the Mono Craters chain. In the Holocene, this system advanced both north and south, producing approximately 30 dike-fed domes of crystal-poor high-silica rhyolite, some as young as 650 years. The nearby chain of mid-to-late Holocene Inyo domes is a fault-influenced zone of mixing where magmas of at least four kinds are confluent. The sixth and youngest focus is at Mono Lake, where basalt, dacite, and low-silica rhyolite unrelated to the Mono Craters magma reservoir have erupted in the interval 14 to 0.25 ka. A compelling inference is that mantle-driven magmatic foci have moved repeatedly, allowing abandoned silicic reservoirs, including the formerly vigorous ***Long Valley*** magma chamber, to crystallize. A 100-fold decline of

intracaldera eruption rate after 650 ka, lack of crystal-poor rhyolite since 300 ka, limited volumes of moat rhyolite (most of it crystal-rich), absence of postcaldera mafic ***volcanism*** inside the structural caldera (or north and south adjacent to it), low thermal gradients inside the caldera, and sourcing of hydrothermal underflow within the western array well outside the ring-fault zone all suggest that the ***Long Valley*** magma reservoir is moribund.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2006-003457

38. **Database** GeoRef

Title **The role of extensional structures on experimental calderas and resurgence**

Author Acocella, V; Funiciello, R; Marotta, E; Orsi, G; De Vita, S

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Affiliation University of California at Berkeley, United States (USA); University of Tokyo, Japan (JPN); Osservatorio Vesuviano, Italy (ITA)

Monograph Title The role of laboratory experiments in volcanology

Editor Mader, Heidy M; Manga, Michael; Koyaguchi, Takehiro

Affiliation University of Bristol, Department of Earth Sciences, Bristol, United Kingdom (GBR)

Source Journal of Volcanology and Geothermal Research, vol.129, no.1-3, pp.199-217, 15 Jan 2004

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The structure and shape of collapses and resurgences is often controlled by pre-existing discontinuities, such as normal faults in rift zones. In order to study the role of extensional structures on collapse and resurgence, we used analogue models. Dry sand simulated the brittle crust; silicone, located at the base of the sand-pack, simulated magma. In the experiments, regional extension pre-dated collapse or resurgence, forming normal faults in a graben-like structure; the graben was filled with additional sand, simulating post-rift deposits. A piston then moved the silicone downward or upward, inducing collapse or resurgence within the previously deformed sand. The collapses showed an ellipticity (length of minor axis/length of major axis) between 0.8 and 0.9, with the major axis parallel to the extension direction. The partial reactivation of the pre-existing normal faults was observed during the development of the caldera reverse faults, which, conversely to what was expected (from experiments without pre-existing extension), became partly inward dipping. Resurgence showed an elongation of the uplifted part, with the main axis perpendicular to the extension direction. At depth, pre-existing normal faults were partly reactivated by the reverse faults formed during resurgence; these locally became outward dipping normal faults. A total reactivation of pre-existing faults was also observed during resurgence. The experiments suggest that the observed elongation of calderas and resurgences is the result of the reactivation of pre-existing structures during differential uplift. Such a reactivation is mainly related to the loss in the coefficient of friction of the sand. The results suggest that elliptic calderas and resurgences in nature may develop even from circular magma chambers.

Publication Year 2004

Publication Type Serial; Analytic

Country of Publication Netherlands (NLD)

Accession Number 2004-066302

39. **Database** GeoRef

Title **Study of volcanic sources at *Long Valley* Caldera, California, using gravity data and a genetic algorithm inversion technique**

Author Charco, M; Fernandez, Jose; Tiampo, K; Battaglia, M; Kellogg, L; McClain, J; Rundle, J B

Affiliation Ciudad Universitaria, Instituto de Astronomia y Geodesia, Madrid, Spain (ESP)

Affiliation University of Colorado, United States (USA); Stanford University, United States (USA); University of California at Davis, United States (USA); Jet Propulsion Laboratory, United States (USA)

Monograph Title Geodetic and geophysical effects associated with seismic and volcanic hazards

Editor Fernandez, Jose

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Facultad de Ciencias Matematicas, Madrid, Spain (ESP)

Source Pure and Applied Geophysics, vol.161, no.7, pp.1399-1413, 2004

Resource Location http://link.springer.de/link/service/journals/ 00024/index.htm

Publisher Birkhaeuser, Basel, Switzerland (CHE)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication Switzerland (CHE)

Accession Number 2006-018077

40. **Database** GeoRef

Title **The interpretation of gravity changes and crustal deformation in active volcanic areas**

Author Battaglia, M; Segall, P

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Monograph Title Geodetic and geophysical effects associated with seismic and volcanic hazards

Editor Fernandez, Jose

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Facultad de Ciencias Matematicas, Madrid, Spain (ESP)

Source Pure and Applied Geophysics, vol.161, no.7, pp.1453-1467, 2004

Resource Location http://link.springer.de/link/service/journals/ 00024/index.htm

Publisher Birkhaeuser, Basel, Switzerland (CHE)

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication Switzerland (CHE)

Accession Number 2006-018080

41. **Database** GeoRef

Title **Fragmentation, nucleation and migration of crystals and bubbles in the Bishop Tuff rhyolitic magma**

Author Gualda, Guilherme A R; Cook, David L; Chopra, Rahul; Qin, Liping; Anderson, Alfred T, Jr; Rivers, Mark

Affiliation University of Chicago, Department of the Geophysical Sciences, Chicago, IL, United States (USA)

Monograph Title Fifth Hutton symposium on The origin of granites and related rocks

Editor Ishihara, Shunso; Stephens, W E; Harley, Simon L; Arima, M; Nakajima, Takashi

Source Transactions of the Royal Society of Edinburgh: Earth Sciences, vol. 95, Parts 1-2, pp.375-390, 2004

Resource Location http://www.royalsoced.org.uk/rse_publications/volumes/ trans.htm

Publisher Royal Society of Edinburgh, Edinburgh, United Kingdom (GBR)

Abstract The Bishop Tuff (USA) is a large-volume, high-silica pyroclastic rhyolite. Five pumice clasts from three early stratigraphic units were studied. Size distributions were obtained using three approaches: (1) crushing, sieving and winnowing (reliable for crystals >100 mu m); (2) microscopy of approximately 1 mm (super 3) fragments (preferable for crystals <100 mu m); and (3) computerised X-ray microtomography of approximately 1 cm (super 3) pumice pieces. Phenocryst fragments coated with glass are common, and the size distributions for all crystals are concave-upward, indicating that crystal fragmentation is an important magmatic process. Three groups are recognised, characterised by: (1) high-density (0.759 -0.902 g cm (super -3)), high-crystal content (14.4-15.3 wt. %) and abundant large crystals (>800 mu m); concave-downward size distributions for whole crystals indicate late-stage growth with limited nucleation, compatible with the slow cooling of a large, gas-saturated, stably stratified magma body; (2) low-density (0.499 g cm (super -3)), low-crystal content (6.63 wt.%) and few large crystals; the approximately linear size distribution reveals that nucleation was locally important, perhaps close to the walls; and (3) intermediate characteristics in all respects. The volumetric fraction of bubbles inversely correlates with the number of large crystals. This is incompatible with isobaric closed-system crystallisation, but can be explained by sinking of large crystals and rise of bubbles in the magma.

Publication Year 2004

Publication Type Serial; Conference document; Analytic

Country of Publication United Kingdom (GBR)

Accession Number 2005-047532

42. **Database** GeoRef

Title **Eruptive history and chemical evolution of the precaldera and postcaldera basalt-dacite sequences, *Long Valley*, California; implications for magma sources, current seismic unrest, and future *volcanism***

Author Bailey, Roy A

Affiliation U. S. Geological Survey, USA, (United States)

Source U. S. Geological Survey Professional Paper, Report: P 1692, 75 pp., 2004

Resource Location http://pubs.usgs.gov/pp/pp1692/

Report Number P 1692

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract The ***Long Valley*** Volcanic Field in east-central California straddles the East Sierran frontal fault zone, overlapping the Sierra Nevada and western Basin and Range Provinces. ***Long Valley volcanism*** began about 4 Ma during Pliocene time and has continued intermittently through the Holocene. The current (post-1980) seismic unrest at ***Long Valley***, accompanied by uplift of the resurgent dome, may signal the onset of a new episode of regional extension and basalt injection into the residual magma chamber.

Pages 75

Publication Year 2004

Publication Type Serial; Report; Monographic

Country of Publication United States (USA)

Accession Number 2005-004738

43. **Database** GeoRef

Title **Radon outgassing in the Casa Diablo region, *Long Valley* Caldera, California**

Author Adarkwah, Nipah; Cuff, Kevin

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., pp.F460, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2008-096567

44. **Database** GeoRef

Title **Seismic character of an active silicic volcanic system; *Long Valley* Caldera, California**

Author John, Barbara E; Fountain, David M

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Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52B-0441, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005227

45. **Database** GeoRef

Title **Towards a 4D viscoelastic model for deformation of the *Long Valley* Caldera 1997 inflation episode**

Author Newman, Andrew V; Dixon, Timothy H; Gourmelen, Noel

Affiliation Los Alamos National Laboratory, Earth and Environmental Sciences, Los Alamos, NM, United States (USA)

Affiliation University of Miami, United States (USA)

Monograph Title AGU 2003 fall meeting

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 84, no. 46, Suppl., Abstract no. V52E-08, 08 Dec 2003

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2009-005250

46. **Database** GeoRef

Title **Nomadic crystals; records of magma dynamics at Mt St Helens and Mt Shasta**

Author Cooper, Kari M; Reid, Mary R

Affiliation University of Washington, Department of Earth and Space Sciences, Seattle, WA, United States (USA)

Affiliation Northern Arizona University, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.643, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Crystal ages can provide unique insights about timescales of storage and mixing of liquid and crystal populations within a system, particularly in cases where mixing is difficult to recognize because successive magma batches and crystal populations are chemically similar. We present two case studies where we re-evaluate previously -published U-series, and specifically Ra-Th, ages for mineral separates in mafic and intermediate lavas from Mt. St. Helens (MSH) and Mt. Shasta by incorporating new constraints on the quantity

of Ra initially present in the crystals. Several observations emerge from these revised ages: 1) plagioclase crystals are on average hundreds to thousands of years older than the ages of eruption; 2) four of the nine samples yield discordant pairs of U-series ages (Ra-Th and U-Th) for the same mineral separates, which can be explained by mixtures of crystal populations (or zones) of different ages; and 3) plagioclase separates in the 1982 dacite (MSH) and the Black Butte dacite (Shasta) have anomalously high Ra contents compared to what would theoretically be in equilibrium with liquids like those erupted recently, which may reflect rapid crystal growth (possibly as rims on older crystals) during final ascent and degassing of magmas. One implication of these observations is that recycling of crystals within the same reservoir and related multiple episodes of crystal growth appear to be common (though not ubiquitous) in arc systems. Recycled crystals may have been stored at relatively low temperatures, perhaps in a crystal mush, based on the diffusive behavior of Ba compared to the Ba zoning preserved in individual MSH crystals. In this respect, arc volcanoes may be like slow-spreading midocean ridge systems, where liquid reservoirs are small, ephemeral, or nonexistent. The residence times of crystals within these systems appears to be intermediate between the days to hundreds of years observed in mafic systems (e.g., Kilauea, Hawaii, Ardoukoba, Africa) and the tens to hundreds of ka found in many silicic systems (e.g., ***Long Valley***, Toba caldera).

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-056099

47. **Database** GeoRef

Title **Earthquake-induced fluid pressure changes at *Long Valley*, California; results from the *Long Valley* exploration well**

Author Roeloffs, Evelyn A; Farrar, C D; Henfling, J A; Howle, J F; Jacobson, R D; Sneed, Michelle

Affiliation U. S. Geological Survey, Western Earthquakes Hazard Team, Vancouver, WA, United States (USA)

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Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.196, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract At ***Long Valley*** caldera, California, both local and distant earthquakes have produced persistent water level drops in wells on and north of the caldera's resurgent dome, accompanied by earthquake -induced fluid level increases in the caldera's hydrothermally active south moat. Earthquake-induced water-level drops on and north of the resurgent dome may represent diffusion of localized fluid pressure drops induced abruptly by seismic waves. We evaluate this hypothesis using recent data from the ***Long Valley*** Exploration Well (LVEW), a 3 km deep borehole penetrating the center of the resurgent dome. The uncased interval of the LVEW penetrates relatively impermeable metapelite, and fluid communication is primarily through a conductive fracture 2.6 km below the surface. It has proven useful to collect data using pressure-temperature logging tools built to operate for extended periods at the depth of the fracture zone (temperature 102 degrees C, pressure 22.3 MPa). Data from a pumping test in September, 2001, are consistent with a high-conductance planar fracture 10-100 m ***long*** in country rock with hydraulic diffusivity of 1-10 m (super 2) /s. Tidal amplitudes at the fracture zone depth are 1.93 kPa peak -to -peak, and the ratio of pressure change to strain based on the M2 earth tide constituent is 30.3 kPa/microstrain. Both the Hector Mine, California (Oct. 16, 1999, M7.1) and Denali Fault, Alaska (Nov. 4, 2002, M7. 9) earthquakes produced steplike pressure drops in the LVEW which reached their minimum values (1.24 kPa and 1.17 kPa, respectively) within 3 hours. In contrast, water level drops induced by the same two earthquakes at the shallower LKT well, 4 km NW of the center of the dome, required 10 to 15 days to reach their minima. The Denali Fault earthquake response at the LVEW was not only faster than at LKT, but also about twice as large, consistent with fluid pressure changes occurring abruptly with the passage of seismic waves at a location closer to the LVEW than to LKT. The pressure drops caused by the Hector Mine earthquake are less consistent with this conceptual model, because the fluid pressure dropped slightly more in LKT than in the LVEW. Continued fluid - pressure monitoring should yield more information about the time-space distribution of earthquake -induced fluid-pressure changes at ***Long Valley***.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-083163

48. **Database** GeoRef

Title **New ages for young rhyolites, Mono Craters, California; ion microprobing into the Holocene**

Author Reid, Mary R

Affiliation Northern Arizona University, Department of Geology, Flagstaff, AZ, United States (USA)

Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.183, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract New ages for the Mono Craters rhyolites, the most active volcanic center associated with the ***Long Valley*** caldera system of eastern California, support and extend earlier, sometimes disregarded, estimates for the eruptive history of the domes. Allanite, a light rare earth element-rich epidote mineral, is an accessory phase in many high silica rhyolites. Because Th is concentrated preferentially with respect to U during allanite growth, the recovery of (super 230) Th to statistical equilibrium with (super 238) U provides a potentially sensitive chronometer for allanite crystallization. I have developed a new ion microprobe analytical technique that enables individual allanites to be dated; ages for single grains have also been confirmed by thermal ionization mass spectrometric analysis. Preliminary ages obtained for the older, more porphyritic and mineralogically diverse Mono Craters domes fall in the range of approximately 7 to 20 ka. Dome 18, inferred to be approximately 9.5 k.y old based on hydration rind dating (Wood, 1977) gives a concordant allanite age of 10+ or -1 ka. Dome 11, suggested to be responsible for ash layer 4 in the Wilson Creek formation (Bursik and Sieh, 1989), gives an allanite crystallization age of 20 + or -1 ka, as compared to an hydration rind age of approximately 23.5 ka and an approximate (super 14) C age of approximately 13.3 for layer 4 (Denham and Cox, 1971). Dome 30, inferred to have an Ar-Ar age of 13 + or -1 ka (Hu et al., 1994), hydration rind age of approximately 8.5 ka, and K-Ar age of 7.7+ or -0.4 ka (Taddeuci et al., 1967), gives an allanite age of 7+ or -1 ka but may contain older, approximately 15 ka allanite crystals. Results for Dome 6 are surprising: previously inferred to be one of the oldest domes from an hydration rind age of approximately 30 k.y., dome 6 may be considerably younger based on an allanite crystallization age of 8+ or -2 ka. It is notable that the allanite ages are as precise as earlier Ar-Ar age constraints for Mono Crater domes, although additional work is needed to refine the accuracy of the allanite ages. The allanite ages are maxima because crystallization may have preceded eruption, but their youthfulness compared to eruption age estimates suggests that the pre-eruption residence times of the allanites are negligible. Moreover, these new ages do not support the recalibrated history of ***volcanism*** of Bursik and Sieh (1989) but do support a Holocene rhyolite production rate of 0.8 km (super 3) /k.y. associated with Mono Craters.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2004-085486

49. **Database** GeoRef

Title **Hydrothermal discharge from volcanic areas in the Western United States**

Author Ingebritsen, S E; Mariner, R H; Evans, W C; Hurwitz, S; Schmidt, M E

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Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.487, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Except in the MOR environment, voluminous, high-temperature hydrothermal discharge is commonly associated with silicic ***volcanism*** and a shallow regional water table (e.g. Yellowstone, Kamchatka, Taupo volcanic zone). In the Western U.S., hydrothermal heat discharge ranges up to 6 GW (Yellowstone) and values in the 100 MW range are not uncommon (***Long Valley***, Lassen, Austin Hot Springs). Such large heat discharges likely imply mining of magmatic heat and, as pointed out by Clive Lister (1974), may require active fluid circulation near or within recently crystallized magma. The average hydrothermal heat discharge from some silicic magmatic systems is fairly constant on a multidecadal scale. For instance, measurements at Yellowstone and Lassen suggest relatively steady heat discharge since the early 20th century. Large seasonal variations observed at some localities over the past 30 years are due mainly to interaction with the shallow, cold hydrologic system. Mining of heat from subaerial deposits (Katmai, Loowit Hot Springs at Mt. St. Helens) can temporarily generate comparably large (100s of MW) values of hydrothermal discharge, but pronounced declines in heat output are observed on decadal scales. Relative to silicic systems, focused basaltic magmatism can

provide similarly large heat inputs (e.g. 5-6 GW at Kilauea), but depth to water table tends to be greater in basaltic terranes, and hydrothermal discharge tends to be weaker and less conspicuous (e.g. a maximum of approximately 1 GW of subaerial hydrothermal discharge at Kilauea, mainly as low-temperature, dilute discharge near the coast). Andesitic arcs worldwide exhibit a range of length-normalized hydrothermal -discharge rates. The most important factors controlling hydrothermal discharge may be the rate of magmatic heat input and depth to water table. In the central Oregon Cascade Range, perhaps the most active part of a relatively "weak" andesitic arc (intrusion rate approximately 9-50 cubic km/m.y./km arc length), hydrothermal discharge (approximately 2 MW/km arc length) is relatively hot and visible west of the arc, where the water table is shallow, and relatively cool, dilute, and inconspicuous east of the arc, where the water table is deep. Current length-normalized rates of hydrothermal heat discharge from the Cascade arc are approximately 10 times lower than those in the Taupo volcanic zone, an arc segment analogous to the more-silicic Miocene Cascades.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2005-039274

50. **Database** GeoRef

Title **Remote sensing and GIS evaluation of CO (sub 2) -induced tree kills at Mammoth Mountain, California; 1989 to present**

Author List, Mark R; Hausback, Brian P; Farrar, Christopher D; Pieri, David C

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Monograph Title Geological Society of America, 2003 annual meeting

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.321, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain, a rhyolite to dacite dome complex on the southwestern rim of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold magmatic carbon dioxide (CO (sub 2)), vent from the flanks of the mountain, and this gas is responsible for over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne and satellite based remote sensing data for the field area, collected using multi- and hyperspectral [NS001 (TMS), MASTER, ASTER and AVIRIS] sensors, are evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Two seasons (1998 and 2003) of field spectral measurements have been incorporated into the remote sensing evaluation to establish the reflectance characteristics of the field area, allow for error evaluation, and provide ground truth measurements for improving the quality of the remote sensing analyses. The results of the temporal remote sensing assessment, combined using geographic information systems, are highlighting relationships between surface geology and areas of tree mortality and delineating the migration of tree kills since 1989. These evaluations improve our understanding of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Country of Publication United States (USA)

Accession Number 2006-029575

51. Database GeoRef

Title **Remote sensing and GIS evaluation of CO (sub 2) -induced tree kills at Mammoth Mountain, California; 1989 to present**

Author List, Mark R; Hausback, Brian P; Farrar, Christopher D; Pieri, David C

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Affiliation U. S. Geological Survey, United States (USA); Jet Propulsion Laboratory, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.321, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain, a rhyolite to dacite dome complex on the southwestern rim of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold magmatic carbon dioxide (CO (sub 2)), vent from the flanks of the mountain, and this gas is responsible for over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne and satellite based remote sensing data for the field area, collected using multi- and hyperspectral [NS001 (TMS), MASTER, ASTER and AVIRIS] sensors, are evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Two seasons (1998 and 2003) of field spectral measurements have been incorporated into the remote sensing evaluation to establish the reflectance characteristics of the field area, allow for error evaluation, and provide ground truth measurements for improving the quality of the remote sensing analyses. The results of the temporal remote sensing assessment, combined using geographic information systems, are highlighting relationships between surface geology and areas of tree mortality and delineating the migration of tree kills since 1989. These evaluations improve our understanding of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2006-029575

52. Database GeoRef

Title **Geology in context; an introductory geology course with a multi-disciplinary focus on a field trip to Yosemite and Owens *Valley***

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Affiliation University of the Pacific, Department of Geosciences, Stockton, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.6, pp.276, Nov 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract The Freshman Honors section of my Physical Geology course is focused on a 3-day field trip we take early in the semester through the Sierra foothills to Yosemite and Owens ***Valley*** (all within 3-4 hours drive from campus). Most of the lab units and all of the homework assignments are related to the trip. This trip allows us to study volcanic activity, intrusive igneous rocks, earthquakes, glaciation, hydrology, and mass wasting in a local and regional context. For example, topographic and geologic maps are studied utilizing maps of Yosemite and the ***Long Valley*** Caldera (LVC); igneous rocks and volcanic processes labs include material from Yosemite, LVC, and Devil's Postpile. Post field-trip labs include a study of glacial landforms of Yosemite, analysis of recent stream flow data for areas visited and an analysis of current water composition (from collected samples) and the recent evolution of Mono Lake. Homework assignments prior to the trip involve analysis of current and recent earthquake data as well as data related to recent and potential volcanic activity in ***Long Valley***. Students study geologic maps of the areas to be visited and student pairs are

assigned field trip stops for which they will be the "experts". They prepare handouts and give presentations on the outcrop at their assigned stops. The approach is also multi-disciplinary. Students read the selections from John Muir's "My First Summer in the Sierra" describing his first view of Yosemite ***Valley*** and they write reflections relating it to their own experiences on the trip. In addition the students meet with the curator of a recent exhibit of paintings of Yosemite and the eastern Sierra to view the images and learn how artists visualize the landscapes we have visited. As a final project, the students prepare a group presentation for the other section of the Physical Geology course on the geology of the areas visited, delivered during class at the end of the semester. The presentation requires them to synthesize, both individually and as a group, all the various aspects of the course and to develop (and explain) an understanding of the geologic history of this region. Thus, all of the students gain a better understanding of geology within this local/regional context.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2006-037980

53. Database GeoRef

Title **Crustal unrest in *Long Valley* Caldera, California; new interpretations from geophysical and hydrologic monitoring and deep drilling**

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.165-392, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Publication Year 2003

Publication Type Serial; Monographic

Accession Number 2005-016375

54. Database GeoRef

Title **Summary of recent research in *Long Valley* Caldera, California**

Author Sorey, Michael L; McConnell, Vicki Sue; Roeloffs, Evelyn

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Affiliation Oregon Department of Natural Resources, United States (USA); Oregon Department of Geology and Mineral Resources, United States (USA)

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.165-173, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Since 1978, volcanic unrest in the form of earthquakes and ground deformation has persisted in the ***Long Valley*** caldera and adjacent parts of the Sierra Nevada. The papers in this special volume focus on periods of accelerated seismicity and deformation in 1980, 1983, 1989-1990, and 1997-1998 to delineate relations between geologic, tectonic, and hydrologic processes. The results distinguish between earthquake sequences that result from relaxation of existing stress accumulation through brittle failure and those in which brittle failure is driven by active intrusion. They also indicate that in addition to a relatively shallow (7-10-km) source beneath the resurgent dome, there exists a deeper (approximately 15-km) source beneath the south moat. Analysis of microgravimety and deformation data indicates that the composition of the shallower source may involve a combination of silicic magma and hydrothermal fluid. Pressure and temperature fluctuations in wells have accompanied periods of crustal unrest, and additional pressure and temperature changes accompanying ongoing geothermal power production have resulted in land subsidence. The completion in 1998 of a 3000-m-deep drill hole on the resurgent dome has provided useful information on present and past periods of circulation of water at temperatures of 100 -200 degrees C within the crystalline basement rocks that underlie the post-caldera volcanics. The well is now being converted to a permanent geophysical monitoring station.

Publication Year 2003

Publication Type Serial; Analytic

Accession Number 2005-016376

55. Database GeoRef

Title **The mechanics of unrest at *Long Valley* Caldera, California; 1, Modeling the geometry of the source using GPS, leveling and two-color EDM data**

Author Battaglia, M; Segall, P; Murray, J; Cervelli, P; Langbein, John O

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Affiliation Oregon Department of Natural Resources, United States (USA); U. S. Geological Survey, United States (USA)

Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.195-217, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We surveyed 44 existing leveling monuments in ***Long Valley*** caldera in July 1999, using dual frequency global positioning system (GPS) receivers. We have been able to tie GPS and leveling to a common reference frame in the ***Long Valley*** area and computed the vertical deformation by differencing GPS-based and leveled orthometric heights. The resurgent dome uplifted 74+ or -7 cm from 1975 to 1999. To define the inflation source, we invert two-color EDM and uplift data from the 1985-1999 unrest period using spherical or ellipsoidal sources. We find that the ellipsoidal source satisfies both the vertical and horizontal deformation data, whereas the spherical point source cannot. According to our analysis of the 1985-1999 data, the main source of deformation is a prolate ellipsoid located beneath the resurgent dome at a depth of 5.9 km (95% bounds of 4.9-7.5 km). This body is vertically elongated, has an aspect ratio of 0.475 (95% bounds are 0.25-0.65) and a volume change of 0.086 km (super 3) (95% bounds are 0.06-0.13 km (super 3)). Failure to account for the ellipsoidal nature of the source biases the estimated source depth by 2.1 km (35%), and the source volume by 0.038 km (super 3) (44%).

Publication Year 2003

Publication Type Serial; Analytic

Accession Number 2005-016378

56. Database GeoRef

Title **The mechanics of unrest at *Long Valley* Caldera, California; 2, Constraining the nature of the source using geodetic and micro-gravity data**

Author Battaglia, M; Segall, P; Roberts, C

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Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.219-245, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We model the source of inflation of ***Long Valley*** caldera by combining geodetic and micro- gravity data. Uplift from GPS and leveling, two-color EDM measurements, and residual gravity change determinations are used to estimate the intrusion geometry, assuming a vertical prolate ellipsoidal source. The U.S. Geological Survey occupied the ***Long Valley*** gravity network six times from 1980 to 1985. We reoccupied this network twice, in the summer of 1998 (33 stations), and the summer of 1999 (37 stations). Before gravity data can be used to estimate the density of the intrusion, they must be corrected for the effect of vertical deformation (the free-air effect) and changes in the water table. We use geostatistical techniques to interpolate uplift and water table changes at the gravity stations. The inflation source (a vertical prolate ellipsoid) is located 5.9 km beneath the resurgent dome with an aspect ratio equal to 0.475, a volume change from 1982 to 1999 of 0.136 km (super 3) and a density of around 1700 kg/m (super 3) . A bootstrap method was employed to estimate 95% confidence bounds for the parameters of the inflation model. We obtained a range of 0.105 -0.187 km (super 3) for the volume change, and 1180-2330 kg/m (super 3) for the density. Our results do not support hydrothermal fluid intrusion as the primary cause of unrest, and confirm the intrusion of silicic magma beneath ***Long Valley*** caldera. Failure to account for the ellipsoidal nature of the source biases the estimated source depth by 2.9 km (a 33% increase), the volume change by 0.019 km (super 3) (a 14% increase) and the density by about 1200 kg/m (super 3) (a 40% increase).

Publication Year 2003

Publication Type Serial; Analytic

Accession Number 2005-016379

57. Database GeoRef

Title **Inferences on the hydrothermal system beneath the resurgent dome in *Long Valley* Caldera, East-Central California, USA, from recent pumping tests and geochemical sampling**

Author Farrar, Christopher D; Sorey, Michael L; Roeloffs, Evelyn; Galloway, Devin L; Howle, James F; Jacobson, Ronald

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Affiliation U. S. Geological Survey, Portola Valley, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.127, no.3-4, pp.305-328, 15 Oct 2003

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Quaternary volcanic unrest has provided heat for episodic hydrothermal circulation in the ***Long Valley*** caldera, including the present -day hydrothermal system, which has been active over the past 40 kyr. The most recent period of crustal unrest in this region of east-central California began around 1980 and has included periods of intense seismicity and ground deformation. Uplift totaling more than 0.7 m has been centered on the caldera's resurgent dome, and is best modeled by a near -vertical ellipsoidal source centered at depths of 6-7 km. Modeling of both deformation and microgravity data now suggests that (1) there are two inflation sources beneath the caldera, a shallower source 7-10 km beneath the resurgent dome and a deeper source approximately 15 km beneath the caldera"s south moat and (2) the shallower source may contain components of magmatic brine and gas. The ***Long Valley*** Exploration Well (LVEW), completed in 1998 on the resurgent dome, penetrates to a depth of 3 km directly above this shallower source, but bottoms in a zone of 100 degrees C fluid with zero vertical thermal gradient. Although these results preclude extrapolations of temperatures at depths below 3 km, other information obtained from flow tests and fluid sampling at this well indicates the presence of magmatic volatiles and fault-related permeability within the metamorphic basement rocks underlying the volcanic fill. In this paper, we present recently acquired data from LVEW and compare them with information from other drill holes and thermal springs in ***Long Valley*** to delineate the likely flow paths and fluid system properties under the resurgent dome. Additional information from mineralogical assemblages in core obtained from fracture zones in LVEW documents a previous period of more vigorous and energetic fluid circulation beneath the resurgent dome. Although this system apparently died off as a result of mineral deposition and cooling (and/or deepening) of magmatic heat sources, flow testing and tidal analyses of LVEW water level data show that relatively high permeability and strain sensitivity still exist in the steeply dipping principal fracture zone penetrated at a depth of 2.6 km. The hydraulic properties of this zone would allow a pressure change induced at distances of several kilometers below the well to be observable within a matter of days. This indicates that continuous fluid pressure monitoring in the well could provide direct evidence of future intrusions of magma or high-temperature fluids at depths of 5-7 km.

Publication Year 2003

Publication Type Serial; Analytic

Accession Number 2005-016382

58. Database GeoRef

Title **A volcanotectonic cascade; activation of range front faulting and eruptions by dike intrusion, Mono Basin-*Long Valley* Caldera, California**

Author Bursik, M; Renshaw, C; McCalpin, J; Berry, M

Affiliation State University of New York at Buffalo, Department of Geology, Buffalo, NY, United States (USA)

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Source Journal of Geophysical Research, vol.108, no.B8, 14 pp., 10 Aug 2003

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Analytic

Accession Number 2005-012144

59. Database GeoRef

Title **Remote sensing evaluation of Mammoth Mountain, California; mapping spatial and temporal variations in volcanogenic CO (sub 2) induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Sacramento, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.35, no.4, pp.7, Apr 2003

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Mammoth Mountain Volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera in eastern central California, has shown signs of volcanic unrest since the early 1980s. High concentrations of cold carbon dioxide (CO (sub 2)), believed to be volcanogenic in nature, are being emitted from the flanks of the mountain. The emitted CO (sub 2) is interpreted to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. Airborne remote sensing data for the field area, collected using multi- and hyperspectral (NS001 (TMS), MASTER, ASTER and AVIRIS) sensors, are being evaluated to map the spatial and temporal variation in the distribution of magmatic CO (sub 2) -induced tree kills between 1989 and present. Field spectral measurements have been incorporated into the remote sensing evaluation to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the remote sensing analyses. The results of the temporal remote sensing assessment have been integrated into a geographic information system with a detailed geologic map of the field area to highlight relationships between surface geology and areas of tree mortality. These evaluations will assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-010631

60.Database GeoRef

Title **Three-dimensional crustal structure of *Long Valley* Caldera, California, and evidence for the migration of CO (sub 2) under Mammoth Mountain**

Author Foulger, G R; Julian, B R; Pitt, A M; Hill, D P; Malin, P E; Shalev, Eylon

Affiliation U. S. Geological Survey, Volcano Hazards Team, Menlo Park, CA, United States (USA)

Affiliation Duke University, United States (USA)

Source Journal of Geophysical Research, vol.108, no.B3, 16 pp., 10 Mar 2003

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2003

Publication Type Serial; Analytic

Accession Number 2004-066574

61. Database GeoRef

Title **The *Long Valley* Caldera GIS database**

Author Battaglia, Maurizio; Williams, M J; Venezky, D Y; Hill, D P; Langbein, J O; Farrar, C D; Howle, J F; Sneed, Michelle; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Source U. S. Geological Survey Digital Data Series, Report: DDS-0081, 1 disc, 2003

Resource Location http://pubs.usgs.gov/dds/dds-81/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract This database provides an overview of the studies being conducted by the ***Long Valley*** Observatory in eastern California from 1975 to 2001. The database includes geologic, monitoring, and topographic datasets related to ***Long Valley*** caldera.

Publication Year 2003

Publication Type Serial; Report; Monographic

Accession Number 2005-008519

62. Database GeoRef

Title **Crystal size distribution and geochemistry of rhyolitic lavas from the Inyo volcanic chain, *Long Valley*, California**

Author Meilleur, D; Higgins, M D

Affiliation Universite du Quebec a Chicoutimi, Chicoutimi, QC, Canada (CAN)

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol.28, unpaginated, 2003

Resource Location http://www.esd.mun.ca/~gac/ ANNMEET/annmeet.htmls

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 2003

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2007-078271

63. Database GeoRef

Title **Roots of the *Long Valley* Caldera? Mono Craters volcanic field**

Author Hill, David P; Bailey, Roy A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.83, no.47, Suppl., pp.1032, Nov 2002

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2005-064003

64. Database GeoRef

Title **Inferring volcanic activity and subsurface conditions at Mammoth Mountain, California by mapping remotely sensed spatial and temporal variations in CO (sub 2) -induced tree kills**

Author List, Mark R; Hausback, Brian P

Affiliation California State University at Sacramento, Geology Department, Sacramento, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.34, no.6, pp.551, Oct 2002

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract High Concentrations of cold Carbon dioxide (CO (sub 2)) emitted from the flanks of Mammoth Mountain volcano, on the southwestern ring fracture of the ***Long Valley*** Caldera, eastern California, are believed to be the cause of over 170 acres of dead trees in that area since 1990. Shallow magmatic intrusions, inferred from seismic activity, ground deformation, and changes in fumarolic gas composition on and around Mammoth Mountain beginning in 1989, have been interpreted as the source of the CO (sub 2) gas. To evaluate volcanic activity and interpret subsurface conditions at Mammoth Mountain, this study maps the

spatial and temporal variations in the distribution of magmatic CO (sub 2) -induced tree kills using remote sensing technology. Digital mapping of the time-varied CO (sub 2) -induced tree kills incorporates available multi-and hyper -spectral image sets from NASA, including: AVIRIS, TIMS, NS001 (TM Simulator), and MASTER data for the study area. Spectral measurements have been made in the field to establish the reflectance characteristics of the field area, to provide ground truth measurements and improve the quality of the remote sensing analyses. Developing an understanding of the temporal migration of CO (sub 2) emission-induced tree kills may assist in constructing a picture of the structure and volcanic activity beneath Mammoth Mountain and aid in analysis of future volcanic unrest.

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2005-019340

65. Database GeoRef

Title **Gas geochemistry of the Valles Caldera region, New Mexico and comparisons with gases at Yellowstone, *Long Valley* and other geothermal systems**

Author Goff, Fraser; Janik, Cathy J

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.116, no.3-4, pp.299-323, Aug 2002

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Noncondensible gases from hot springs, fumaroles, and deep wells within the Valles caldera geothermal system (210 -300 degrees C) consist of roughly 98.5 mol% CO (sub 2) , 0.5

mol% H (sub 2) S, and 1 mol% other components. (super 3) He/ (super 4) He ratios indicate a deep magmatic source (R/R (sub a) up to 6) whereas delta (super 13) C-CO (sub 2) values (-3 to -5 per mil) do not discriminate between a mantle/magmatic source and a source from subjacent, hydrothermally altered Paleozoic carbonate rocks. Regional gases from sites within a 50-km radius beyond Valles caldera are relatively enriched in CO (sub 2) and He, but depleted in H (sub 2) S compared to Valles gases. Regional gases have R/R (sub a) values < or =1.2 due to more interaction with the crust and/or less contribution from the mantle. Carbon sources for regional CO (sub 2) are varied. During 1982-1998, repeat analyses of gases from intracaldera sites at Sulphur Springs showed relatively constant CH (sub 4) , H (sub 2) , and H (sub 2) S contents. The only exception was gas from Footbath Spring (1987-1993), which experienced increases in these three components during drilling and testing of scientific wells VC-2a and VC-2b. Present-day Valles gases contain substantially less N (sub 2) than fluid inclusion gases trapped in deep, early -stage, post- caldera vein minerals. This suggests that the ***long***-lived Valles hydrothermal system (ca. 1 Myr) has depleted subsurface Paleozoic sedimentary rocks of nitrogen. When compared with gases from many other geothermal systems, Valles caldera gases are relatively enriched in He but depleted in CH (sub 4) , N (sub 2) and Ar. In this respect, Valles gases resemble end -member hydrothermal and magmatic gases discharged at hot spots (Galapagos, Kilauea, and Yellowstone).

Publication Year 2002

Publication Type Serial; Analytic

Accession Number 2002-060633

66. Database GeoRef

Title **Testing the internally consistent age information of U-series disequilibria in rhyolites; Inyo Domes, CA**

Author Heumann, A; Elliott, T; Davies, G R

Affiliation Vrije Universiteit, FALW, Amsterdam, Netherlands (NLD)

Affiliation University of Bristol, United Kingdom (GBR)

Author Anonymous

Source Geochimica et Cosmochimica Acta, vol.66, no.15A, pp.327, Aug 2002

Resource Location http://www.sciencedirect.com/ science/journal/00167037

Publisher Pergamon, Oxford, International (III)

Publication Year 2002

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-019288

67. Database GeoRef

Title **Tracing and quantifying magmatic carbon discharge in cold groundwaters; lessons learned from Mammoth Mountain, USA**

Author Evans, William C; Sorey, Michael L; Cook, Andrea C; Kennedy, B Mack; Shuster, David L; Colvard, Elizabeth M; White, Lloyd D; Huebner, Mark A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA); Lawrence Berkeley National Laboratory, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.114, no.3-4, pp.291-312, 30 May 2002

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A major campaign to quantify the magmatic carbon discharge in cold groundwaters around Mammoth Mountain volcano in eastern California was carried out from 1996 to 1999. The total water flow from all sampled cold springs was > or =1.8X10 (super 7) m (super 3) /yr draining an area that receives an estimated 2.5X10 (super 7) m (super 3) /yr of recharge, suggesting that sample coverage of the groundwater system was essentially complete. Some of the waters contain magmatic helium with (super 3) He/ (super 4) He ratios as high as 4.5 times the atmospheric ratio, and a magmatic component in the dissolved inorganic

carbon (DIC) can be identified in virtually every feature sampled. Many waters have a (super 14) C of 0-5 pmC, a delta (super 13) C near -5 per mil, and contain high concentrations (20-50 mmol/l) of CO (sub 2(aq)) ; but are otherwise dilute (specific conductance = 100-300 mu S/cm) with low pH values between 5 and 6. Such waters have previously escaped notice at Mammoth Mountain, and possibly at many other volcanoes, because CO (sub 2) is rapidly lost to the air as the water flows away from the springs, leaving neutral pH waters containing only 1-3 mmol/l HCO (sub 3) (super -) . The total discharge of magmatic carbon in the cold groundwater system at Mammoth Mountain is approximately 20 000 t/yr (as CO (sub 2)), ranging seasonally from about 30 to 90 t/day. Several types of evidence show that this high discharge of magmatic DIC arose in part because of shallow dike intrusion in 1989, but also demonstrate that a ***long***-term discharge possibly half this magnitude (approximately 10 000 t/yr) predated that intrusion. To sustain a 10 000 t/yr DIC discharge would require a magma intrusion rate of 0.057 km (super 3) per century, assuming complete degassing of magma with 0.65 wt% CO (sub 2) and a density of 2.7 t/m (super 3) . The geochemical data also identify a small (<1 t/day) discharge of magmatic DIC that can be traced to the Inyo Domes area north of Mammoth Mountain and outside the associated ***Long Valley*** caldera. This research, along with recent studies at Lassen Peak and other western USA volcanoes, suggests that the amount of magmatic carbon in cold groundwaters is important to constraining rates of intrusion and edifice weathering at individual volcanoes and may even represent a significant fraction of the global carbon discharge from volcanoes.

Publication Year 2002

Publication Type Serial; Analytic

Accession Number 2002-057957

68. Database GeoRef

Title **Detecting volcanic eruption precursors; a new method using gravity and deformation measurements**

Author Williams-Jones, Glyn; Rymer, Hazel

Affiliation Open University, Department of Earth Sciences, Milton Keynes, United Kingdom (GBR)

Affiliation University of Miami, United States (USA); Universidad Nacional Autonoma de Mexico, Mexico (MEX)

Affiliation Russian Academy of Sciences, Geoelectromagnetic Research Institute, Moscow, Russian Federation (RUS)

Source Journal of Volcanology and Geothermal Research, vol.113, no.3-4, pp.379-389, 30 Mar 2002

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract One of the fundamental questions in modern volcanology is the manner in which a volcanic

eruption is triggered; the intrusion of fresh magma into a reservoir is thought to be a key component. The amount by which previously ponded reservoir magma interacts with a newly intruded magma will determine the nature and rate of eruption as well as the chemistry of erupted lavas and shallow dykes. The physics of this interaction can be investigated through a conventional monitoring procedure that incorporates the simple and much used Mogi model relating ground deformation (most simply represented by Delta h) to changes in volume of a magma reservoir. Gravity changes (Delta g) combined with ground deformation provide information on magma reservoir mass changes. Our models predict how, during inflation, the observed Delta g/Delta h gradient will evolve as a volcano develops from a state of dormancy through unrest into a state of explosive activity. Calderas in a state of unrest and large composite volcanoes are the targets for the methods proposed here and are exemplified by Campi Flegrei, Rabaul, Krafla, and ***Long Valley***. We show here how the simultaneous measurement of deformation and gravity at only a few key stations can identify important precursory processes within a magma reservoir prior to the onset of more conventional eruption precursors.

Publication Year 2002

Publication Type Serial; Conference document; Analytic

Accession Number 2002-055679

69. Database GeoRef

Title **Response plan for volcano hazards in the *Long Valley* Caldera and Mono Craters region California**

Author Hill, David P; Dzurisin, Daniel; Ellsworth, William L; Endo, Elliot T; Galloway, D L; Gerlach, Terry M; Johnston, Malcolm J S; Langbein, John; McGee, Ken A; Miller, C Dan; Oppenheimer, David H; Sorey, Michael L

Affiliation U. S. Geological Survey, USA, (United States)

Source U. S. Geological Survey Bulletin, Report: B 2185, 57 pp., 2002

Resource Location http://pubs.usgs.gov/bul/b2185/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Persistent unrest in the ***Long Valley*** Caldera, characterized by recurring earthquake swarms, inflation of the resurgent dome in the central sections of the caldera, and emissions of magmatic carbon dioxide around Mammoth Mountain, during the last two decades and continuing into the 21st century emphasize that this geologically youthful volcanic system is capable of further volcanic activity. This document describes the U. S. Geological Survey's (USGS) response plan for future episodes of unrest that might augur the onset of renewed ***volcanism*** in the caldera or along the Inyo-Mono Craters chain to the north. Central to this response plan is a four-level color code with successive conditions, GREEN (no immediate risk) through RED (eruption under way), reflecting progressively more intense activity levels as summarized in table 1 and 2 and described in detail in section II of this report.

Publication Year 2002

Publication Type Serial; Report; Monographic

Accession Number 2002-030974

70. Database GeoRef

Title **New insights into the structural, hydrothermal, and biological systems of the *Long Valley* Caldera using hyperspectral imaging**

Author Martini, Brigette Ann

Publication Year 2002

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 2004-002915

71. Database GeoRef

Title **Time-variation of hydrothermal discharge at selected sites in the Western United States; implications for monitoring**

Author Ingebritsen, S E; Galloway, D L; Colvard, E M; Sorey, M L; Mariner, R H

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.111, no.1-4, pp.1-23, Nov 2001

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We compiled time series of hydrothermal discharge consisting of 3593 chloride - or heat- flux measurements from 24 sites in the Yellowstone region, the northern Oregon Cascades, Lassen Volcanic National Park and vicinity, and ***Long Valley***, California. At all of these sites the hydrothermal phenomena are believed to be as yet unaffected by human activity, though much of the data collection was driven by mandates to collect environmental-baseline data in anticipation of geothermal development. The time series average 19 years in length and some of the Yellowstone sites have been monitored intermittently for over 30 years. Many sites show strong seasonality but few show clear ***long***-term trends, and at most sites statistically significant decadal -scale trends are absent. Thus, the data provide robust estimates of advective heat flow ranging from approximately 130 MW in the north-central Oregon Cascades to approximately 6100 MW in the Yellowstone region, and also document Yellowstone hydrothermal chloride and arsenic fluxes of 1740 and 15-20 g/s, respectively. The discharge time series show little sensitivity to regional tectonic events such as earthquakes or inflation/deflation cycles. Most ***long***-term monitoring to date has focused on high-chloride springs and low -temperature fumaroles. The relative stability of these features suggests that discharge measurements done as part of volcano-monitoring programs should focus instead on high-temperature fumaroles, which may be more immediately linked to the magmatic heat source.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2002-023882

72. Database GeoRef

Title **The control of overburden thickness on resurgent domes; insights from analogue models**

Author Acocella, V; Cifelli, F; Funiciello, R

Affiliation Universita di Roma Tre, Dipartimento di Scienze Geologiche, Rome, Italy (ITA)

Source Journal of Volcanology and Geothermal Research, vol.111, no.1-4, pp.137-153, Nov 2001

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Resurgent doming consists of the uplift, usually accompanied by volcanic activity, of part of a collapse caldera. Analogue models were used to investigate the architecture of resurgent domes. Dry sand simulates the brittle crust; uprising silicone, located at the base of the sand-pack, simulates magma. The deformation pattern depends mainly upon: (1) the ratio (aspect ratio) between the thickness of the sand overburden and the width of the silicone intrusion; (2) the duration of experiment. For aspect ratios nearly equal 1, two concentric domes develop; the first-formed outer dome is bordered by inward-dipping reverse ring faults, while the inner dome by outward-dipping normal ring faults. The layers inside the dome are uniformly dipping. For aspect ratios nearly equal 0.4, the dome shows a crestal depression, surrounded by radial fractures, followed by an apical extrusion of silicone. The internal structure of the dome is made up of domed layers. Independently from the aspect ratio, the duration of the experiment enhances silicone extrusion. A consistent structure is observed in most resurgent domes in nature. The comparison between experiments and nature suggests that two distinct resurgence modes occur, mainly depending on the aspect ratio (thickness/width) of the crust overlying the magma chamber. Aspect ratios nearly equal 1 develop a resurgent block with uniformly-dipping layers and peripheral volcanic activity (Ischia and Pantelleria type). Aspect ratios nearly equal 0.4 develop a resurgent dome with a crestal depression, domed layers within and peripheral and internal volcanic activity (Valles and ***Long Valley*** type).

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2002-023889

73. Database GeoRef

Title **Onset of caldera collapse during ignimbrite eruptions**

Author Roche, Olivier; Druitt, Timothy H

Affiliation Universite Blaise Pascal, Laboratoire Magmas et Volcans, Clermont-Ferrand, France (FRA)

Source Earth and Planetary Science Letters, vol.191, no.3-4, pp.191-202, 15 Sep 2001

Resource Location http://www.sciencedirect.com/ science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The rapid depressurisation and discharge of volatile rich silicic magma chamber and the onset of caldera collapse associated with ignimbrite eruption is investigated using combined theoretical and experimental approaches. We first present a scaling analysis of the force balance on the roof of a depressurising magma chamber. This provides a failure criterion for the chamber roof and shows that the chamber underpressure required to trigger coherent (piston) collapse along a vertical or steeply outward dipping reverse ring fault increases with the roof aspect ratio (R = thickness/width). The failure criterion is validated by a series of experiments that reveal a transition, with increasing roof aspect ratio, from piston collapse to either (1) no collapse (low reservoir underpressure) or (2) non-coherent collapse (high reservoir underpressure). Then, taking into account the failure criterion obtained with the scaling analysis, a theoretical model allows calculation of the erupted chamber volume fraction required to trigger caldera collapse. We consider a two stage model, with an initially overpressured chamber that becomes progressively underpressured as the eruption proceeds. The main input parameters are the chamber depth, vertical extent and ellipticity in plan view, the magma water content, the cohesion and coefficient of internal friction of the roof, and the ring fault dip. In the case of a mechanically homogeneous roof and a single, large and rapid eruption, the erupted volume fraction required to trigger piston collapse increases with the roof aspect ratio until the chamber is totally emptied (before initiation of

any collapse) at R nearly equal 1-1.4, the exact value depending mainly on the ring fault dip and to a lesser extent on the coefficient of internal friction of the roof. As shown by experiments, collapse into reservoirs with R>1-1.4 probably cannot collapse as a piston and, if a surface caldera forms at all, collapse is more likely to occur non-coherently. Data for the onset of caldera collapse during seven well documented major ignimbrite eruptions are in broad agreement with the model.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-075259

74. Database GeoRef

Title **Joint interpretation of displacement and gravity data in volcanic areas; a text example; *Long Valley* Caldera, California**

Author Fernandez, J; Charco, M; Tiampo, K F; Jentzsch, G; Rundle, J B

Affiliation Universidad Complutense de Madrid, Instituto de Astronomia y Geodesia, Madrid, Spain (ESP)

Affiliation University of Colorado, United States (USA); FSU Jena, Federal Republic of Germany (DEU)

Source Geophysical Research Letters, vol. 28, no. 6, pp.1063-1066, 15 Mar 2001

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Volcanic activity produces deformation and gravity changes that many times can be used as precursors of future eruptions. Applying geodetic techniques to monitoring activity involves interpretation using deformation models. Usually gravity change data and displacement data are interpreted separately. We show, using modeling of deformation and gravity change data in ***Long Valley*** Caldera, California, USA, that this can lead to incorrect interpretations. The results obtained show that displacements and gravity changes must be interpreted together whenever possible and that elastic-gravitational models can be a far more appropriate approximation to problems of volcanic load in the crust than the more commonly used purely elastic models. Therefore it is necessary to change the philosophy normally used to interpret geodetic observations, improving the possibility of predicting future eruptions. Copyright 2001 by the American Geophysical Union.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-033338

75. Database GeoRef

Title **Geodetic and seismic constraints on recent activity at *Long Valley* Caldera, California; evidence for viscoelastic rheology**

Author Newman, A V; Dixon, T H; Ofoegbu, G I; Dixon, J E

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation Rosenstiel School of Marine and Atmospheric Science, United States (USA); Southwest Research Institute, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.105, no.3, pp.183-206, Feb 2001

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract ***Long Valley*** Caldera is an active volcanic region in east central California. Surface deformation on the resurgent dome within the caldera was an order of magnitude higher for the five-month period September 1997 through January 1998 compared to the previous three-year average. However, the location of the immediate (shallow) source of deformation remained essentially constant, 5-7 km beneath the dome, near the top of a region of probable magma accumulation defined by seismic data. Similarly, although the rate of seismic moment release increased dramatically, earthquake locations remained similar to earlier periods. The rate of deformation increased exponentially between April-May 1997 and late November 1997 with a time constant of approximately 55-65 days, after which it decreased exponentially with about the same time constant. We develop a model consistent

with these observations and also consistent with independent constraints on sub-surface rheology from thermal, geochemical and laboratory data. Deformation at sites on the resurgent dome most sensitive to the shallow deformation source are well fit by a model with a single pressure source at 6km depth which experienced a pressure pulse that began in late 1996, peaked in November 1997, close to the time of major seismic moment release, and essentially ended in mid-1999. The pressure source in our model is surrounded by a 1 km thick "shell" of Maxwell viscoelastic material (shell viscosity 10 (super 16) Pa s) within an elastic half space, and has peak values that are much lower than corresponding purely elastic half space models. The shell viscosity is characteristic of a weak, deformable solid, e.g. quartz-bearing country rock surrounding the magma chamber at temperatures in the range 500-600 degrees C, i.e. above the brittle-ductile transition, and/or largely crystallized rhyolite near its solidus temperature of approximately 670 degrees C, material that probably exists near the top of the zoned magma chamber at ***Long Valley***.

Publication Year 2001

Publication Type Serial; Analytic

Accession Number 2001-030954

77. Database GeoRef

Title **Analogue models of collapse calderas and resurgent domes**

Author Acocella, V; Cifelli, F; Funiciello, R

Affiliation Universita di Roma Tre, Dipartmento di Scienze Geologiche, Rome, Italy (ITA)

Source Journal of Volcanology and Geothermal Research, vol.104, no.1-4, pp.81-96, Dec 2000

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Collapse calderas and resurgent domes are a common association related to inflation-deflation processes in volcanic systems. The structure of calderas and domes depends upon the permitted, relative movements of crustal volumes at depth (the so-called "space problem"). In order to study the structures of collapse calderas and resurgent domes and to take the space problem into account, several analogue models were made. Dry-quartz sand was used to simulate the rheology of the brittle crust, while newtonian silicone putty, located at the base of the sand-pack, simulated the ductile behaviour of the magma. A piston moved the silicone putty downward or upward, inducing collapse and doming within the sand. Three separate sets of experiments simulated: (1) caldera collapse; (2) resurgence; and (3) superimposition of resurgence on collapse and vice versa. Collapse experiments are characterized by the development of two concentric depressions; the first-formed depression is bordered by outward dipping reverse ring faults; the subsequent, outer concentric depression is bordered by inward dipping normal ring faults. The deformation pattern during resurgence is a function of the overburden thickness (T) and the dome diameter (D). For higher T/D ratios a dome forms, bordered by inward dipping high angle reverse ring faults;

outward dipping normal ring faults develop at late stages. For lower T/D ratios, the dome shows, at late stages, a crestal depression accompanied by radial fractures; subsequently, an apical extrusion of silicone occurs. The superimposition of resurgence over collapse (and vice versa) is characterized by the complete reactivation, with opposite kinematics, of all the pre-existing ring faults during inversion. Both in caldera and resurgence, reverse ring faults form in the early stages due to differential uplift; extensional structures subsequently form to accommodate gravitational collapse during the activity of the reverse faults. The experiments and the overall similarities with nature suggest that the activity of both reverse and normal faults constitutes a possible solution to the space problem during major collapses or resurgences.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2001-025307

78. Database GeoRef

Title **Magmatic carbon in cold groundwaters at Mammoth Mountain, CA**

Author Evans, William C; Sorey, Michael L; Cook, Andrea C; Kennedy, B Mack

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1386, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-070091

79. Database GeoRef

Title **Why was the eruption of the Bishop Tuff so large?**

Author Jellinek, Mark; DePaolo, Donald J

Affiliation University of California at Berkeley, Department of Earth and Planetary Sciences, Berkeley, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1321, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073901

80. Database GeoRef

Title **Contemporaneous mafic and silicic eruptions during the past 160 ka at *Long Valley* Caldera, California; implications of new 40Ar/39Ar eruption ages for current volcanic hazards**

Author Mahood, Gail A; Ring, Joshua H; McWilliams, Michael

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1321, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073902

81. Database GeoRef

Title **Fracture orientations and ages of hydrothermal activity in the basement rocks of the *Long Valley* Caldera, California**

Author McConnell, Vicki S; Prejean, Stephanie G; Heumann, Arnd

Affiliation Oregon Department of Geology and Mineral Industries, Baker City, OR, United States (USA)

Affiliation Stanford University, United States (USA); Vrije Universiteit, Netherlands (NLD)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1321-1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073903

82. Database GeoRef

Title **Growth history of quartz crystals from open fissures at 2600 m depth, *Long Valley* exploratory well, California**

Author Fischer, Miriam; Roeller, Klaus; Kuester, Martina; McConnell, Vicki Sue; Stoeckhert, Bernhard

Affiliation Ruhr-University, Institute of Geology, Mineralogy and Geophysics, Bochum, Federal Republic of Germany (DEU)

Affiliation Oregon Deptartment of Geology and Mineral Industries, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073904

83. Database GeoRef

Title **Analysis of geodetic measurements of crustal deformation at *Long Valley* Caldera**

Author Simons, M; Fialko, Yuri; Rivera, L; Chapin, E; Hensley, S; Rosen, P A; Shaffer, S; Webb, F H; Langbein, J

Affiliation California Institute of Technology, Seismology Laboratory, Pasadena, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073905

84. Database GeoRef

Title **Magma intrusion beneath *Long Valley* Caldera, California, confirmed by temporal gravity changes**

Author Battaglia, Maurizio; Roberts, Carter W; Segall, Paul

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1322, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073908

85. Database GeoRef

Title **Earthquake relocations and stress inversions in the *Long Valley* Caldera, California**

Author Prejean, Stephanie G; Ellsworth, William L; Waldhauser, Felix; Zoback, Mark D

Affiliation Stanford University, Department of Geophysics, Stanford, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1323, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073909

86. Database GeoRef

Title **Multiple ruptures for *Long Valley* microearthquakes; a link to volcanic tremor?**

Author Stroujkova, Anastasia; Malin, Peter E

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1323, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073910

87. Database GeoRef

Title **Tomographic evidence for migration of volcanic gas beneath Mammoth Mountain, *Long Valley* Caldera, California, between 1989 and 1997**

Author Foulger, G R; Julian, Bruce R; Pitt, A M; Hill, David P; Malin, Peter E; Shalev, Eylon

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Duke University, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1323, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073911

88. Database GeoRef

Title **Measurement and analysis of diffuse degassing of magmatic CO (sub 2) at Mammoth Mountain, California**

Author Rogie, John D; Kerrick, Derrill M; Sorey, Mike L; Chiodini, Giovanni

Affiliation Pennsylvania State University, Department of Geosciences, University Park, PA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Osservatorio Vesuviano, Italy (ITA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1323, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-073912

89. Database GeoRef

Title **Role of static stress transfer in earthquake-magmatic interactions at *Long Valley* Caldera, eastern California, 1978-2000**

Author Thatcher, Wayne R

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1384-1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074121

90. Database GeoRef

Title **Geodetic and seismic constraints on the 1997 inflation event at *Long Valley* Caldera**

Author Newman, Andrew V; Dixon, Timothy H; Ofoegbu, Goodluck I; Dixon, Jacqueline E

Affiliation University of California, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation University of Miami, United States (USA); Southwest Research Institute, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074122

91. Database GeoRef

Title **Hyperspectral remote sensing for research and monitoring in active volcanic regions; *Long Valley* Caldera, CA**

Author Martini, Brigette A; Silver, Eli A; Potts, Donald C; Pickles, William L

Affiliation University of California at Santa Cruz, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074123

92. Database GeoRef

Title **Strength and deformability of the *Long Valley* Caldera basement rock**

Author Chang, Chandong; Haimson, Bezalel C

Affiliation University of Wisconsin, Materials Science & Engineering, Madison, WI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074124

93. Database GeoRef

Title **Resistivity imaging of *Long Valley* Caldera; first results from a DC- geoelectrical deep sounding experiment 2000**

Author Schuetze, Claudia; Brunner, Ingolf; Flechsig, Christina; Kulenkampff, Johannes; Jacobs, Franz; Serfling, Ulrich

Affiliation University of Leipzig, Leipzig, Federal Republic of Germany (DEU)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.1385, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-074126

94. Database GeoRef

Title **Real-time GPS at the *Long Valley* Caldera, California**

Author Endo, Elliot T; Iwatsubo, Eugene Y

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.81, no.48, Suppl., pp.320, 28 Nov 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-048344

95. Database GeoRef

Title **Spherical and ellipsoidal volcanic sources at *Long Valley* Caldera, California, using a genetic algorithm inversion technique**

Author Tiampo, K F; Rundle, J B; Fernandez, J; Langbein, J O

Affiliation University of Colorado, Department of Geology and CIRES, Boulder, CO, United States (USA)

Affiliation Universidad de Madrid, Spain (ESP); U. S. Geological Survey, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.102, no.3-4, pp.189-206, Nov 2000

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We model the second inflation period at ***Long Valley*** caldera, California using a genetic algorithm technique and high quality geodetic measurements of elevation changes and baseline extensions. We compare two source inversions for both spherical Mogi point sources and the finite prolate ellipsoid of Yang and Davis. A sensitivity analysis for the genetic algorithm is performed based upon synthetic data set inversions on similar sources in order to better constrain the areal location, orientation, and volume of the potential sources. The spherical sources are well constrained, the larger located at 9.9 km beneath the resurgent dome, with a volume of 0.036 km (super 3) , while the second, at only 0.008 km (super 3) , is located at a depth of 7.3 km beneath the south moat. The depths to the ellipsoidal sources are switched, with the larger source at a depth of 9.6 km and the smaller at 11.8 km, with volumes of 0.037 and 0.002 km (super 3) , respectively.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2001-011101

96. Database GeoRef

Title **The physical controls on residence times in silicic magma chambers**

Author Davies, G R; Heumann, A

Affiliation Vrije Universiteit Amsterdam, Department of Earth Sciences, Amsterdam, Netherlands (NLD)

Author Wirakusumah, A Djumarma (chairperson)

Publisher IAVCEI, Indonesia (IDN)

Publication Year 2000

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2009-069563

97. Database GeoRef

Title **Young *volcanism* in western *Long Valley* Caldera, California; (1) Hazards due to lahars and block-and-ash flows at Mammoth Mountain; (2) Contemporaneous mafic and silicic eruptions during the past 160 Ka at *Long Valley* Caldera, California; implications of new (super 40) Ar/ (super 39) Ar eruption ages for current volcanic hazard; (3) Evidence for magma mixing from petrography and electron microprobe analyses**

Author Ring, Joshua H

Abstract Over the past two decades at Mammoth Mountain and in the western moat of ***Long Valley*** caldera, in the eastern Sierra Nevada of California, shallow earthquake swarms, CO (sub 2) -saturated soils causing areas of treekill, and He-emissions with >5 Ra have been attributed to the intrusion of magma to shallow depths in the crust. Given the close proximity of Mammoth Mountain to the resort town of Mammoth Lakes an accurate assessment of volcanic hazards is critical. To this end a three-part study was initiated: (1) computer modeling of the extent of lahars and block-and-ash flows of a range of volumes during an eruption of Mammoth Mountain, (2) a (super 40) Ar/ (super 39) Ar dating study of a possible temporal and spatial correlation of past mafic and silicic eruptions, and (3) a petrographic and petrologic study to better understand what types and styles of future eruptions are to be expected in the region. Hazards from gravity-driven flows at Mammoth Mountain are evaluated due to the recent activity being focused beneath the mountain. The extent of hazards from block-and-ash flows around Mammoth Mountain is evaluated by implementing the Energy Cone Model of Sheridan (1980) into a Geographical Information System. Similarly, hazards due to lahars are also evaluated around Mammoth Mountain using the ***valley***-inundation model of Iverson et al. (1998). The results show that the town of Mammoth Lakes is threatened by moderate-volume (1X10 (super 6) m (super 3)) block-and-ash flows and that even small-volume lahars (1X10 (super 5) m (super 3)) could reach the town due to their more fluid nature. A (super 40) Ar/ (super 39) Ar study of the youngest units in and adjacent to the western third of the caldera was undertaken. The results show that the bulk of Mammoth Mountain consists of trachydacitic lavas erupted at approximately 67 ka. These ages and our 29-40 ka ages for trachydacitic lavas in the northwest quadrant of the caldera indicate that these silicic lavas are considerably younger than previously thought. The mafic and silicic eruptions are temporally and spatially correlated and can be divided into four eruptive sequences over the past 160,000 years: the western moat sequence (approximately 160 ka), the Mammoth sequence (approximately 119-57 ka), the northwest caldera sequence (approximately 40-29 ka), and the Inyo trend sequence (approximately 6 ka-present). Mafic magmas vented widely and contemporaneously with felsic lavas throughout the western third of the caldera, suggesting that it cannot have been underlain by a large body (or bodies) of silicic magma in the last 160,000 years, which otherwise would have created a "shadow zone" for the rise of denser basaltic magma. To understand the type(s) of future eruptions in the ***Long Valley*** region, it is important to assess and describe past ***volcanism*** and magmatic interactions. The silicic volcanic rocks of the areas in and adjacent to the western third of ***Long Valley*** caldera can be divided into fifteen distinct units based on location, mineral assemblage and mineral abundance. Many of the lavas are complex mixtures of multiple magmas, with evidence in the form of magmatic

inclusions, compositional banding, microdioritic inclusions, strongly resorbed phenocrysts, fritted plagioclase jacketed by intact rims of plagioclase or sanidine similar in composition to unresorbed phenocrysts, and xenocrystic phases. The silicic volcanics contain plagioclase with resorbed calcic cores and intact, more albitic rims, suggesting that the cores were derived from a more mafic magma. Large changes in barium concentrations at core-rim boundaries suggest that Ba could be a useful monitor of magma mixing. Two suites of silicic lavas coexisted for at least the past 110 ka: (1) trachydacites and alkali rhyolites associated with Mammoth Mountain, and (2) less alkalic trachydacites and rhyolites all containing

phenocrysts of potassic sanidine in lavas north and northeast of Mammoth Mountain, including the Inyo lavas. Electron microprobe data and sparse chemical data suggest that the Mammoth Mo untain suite consists chiefly of mixtures of differentiation products of the local mafic lavas. The potassic -sanidine-bearing suite contains a contribution from these same magmas, but they also contain components derived from magma bodies related to the residual ***Long Valley*** magma chamber. This latter component, solidified or very nearly so, is available for eruption only where it is remobilized by intrusion of basaltic magma along the north-south Inyo trend. The knowledge that mafic and silicic eruptions have been contemporaneous and have interacted at ***Long Valley*** caldera for the past 160,000 years has implications for volcanic hazards. The unrest of the last two decades may be the result of basalt injected beneath Mammoth Mountain and the caldera and, considering the correlation of mafic and silicic eruptions in the past, the potential for spatially associated silicic eruptions exists, which could be considerably more explosive.

Publication Year 2000

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 2002-042017

98. Database GeoRef

Title **Invisible CO (sub 2) gas killing trees at Mammoth Mountain, California**

Author Sorey, Michael L; Farrar, Christopher D; Gerlach, Terrence M; McGee, Kenneth A; Evans, William C; Colvard, Elizabeth M; Hill, David P; Bailey, Roy A; Rogie, John D; Hendley, James W, II; Stauffer, Peter H

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0172-96, 2 pp., Jun 2000

Resource Location http://pubs.usgs.gov/fs/fs172-96/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2000

Publication Type Serial; Report; Monographic

Accession Number 2000-064068

99. Database GeoRef

Title **Scientific drilling in *Long Valley* Caldera, California; an update**

Author Sorey, Mike L; Hill, Dave; McConnell, Vicki S

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Oregon Department of Geology and Mineral Industries, United States (USA)

Source California Geology, vol.53, no.1, pp.4-11, Feb 2000

Publisher California Division of Mines and Geology, San Francisco, CA, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2000-033254

100.Database GeoRef

Title **Bibliography of literature pertaining to *Long Valley* Caldera and associated volcanic fields**

Author Ewert, John W; Harpel, Christopher J

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 00-0221, 156 pp., 2000

Resource Location http://pubs.usgs.gov/of/2000/of00-221/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 2000

Publication Type Serial; Report; Monographic

Accession Number 2001-004778

101.Database GeoRef

Title **Using airborne laser altimetry to detect topographic change at *Long Valley* Caldera, California**

Author Hofton, M A; Minster, J B; Ridgway, J R; Williams, N P; Blair, J B; Rabine, D L; Bufton, J L

Affiliation Scripps Institution of Oceanography, Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation California Institute of Technology, United States (USA); Arizona State University, United States (USA); NASA, Goddard Space Flight Center, United States (USA)

Affiliation University of Hawaii, Hawaii Institute of Geophysics and Planetology, Honolulu, HI, United States (USA)

Source Geophysical Monograph, vol.116, pp.249-264, 2000

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2001-007394

102. **Database** GeoRef

Title **Geological and geobotanical insights into the hydrothermal, structural, and magmatic systems of a restless caldera using three meter HyMap imagery; *Long Valley* Caldera, California, USA**

Author Martini, B A; Silver, E A; Potts, D C; Pickles, W L

Affiliation University of California at Santa Cruz, Earth Sciences Department, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Author Anonymous

Source Proceedings of the ... International Conference on Applied Geologic Remot Sensing, vol.14, pp.28-35, 2000

Publisher Veridian ERIM International, Ann Arbor, MI, United States (USA)

Abstract Ground studies of the restless ***Long Valley*** caldera under the aegis of volcanic hazard monitoring for the past 25 years, have provided a wealth of geophysical and geochemical data culminating in new hydrothermal and structural models. However, limited remote sensing has been attempted at this caldera. Our group is applying spectroscopic mapping with traditional geological data to refine current geological models and maps, to assess the strengths and limitations of using biological phenomena to model and map geological processes and structures, and to prepare baseline datasets for volcano monitoring efforts via space-borne instruments. On September 7, 1999, imagery of the caldera was flown using Integrated Spectronic's HyMap hyperspectral imager. These images are being analyzed to gain a better understanding of the hydrothermal system and to refine present flow models. This includes delineating zones of discharge and their general geochemistry and temperatures as resolved by hydrothermal mineral assemblage mapping. We present an example of structural mapping in the western caldera which elucidates how this region of crust is accommodating such perturbations as magma chambers, dike intrusions, and regional stress as well as aspects of the transport of hydrothermal fluids, gasses, and magma along such structures. We also present data on the sizes and locations of the CO (sub 2) -induced tree-kills at Mammoth Mt., specifically near Horseshoe Lake.

Publication Year 2000

Publication Type Serial; Conference document; Analytic

Accession Number 2001-079541

103. **Database** GeoRef

Title **On the source of deformation of the *Long Valley* Caldera, Northern California**

Author Lykov, V I; Mostryukov, A O; Ruban, V F

Affiliation Russian Academy of Sciences, Borok Geophysical Observatory, Borok Village, Russian Federation (RUS)

Source Volcanology and Seismology, vol.22, no.4, pp.371-373, 2000

Publisher Gordon and Breach Science Publishers, New York, NY, United States (USA)

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2003-007066

104. **Database** GeoRef

Title **Earthquake swarms and accompanying phenomena in intraplate regions; a review**

Author Spicak, Ales

Affiliation Academy of Sciences of the Czech Republic, Geophysical Institute, Prague, Czech Republic (CZE)

Source Studia Geophysica et Geodetica, vol.44, no.2, pp.89-106, 2000

Resource Location http://www.springerlink.com/(gei43545lhkbqafqptkgoqfy)/app/home/journal.asp?referrer=parent&backto=linkingpublicationresults,1:109194,1

Publisher Academy of Sciences of the Czech Republic, Geophysical Institute, Prague, Czech Republic (CZE)

Abstract The western part of the Bohemian Massif has played an exceptional role in recent geodynamic activity of the region. It is characterised by repeated occurrences of earthquake swarms and by other manifestations of deep tectonic processes (CO (sub 2) emissions, anomalous (super 3) He content, mineral waters, mofettes, etc.). The purpose of this paper is to introduce some other intraplate regions with earthquake swarm occurrence (French Massif Central; Colli Albani and Vulsini Mts., central Italy; Southern Apennines, Italy; the Danville and ***Long Valley*** regions, California; central Arkansas), and with artificially induced earthquake swarms (Larderello, Italy, geothermal field; Coso, California, geothermal field; NE Bavaria, Germany, deep drilling project). Although these areas represent different tectonic environments, the manifestations of recent geodynamic and/or man-made activity are similar in many aspects. This coincidence most probably issues from a common cause of both tectonic and artificially induced earthquake swarms - intrusions/injections of fluids. the regions with earthquake swarm occurrence of tectonic origin are situated as a rule in the close neighbourhood of Quaternary volcanoes, the intruding fluids seem to be derived from magma recently transported to upper crustal layers.

Publication Year 2000

Publication Type Serial; Analytic

Accession Number 2003-063462

105. Database GeoRef

Title **Are the Sierras overriding a deep volcanic source at *Long Valley*?**

Author Smith, Ken; Biasi, Glenn P

Affiliation University of Nevada-Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.32, no.7, pp.461, 2000

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract A synthesis of tectonic, geologic and geophysical evidence supports the hypothesis that the Sierran Mountain block in east central California is overriding the deep volcanic source responsible for ***Long Valley*** Caldera (LVC). For 12 mm/yr of NW motion of the Sierran block relative to a fixed volcanic source at depth, at least 10 km of southerly offset would have

accumulated since the 0.75 Ma caldera forming event at ***Long Valley***. The modern period of earthquake activity (1978-present), extends 15-20 km south into the Sierran block and 20-30 km east and southeast of the current expression of LVC. This distribution of earthquake activity is difficult to reconcile with a crustal volcanic source associated exclusively with resurgence of the central caldera. Teleseismic P-wave tomography of the lower crust and upper mantle shows a region of decreased velocities extending south of LVC into the Sierran lithosphere. The largest earthquakes, the distributed seismicity and the anomalous local orientation of stress axes from earthquake focal mechanisms that appear to be related to the upper mantle feature implies that the velocity contrast is also a lithospheric strength boundary. Although Mono Craters represent a northward extension of ***volcanism*** since the formation of ***Long Valley***, several lines of evidence also suggest the evolution of a deeper volcanic source south of the caldera. Magmatic intrusion into the Sierran block has been inferred from modeling deformation dominated by uplift in the central caldera (Langbein and others, 1995), attenuation of shear waves (Sanders and Nixon, 1995), reflections from potential magma sources from local earthquakes (Peppin and others, 1989) and anomalous signatures from modeling earthquake dislocations (Julian, 1983; Dreger and others, 2000). The most plausible deep source for ***volcanism*** south of LVC is the continued dewatering of upper mantle originally hydrated by post-20 Ma subduction. Caldera -forming ***volcanism*** implies the original presence of huge quantities of volatiles including water and CO2. These quantities would be hard to concentrate in the small area of LVC through purely crustal tectonic mechanisms.

Publication Year 2000

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-014856

106. Database GeoRef

Title **Reconnaissance of lahar deposits, Glass Creek and Owens River, California**

Author Bursik, Marcus I; Reid, John B

Affiliation State University of New York at Buffalo, Department of Geology, Buffalo, NY, United States (USA)

Affiliation Hampshire College, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1187, 16 Nov 1999

Resource Location http://www.geology.buffalo.edu/mib/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-061418

107. Database GeoRef

Title **Analysis of geodetic measurements of crustal deformation at *Long Valley* Caldera**

Author Simons, Mark; Fialko, Yuri; Chapin, Elaine; Hensley, Scott; Rosen, Paul A; Shaffer, Scott Webb, Frank

Affiliation California Institute of Technology, Seismological Laboratory, Pasadena, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1194, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-061451

108. Database GeoRef

Title **Constraints on deep fluid circulation in *Long Valley* Caldera**

Author Sorey, Michael L

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1162, 16 Nov 1999

Resource Location http://quake.wr.usgs.gov/VOLCANOES/LongValley/index.html

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-063315

109. Database GeoRef

Title **A magma mass beneath Casa Diablo? Further evidence from reflected seismic waves**

Author Stroujkova, Anastasia; Malin, Peter

Affiliation Duke University, Division of Earth and Ocean Sciences, Durham, NC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1162, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-063318

110. Database GeoRef

Title **Borehole strain measurements and volcanic activity**

Author Linde, Alan T; Sacks, Selwyn

Affiliation Carnegie Institution of Washington, Washington, DC, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.972-973, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-021395

111. Database GeoRef

Title **Are the eastern Sierras overriding a deep heat/fluid source at *Long Valley*? A tectonic model for the west central Great Basin**

Author Smith, Kenneth D; Biasi, Glenn P

Affiliation University of Nevada Reno, Nevada Seismological Laboratory, Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.981, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2003-004777

112. Database GeoRef

Title **Geological and geobotanical studies of *Long Valley* Caldera and Mammoth Mountain, CA utilizing new high resolution hyperspectral imagery**

Author Martini, Brigette A; Silver, Eli A; Pickles, William L; Potts, Donald C

Affiliation University of California, Department of Earth Sciences, Santa Cruz, CA, United States (USA)

Affiliation Lawrence Livermore National Laboratory, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.80, no.46, Suppl., pp.1091, 16 Nov 1999

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-018715

113. Database GeoRef

Title **Seismic evidence for a complex magmatic system beneath *Long Valley* Caldera, California**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.222, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056553

114. Database GeoRef

Title **Applications of GPS to volcano monitoring**

Author Newman, A; Dixon, T H; Dixon, J; Meertens, C; Perin, B; Stein, S

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation Rosenstiel School of Marine and Atmospheric Science, United States (USA); UNAVCO, United States (USA)

Author Malone, Steve D (chairperson)

Affiliation University of Washington, Geophysics Program, Seattle, WA, United States (USA)

Source Seismological Research Letters, vol. 70, no. 2, pp.224, Apr 1999

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2000-056561

115. **Database** GeoRef

Title **Soil pH mapping to evaluate intensive magmatic-hydrothermal diffuse degassing on active volcanoes**

Author Valiente, Marcos; Meneses, Belen; Rodriguez, Paqui; Salazar, Jose M L; Perez, Nemesio M; Hernandez, Pedro A

Affiliation Univ. La Laguna, Faculty of Chemistry, Tenerife, Spain (ESP)

Affiliation ITER, Spain (ESP); University of Tokyo, Japan (JPN)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.97-98, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068039

116. **Database** GeoRef

Title **Inversion for multiple volcanic sources using a genetic algorithm technique**

Author Tiampo, K F; Rundle, John B; Fernandez, Jose M; Langbein, John

Affiliation University of Colorado, CIRES, Boulder, CO, United States (USA)

Affiliation CSIC-UCM, Spain (ESP); U. S. Geological Survey, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.99, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068048

117. **Database** GeoRef

Title **Geodetic and seismic constraints on Recent activity and shallow magmatic properties at *Long Valley* Caldera, CA, USA**

Author Newman, Andrew V; Dixon, Jacqueline E; Dixon, Timothy H

Affiliation Northwestern University, Department of Geological Sciences, Evanston, IL, United States (USA)

Affiliation University of Miami, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.100, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068061

118. **Database** GeoRef

Title **Temporal and three-dimensional spatial analyses of the frequency-magnitude distribution near *Long Valley* Caldera, California**

Author McNutt, Stephen R; Wiemer, Stefan; Wyss, Max

Affiliation University of Alaska at Fairbanks, Geophysical Institute, Fairbanks, AK, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, Week B, pp.101, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2001-068062

119. Database GeoRef

Title **Imaging gas beneath an active volcano using seismic tomography**

Author Foulger, G R; Julian, B R; Pitt, A M; Hill, D P

Affiliation University of Durham, Department of Geological Sciences, Durham, United Kingdom (GBR)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, WEEK B, pp.151, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-064520

120. Database GeoRef

Title **High resolution spatial and temporal mapping of the frequency-magnitude distribution in volcanic areas for structural analysis and monitoring; capabilities and limitations**

Author Wiemer, Stefan

Affiliation ETH Hoenggerberg, Institute of Geophysics, Zurich, Switzerland (CHE)

Author Anonymous

Source International Union of Geodesy and Geophysics General Assembly = Union Geodesique et Geophysique Internationale Comptes Rendus de la ...Assemblee Generale, vol.99, WEEK B, pp.155-156, 1999

Publisher IUGG, [location varies], International (III)

Publication Year 1999

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2004-064556

122. Database GeoRef

Title **The thermal regime in *Long Valley* Caldera, California**

Author Hurter, Suzanne; Pribnow, Dan

Affiliation BGR, DEU, (Federal Republic of Germany)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.79, no.45, Suppl., pp.829, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2006-004850

123. Database GeoRef

Title **Paleohydrothermal fluid flow derived from oxygen isotope compositions of volcanic rocks in *Long Valley* Caldera, CA**

Author McConnell, Vicki S; Valley, John W; Spicuzza, Michael J

Affiliation University of Wisconsin at Madison, Department of Geology and Geophysics, Madison, WI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.964, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2009-024866

124. Database GeoRef

Title **The U-Th disequilibrium record of *Long Valley* Caldera; open system versus in-situ differentiation**

Author Heumann, Arnd; Davies, Gareth R; Elliott, Tim R

Affiliation Vrije Universiteit Amsterdam, Faculteit der Aardwetenschappen, Amsterdam, Netherlands (NLD)

Affiliation Geochemisches Institut, Federal Republic of Germany (DEU)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol. 79, no. 45, Suppl., pp.961, 10 Nov 1998

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2009-024918

125. Database GeoRef

Title **Record of the younger part of the Pringle Falls excursion at *Long Valley*, California**

Author Liddicoat, Joseph C; Coe, Robert S; Glen, Jonathan M

Affiliation Columbia University, Department of Environmental Science, New York, NY, United States (USA)

Affiliation University of California Santa Cruz, United States (USA)

Source Geophysical Journal International, vol.135, no.2, pp.663-670, Nov 1998

Resource Location http://www.blackwellpublishing.com/journal.asp?ref=0956-540X

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-012037

126. Database GeoRef

Title **Triggering of volcanic eruptions**

Author Linde, Alan T; Sacks, I Selwyn

Affiliation Carnegie Institution of Washington, Department of Terrestrial Magnetism, Washington, DC, United States (USA)

Source Nature (London), vol.395, no.6705, pp.888-890, 29 Oct 1998

Resource Location http://www.nature.com/nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-002823

127. Database GeoRef

Title **Collaborative research with GEO-HAZ Consulting, Inc., and U. S. Geological Survey; interaction of volcanic and tectonic processes in the past 40,000 years near *Long Valley* Caldera**

Author McCalpin, James P (investigator); Berry, Margaret E (investigator); Sarna-Wojcicki, Andrei M (investigator)

Affiliation GEO-HAZ Consulting, Estes Park, CO, United States (USA)

Publication Year 1998

Publication Type Report; Monographic

Accession Number 2000-063207

128. Database GeoRef

Title **Seeking power from magma; phase III of *Long Valley* exploratory well may provide clues about both volcanic hazards and electric potential**

Author Anonymous

Source Bulletin - Geothermal Resources Council, vol.27, no.7, pp.201-202, Oct 1998

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-059724

129. Database GeoRef

Title **1998 SSA meeting; Presidental address; Science, geologic hazards, and public in a large, restless caldera**

Author Hill, David P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Seismological Research Letters, vol. 69, no. 5, pp.400-404, Oct 1998

Publisher Seismological Society of America, Eastern Section, [Berkeley, CA], United States (USA)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-039319

130. Database GeoRef

Title **Carbon dioxide and helium emissions from a reservoir of magmatic gas beneath Mammoth Mountain, California**

Author Sorey, M L; Evans, W C; Kennedy, B M; Farrar, C D; Hainsworth, L J; Hausback, B

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Lawrence Berkeley National Laboratory, United States (USA); Emory and Henry College, United States (USA); California State University, United States (USA)

Source Journal of Geophysical Research, vol. 103, no. B7, pp.15,303-15,323, 10 Jul 1998

Resource Location http://www.agu.org/journals/jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Carbon dioxide and helium with isotopic compositions indicative of a magmatic source (delta (super 13) C = -4.5 to -5 per mil, (super 3) He/ (super 4) He = 4.5 to 6.7 R (sub A)) are discharging at anomalous rates from Mammoth Mountain, on the southwestern rim of the ***Long Valley*** caldera in eastern California. The gas is released mainly as diffuse emissions from normal-temperature soils, but some gas issues from steam vents or leaves the mountain dissolved in cold groundwater. The rate of gas discharge increased significantly in 1989 following a 6-month period of persistent earthquake swarms and associated strain and ground deformation that has been attributed to dike emplacement beneath the mountain. An increase in the magmatic component of helium discharging in a steam vent on the north side of Mammoth Mountain, which also began in 1989, has persisted until the present time. Anomalous CO (sub 2) discharge from soils first occurred during the winter of 1990 and was followed by observations of several areas of tree kill and/or heavier than normal needlecast the following summer. Subsequent measurements have confirmed that the tree kills are associated with CO (sub 2) concentrations of 30-90% in soil gas and gas flow rates of up to 31,000 g m (super -2) d (super -1) at the soil surface. Each of the tree-kill areas and one area of CO (sub 2) discharge above tree line occurs in close proximity to one or more normal faults, which may provide conduits for gas flow from depth. We estimate that the total diffuse CO (sub 2) flux from the mountain is approximately 520 t/d, and that 30-50 t/d of CO (sub 2) are dissolved in cold groundwater flowing off the flanks of

the mountain. Isotopic and chemical analyses of soil and fumarolic gas demonstrate a remarkable homogeneity in composition, suggesting that the CO (sub 2) and associated helium and excess nitrogen may be derived from a common gas reservoir whose source is associated with some combination of magmatic degassing and thermal metamorphism of metasedimentary rocks. Furthermore, N (sub 2) /Ar ratios and nitrogen isotopic values indicate that the Mammoth Mountain gases are derived from sources separate from those that supply gas to the hydrothermal system within the ***Long Valley*** caldera. Various data suggest that the Mammoth Mountain gas reservoir is a large, low-temperature cap over an isolated hydrothermal system, that it predates the 1989 intrusion, and that it could remain a source of gas discharge for some time. Copyright 1998 by the American Geophysical Union.

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1998-056377

131. Database GeoRef

Title **Rock deformation and fracturing processes due to nonlinear shock waves propagating in hyperthermal fluid pressurized domains**

Author Natale, G; Salusti, E; Troisi, A

Affiliation Universite de Montpellier 2, Laboratoire de Geofluides, Montpellier, France (FRA)

Affiliation Universita La Sapienza, Italy (ITA)

Source Journal of Geophysical Research, vol. 103, no. B7, pp.15,325-15,338, 10 Jul 1998

Resource Location http://www.agu.org/journals/jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract An analytical model for rock deformation and fracturing processes due to nonlinear waves of temperature and pressure and evolving with particularly large velocities in a fluid-saturated rock over a hyperthermal aquifer is here discussed. As in classical studies by Rice and Cleary [1976], McTigue [1986], and also Bonafede [1991] and Natale and Salusti [1996], the upper fluid-saturated matrix is considered homogeneous, thermoelastic, and isotropic in a one-dimensional formulation. As regards the nonlinear wave generation mechanism, at the boundary between the two horizons the hot fluid from below is forced upward by a pressure gradient, thus giving rise to strong pressure and temperature perturbations. In such a context, in order to schematize wave-induced rock deformation and fracturing processes we assume a continuous temperature and pressure dependence of model parameters such as fluid diffusivity and thermal expansivity of the rock and fluid. The solution we obtain is a strong shock wave corresponding to nonlinear fluid migration mechanisms, in turn enhanced by the flow through the induced fractures in the overlying rock. It has to be stressed that once such a process starts off, it may be amplified and also may produce rather catastrophic behavior in the natural system. This model essentially provides a theoretical tool for interpreting such geophysical effects, in particular for volcanic complexes such as the Rabaul caldera, ***Long Valley*** caldera, Campi Flegrei, the island of Vulcano, or similar kinds of geological system. Copyright 1998 by the American Geophysical Union.

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1998-056378

132. Database GeoRef

Title **Monitoring of volcanogenic CO (sub 2) -induced tree kills with AVIRIS image data at Mammoth Mountain, California**

Author Strong, Mel; Hausback, Brian P; Farrar, Chris D; Pieri, David

Affiliation California State University, Geology Department, Sacramento, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); California Institute of Technology, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.30, no.5, pp.67, Mar 1998

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-044889

133. Database GeoRef

Title **Scientific drilling in *Long Valley*, California; what will we learn?**

Author Priest, Susan S; Sass, John H; Ellsworth, W L; Farrar, Christopher D; Sorey, Michael L; Hill,

David P; Bailey, Roy A; Jacobson, Ronald D; Finger, John T; McConnell, Vicki Sue; Zoback, Mark D

Affiliation U. S. Geological Survey, USA, (United States)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0077-98, 2 pp., 1998

Resource Location http://quake.wr.usgs.gov/VOLCANOES/LongValley/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1998

Publication Type Serial; Report; Monographic

Accession Number 1998-060421

134. Database GeoRef

Title **Imaging spectrometry for monitoring tree damage caused by volcanic activity in the *Long Valley* Caldera, California**

Author de Jong, Steven M

Affiliation Utrecht University, Department of Physical Geography, Utrecht, Netherlands (NLD)

Source ITC Journal = Bulletin de l'ITC, vol.1998, no.1, pp.1-10, 1998

Publisher International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands (NLD)

Publication Year 1998

Publication Type Serial; Analytic

Accession Number 1999-018308

135. Database GeoRef

Title **The origin and evolution of large-volume silicic magma systems; *Long Valley* Caldera**

Author Knesel, Kurt M; Davidson, Jon P

Affiliation University of California at Los Angeles, Department of Earth and Space Sciences, Los Angeles, CA, United States (USA)

Affiliation University of California at Bishop, White Mountain Research Station, United States (USA)

Affiliation Stanford University, Department of Geological and Environmental Sciences, Stanford CA, United States (USA)

Publisher Bellwether Publishing, Columbia, MD, United States (USA)

Publication Year 1998

Publication Type Book; Analytic

Accession Number 1999-022487

136. Database GeoRef

Title **A color-code notification system for volcanic unrest in *Long Valley* Caldera, California**

Author Hill, D P

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Publisher Officine grafiche napoletane Francesco Giannini & Figli s.p.a., Naples, Italy (ITA)

Publication Year 1998

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2000-055491

137. Database GeoRef

Title **Response to the July 1997 - January 1998 unrest in *Long Valley* Caldera, CA**

Author Hill, D P; Fuller, T

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Publisher Officine grafiche napoletane Francesco Giannini & Figli s.p.a., Naples, Italy (ITA)

Publication Year 1998

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2000-055492

138. Database GeoRef

Title **Diffuse degassing of magmatic tree-killing CO (sub 2) , Mammoth Mountain, CA**

Author Rogie, J D; Chiodini, G; Sorey, M L; Kerrick, D M; Frondini, F; Evans, W C; Virgili, G

Affiliation Pennsylvania State University, Department of Geosciences, University Park, PA, United States (USA)

Affiliation Osservatorio Vesuviano, Italy (ITA); U. S. Geological Survey, United States (USA); Universita di Perugia, Italy (ITA)

Publisher Officine grafiche napoletane Francesco Giannini & Figli s.p.a., Naples, Italy (ITA)

Publication Year 1998

Publication Type Book; Conference document; Analytic; Abstract only

Accession Number 2000-055538

139. Database GeoRef

Title **Recent activity and hazards at active volcanoes; Galeras (Colombia), Soufriere Hills (Montserrat), Masaya Caldera (Nicaragua), and *Long Valley* Caldera (USA)**

Author Stix, John

Affiliation Universite de Montreal, Departement de Geologie, Montreal, QC, Canada (CAN)

Author Hebert, Rejean (president)

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 23, pp.180-181, 1998

Resource Location http://www.esd.mun.ca/~gac/ANNMEET/annmeet.htmls

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1998

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-013416

140. Database GeoRef

Title **Carbon dioxide and helium emissions from a reservoir of magmatic gas beneath Mammoth Mountain, California, USA**

Author Sorey, M L; Evans, W C; Farrar, C D; Kennedy, B M

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Institute of Geological and Nuclear Sciences, New Zealand (NZL); Lawrence Berkeley National Laboratory, United States (USA)

Affiliation Wairakei Research Centre, Institute of Geological and Nuclear Sciences, Taupo, New Zealand (NZL)

Source Proceedings - International Symposium on Water-Rock Interaction, vol. 9, pp.491-494, 1998

Publisher International Association of Geochemistry and Cosmochemistry and Alberta Research Council, Sub-Group on Water-Rock Interaction, Toronto, ON, International (III)

Publication Year 1998

Publication Type Serial; Conference document; Analytic

Accession Number 2007-031494

141. Database GeoRef

Title **Seismic tomography; inversion for P- and S-wave velocities**

Author Tryggvason, Ari

Affiliation Uppsala University, Department of Earth Sciences, Uppsala, Sweden (SWE)

Source Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, vol. 369, 31 pp., 1998

Publisher Acta Universitatis Upsaliensis, Uppsala, Sweden (SWE)

Abstract Seismology is undoubtedly the most powerful method for determining the structure of the Earth below the deepest borehole. This thesis describes the use of seismic signals from both man-made and earthquake sources to model seismic velocities within a volume of the Earth. Based on data from explosions, a two-dimensional model for the P-wave velocities from the Baltic Shield in southern Sweden, across Denmark and into the North German Basin is presented. The observed crustal structures show clear signs of extension,

estimated to be at least 20% along the profile. However, the emphasis of my work has been on modeling seismic velocities in three dimensions using local earthquake travel times. Two studies have been conducted, one using data from the ***Long Valley*** caldera, California. Originally formed in a catastrophic eruption 0.76 My ago, the caldera is today characterized by intense seismic activity. To better understand this volcanic system we have imaged the three-dimensional P-

and S-wave velocity structure beneath the caldera. Low seismic velocities are observed below the resurgent dome down to depths of 9 km, which we believe are caused by hydrothermal circulation of fluids rather than by a large magma chamber. The observed lower than normal Vp/Vs ratios (<1.7) are associated with fractured rock containing compressible and low density fluids. Partially molten or hot material will reduce the S- more than the P-wave velocities, thus producing elevated Vp/Vs ratios. The second study exploits the earthquake data catalog from southwest Iceland. Within the study region are several volcanic centers, active and extinct. The seismically most active one is the Hengill volcanic complex, within 30 km of Reykjavik. The large fissure system is characterized by lower than normal velocities and, similar to the ***Long Valley*** caldera, low Vp/Vs ratios. We conclude that supercritical magmatic fluids, such as CO (sub 2) and H (sub 2) O, circulate in the fissure system and cause the reduced velocities. These findings are important for understanding the nature of the ***volcanism*** and volcanic hazard in both study regions.

Publication Year 1998

Publication Type Serial; Monographic

Accession Number 1999-024845

142. Database GeoRef

Title **Using airborne laser altimetry to detect topographic change of *Long Valley* Caldera, CA**

Author Hofton, M A; Minster, J B; Ridgway, J R; Williams, N P; Blair, J B; Bufton, J L; Rabine, D L

Affiliation Scripps Institution of Oceanography, Institute of Geophysics and Planetary Physics, La Jolla, CA, United States (USA)

Affiliation NASA, Goddard Space Flight Center, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.799, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-001401

143. Database GeoRef

Title **Inversion for the volcanic source as *Long Valley*, California, using multiple data sources and a genetic algorithm technique**

Author Tiampo, Kristy F; Hofton, Michelle; Rundle, J B; Minster, J B; Langbein, John

Affiliation University of Colorado, CIRES, Boulder, CO, United States (USA)

Affiliation NASA, Goddard Space Flight Center, United States (USA); Scripps Institution of Oceanography, United States (USA); U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.78, no.46, Suppl., pp.776, 18 Nov 1997

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1997

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 2002-004075

144. Database GeoRef

Title **Airborne laser altimeter survey of *Long Valley*, California**

Author Ridgway, J R; Minster, J B; Williams, N; Bufton, J L; Krabill, W B

Affiliation Scripps Institution of Oceanography, La Jolla, CA, United States (USA)

Affiliation NASA, United States (USA)

Source Geophysical Journal International, vol.131, no.2, pp.267-280, Nov 1997

Publisher Blackwell Scientific, Oxford, United Kingdom (GBR)

Abstract Airborne laser altimetry has proved useful in recent years in examining volcanic landforms

and glacial ice sheets. With the advent of accurate differential GPS aircraft tracking, we believe that airborne lasers will also prove useful in monitoring time-varying topographic uplift, with rates as low as several centimetres of vertical motion per year. The ***Long Valley***, California, caldera provides an excellent testing ground for this new technology. The region has a history of extensive ***volcanism***, and its central dome has recently been undergoing resurgent uplift of up to 4 cm per year. In September 1993 we conducted three aircraft topographic surveys over the caldera and resurgent dome, utilizing a NASA T39 jet aircraft outfitted with a nadir-profiling altimetric laser (ATLAS), two P-code GPS receivers, a Litton LTN92 inertial unit for attitude, and aerial cameras. In addition, we operated two base - station GPS receivers for post-flight differential navigation and conducted a kinematic automobile survey of roads crossing the dome. The aircraft flew at a mean altitude of 500 m above ground, and at speeds of 80-100 m s (super -1) . The laser had a divergence of 1.7 mrad, and output 50 pulses per second, yielding footprints of 0.9 m diameter separated by about 2 m along track. Precision flying yielded multiple profiles along nearly identical paths, including crossing profiles over the resurgent dome, off the dome, and along a nearby highway. The surveys included daily flights over Mono Lake for roll and pitch bias calibrations, and over the well-surveyed Lake Crowley to provide an independent check of estimated elevations. Much progress has been made in developing analysis procedures for the laser timing and attitude corrections. Crossover points from repeated profiles over the dome and the lake indicate that although some profiles contain relative bias errors of up to 10 cm, most are substantially more accurate. The accuracy of the measurements will increase as the various sources of error are better defined and dealt with. Even with the present analysis level, the distribution of crossovers near the centre of the dome is roughly Gaussian, with a mean of 2.6 cm and a standard deviation of 11 cm. The standard error of the mean is low (1 cm), due to the high number of crossover points, which holds promise for measuring systematic changes in the dome height from year to year. Also, comparison of laser heights of Lake Crowley to tidal gauge heights yields only a 1-4 cm difference in absolute height. These encouraging results serve to confirm further the concept of using aircraft laser surveys for geodetic tectonic monitoring.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1998-009295

145. Database GeoRef

Title **The Bishop Tuff; new insights from eruptive stratigraphy**

Author Wilson, Colin J N; Hildreth, Wes H

Affiliation Institute of Geological and Nuclear Sciences, Taupo, New Zealand (NZL)

Affiliation U. S. Geological Survey, United States (USA)

Source Journal of Geology, vol.105, no.4, pp.407-439, Jul 1997

Resource Location http://www.journals.uchicago.edu/JG/home.html

Publisher University of Chicago Press, Chicago, IL, United States (USA)

Abstract The 0.76 Ma Bishop Tuff, from ***Long Valley*** caldera in eastern California, consists of a widespread fall deposit and voluminous partly welded ignimbrite. The fall deposit (F), exposed over an easterly sector below and adjacent to the ignimbrite, is divided into nine units (F1-F9), with no significant time breaks, except possibly between F8 and F9. Maximum clast sizes are compared with other deposits where accumulation rates are known or inferred to estimate an accumulation time for F1-F8 as ca. 90 hrs. The ignimbrite (Ig) is divided into chronologically and/or geographically distinct packages of material. Earlier packages (Ig1) were emplaced mostly eastward, are wholly intraplinian (coeval with fall units F2-F8), lack phenocrystic pyroxenes, and contain few or no Glass Mountain-derived rhyolite lithic fragments. Later packages (Ig2) were erupted mostly to the north and east, are at least partly intraplinian (interbedded with fall unit F9 to the east), contain pyroxenes, and have lithic fractions rich in Glass Mountain-derived rhyolite or other lithologies exposed on the northern caldera rim. Recognition of the intraplinian nature of Ig1 east of the caldera and use of the fall deposit chronometry yields accumulation estimates of ca. 25 hrs for an earlier, less-welded subpackage and ca. 36 hrs for a later, mostly welded subpackage. Average accumulation rates range up to > or =1 mm/s of densewelded massive ignimbrite, equivalent to > or =2.5 mm/s of non -welded material. Comparisons of internal stratification in Ig1 and northern Ig2 lobes suggest the thickest northern ignimbrite accumulated in < or =35 hrs. Identifiable vent positions migrated from an initial site previously proposed in the south- central part of the caldera (F1-8, Ig1) in complex fashion; one vent set (for eastern Ig2) migrated east and north toward Glass Mountain, while another set (for northern Ig2) opened from west to east across the northern caldera margin. Vent locations for Ig1 and Ig2 southwest of the caldera have not been identified. The new stratigraphic framework shows that much of the Bishop ignimbrite is intraplinian in nature, and that fall deposits and ignimbrite units previously inferred to be sequential are largely or wholly coeval. Fundamental reassessment is therefore required of all existing models for the eruption dynamics and the nature and causes of pre-eruptive zonations in trace elements, volatiles, and isotopes in the parental magma chamber.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1997-058977

146. Database GeoRef

Title **Prolonged residence times for the youngest rhyolites associated with *Long Valley* Caldera; (super 230) Th- (super 238) U ion microprobe dating of young zircons**

Author Reid, Mary R; Coath, Christopher D; Harrison, T Mark; McKeegan, Kevin D

Affiliation University of California at Los Angeles, W. M. Keck Foundation Center for Isotope Geochemistry, Los Angeles, CA, United States (USA)

Source Earth and Planetary Science Letters, vol.150, no.1-2, pp.27-39, Jul 1997

Resource Location http://www.sciencedirect.com/science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract We describe a new ion microprobe method for dating magmatic zircon growth that is based on in situ measurement of the magnitude of (super 238) U- (super 230) Th disequilibrium. Our results support independent inferences that zircon can remain suspended for ***long*** periods (>100 ka) in the convecting portions of the magma from which it crystallizes. Because the crystallization ages date when the magma cooled to its zircon saturation temperature, even when the zircons have ***long*** magmatic residence times, (super 238) U- (super 230) Th zircon dating can be used to constrain the thermochemical evolution of silicic magmas. (super 238) U- (super 230) Th ages have been determined for individual zircons from rhyolites associated with the ***Long Valley*** magmatic system of eastern California. The samples are from Deer Mountain, an 115+ or -3 ka low-silica moat rhyolite, and from the coarsely porphyritic, low-silica rhyolite of South Deadman dome, one of the approximately 0.6 ka Inyo domes. Previous investigations have suggested that the two lavas were derived from the same magma reservoir. A few of the zircon model ages, calculated with respect to the isotopic characteristics of the whole rocks, are within error of that for eruption of the Deer Mountain rhyolite. However, the majority of zircons from both lavas cluster around an age of approximately 230 ka. This common interval of zircon nucleation and growth, for petrologically similar lavas, suggests that the younger Inyo dome lava may have tapped the same magma body from which the Deer Mountain rhyolite erupted more than 100 ka before. On the other hand, most of the zircon model ages are younger than previous episodes of silicic ***volcanism*** in the ***Long Valley*** Caldera, suggesting that the rhyolites may have been generated during development of a silicic upper crustal magma chamber in the western portion of ***Long Valley*** caldera. Zircon saturation temperatures for the rhyolites studied (795-810 degrees C) are the same as those obtained from coexisting Fe-Ti oxides (809+ or -4 degrees C), showing that the magma cooled to <815 degrees C more than 200 ka ago. The surprising consequence of these temperatures is the apparent longevity of the shallow magma reservoir from which relatively small (<1 km (super 3)) volume magmas erupted. The magma reservoir could have remained molten because of the regular influx and differentiation of mafic magma, resulting in accumulation of a much larger volume of magma than that erupted.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1997-063524

147. Database GeoRef

Title **Living with a restless caldera; *Long Valley*, California**

Author Hill, David P; Bailey, Roy A; Sorey, Michael L; Hendley, James W, II; Stauffer, Peter H

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source Fact Sheet - U. S. Geological Survey, Report: FS 0108-96, 2 pp., Jul 1997

Resource Location http://pubs.usgs.gov/fs/fs108-96/

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1997

Publication Type Serial; Report; Monographic

Accession Number 1998-031348

148. Database GeoRef

Title **Continuous monitoring of surface deformation at *Long Valley* Caldera, California, with GPS**

Author Dixon, Timothy H; Mao, Ailin; Bursik, Marcus I; Heflin, Michael B; Langbein, John; Stein, Ross S; Webb, Frank H

Affiliation University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States (USA)

Affiliation State University of New York at Buffalo, United States (USA); Jet Propulsion Laboratory, United States (USA); U. S. Geological Survey, United States (USA)

Source Journal of Geophysical Research, vol. 102, no. B6, pp.12,017-12,034, 10 Jun 1997

Resource Location http://www.agu.org/journals/jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Continuous Global Positioning System (GPS) measurements at ***Long Valley*** Caldera, an active volcanic region in east central California, have been made on the south side of the resurgent dome since early 1993. A site on the north side of the dome was added in late 1994. Special adaptations for autonomous operation in remote regions and enhanced vertical precision were made. The data record ongoing volcanic deformation consistent with uplift and expansion of the surface above a shallow magma chamber. Measurement precisions (1 standard error) for "absolute" position coordinates, i.e., relative to a global reference frame, are 3-4 mm (north), 5-6 mm (east), and 10-12 mm (vertical) using 24 hour solutions. Corresponding velocity uncertainties for a 12 month period are about 2 mm/yr in the horizontal components and 3-4 mm/yr in the vertical component. High precision can also be achieved for relative position coordinates on short (<10 km) baselines using broadcast ephemerides and observing times as short as 3 hours, even when data are processed rapidly on site. Comparison of baseline length changes across the resurgent dome between the two GPS sites and corresponding two-color electronic distance measurements indicates similar extension rates within error (approximately 2 mm/yr) once we account for a random walk noise component in both systems that may reflect spurious monument motion. Both data sets suggest a pause in deformation for a 3.5 month period in mid-1995, when the extension rate across the dome decreased essentially to zero. Three dimensional positioning data from the two GPS stations suggest a depth (5.8 + or - 1.6 km) and location (west side of the resurgent dome) of a major inflation center, in agreement with other geodetic techniques, near the top of a magma chamber inferred from seismic data. GPS systems similar to those installed at ***Long Valley*** can provide a practical method for near real-time monitoring and hazard assessment on many active volcanoes. Copyright 1997 by the American Geophysical Union.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1998-001026

149. Database GeoRef

Title **Oxygen isotope compositions of intracaldera rocks; hydrothermal history of the *Long Valley* Caldera, California**

Author McConnell, Vicki S; Valley, John W; Eichelberger, John C

Affiliation University of Alaska, Fairbanks, AK, United States (USA)

Affiliation University of Wisconsin, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.76, no.1-2, pp.83-109, Mar 1997

Resource Location http://www.sciencedirect.com/science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract The Bishop Tuff and associated rocks filling ***Long Valley*** Caldera, California represent a case where thick and relatively uniform geologic units of known initial compositions have been subjected to a strong geothermal fluid flux within an enclosed basin. Oxygen isotopic compositions within individual components of this "flux plate" are used to characterize a magmatically driven paleohydrothermal system. Oxygen isotope ratios of silicate components analyzed with a laser-probe/mass-spectrometer system clearly illustrate the isotopic heterogeneity in the hydrothermally altered felsic volcanic rocks. The alteration resulted from moderately high-temperature hydrothermal activity. Hydrothermal activity is linked to periods of post-caldera-collapse ***volcanism*** and resurgence in the central caldera. In general, (super 18) O depletion in the Bishop Tuff resulting from exchange with hydrothermal fluids proceeds as pumice>matrix>sanidine>quartz due to progressive resistance to alteration. Samples from the ***Long Valley*** Exploratory Well (LVEW) centered on the resurgent dome show downward increasing exchange and disequilibrium over the well's 2000-m depth. A flanking well shows the opposite pattern over 1300 m depth. Oxygen isotope isopleths along a W-E vertical cross section of the caldera reveals convective circulation upwards and outwards from the central resurgent dome. A paleotemperature maximum of approximately 350 degrees C in LVEW and a geothermal gradient of approximately 130 degrees C/km are deduced from feldspar/water oxygen isotope fractionation equations using the pumice and sanidine components of the intracaldera volcanic rocks. This is consistent with the degree of alteration and the secondary mineralogy. Present-day temperature maximum in the well is approximately 100 degrees C, and the geothermal gradient is 50 degrees C/km. Fossil hydrothermal water, trapped in fluid inclusions in hydrothermal vein quartz hosted by intracaldera rocks, has a calculated oxygen isotope composition of -10.2per mil based on chemistry and trapping temperature. This is 4per mil heavier than the average value for the present-day hydrothermal water and consistent with higher temperatures and water/rock ratios. Intrusive activity was initiated in the resurgent dome area soon after caldera collapse (760 ka), but migrated toward the western margin of the caldera, the locus of Holocene ***volcanism***. Thus, the central hydrothermal system matured and waned as the heat sources from intrusions shifted westward. Geophysical evidence of renewed intrusive activity located beneath the resurgent dome may presage a future renewal of the cycle of hydrothermal activity in the central caldera region. Although the hydrothermal activity is complex and transitory, this history is normal for a large, relatively active caldera system such as ***Long Valley*** Caldera.

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1997-033962

150. Database GeoRef

Title **Living with a restless caldera; *Long Valley*, California**

Source The Earth Scientist, vol. 14, no. 4, pp.18-20, 1997

Resource Location http://pubs.er.usgs.gov/djvu/FS/fs_96_108.djvu

Publisher National Earth Science Teachers Association (NESTA), Lansing, MI, United States (USA)

Publication Year 1997

Publication Type Serial; Analytic

Accession Number 1999-031507

151. Database GeoRef

Title **Magmatic evolution of Quaternary mafic magmas at *Long Valley* Caldera and the Devils Postpile, California; effects of crustal contamination on lithospheric mantle-derived magmas**

Author Cousens, Brian L

Affiliation Carleton University, Department of Earth Sciences, Ottawa, ON, Canada (CAN)

Source Journal of Geophysical Research, vol. 101, no. B12, pp.27,673-27,689, 10 Dec 1996

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Isotopic variations in Cenozoic mafic volcanic rocks in the Basin and Range Province of the southwestern United States are considered by many to be due to differences in mantle sources, either subduction -enriched subcontinental lithosphere or the asthenosphere. This is a detailed geochemical investigation of the magmatic evolution and mantle source(s) of Quaternary mafic ***volcanism*** at ***Long Valley*** Caldera and the Devils Postpile National Monument, Western Great Basin. The Quaternary mafic lavas are dominantly post-Bishop Tuff (<0.7 Ma) in age, occur as isolated cinder cones and small -volume lava flows within the caldera, and range in composition from alkali basalt to trachyandesite. Whereas fractional crystallization is the dominant process effecting the evolution of ***Long Valley*** lavas with MgO > 7%, assimilation of Sierra Nevada granitoids becomes increasingly important at MgO < 7%, such that SiO (sub 2) , K/La, and (super 87) Sr/ (super 86) Sr increase asP/K, Zr/Ba, and (super 143) Nd/ (super 144) Nd decrease. Assimilation -fractional crystallization calculations suggest that the most evolved trachyandesites include approximately 30% of upper crustal component. In lavas with > 7% MgO, (super 87) Sr/ (super 86) Sr and La/Sm decrease as (super 143) Nd/ (super 144) Nd, Nb/La, Zr/Ba and (to a lesser extent) Pb isotope ratios increase from the oldest to the youngest Quaternary lavas. The oldest lavas are chemically similar to other lavas in the western Basin and Range thought to have an enriched lithospheric mantle source. Whereas the shifts in Sr and Nd isotope ratios from oldest to youngest basalts might be consistent with a progressively increasing asthenospheric component in the lavas, the shifts in incompatible element ratios and lack of shifts in Pb isotope ratios with time are not. Instead, they indicate that with time the mafic lavas may have increasingly interacted with mafic crust, perhaps gabbroic/dioritic rocks at depth within the Sierra Nevada Batholith. Alternatively, a second, less enriched lithospheric mantle source is present beneath the ***Long Valley*** area that has only recently begun to undergo melt generation, and this source has made progressively larger contributions to the basaltic magmas erupted at the surface. Copyright 1996 by the American Geophysical Union.

Publication Year 1996

Publication Type Serial; Analytic

Accession Number 1997-021098

152. Database GeoRef

Title **Pre- and postcaldera lava sequences, *Long Valley*, California; asthenospheric, lithospheric, and lower crustal magma sources, current magmatic unrest, and future *volcanism***

Author Bailey, Roy A

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.790, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-020263

153. Database GeoRef

Title **In situ ion microprobe (super 238) U- (super 230) Th dating of zircon: *long* magma residence times for the youngest rhyolites associated with *Long Valley* Caldera**

Author Reid, M R; Coath, C D; Harrison, T M; McKeegan, K D

Affiliation University of California at Los Angeles, Department of Earth and Space Sciences, Los Angeles, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.77, no.46, Suppl., pp.794, 12 Nov 1996

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1996

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-020285

154. Database GeoRef

Title **Rb-Sr ages and Nd isotopic compositions of melt inclusions from the Bishop Tuff and the generation of silicic magma**

Author Christensen, John N; Halliday, Alex N

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Source Earth and Planetary Science Letters, vol.144, no.3-4, pp.547-561, Nov 1996

Resource Location http://www.sciencedirect.com/ science/journal/0012821X

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Rb-Sr ages of melt inclusions in quartz have the potential to provide a unique and illuminating record of the differentiation and accumulation history of silicic magmas. Here we report the first Sr and Nd isotopic measurements of melt inclusion bearing quartz (MIBQ), extracted from the Bishop Tuff (BT), representing what is arguably the world's most controversial yet classic zoned silicic magmatic system. Early erupted BT airfall pumice, representing material from the top of the magma chamber, yields individual quartz crystals with Rb/Sr>70 and variable apparent differentiation ages of 1,420+ or -80 ka, 2,100+ or -100 ka, 2,150+ or -150 ka and 2,500+ or -200 ka. A bulk quartz separate has an apparent age of 1,900+ or -300 ka, while a quartz separate from an individual airfall pumice has an apparent age of 1,330+ or -80 ka. These ages are similar to the Rb-Sr differentiation ages (2,047-1,894 ka) and k-Ar eruption ages (2,100 -1,300 ka) of the adjacent early pre-caldera rhyolites at Glass Mountain (GM), indicating that the upper portions of the BT magma chamber included components that episodically differentiated over the same time interval as early Glass Mountain ***volcanism***. However, at this stage the magmatic systems were separate, as indicated by epsilon (sub Nd) of -1 for airfall melt inclusions, similar to the BT and late GM rhyolites, compared to epsilon (sub Nd) of -3 for early GM rhyolites. In contrast to BT airfall, melt inclusions from intermediate and later erupted BT ignimbrite pumice, from deeper levels of the magma chamber, give younger apparent differentiation ages: 1,040+ or -140 ka (late erupted), 1,180+ or -80 ka (intermediate erupted clast 1), and 1,060+ or -110 ka, 1080+ or -110 ka (intermediate erupted clast 2, two quartz size fractions). These ages are indistinguishable from the Rb-Sr differentiation age of the late pre-caldera GM rhyolites, 1,140+ or -80 ka. The epsilon (sub Nd) of intermediate and late erupted melt inclusions is -1,

the same as BT airfall melt inclusions. These data are consistent with an early episodic development of the evolved upper portions of the BT magma chamber. However, we find no evidence that most of the differentiation took place at around 2 Ma, as recently suggested on the basis of (super 40) Ar- (super 39) Ar dating. Most of the Bishop Tuff magma, particularly the later erupted portions, differentiated in major events at around 1.0-1.2 Ma. Early differentiated melts repeatedly accumulated in the upper portions of the chamber concomitantly with differentiation, accumulation and eruption in the nearby Glass Mountain magma reservoir, which possibly represented a separate cupola to a larger complex system. By approximately 1.2 Ma the Bishop Tuff magmatic system expanded to include the Glass Mountain region. We find no evidence for differentiation younger than approximately 1.0 Ma in any samples from the Bishop Tuff (or Glass Mountain), confirming the view that over the >300,000 years that elapsed before eruption of the Bishop Tuff, the stratified magmatic system remained largely stable.

Publication Year 1996

Publication Type Serial; Analytic

Accession Number 1997-014727

155. Database GeoRef

Title **Hazards: CO (sub 2) emissions at Mammoth Mountain, California**

Author Sorey, Michael L

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Source United States Geological Survey Yearbook, pp.17 -18, 1996

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1996

Publication Type Serial; Report; Analytic; Abstract only

Accession Number 1997-021370

156. Database GeoRef

Title **Mantle sources and mantle vs. crustal contributions to Quaternary basaltic *volcanism* at *Long Valley* Caldera and Devils Postpile National Monument, California**

Author Cousens, Brian L

Affiliation Carleton University, Earth Sciences, Ottawa, ON, Canada (CAN)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.687, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1996-025754

157. Database GeoRef

Title **Magmatic CO (sub 2) record in pine needles and growth rings at Mammoth Mtn., CA**

Author Hainsworth, L J; Farrar, C D; Southon, J R

Affiliation Lawrence Livermore National Laboratory, Center for Accelerator Mass Spectrometry, Livermore, CA, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.76, no.46, Suppl., pp.688, 07 Nov 1995

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1996-025763

158. Database GeoRef

Title **Rhyolite intrusions in the intracaldera Bishop Tuff, *Long Valley* Caldera, California**

Author McConnell, V S; Shearer, C K; Eichelberger, J C; Keskinen, M J; Layer, P W; Papike, J J

Affiliation University of Alaska, Fairbanks, AK, United States (USA)

Affiliation Earth Sciences and Resources Institute, United States (USA); University of New Mexico, United States (USA)

Affiliation Los Alamos National Laboratory, Los Alamos, NM, United States (USA)

Source Journal of Volcanology and Geothermal Research, vol.67, no.1-3, pp.41-60, Aug 1995

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract Drilling of the ***Long Valley*** Exploratory Well on the resurgent dome in the ***Long Valley*** Caldera revealed >300 m cumulative thickness of granophyric intrusions within the 1180-m-thick, 760 ka intracaldera Bishop Tuff. The intrusions are aphyric to sparsely plagioclase -phyric, high-silica, high-barium and low-strontium rhyolites. They resemble the lavas of the Early Rhyolite, the first phase of post-caldera ***volcanism***. A mean (super 40) Ar/ (super 39) Ar age of 590+ or -17 ka from a part of a shallow intrusion is coeval with Early Rhyolite ***volcanism***. A second mean age of 454+ or -17 ka from the same intrusion may reflect either younger Early Rhyolite activity with no external equivalent or hydrothermal resetting of the argon system. Hydrothermal alteration of the intrusions is characterized by introduction of quartz, calcite and pyrite and formation of illite/smectite. High CO (sub 2) content of fluids apparently inhibited zeolite formation. Alteration varies locally within intrusions and intrusive groups and does not vary systematically with depth. Oxygen shows consistent depletion of the (super 18) O isotope from an initial magmatic composition of +6.0 to +8.5 per mil to values ranging from +1.4 to -0.4 per mil. The constant oxygen isotope depletion most likely reflects alteration of intrusions due to local emplacement -induced hydrothermal circulation rather than a caldera-scale hydrothermal system. In contrast, (super 18) O depletion of the host Bishop Tuff increases regularly with depth (except at an intrusive contact). A pre-Early Rhyolite geothermal gradient of approximately 70 degrees C/km was inferred. This is substantially higher than the current gradient but substantially lower than expected for the case of a conductive regime over a shallow residual magma chamber. Either the intrusions were fed from a deep chamber, or a cool hydrologic recharge regime was established early in caldera history. The age, thickness and suspected lateral extent of these shallow intrusions are such that emplacement of the intrusions, rather than inflation of a shallow chamber, is responsible for resurgence of the central ***Long Valley*** Caldera. Similar intrusions occur in another well on the resurgent dome (LV13-21) but not in wells located off the dome.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1996-002730

159. Database GeoRef

Title **Shallow and peripheral volcanic sources of inflation revealed by modeling two-color geodimeter and leveling data from *Long Valley* Caldera, California,1988-1992**

Author Langbein, John; Dzurisin, Daniel; Marshall, Grant; Stein, Ross; Rundle, John

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Affiliation University of Colorado at Boulder, United States (USA)

Source Journal of Geophysical Research, vol. 100, no. B7, pp.12,487-12,495, 10 Jul 1995

Resource Location http://www.agu.org/journals/ jd/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract We refined the model for inflation of the ***Long Valley*** caldera near Mammoth Lakes, California, by combining both geodetic measurements of baseline length and elevation changes. Baseline length changes measured using a two-color geodimeter with submillimeter precision revealed that the resurgent dome started to reinflate in late 1989. Measurements between late 1989 and mid-1992 revealed nearly 13 cm of extension across the resurgent dome. Geodetic leveling surveys with approximately 2-mm precision made in late 1988 and in mid-1992 revealed a maximum of about 8 cm of uplift of the resurgent dome. Two ellipsoidal sources satisfy both the leveling and two-color measurements, whereas spherical point sources could not. The model's primary inflation source is located 5.5 km beneath the resurgent dome with the two horizontal axes being nearly equal in size and the vertical axis being 4 times the length of the horizontal axes. A second ellipsoidal source was added to improve the fit to the two-color measurements. This secondary source is located at a depth between 10 and 20 km beneath the south moat of the caldera and has the geometry of an elongated ellipsoid or pipe that dips down to the northeast. In addition, the leveling data suggest dike intrusion beneath Mammoth Mountain during the 1988-1992 interval, which is likely associated with an intense swarm of small earthquakes during the summer of 1989 at that location. Our analysis shows the dike intrusion to be the shallowest of the three sources with a depth range of 1-3 km below the surface to the top of the intrusion. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-053145

160. Database GeoRef

Title **Inflation of *Long Valley* Caldera from one year of continuous GPS observations**

Author Webb, Frank H; Bursik, Marcus; Dixon, Timothy; Farina, Frederic; Marshall, Grant; Stein, Ross S

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Affiliation State University of New York at Buffalo, United States (USA); Rosenstiel School of Marine and Atmospheric Science, United States (USA); U. S. Geological Survey, United States (USA)

Source Geophysical Research Letters, vol. 22, no. 3, pp.195-198, 01 Feb 1995

Resource Location http://www.agu.org/journals/ gl/

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract A permanent Global Positioning System receiver at Casa Diablo Hot Springs, ***Long Valley*** Caldera, California was installed in January, 1993, and has operated almost continuously since then. The data have been transmitted daily to the Jet Propulsion Laboratory for routine analysis with data from the Fiducial Laboratories for an International Natural sciences Network (FLINN) by the JPL FLINN analysis center. Results from these analyses have been used to interpret the on going deformation at ***Long Valley***, with data excluded from periods when the antenna was covered under 2.5 meters of snow and from some periods when Anti Spoofing was enforced on the GPS signal. The remaining time series suggests that uplift of the resurgent dome of ***Long Valley*** Caldera during 1993 has been 2.5 + or - 1.1 cm/yr and horizontal motion has been 3.0 + or - 0.7 cm/yr at S53W in a no-net-rotation global reference frame, or 1.5 + or - 0.7 cm/yr at S14W relative to the Sierra Nevada block. These rates are consistent with uplift predicted from frequent horizontal strain measurements. Spectral analysis of the observations suggests that tidal forcing of the magma chamber is not a source of the variability in the 3 dimensional station location. These results suggest that remotely operated, continuously recording GPS receivers could prove to be a reliable tool for volcano monitoring throughout the world. Copyright 1995 by the American Geophysical Union.

Publication Year 1995

Publication Type Serial; Analytic

Accession Number 1995-033007

161. Database GeoRef

Title **Hydrothermal history of the *Long Valley* Caldera, California; life after collapse**

Author McConnell, Vicki Sue

Publication Year 1995

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1996-056228

162. Database GeoRef

Title **Seismicity and eruptions triggered by large earthquakes**

Author Linde, Alan T; Sacks, I Selwyn

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Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.21, Week A, pp.353, 1995

Publisher [publisher varies], [location varies], International (III)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1998-050273

163. Database GeoRef

Title **Models for volatile transport beneath Mammoth Mountain, California**

Author Sorey, M L; Evans, W C; Farrar, C D; Kennedy, B M

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Lawrence Berkeley Laboratory, United States (USA)

Author Anonymous

Source International Union of Geodesy and Geophysics, General Assembly, vol.21, Week A, pp.466-467, 1995

Publisher [publisher varies], [location varies], International (III)

Publication Year 1995

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1999-035949

164. Database GeoRef

Title **Volcano geodesy; results of 100 years of surveillance**

Author Dvorak, John J

Affiliation U. S. Geological Survey, Vancouver, WA, United States (USA)

Affiliation Observatoire Royal de Belgique, Brussels, Belgium (BEL)

Source Cahiers du Centre Europeen de Geodynamique et de Seismologie (ECGS), vol.8, pp.1-19, 1995

Publisher Centre Europeen de Geodynamique et de Seismologie, Luxembourg (LUX)

Abstract Routine geodetic measurements are made at only a few dozen of the world's 600 or so active volcanoes, even though these measurements have proven to be one of the surest precursors to eruptions. Shallow magma accumulation in the crust often results in slight

movement of the ground surface, easily measured using standard land-surveying techniques. The pattern and rate of surface movement reveals the depth and rate of pressure increase within a shallow magma reservoir. This process is clearly demonstrated at Kilauea and Mauna Loa, Hawaii; ***Long Valley*** caldera, California; Campi Flegrei caldera, Italy; Rabaul caldera, Papua New Guinea; and Aira caldera and nearby Sakurajima, Japan. Slower and lesser amounts of ground movement at Yellowstone caldera, Wyoming, and Tangkuban Parahu, Java, are attributed to changes in a hydrothermal system that overlies a crustal magma body. The vertical and horizontal dimensions of eruptive fissures, as well as the amount of widening, were determined from the difference between pre- and post-eruption geodetic surveys at Etna, Italy; Tolbachik, Kamchatka; Krafla, Iceland; and Asal-Ghoubbet, Djibouti, the last a segment of the East Africa Rift Zone. Continuously recording instruments, such as tiltmeters, extensometers, and dilatometers, have recorded lengthening and upward growth of eruptive fissures, usually at rates of hundreds of meters per hour, at Kilauea; Izu-Oshima, Japan; Teishi Knoll seamount, Japan; and Piton de la Fournaise, Reunion Island. Such instruments also have recorded the hour or less of slight ground movement that preceded small explosive eruptions at Sakurajima and presumed sudden gas emissions at Galeras, Colombia. The use of satellite geodesy, in particular the Global Positioning System, offers the possibility to reveal surface strain changes local to a volcano and over a broad region that includes the volcano.

Publication Year 1995

Publication Type Serial; Conference document; Analytic

Accession Number 2004-002111

165. Database GeoRef

Title **Ground deformations in collapsed calderas**

Author De Natale, Giuseppe; Pingue, Folco

Affiliation Osservatorio Vesuviano, Naples, Italy (ITA)

Affiliation Observatoire Royal de Belgique, Brussels, Belgium (BEL)

Source Cahiers du Centre Europeen de Geodynamique et de Seismologie (ECGS), vol.8, pp.57-77, 1995

Publisher Centre Europeen de Geodynamique et de Seismologie, Luxembourg (LUX)

Abstract The influence of collapsed caldera structures on the shape of ground deformations produced by source of overpressure is analyzed. The method uses a 2D approximation of the model of compute, by a boundary method, the effect of lateral stress-strain

discontinuities in a homogeneous elastic medium on ground deformation curves generated by a source of pressure located at depth. Such discontinuities are taken to represent the borders of the collapsed caldera area, where the dislocated contact between different lithologies is likely to be a weakness zone, which can slip during deformation episodes also at low stress levels. The results of numerical modeling point out the strong influence of the presence of such discontinuities on the shape of the deformation field. In particular, the location of such discontinuities affects the lateral extension of the deformed area in a much more effective way than the depth of the pressure source does. Observations from real calderas support this model, showing a very good correlation between the caldera shape and the ground deformation shape. As a consequence, it is doubtful that, in these areas, the application of simple models (e.g., the Mogi model) is effective in determining the source depth. In the case of Rabaul caldera, the application of this model allows to formulate a simple hypothesis for explaining the very small size of the deformed area, without involving the concept of intrusions of magma at very shallow depths.

Publication Year 1995

Publication Type Serial; Conference document; Analytic

Accession Number 2004-002114

166. Database GeoRef

Title **Pb, Sr, Nd isotope and U-series investigation of the Holocene Inyo and Mono high silica rhyolite domes, E. California**

Author Palacz, Zenon; Gill, James

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Source U. S. Geological Survey Circular, Report: C 1107, pp.241, 1994

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1994

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Accession Number 1995-011768

167. Database GeoRef

Title **Quaternary *volcanism* NE of Mono Basin, California; basaltic-andesitic magmatism unrelated by fractional crystallization**

Author Lange, Rebecca A; Carmichael, Ian S E

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Affiliation University of California at Berkeley, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.26, no.7, pp.368, 1994

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-031494

168. Database GeoRef

Title **The U.S.A. Continental Scientific Drilling Program (CSDP)**

Author Luth, William; MacGregor, Ian; Russ, David

Affiliation U. S. Department of Energy, Washington, DC, United States (USA)

Affiliation National Science Foundation, United States (USA); U. S. Geological Survey, United States (USA)

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 19, pp.69, 1994

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1994

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1995-054264

169. Database GeoRef

Title **Deep exploration of an active silicic caldera; a search for magma in the crust beneath *Long Valley*, California**

Author Rundle, John B; Sass, John H; Finger, John; Eichelberger, John C

Affiliation University of Colorado, Department of Geological Sciences, Boulder, CO, United States (USA)

Affiliation U. S. Geological Survey, United States (USA); Sandia National Laboratories, United States (USA); University of Alaska at Fairbanks, United States (USA)

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.59 -62, 1994

Publisher [varies], [location varies], International (III)

Abstract While the deep structure and physical state of active silicic calderas have until now been clouded with uncertainty, a unique opportunity presently exists to make direct observations in deep drill hole within the ***Long Valley*** caldera of eastern California. For the first time, it will be possible to obtain hard data on the physical existence of juvenile magma within the basement rock of ***Long Valley***. To critically test the hypothesis that magma does indeed exist at relatively shallow depth, we need to obtain qualitatively new information on the structure of the basement, on the physical conditions leading to the sudden cessation of earthquakes below approximately 4 km depth at the well site, and on the patterns and thermal efficiency of deep fluid circulation within the basement rock beneath the caldera. These fundamental issues can all be addressed by continuing the ***Long Valley*** Exploration Well that currently extends to a depth of 2.3 km beneath the center of the resurgent dome. We propose to deepen the well to 4.3 km in a third phase of drilling. In contrast to the previous drilling that employed conventional oilfield technology, Phase III will be continuously cored to allow unambiguous characterization of lithology, as well as systematic measurements of physical and chemical properties with depth. The target is the base of the seismogenic zone above the current center of inflation. We expect to resolve the paradox posed by surface geophysical evidence of shallow magma but subdued heat flow at moderate depth. Models for the caldera system can be critically tested only by observing the qualitatively new information given by the depth dependence of physical and chemical properties.

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Accession Number 2010-044460

170. Database GeoRef

Title **Microanalysis of oxygen isotope ratios; *Long Valley* Caldera**

Author Valley, J W; McConnell, V S; Eichelberger, John C; Spicuzza, M J

Affiliation University of Wisconsin, Department of Geology, Madison, WI, United States (USA)

Affiliation University of Alaska at Fairbanks, United States (USA)

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.74 -77, 1994

Publisher [varies], [location varies], International (III)

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Accession Number 2010-044464

171. Database GeoRef

Title **Hydrologic testing and hydrothermal modeling at the *Long Valley* exploratory well**

Author Forster, Craig B; Morin, Roger; Sorey, Michael

Affiliation University of Utah, Earth Sciences and Resources Institute, Salt Lake City, UT, United States (USA)

Affiliation U. S. Geological Survey, United States (USA)

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.82-85, 1994

Publisher [varies], [location varies], International (III)

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Accession Number 2010-044466

172. Database GeoRef

Title **Drilling, coring, and downhole testing at the *Long Valley* exploratory well**

Author Finger, J T; Jacosbon, R D

Affiliation Sandia National Laboratories, Geothermal Research Department, Albuquerque, NM, United States (USA)

Author Mitterer, Richard M (chairperson)

Affiliation University of Texas at Dallas, Department of Geosciences, Dallas, TX, United States (USA)

Source Proceedings - International Symposium on the Observation of the Continental Crust through Drilling, vol. 7, pp.86-88, 1994

Publisher [varies], [location varies], International (III)

Publication Year 1994

Publication Type Serial; Conference document; Analytic

Accession Number 2010-044467

173. Database GeoRef

Title **Reanalysis of S-to-P amplitude ratios for gross attenuation structure, *Long Valley* Caldera, California**

Author Sanders, Christopher O

Affiliation Arizona State University, Department of Geology, Tempe, AZ, United States (USA)

Source Journal of Geophysical Research, vol. 98, no. B12, pp.22,069-22,079, 10 Dec 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Because of the strong interest in the magmatism and ***volcanism*** at ***Long Valley*** caldera, eastern California, and because of recent significant improvements in our knowledge of the caldera velocity structure and earthquake locations, I have reanalyzed the local-earthquake S-to-P amplitude-ratio data of Sanders (1984) for the gross three-dimensional attenuation structure of the upper 10 km of ***Long Valley*** caldera. The primary goals of the analysis are to provide more accurate constraints on the depths of the attenuation anomalies using improved knowledge of the ray locations and an objective inversion procedure. The new image of the high S wave attenuation anomaly in the west-central caldera suggests that the top of the principal anomaly is at 7-km depth, which is 2 km deeper than previously determined. Because of poor resolution in much of the region, some of the data remain unsatisfied by the final attenuation model. This unmodeled data may imply unresolved attenuation anomalies, perhaps small anomalies in the kilometer or two just above the central-caldera anomaly and perhaps a larger anomaly at about 7-km depth in the northwest caldera or somewhere beneath the Mono Craters. The central-caldera S wave attenuation anomaly has a location similar to mapped regions of low teleseismic P wave velocity, crustal inflation, reduced density, and aseismicity, strongly suggesting magmatic association. Copyright 1993 by the American Geophysical Union.

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1994-024600

174. **Database** GeoRef

Title **Potassic *volcanism* near Mono Basin, California; evidence for high water and oxygen fugacities inherited from subduction**

Author Lange, Rebecca A; Carmichael, Ian S E; Renne, Paul R

Affiliation University of Michigan, Department of Geological Sciences, Ann Arbor, MI, United States (USA)

Affiliation University of California at Berkeley, Berkeley, CA, United States (USA); Institute of Human Origins, Berkeley, CA, United States (USA)

Source Geology (Boulder), vol.21, no.10, pp.949-952, Oct 1993

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Exposed around the margins of Mono basin and the periphery of ***Long Valley*** caldera are approximately 100 km (super 3) of potassic, basic to intermediate lavas that record high water and oxygen fugacities. Most eruptions occurred between 4 and 2 Ma, although sporadic potassic ***volcanism*** continued into the Quaternary with a pulse between 0.1 and 0.5 Ma, approximately 15 km northeast of Mono basin. The lava types include absarokite, minette, hornblende lamprophyre, trachybasalt, and trachyandesite. Estimated water contents for lavas without hydrous phenocrysts range between 2 and 3 wt%, considerably more than mid-ocean ridge, oceanic island, or back-arc magmas. Calculated f O (sub 2) values fall between -0.4 and +1.2 log units of the Ni-NiO buffer. Although this potassic suite was erupted in an extensional tectonic setting at the western margin of the Basin and Range province, its high K (sub 2) O/TiO (sub 2) and low Zr/Ba ratios suggest a subduction - modified mantle source. If subduction was the process that enriched the lithospheric mantle in large-ion lithophile elements (K, Ba, etc.), it was also a mechanism for mantle oxidation and hydration. October 1993

Publication Year 1993

Publication Type Serial; Analytic

Accession Number 1993-038104

175. **Database** GeoRef

Title **Neodymium isotopic monitor of eruption potential; postcaldera lavas of *Long Valley*, California**

Author DePaolo, D J; Perry, F V; Baldridge, W S; Christensen, J N

Affiliation University of California at Berkeley, Center for Isotope Geochemistry, Berkeley, CA, United States (USA)

Affiliation University of New Mexico, United States (USA); Los Alamos National Laboratory, United States (USA); University of Michigan, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.16, Suppl., pp.334, May 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-004182

176. **Database** GeoRef

Title **Strain transient recorded in the *Long Valley* Caldera during triggered seismicity from the June 28, 1992, M (sub L) 7.4 Landers, California, earthquake**

Author Johnston, M J S; Linde, A T; Hill, D P; Langbein, J

Affiliation U. S. Geological Survey, Menlo Park, CA, United States (USA)

Affiliation Carnegie Institution, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.74, no.16, Suppl., pp.317, May 1993

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1993

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-007314

177. **Database** GeoRef

Title **Thermal and dynamical regimes of single- and two-phase magmatic flow in dikes**

Author Carrigan, Charles R; Schubert, Gerald; Eichelberger, John C

Affiliation Lawrence Livermore National Laboratory, Earth Sciences Department, Livermore, CA, United States (USA)

Affiliation University of California at Los Angeles, United States (USA); University of Alaska, United States (USA)

Source Journal of Geophysical Research, vol. 97, no. B12, pp.17,377-17,392, 10 Nov 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Finite element calculations of magma flow in dikelike channels with length-to-width ratios of 1000:1 or more have been used to investigate the coupling between thermal and dynamical regimes due to temperature-dependent viscosity and dissipation. Steady state solutions with realistic thermal and dynamical parameter values have been obtained. The models show that the onset of solidification on the boundaries of a basaltic or andesitic dike, as predicted by idealized laminar flow models, can be prevented or significantly delayed by a small amount of transverse flow induced by rising bubbles, boundary roughness, or turbulence. This effect will reduce the critical initial widths of dikes estimated by Bruce and Huppert (1989). In the absence of transverse flow, the bulk temperature of the magma may actually increase slightly with distance along the dike as a result of viscous dissipation even while solidification is occurring on the walls of the dike. With converging or necking dike walls it is found that boundary temperatures fall to a minimum and then increase with distance along a dike even if viscous heating is neglected. For viscous heating to offset significant rates of heat loss (2 kW/m (super 2)) in a plane-parallel 1-m-wide basaltic dike, an average flow velocity of 2.7 m/s driven by a pressure gradient of 1.7 MPa/km is required. A 7% void fraction caused by exsolution of volatiles or chamber gas in the magma will produce this pressure gradient. The ease of producing such a gradient by reducing the density of the magmatic column with addition of a gas phase makes it likely that flows of basaltic magma could be maintained in dikes tens of kilometers ***long***. Furthermore, a gas phase may be important for the propagation of the fracture prior to the initial injection of magma during dike emplacement. Rapid transport of more silicic magmas through dikes is inhibited by the requirement of large driving pressure gradients exceeding several hundred megapascals per kilometer. However, the pressure gradient can be substantially reduced if the magma is a heterogenous mixture of a predominantly silicic component with a more mafic component.
Pipe flow experiments involving molten polymers that exhibit dynamical similarity to magmas strongly suggest that unmixing occurs when a two-component magma mixture, in which the components have different viscosities, rises within a dike. Within a few dike widths of the inlet the less viscous mafic component encapsulates the more viscous silicic part, effectively lubricating the passage of the more viscous component. Compositional variations in the Obsidian Dome volcano support the occurrence of this pressure reduction or self-lubrication mechanism. Such a self-lubrication process often may be necessary to permit very viscous magmas to reach Earth's surface. If so, chemical and lithologic zoning would be anticipated as a common feature of near-surface intrusions or lava flows that are characterized by a high silica and/or high crystal content such as at Deadman Dome in ***Long Valley***, California. Copyright 1992 by the American Geophysical Union.

Publication Year 1992

Publication Type Serial; Analytic

Accession Number 1992-070878

178. **Database** GeoRef

Title **How to predict an eruption at *Long Valley* Caldera**

Author Bursik, Marcus

Affiliation State University New York, Department of Geology, Buffalo, NY, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.43, suppl., pp.343, 27 Oct 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014028

179. **Database** GeoRef

Title **Geochemistry and isotopic composition of post-caldera basaltic lavas from *Long Valley*, California**

Author Cousens, Brian L

Affiliation Universite de Montreal, Departmente de Geologie, Montreal, QC, Canada (CAN)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.73, no.14, supplement, pp.337, 07 Apr 1992

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1992

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1993-014643

180. **Database** GeoRef

Title **Origin of the *Long Valley* Caldera moat basalt**

Author Woodburne, Timothy Bradner

Abstract The moat basalt was rapidly erupted between 0.24 and 0.06 Ma ago and flooded the western half of the ***Long Valley*** Caldera, California. Twenty-three moat basalt lava flows and a possible feeder dike have been sampled. Based on chemistry and petrography, these rocks can be divided into five distinct groups: from group V, the most primitive (approximately 48 wt.% Si02) and presumably the oldest, to group I, the most evolved (approximately 58 wt.% Si02) and the youngest. The groups, in general, become more evolved towards the top of the sequence. These groups can be related by assimilation and crystal fractionation. Olivine and pyroxene are the fractionating phases relating group V, group IV, and group III. Plagioclase joins the fractionating phases relating group III, group II and group I. A granodiorite composition has been calculated as the assimilant using multiple linear regression. A chemically zoned lava flow overlain by a primitive group IV flow lying between more evolved group II flows are interpreted as eruptions from a zoned magma chamber.

Publication Year 1992

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1995-058948

181. **Database** GeoRef

Title **Potential impact on water resources from future volcanic eruptions at *Long Valley*, Mono County, California, U.S.A.**

Author Hopson, R Forrest

Affiliation 6597 Camino Venturoso, Goleta, CA, United States (USA)

Source Environmental Geology and Water Sciences, vol. 18, no. 1, pp.49 -55, Aug 1991

Publisher Springer International, Berlin, Federal Republic of Germany (DEU)

Publication Year 1991

Publication Type Serial; Analytic

Accession Number 1991-040532

182. **Database** GeoRef

Title **Petrogenesis of precaldera mafic and intermediate lavas, *Long Valley*, California**

Author Nielsen, D; Mahood, Gail A; Halliday, A N; Essene, E J

Affiliation Univ. Mich., Dep. Geol. Sci., Ann Arbor, MI, United States (USA)

Affiliation Stanford Univ., United States (USA)

Author Wong, Ivan G (chairperson); Sullivan, Ray (chairperson)

Source Seismological Research Letters, vol.62, no.1, pp.27, Mar 1991

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1991-046656

183. **Database** GeoRef

Title **Petrogenesis of precaldera mafic and intermediate lavas, *Long Valley*, CA**

Author Nielsen, D; Mahood, G; Halliday, A; Essene, E J

Affiliation Univ. Mich., Dep. Geol. Sci., Ann Arbor, MI, United States (USA)

Affiliation Stanford Univ., United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.23, no.2, pp.83, Mar 1991

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-003226

184. **Database** GeoRef

Title **Hazard zones for assessing the impact of future volcanic eruptions on water resources in the *Long Valley* area, eastern California**

Author Hopson, R Forrest

Affiliation California State University, Department of Geology, Los Angeles, CA, United States (USA)

Author Anonymous

Source Abstracts with Programs - Geological Society of America, vol.23, no.5, pp.204, 1991

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1991

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1994-008019

185.Database GeoRef

Title **Volcanoes; old new, and--perhaps--yet to be**

Author Kerr, Richard A

Affiliation Am. Assoc. Adv. Sci., Washington, DC, United States (USA)

Source Science, vol.250, no.4988, pp.1660-1661, 21 Dec 1990

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1991-001507

186. **Database** GeoRef

Title **Heat flow from DOE's magma-energy research well at *Long Valley*, California**

Author Sass, J H; Jacobson, Ronald; Sorey, M L

Affiliation U. S. Geol. Surv., Flagstaff, AZ, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.71, no.43, pp.1684, 23 Oct 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-017933

187. Database GeoRef

Title **Teleseismic tomography of the compressional wave velocity structure beneath the *Long Valley* region, California**

Author Dawson, P B; Evans, J R; Iyer, H M

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 95, no. B7, pp.11,021-11,050, 10 Jul 1990

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract In 1982 and 1984 the U.S. Geological Survey used several seismic networks, totaling over 90 stations, to record teleseismic P waves and measure travel time residuals in an area centered on the ***Long Valley*** caldera. We inverted the travel time residuals to obtain a three- dimensional image of the velocity structure with resolution of 5-6 km to depths of 70 km beneath the array. Direct inversion of these data indicates that the 2- to 4-km-thick low-velocity caldera fill contaminates the signal from any midcrustal velocity anomalies beneath the caldera. Thus two methods were used to strip the effects of the upper crust from the travel time residuals: (1) ray tracing through upper crustal velocity models provided by seismic refraction experiments and gravity surveys, and (2) an iterative stripping scheme using the inversion itself. The methods produce essentially identical results and adequately remove the effects of the shallowest crustal structures, including the caldera fill and hydrothermal alteration effects. The resulting "stripped" models show two well-resolved midcrustal low-velocity bodies in the ***Long Valley*** region. The first body is centered between 7 and 20 km depth beneath the resurgent dome of the ***Long Valley*** caldera and has a volume of 150-600 km (super 3) . The second, with a similar volume, is centered between 10 and 20 km depth beneath the Mono Craters, about 10 km north of ***Long Valley***. Velocity contrasts in both of these bodies are about 6-10%, and the features are interpreted as silicic magma chambers. This experiment does not preclude the presence of additional pockets of magma smaller than 5 km across in the upper crust, particularly beneath the resurgent dome of the caldera (which would be removed with the stripping methods). It is likely that the midcrust anomaly beneath the resurgent dome is a remnant of the caldera forming magma chamber. Upper mantle velocities are lower than average beneath Mono Craters and higher than average beneath ***Long Valley***. We tentatively interpret these anomalies as mantle partial melt beneath the Mono Craters and refractory upper mantle residuum beneath ***Long Valley***. The high eruptive rate of the Mono Craters and these upper mantle structures

suggest that the focus of ***volcanism*** is shifting north from ***Long Valley*** to the Mono Craters. Copyright 1990 by the American Geophysical Union.

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1990-049546

188. Database GeoRef

Title **Magmatic unrest at *Long Valley* Caldera, California, 1980-1990**

Author Bailey, R A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Program with Abstracts - Geological Association of Canada; Mineralogical Association of Canada: Joint Annual Meeting, vol. 15, pp.6, May 1990

Publisher Geological Association of Canada, Waterloo, ON, Canada (CAN)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-059615

189. Database GeoRef

Title **Magma energy; what is the potential?**

Author Eichelberger, John C; Dunn, James C

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Source Bulletin - Geothermal Resources Council, vol.19, no.2, pp.53-56, Feb 1990

Publisher Geothermal Resources Council, Davis, CA, United States (USA)

Publication Year 1990

Publication Type Serial; Analytic

Accession Number 1990-034150

190. **Database** GeoRef

Title **Normal faults and volcanoes**

Author Ellis, Michael; King, Geoffrey

Affiliation Cent. Earthquake Res. and Inf., Memphis, TN, United States (USA)

Affiliation Univ. Colo., United States (USA)

Author Anonymous

Affiliation United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.22, no.7, pp.273, 1990

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1990

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1992-066972

191. **Database** GeoRef

Title **Range front faulting and *volcanism* in the Mono Basin, eastern California**

Author Bursik, Marcus; Sieh, Kerry E

Affiliation Calif. Inst. Technol., Dep. Geol. and Planet. Sci., Pasadena, CA, United States (USA)

Source Journal of Geophysical Research, vol. 94, no. B11, pp.15,587-15,609, 10 Nov 1989

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The spatial and temporal pattern of range front normal faulting and ***volcanism*** in the Mono Basin of eastern California suggests that dikes are being intruded underneath the Mono Craters in response to crustal stretching and are now accommodating strain that was once taken up by range front faulting. The section of the Sierra Nevadan range front near the craters accommodated as much as 1 mm/yr of extension as recently as about 40,000 years ago. For the past 40,000 years, this section of range front has been inactive, even though range front extension to the north and south has continued at up to 0.9 mm/yr. For the past 40,000 years, dikes, intruding underneath the Mono Craters, seem to have been accommodating the 1 mm/yr of extension that was previously taken up by faulting. Since the basin is extending obliquely to the trend of the frontal faults, there is a component of dextral shear to their motion, so that the Mono Craters may be forming on an extensional boundary of a pull-apart basin. If the craters represent incipient caldera formation, then calderas such as ***Long Valley*** may also have formed in pull-apart zones. Copyright 1989 by the American Geophysical Union.

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1990-004570

192. **Database** GeoRef

Title **On restless calderas**

Author Smith, Peter J

Affiliation Open Univ., Dep. Earth Sci., Milton Keynes, United Kingdom (GBR)

Source Geology Today, vol.5, no.5, pp.171-174, Oct 1989

Publisher Blackwell, Oxford, United Kingdom (GBR)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-075540

193. **Database** GeoRef

Title **DOE thermal regimes drilling program through 1988**

Author Wollenberg, Harold; Eichelberger, John C; Elders, Wilfred A; Goff, Fraser; Younker, Leland W

Affiliation Lawrence Berkeley Lab., Earth Sci. Div., Berkeley, CA, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA); Univ. Calif., United States (USA); Los Alamos Natl. Lab., United States (USA); Lawrence Livermore Natl. Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.70, no.28, pp.697, 706-707, 11 Jul 1989

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1989

Publication Type Serial; Analytic

Accession Number 1989-080925

194. **Database** GeoRef

Title **Modeling of deformation and stresses associated with *volcanism* at *Long Valley*, California**

Author Wu, Mingdong

Publication Year 1989

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1990-042235

195. **Database** GeoRef

Title **Cooling, devitrification, and flow of large hot rhyolite lava flows; numerical modeling results**

Author Manley, Curtis R

Affiliation Stanford Univ., Dep. Geol., Stanford, CA, United States (USA)

Author Anonymous

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, Report: 131, pp.174, Apr 1989

Resource Location http://geoinfo.nmt.edu/publications/ home.html

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Publication Year 1989

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Accession Number 1990-023926

196. **Database** GeoRef

Title **Volcanic tremor from around the world**

Author McNutt, S R

Affiliation Calif. Dep. Conserv., Div. Mines and Geol., Sacramento, CA, United States (USA)

Source Bulletin - New Mexico Bureau of Geology & Mineral Resources, vol. 131, pp.183, Apr 1989

Resource Location http://geoinfo.nmt.edu/publications/ home.html

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Abstract Volcanic tremor or related phenomena have been recorded at more than 120 volcanic areas worldwide. A comprehensive literature search of over 560 references covering 105 volcanoes was made to determine quantitative relationships between different tremor parameters. Unpublished data from 5 volcanoes were added to the compilation. Preliminary results show that more than 240,000 episodes of tremor are reported in the literature. Analyses of subsets of these data show that approximately 65% of tremor episodes accompany eruptions of gases or lava, and 35% occurred with no eruption. Volcanic tremor preceded eruptions on a time scale of minutes to hours in approximately 20% of the cases studied, and followed eruptions in about 15% of the cases. Durations of individual tremor episodes range from minutes to years: 62% from 1-59 minutes: 17% from 1-23 hours; 10% from 1-6 days: and 3% weeks or longer No data on durations were given for 8% of the episodes. Continuous tremor episodes with durations longer than one year have occurred at Etna, Stromboli, Arenal, Kilauea, and Oshima volcanoes. Based on data from 55 volcanoes for which it was reported, the mean frequency of volcanic tremor is 3.8 Hz, and the median value is 3.2 Hz (Figure 1 below). The range of frequencies reported for tremor extends from 0.12 Hz to 15 Hz. The higher values are typical of station distances of less than 1 km and active geothermal systems, while the lower values are typical of distances on the order of 5- 10 km and magmatic activity. Observations of tremor depend critically on seismic stations, and data on seismic stations are readily available for 78 volcanoes. Of these, 25 volcanoes have at least one seismic station within 1 km of the vent. While the most distant station to record tremor is 430 km away (Hydrophones have recorded T- phases from submarine eruptions up to 8,600 km away.) Detection thresholds, normalized to reduced displacement,

could be calculated for 43 volcanoes. Twelve volcanoes have detection thresholds less than 1.0 cm (super 2) ; the lowest thresholds are 0.02 cm (super 2) at Kilauea and 0.05 cm (super 2) at Ruiz. Estimates of the maximum amplitude of tremor, again normalized to reduced displacement, were calculated for 22 volcanoes. These range from 0.56 cm (super 2) to approximately 100,000 cm (super 2) , the latter value accompanying the great Vesuvius eruption of 1906. All of the values over 100 cm (super 2) except one occurred when large eruptions were in progress. The dynamic range of tremor at individual volcanoes varies from 14 to 75 dB, with a mean of 38 dB and a median of 37 dB (Figure 2 below). Felt tremor has been reported at 10 volcanoes: Paricutin, Lamington, Etna, Api Siau, Sierra Negra, Vesuvius, Ruiz, Pacaya, Surtsey, and Kilauea Deep (>10 km) tremor or low-frequency events have occurred at 3 volcanoes: Kilauea, Oshima, and Lassen. Banded tremor -- periodic episodes separated in time at regular intervals -- has occurred at 6 volcanoes: Karkar, Ruiz, Pavlof, Suwanose -jima. Ulawun. Klyuchevskoy, and at Old Faithful geyser. Spasmodic tremor has occurred at Kilauea, Mount St. Helens, Fuego, Klyuchevskoy, ***Long Valley***, and Vesuvius.

Publication Year 1989

Publication Type Serial; Report; Conference document; Analytic; Abstract only

Accession Number 1990-027507

197. Database GeoRef

Title **Excursion 13B; *Long Valley* Caldera and Mono-Inyo Craters volcanic chain, eastern California**

Author Bailey, R A; Miller, C D; Sieh, Kerry E

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Calif. Inst. Technol., United States (USA)

Affiliation N.M. Bur. Mines and Miner. Resour., Socorro, NM, United States (USA)

Source Memoir - New Mexico, Bureau of Mines and Mineral Resources, vol.47, pp.227-254, 1989

Publisher New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, United States (USA)

Publication Year 1989

Publication Type Serial; Conference document; Analytic

Accession Number 1990-000371

198. Database GeoRef

Title ***Volcanism* and plutonism of Western North America; Volume 1, Quaternary *volcanism* of *Long Valley* Caldera and Mono-Inyo craters, eastern California**

Author Bailey, Roy A (leader); Miller, C Dan (leader); Sieh, Kerry E (leader)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Publisher Am. Geophys. Union, Washington, DC, United States (USA)

Publication Year 1989

Publication Type Book; Monographic

Accession Number 1990-029833

199. **Database** GeoRef

Title **The regional subsurface structure of *Long Valley* (California) Caldera fill from gravity and magnetotelluric data**

Author Hermance, John F; Neumann, G A; Slocum, W

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Geological Society of America Bulletin, vol.100, no.11, pp.1819-1823, Nov 1988

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract ***Long Valley*** caldera, in eastern California, is a deep, basinlike feature bounded by steeply dipping normal faults having vertical offsets of at least several kilometers and is largely filled with effusive volcanics and lacustrine deposits. Interest in delineating its substructure has escalated over the past decade for a number of reasons; for example, there is increasing evidence that patterns of recent seismicity and ***volcanism*** may be controlled by pre-existing basement structures. In addition, the highly porous fill of the caldera basin forms the major hydrologic element in the region. For these and other reasons, characterizing the subsurface geometry of ***Long Valley*** caldera is an important objective of current geophysical studies.This paper reports a combined gravity and magnetotelluric interpretation which reveals a close similarity between a simple 3-D gravity model and a telluric thin sheet interpretation. This underscores the fact that both the gravity and the MT data are largely influenced by the same geologic elements: the caldera fill, basement topography, and the major boundary faults. Moreover, as in earlier MT interpretations, a conductive zone is seen beneath the southwest moat. In addition, however, because of new data, we now have evidence for a buried resistive ridge cutting across the main body of the caldera from the northwest to the southeast beneath the resurgent dome. Interpreting this resistive feature as a basement structural "high" (that is, a horst block) is compatible with limited drilling data,
and it appears to be the same feature that has been described as a "central platform" from previous gravity studies. The presence of such a horst may be fundamentally related to the structural evolution of the resurgent dome.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-074076

200. **Database** GeoRef

Title **Evidence for multiple boundary faults beneath the northwest moat of *Long Valley* Caldera; magnetotelluric results**

Author Hermance, John F; Neumann, Gregory A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Geophysical Research Letters, vol. 15, no. 12, pp.1437-1440, Nov 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The boundaries of ***Long Valley*** Caldera, in Eastern California, are sharply delineated by steeply dipping normal faults which, for the most part, are buried and obscured by recent volcanic and sedimentary cover. The only evidence for their presence is from their geophysical signatures on regional gravity, seismic and electromagnetic surveys. Recently, a surge of interest has focused studies in the western moat, where the ***volcanism*** is most recent, and where many workers feel that the geothermal potential is highest. A detailed, narrow-band (20-80 s) magnetotelluric profile in that area has delineated a parallel set of buried high angle normal faults which have virtually no expression at the surface. The outermost fault has a throw of approximately 500 m, while the innermost has a throw of approximately 2 km; neither has an expression in the surface morphology. Moreover, based on a relatively low resistivity contrast between the basement and the basin fill, we infer a relatively high fracture porosity in the Sierran basement, which suggests that there may be considerable lateral and vertical migration of meteoric water; a result which has considerable significance to understanding the regional hydrology.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1989-004149

201. **Database** GeoRef

Title **A three-dimensional structural model for the *Long Valley* Caldera, California**

Author Carle, Steven F; Goldstein, N E

Source LBL - Lawrence Berkeley Laboratory, Report: 24200, pp.99-103, Sep 1988

Publisher Lawrence Berkeley Laboratory, University of California, Berkeley, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic

Accession Number 1990-030186

202. **Database** GeoRef

Title **Three-dimensional interpretation of magnetotelluric data in *Long Valley*, California**

Author Park, S K; Torres-Verdin, C; Morrison, H F

Source LBL - Lawrence Berkeley Laboratory, Report: 24200, pp.125-129, Sep 1988

Publisher Lawrence Berkeley Laboratory, University of California, Berkeley, CA, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic

Accession Number 1990-030193

203. **Database** GeoRef

Title **Origin of cryptoperthites in the Bishop Tuff and their bearing in its thermal history**

Author Snow, Eleanour Anne; Yund, Richard A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Journal of Geophysical Research, vol. 93, no. B8, pp.8975-8984, Aug 1988

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract The Bishop Tuff is a large rhyolitic ash flow which erupted from ***Long Valley*** caldera in eastern California and contains abundant sanidine cryptoperthite phenocrysts, which can be used to constrain the time between the two major cooling units. The cryptoperthites (bulk composition Or (sub 66) Ab (sub 33) An (sub 1)) have exsolved in two principal stages, followed by a third, minor stage. The earliest exsolution, which produced patches of

relatively wide lamellae (100-800 nm) without wedge-shaped ends (WSE), occurred by coherent nucleation and was probably related to a high flux of water associated with fumarolic activity in this area. The spacing of these lamellae shows no correlation with depth or thermal history. The second major stage of exsolution occurred by spinodal decomposition, which produced lamellae with WSE having spa ein g s of from 80 to 170 nm, and the spacing of these lamellae varies with depth in a pattern consistent with the two known cooling units. Heat flow calculations indicate that this pattern of lamellar spacings is consistent with an interval of about 1.0-2.0 years between the eruption of these two cooling units.

Publication Year 1988

Publication Type Serial; Analytic

Accession Number 1988-066716

204. **Database** GeoRef

Title **NASA field workshop on ignimbrites and domes, Mammoth Lakes, California**

Author Sheridan, Michael F; Fink, Jonathan H

Affiliation Ariz. State Univ., Geol. Dep., Tempe, AZ, United States (USA)

Source NASA Technical Memorandum, Report: 4041, pp.567, Jun 1988

Publisher National Aeronautics and Space Administration (NASA), Washington, DC, United States (USA)

Publication Year 1988

Publication Type Serial; Report; Analytic; Abstract only

Accession Number 1988-074337

205. **Database** GeoRef

Title **Stress, surface deformation, and phreatic eruptions above a shallow dike, Inyo Craters, *Long Valley* Caldera, California**

Author Mastin, Larry Garver

Publication Year 1988

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1989-061789

206. **Database** GeoRef

Title **Results from shallow research drilling at Inyo Domes *Long Valley* Caldera, California and the Salton Sea geothermal field, Salton Trough, California**

Author Younker, L W; Eichelberger, J C; Kasameyer, P W; Newmark, R L; Vogel, T A

Affiliation Lawrence Livermore Natl. Lab., Livermore, CA, United States (USA)

Author Eriksson, K G

Affiliation Vattenfall, Vallingby, Sweden (SWE)

Publisher Springer-Verlag, Berlin Heidelberg New York London Paris Tokyo, Federal Republic of Germany (DEU)

Publication Year 1988

Publication Type Book; Conference document; Analytic

Accession Number 1994-004703

207.Database GeoRef

Title **Seismological detection and delineation of magma chambers beneath intraplate volcanic centers in western USA**

Author Iyer, H M

Author Anonymous

Publisher Friedrick Vieweg und Sohn, Braunschweig, Federal Republic of Germany (DEU)

Abstract In this review I describe results from experiments conducted by the U.S. Geological Survey in diverse volcanic environments to image velocity anomalies in the crust and upper mantle using teleseismic P-wave residuals. The linear least-squares inversion technique of Aki et. al. (1976, 1977) is extensively used in these studies. The seismic models thus obtained are synthesized with available geologic and geophysical data to infer plausible models of magma genesis in these regions. The three-dimensional velocity model beneath Yellowstone Plateau shows a large low-velocity body of approximately 100 km diameter centered on the caldera and extending from the crust to a depth of about 250 km. This is interpreted to be a massive magma body which is responsible for the ***volcanism*** during the past 2 m.y. in Yellowstone. Teleseismic S-wave residuals, Raleigh-wave dispersion data, heat-flow, gravity, Curie isotherm depths, and magnetotelluric data, all support the existence of a temperature near granite solidus beginning at a depth of 5-10 km beneath the Yellowstone caldera floor. In the Eastern Snake River Plain (ESRP) a low-velocity anomaly is present in the upper mantle but not in the crust, leading to the speculation that ESRP is the healed track of a northeast propagating volcanic center whose present position is Yellowstone. The seismic model for the ESRP-Yellowstone volcanic system, though unable to distinguish between different models of origin of the system, clearly shows that basaltic magma rises from the mantle, melts the lithosphere and yields massive quantities of rhyolitic magma. The seismic velocity structure beneath Hawaii, an oceanic hot spot, shows a complex crustal structure with no evidence for a large magma chamber in the crust. However, in the upper mantle there is an elongate north-south trending low-velocity zone, 200 km wide and traceable to a depth of 165 km. Thus, similar hot-spot generation models in the asthenosphere may be applicable to

Yellowstone and Hawaii, though the chemistry and volume of surface ***volcanism*** is greatly different in the two areas. In all the six intra- plate silicic volcanic centers which we have probed using the teleseismic-residual technique, low-velocity anomalies, inferred as crustal magma chambers have been found. In at least one such volcanic center, ***Long Valley*** in California, uplift and S-wave attenuation measurements support that the magma chamber delineated by teleseismic residuals is real. The suggestion of a root to the magma chamber extending into the upper mantle supports the geologic model for magma genesis in these centers, namely, infusion of basaltic magma from the asthenosphere into the lithosphere and crust, and resulting partial melting. In contrast to the silicic volcanic centers, none of the andesitic Cascade volcanoes show evidence for crustal magma chambers detectable using the teleseismic technique. Teleseismic-residual data in two volcanoes, Newberry in Oregon, and Medicine Lake in California, show massive high-velocity intrusions in the crust beneath the volcano edifice. A high-resolution seismic imaging experiment has revealed the presence of a low-velocity anomaly which could be a dike-like molten magma pocket within the high-velocity intrusive in Newberry volcano. On a regional scale, the teleseismic residual experiments using ***long*** profiles have successfully delineated high-velocity anomalies, possibly related to subduction, in the Oregon Cascades, and a low-velocity anomaly due to asthenospheric upwarp
beneath the Rio Grande Rift.

Publication Year 1988

Publication Type Book; Analytic

Accession Number 2001-076429

208. Database GeoRef

Title **Glass Mountain and the isotopic and chemical evolution of the *Long Valley* Caldera prior to the eruption of the Bishop Tuff**

Author Dempster, Tim; Halliday, Alex N; Mahood, Gail; Metz, Jenny

Affiliation Scott. Univ. Res. and React. Cent., East Kilbride, United Kingdom (GBR)

Affiliation Univ. Mich. at Ann Arbor, United States (USA); Stanford Univ., United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.68, no.44, pp.1520, 03 Nov 1987

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1987

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1990-038406

209. Database GeoRef

Title **The petrology and geochemistry of precaldera magmas, *Long Valley* Caldera, eastern California**

Author Chaudet, Roy Edward

Publication Year 1986

Publication Type Thesis or dissertation; Master's; Monographic

Accession Number 1989-026328

210. Database GeoRef

Title **Thermal and rheological inferences of lava flows from remote observations**

Author Pieri, David C; Baloga, Stephen M; Kahle, Anne B

Affiliation Calif. Inst. Technol., Jet Propul. Lab., Pasadena, CA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.67, no.44, pp.1074, 04 Nov 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-034185

211. **Database** GeoRef

Title **Gravity fields and the interpretation of volcanic structures; geological discrimination and temporal evolution**

Author Rymer, H; Brown, G C

Affiliation Open Univ., Dep. Earth Sci., Milton Keynes, United Kingdom (GBR)

Source Journal of Volcanology and Geothermal Research, vol.27, no.3-4, pp.229-254, Mar 1986

Resource Location http://www.sciencedirect.com/ science/journal/03770273

Publisher Elsevier, Amsterdam, Netherlands (NLD)

Abstract A review of gravity data reflecting shallow concealed structures on volcanoes demonstrates that valuable information may be derived on the geological development of such structures and on the dynamic evolution of active volcanoes. To a first approximation, all recorded examples of anomalous gravity fields associated with volcanoes are concentric with and have sources that lie within the volcanic edifice. Positive anomalies with wavelengths less than 20 km and amplitudes up to ca. 30 mGal, characterise mainly basaltic volcanoes from various tectonic settings, and are caused by a relatively dense intrusive complex/magma body which contrasts with its surroundings either because the body is more mafic than average or, more likely, because near surface, previously erupted materials are uncompacted. Negative anomalies with wavelengths up to 100 km and amplitudes up to ca. 60 mGal, occur over much larger volcanic calderas, many of which have erupted highly silicic pyroclastic ash and pumice; uncompacted silicic caldera infill, with a possible contribution from low-density magma bodies, is responsible for the observed anomalies. There is some evidence for a continuum of gravity anomaly types that corresponds to the geological evolution of volcanic systems generally from primitive rift or subduction -related basaltic andesite to mature, high-level silicic calderas. Repeated microgravity observations over active volcanoes enable magma movements, variations in magma input and changes in magma density to be monitored closely. Dynamic modelling of volcanic systems is providing new evidence on the behaviour of concealed magma bodies and could have considerable potential for predicting eruptive events.

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-056693

212. **Database** GeoRef

Title **Paleomagnetism and K-Ar ages of volcanic rocks from *Long Valley* Caldera, California**

Author Mankinen, Edward A; Gromme, C Sherman; Dalrymple, G Brent; Lanphere, Marvin A; Bailey, Roy A

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Journal of Geophysical Research, vol. 91, no. B1, pp.633-652, 10 Jan 1986

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Paleomagnetic measurements and K-Ar age determinations on volcanic rocks from ***Long Valley*** caldera, California, have enabled further refinement of eruptive activity within this large silicic volcanic center. K-Ar age determinations show that postcaldera volcanic eruptions began 0.73 m.y. ago and continued periodically until about 50,000 years ago. The eruptions were not temporally random but tended to occur in distinct episodes separated by periods of quiescence. ***Volcanism*** in the western half of the caldera was particularly intense between 0.15 and 0.50 m.y. ago, when many units ranging in composition from basalt to rhyolite were erupted. An average of the virtual geomagnetic poles for 33 units from the caldera yields a paleomagnetic pole at 89.7 degrees N, 138.4 degrees E, (alpha (sub 95) = 5.1 degrees), which is indistinguishable from the earth's rotational axis. The ancient geomagnetic field dispersion about this mean pole is 16.0 degrees , with upper and lower limits of 19.3 degrees and 13.6 degrees , respectively.

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1986-028002

213. **Database** GeoRef

Title **Forecasting volcanic eruptions**

Author Decker, Robert W

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Annual Review of Earth and Planetary Sciences, vol.14, pp.267-291, 1986

Resource Location http://arjournals.annualreviews.org/loi/earth

Publisher Annual Reviews, Palo Alto, CA, United States (USA)

Publication Year 1986

Publication Type Serial; Analytic

Accession Number 1987-007545

214. **Database** GeoRef

Title **The petrology and geochemistry of precaldera magmas, *Long Valley* Caldera, eastern California**

Author Chaudet, Roy E

Affiliation Va. Polytech. Inst. and State Univ., Dep. Geol. Sci., Blacksburg, VA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.18, no.6, pp.563, 1986

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-072942

215. **Database** GeoRef

Title **Hydrothermal reactions and hydrologic interpretations from CSDP well RDO-2B, *Long Valley*, California**

Author Janecky, D R; Charles, R W; Goff, F

Affiliation Los Alamos Natl. Lab., Los Alamos, NM, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.18, no.6, pp.645, 1986

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1986

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1988-013780

219. **Database** GeoRef

Title **Links between magma-tectonic rate balances, plutonism, and *volcanism***

Author Shaw, Herbert R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Author Anonymous

Source Journal of Geophysical Research, vol. 90, no. B13, pp.11,275-11,288, 10 Nov 1985

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract With Smith's (1979) model of ash flow magmatism as the point of departure, quantitative regimes of crustal magmatic evolution are outlined. The average extrusive regime of ash flow magmatism operates at a rate of about 0.001 km (super 3) /yr; progressively larger episodes of increasing repose times characterize the evolution of caldera-forming eruptions. The intrusive regime operates at an inferred average rate of about 0.01 km (super 3) /yr expressed in terms of the volumetric influx of mafic magma from the mantle, based on the record of silicic rates of extrusion and a 10:1 intrusive to extrusive ratio derived from evidence of zoned silicic systems. This rate is almost identical with the mean cumulative rate for the Hawaiian-Emperor system of basaltic ***volcanism***, which is determined to be 0.015 km (super 3) /yr. Fluctuations about a mean rate of 10 (super -2) km (super 3) /yr lead to a threefold classification of magmatic regimes in terms of source power, depending on whether they are persistently greater than (HHER regime), about equal to (MHER regime), or lower than (LHER regime) the mean Hawaiian-Emperor rate. Ash flow magmatism correlates with the MHER regime, averaged over a sufficiently ***long*** time. Thus the

conditions of Hawaiian-Emperor magmatism are identified with a characteristic power of magma transfer rates that optimize mechanisms for creation of high-level chambers of derivative and fractionated silicic magma (terminology of Smith (1979)) within sufficiently localized regions of high residence times. These conditions represent a balance point, and a bifurcation, in dynamic paths of magmatic evolution leading to widely divergent types of plutonic-volcanic associations. Categorical examples of the principal types of igneous path are discussed relative to continental basalt, silicic ash flow, batholithic granite, and intrusive porphyry systems. The Henry Mountains, Utah, are thought to represent an example of an intrusive porphyry generated in the LHER regime of a mafic source system lacking sufficient power for volcanic expression or significant mineralization. ***Long Valley***, California (and possibly other systems along the eastern front of the Sierra Nevada), is an example operating at the mean rate with transient excursions to higher and lower rates. In regions of rapid extension and/or volcanic propagation (whether linear or areal) these regimes give rise to basaltic eruptions ranging from isolated cinder cones to flood basalts.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-082058

220. Database GeoRef

Title **Research on volcanic processes**

Author Anonymous

Source Mining Magazine (London), vol.153, no.5, pp.353, Nov 1985

Publisher Mining Journal Ltd., London, United Kingdom (GBR)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1986-016722

221. Database GeoRef

Title **Characterizing thermal energy and mass transport in volcanic caldera complexes; the role of scientific drilling**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Affiliation Lamont -Doherty Geol. Obs., Palisades, NY, United States (USA)

Publisher Springer-Verlag, Berlin, Federal Republic of Germany (DEU)

Publication Year 1985

Publication Type Book; Conference document; Analytic

Accession Number 1986-044660

222. Database GeoRef

Title **Holocene eruptions at the Inyo volcanic chain, California; implications for possible eruptions in *Long Valley* Caldera**

Author Miller, C Dan

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Source Geology (Boulder), vol.13, no.1, pp.14 -17, Jan 1985

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1985

Publication Type Serial; Analytic

Accession Number 1985-038418

223. Database GeoRef

Title ***Long Valley*, California; a caldera under stress**

Author Sorey, M L; Farrar, C D

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Proceedings of the New Zealand Geothermal Workshop, vol.7, pp.133-137, 1985

Publisher University of Auckland Geothermal Institute, Centre for Continuing Education 1979 -, Auckland, New Zealand (NZL)

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1988-018350

224. Database GeoRef

Title **Review of evidence on the potential for major earthquakes and *volcanism* in the *Long Valley*-Mono Craters-White Mountains regions of eastern California**

Author Hill, David P; Wallace, Robert E; Cockerham, Robert S

Affiliation U. S. Geol. Sur., Menlo Park, CA, United States (USA)

Affiliation Niron Univ., Japan (JPN)

Affiliation Univ. Colo., Boulder, CO, United States (USA)

Source Earthquake Prediction Research, vol. 3, no. 3-4, pp.571-594, 1985

Publisher D. Reidel Publishing Company, Dordrecht, Netherlands (NLD)

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1986-011776

225. Database GeoRef

Title **Volcano hazards program in the United States**

Author Tilling, R I; Bailey, R A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Author Fedotov, S A; Yokoyama, I

Affiliation Inst. Volcanol., Petropavlovsk-Kamchatsky, USSR (SUN)

Source Journal of Geodynamics, vol. 3, no. 3-4, pp.425-446, 1985

Publisher Pergamon Press, Oxford - New York, International (III)

Abstract Volcano monitoring and volcanic-hazards studies have received greatly increased attention in the United States in the past few years. Before 1980, the Volcanic Hazards Program was primarily focused on the active volcanoes of Kilauea and Mauna Loa, Hawaii, which have been monitored continuously since 1912 by the Hawaiian Volcano Observatory. After the reawakening and catastrophic eruption of Mount St. Helens in 1980, the program was substantially expanded as the government and general public became aware of the potential for eruptions and associated hazards within the conterminous United States. Integrated components of the expanded program include: volcanic-hazards assessment; volcano monitoring; fundamental research; and, in concert with federal, state, and local authorities, emergency-response planning. In 1980 the David A. Johnston Cascades Volcano Observatory was established in Vancouver, Washington, to systematically monitor the continuing activity of Mount St. Helens, and to acquire baseline data for monitoring the other, presently quiescent, but potentially dangerous Cascade volcanoes in the Pacific Northwest. Since June 1980, all of the eruptions of Mount St. Helens have been predicted successfully on the basis of seismic and geodetic monitoring. The largest volcanic eruptions, but the least probable statistically, that pose a threat to western conterminous United States are those from the large Pleistocene -Holocene volcanic systems, such as ***Long Valley*** caldera (California) and Yellowstone caldera (Wyoming), which are underlain by large magma chambers still potentially capable of producing catastrophic caldera-forming eruptions. In order to become better prepared for possible future hazards associated with such historically unprecedented events, detailed studies of these, and similar, large volcanic systems should be intensified to gain better insight into caldera-forming processes and to recognize, if possible, the precursors of caldera-forming eruptions.

Publication Year 1985

Publication Type Serial; Conference document; Analytic

Accession Number 1987-068399

226. **Database** GeoRef

Title **Drilling to investigate active volcanic processes in *Long Valley*, California**

Author Rundle, John B; Wawersik, W R

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.45, pp.1096, 06 Nov 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-041415

227. **Database** GeoRef

Title **Research drilling at Inyo Domes, *Long Valley* Caldera, California**

Author Eichelberger, J C; Lysne, P C; Younker, L W

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Affiliation Lawrence Livermore Lab., United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.65, no.39, pp.721, 723-725, 25 Sep 1984

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1984

Publication Type Serial; Analytic

Accession Number 1985-023145

228. **Database** GeoRef

Title **Correlation of lavas and tephra from a silicic volcanic center**

Author Metz, J

Affiliation Stanford Univ., Dep. Geol., Stanford, CA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.16, no.6, pp.594, Sep 1984

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-058938

229. **Database** GeoRef

Title **Geochemistry of the most recent eruptive event in the Inyo volcanic chain, eastern California; the intersection of two magmatic systems**

Author Sampson, D E; Cameron, K L

Affiliation Univ. Calif., Earth Sci. Board, Santa Cruz, CA, United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.16, no.6, pp.643, Sep 1984

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1984

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-068107

230. **Database** GeoRef

Title **Volcano hazards program in the USA**

Author Tilling, R I; Bailey, Roy A

Affiliation U. S. Geol. Surv., Natl. Cent., Reston, VA, United States (USA)

Source Report of the ... Session - International Geological Congress, vol.27, no.6, pp.106-118, 1984

Publisher International Geological Congress, [location varies], International (III)

Publication Year 1984

Publication Type Serial; Conference document; Analytic

Accession Number 1985-018544

231. Database GeoRef

Title **Mono Craters, *Long Valley* Caldera; seismicity, *volcanism*, and engineering geology; Field trip II roadlog**

Author Bailey, Roy A; Harp, Edwin L; Keefer, David K; Bennett, M J; Miller, C Dan; Wood, Spencer H; Steine, S

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Boise State Univ., United States (USA); Univ.Calif., Berkeley, United States (USA)

Affiliation Univ. Nev., Dep. Geol. Sci., Reno, NV, United States (USA)

Publisher Univ. Nev. at Reno, Dep. Geol. Sci., Reno, NV, United States (USA)

Publication Year 1984

Publication Type Book; Analytic

Accession Number 1985-041364

232. Database GeoRef

Title **Postcaldera evolution and current activity of the Yellowstone Caldera**

Author Christiansen, Robert L

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.743-783, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059746

233. Database GeoRef

Title **A note on links between magma-tectonic rate-balances, plutonism and *volcanism***

Author Shaw, Herbert R

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Univ. Nev., United States (USA)

Author Jacobson, Muriel L (compiler)

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 84-0939, pp.886-942, 1984

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1984

Publication Type Serial; Report; Conference document; Analytic

Accession Number 1985-059750

234. Database GeoRef

Title **Hydrogen isotopic evidence of rhyolitic magma degassing during shallow intrusion and eruption**

Author Taylor, Bruce E; Eichelberger, J C; Westrich, Henry R

Affiliation Univ. Calif., Dep. Geol., Davis, CA 95616, United States (USA)

Affiliation Sandia Natl. Lab., United States (USA)

Source Nature (London), vol.306, no.5943, pp.541-545, 08 Dec 1983

Resource Location http://www.nature.com/ nature/index.html

Publisher Macmillan Journals, London, United Kingdom (GBR)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1986-043310

235. Database GeoRef

Title **Conductivity anomalies within *Long Valley* Caldera and the Southwest Moat**

Author Slocum, W; Neumann, G A; Hermance, J F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.693, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-040634

236. Database GeoRef

Title **Postcaldera evolution of the *Long Valley* magma chamber, eastern California**

Author Bailey, R A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.889, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016547

237. Database GeoRef

Title **Petrochemical evolution of Mammoth Mountain, *Long Valley* Caldera, eastern California**

Author Koeppen, R P

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.889, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016548

238. Database GeoRef

Title **Controlled-source electromagnetic soundings at the *Long Valley* Caldera, California**

Author Morrison, H F; Goldstein, N E; Wilt, M J; Lee, K H; Turnross, J L

Affiliation Lawrence Berkeley Lab., Berkeley, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016552

239. Database GeoRef

Title **Location and configuration of magma bodies beneath *Long Valley*, California, determined from anomalous earthquake signals**

Author Sanders, Chris O

Affiliation Univ. Nev. at Reno, Seismol. Lab., Reno, NV, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016553

240. Database GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex; status of present magnetotelluric investigations**

Author Hermance, J F; Slocum, W; Neumann, G A

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016554

241. Database GeoRef

Title **Structure of the *Long Valley* Caldera region as interpreted from seismic data**

Author Kissling, E; Cockerham, R S; Ellsworth, William L

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.45, pp.890, 08 Nov 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1987-016555

242. **Database** GeoRef

Title **The *Long Valley*/Mono Basin volcanic complex in eastern California; status of present knowledge and future research needs**

Author Hermance, John F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Source Reviews of Geophysics and Space Physics, vol. 21, no. 7, pp.1545-1565, Aug 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract Silicic complexes. Metallogenesis, mitigation of volcanic and earthquake hazards, and development of conventional and nonconventional forms of geothermal energy. One research technique that has not been exploited is scientific drilling to intermediate depths (2-3 km). If magma has intruded the upper crust of this area, surface geophysics and limited borehole observations may be employed to monitor tectonic and magmatic activity associated with such a phenomenon. A surprising result of commercial drilling for geothermal energy in this area is the failure to detect directly high-temperature hydrothermal reservoirs. Their presence can be inferred from other studies, particularly those using geochemical indicators in thermal fluids.--Modified journal abstract.

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-058112

243. **Database** GeoRef

Title **A giant's troubled sleep**

Author Simon, Cheryl

Source Science News (Washington), vol.124, no.3, pp.40-43, 16 Jul 1983

Publisher Science Service, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-054492

244. **Database** GeoRef

Title **Short polarity reversal (or large geomagnetic excursion) in Brunhes-age lake sediment, *Long Valley*, California**

Author Liddicoat, Joseph C; Lajoie, K R; Sarna-Wojcicki, Andrei M; Bailey, R A

Affiliation Lamont-Doherty Geol. Obs., Palisades, NY, United States (USA)

Affiliation U. S. Geol. Surv., United States (USA)

Author Anonymous

Affiliation Natl. Sci. Found., USA, (United States)

Source Eos, Transactions, American Geophysical Union, vol.64, no.18, pp.217, 03 May 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1984-017224

245. **Database** GeoRef

Title **Spasmodic tremor and possible magma injection in *Long Valley* caldera, eastern California**

Author Ryall, Alan S. Jr; Ryall, Floriana

Affiliation Univ. Nev., Seismol. Lab., Reno, NV, United States (USA)

Source Science, vol.219, no.4591, pp.1432-1433, 25 Mar 1983

Publisher American Association for the Advancement of Science, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-034810

246. **Database** GeoRef

Title **Continental scientific drilling at *Long Valley*-Mono craters**

Author Rundle, J B (reporter); Eichelberger, J C (reporter)

Affiliation Sandia Natl. Lab., Albuquerque, NM, United States (USA)

Source Eos, Transactions, American Geophysical Union, vol.64, no.2, pp.12 -15, 11 Jan 1983

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1983

Publication Type Serial; Analytic

Accession Number 1983-020280

247. **Database** GeoRef

Title **Data report for the August 1982 seismic-refraction experiment in the Mono Craters-*Long Valley* region, California**

Author Meador, P J; Hill, D P

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Source Open-File Report - U. S. Geological Survey, Report: OF 83-0708, 55 pp., 1983

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1983

Publication Type Serial; Report; Map; Monographic

Accession Number 1984-020250

248. **Database** GeoRef

Title **Seismicity and magma injection near Mammoth Lakes, California, in the context of regional tectonics**

Author Ryall, A S

Affiliation Univ. Nev.-Reno, Seismol. Lab., Reno, NV, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012948

249. **Database** GeoRef

Title **Changing Hg soil patterns in the *Long Valley* Caldera; a response to new magma influxes?**

Author Buseck, Peter R; Varekamp, Johan C

Affiliation Ariz. State Univ., Dep. Geol. and Dep. Chem., Tempe, AZ, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012949

250. **Database** GeoRef

Title **Uplift of the *Long Valley*, California, caldera between 1975 and 1982**

Author Messing, J; Riley, F S; Denlinger, R P

Affiliation U. S. Geol. Surv., Denver, CO, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1132, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012950

251. **Database** GeoRef

Title **The possibility of magmatic intrusion beneath the southwestern moat of *Long Valley* Caldera; a preliminary magnetotelluric survey**

Author Neumann, G; Slocum, W; Eysteinsson, H; Hermance, J F

Affiliation Brown Univ., Dep. Geol. Sci., Providence, RI, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.63, no.45, pp.1133, 09 Nov 1982

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1986-012954

252. **Database** GeoRef

Title **Geologic and petrologic data bearing on potential volcanic hazards in *Long Valley* Caldera, eastern California**

Author Bailey, Roy A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.72, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054422

253. **Database** GeoRef

Title **Historical activity at calderas of the world as a framework for interpreting recent activity at *Long Valley* Caldera, California**

Author Newhall, C G

Affiliation U. S. Geol. Surv., Cascades Volcano Obs., Vancouver, WA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.73, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054423

254. **Database** GeoRef

Title **Monitoring hot springs and shallow groundwater in the *Long Valley* Caldera, California**

Author Sorey, M L; Farrar, C D

Affiliation U. S. Geol. Surv., Menlo Park, CA, United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.77, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054431

255. **Database** GeoRef

Title **Spectral character of "tremor" in *Long Valley*, CA, during 1980-1983**

Author Real, C R; Cramer, C H; Chouet, B

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Affiliation Mass. Inst. Technol., Dep. Earth and Planet. Sci., United States (USA)

Affiliation Ga. Inst. Technol., Sch. Geophys. Sci., Atlanta, GA, United States (USA)

Source Earthquake Notes, vol.54, no.1, pp.89, Mar 1982

Publisher Seismological Society of America, Eastern Section, [El Cerrito, CA], United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1983-054457

256. **Database** GeoRef

Title **Potential hazards from future volcanic eruptions in the *Long Valley*-Mono Lake area, east-central California and southwest Nevada; a preliminary assessment**

Author Miller, C D; Mullineaux, D R; Crandell, D R; Bailey, R A

Affiliation U. S. Geol. Surv., USA, (United States)

Source U. S. Geological Survey Circular, Report: C 0877, 10 pp., 1982

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Future volcanic eruptions similar to those that have occurred frequently in the recent geologic past could seriously affect communities in the ***Long Valley***-Mono Lake area of East-central California and Southwest Nevada. This report discusses the kinds and scales of eruptive activity that has occurred in the region in the past and describes potential

hazards and effects of possible future eruptions. Hazard zones for eruptions of moderate and very large volumes are presented.--from New Publications of the Geological Survey, August 1982.

Publication Year 1982

Publication Type Serial; Report; Monographic

Accession Number 1983-012172

257. Database GeoRef

Title **Potentially active volcanic zones in California**

Author Chesterman, Charles W

Affiliation Calif. Acad. Sci. Curator Mineral., San Francisco, CA, United States (USA)

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Source Special Publication - California Department of Conservation, Division of Mines and Geology, vol. 63, pp.9-16, 1982

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic

Accession Number 1983-043400

258. Database GeoRef

Title **Other potential eruption centers in California; *Long Valley*-Mono Lake, Coso, and Clear Lake volcano fields**

Author Bailey, Roy A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Affiliation Calif. Div. Mines and Geol., Sacramento, CA, United States (USA)

Source Special Publication - California Department of Conservation, Division of Mines and Geology, vol. 63, pp.17-28, 1982

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Publication Year 1982

Publication Type Serial; Conference document; Analytic

Accession Number 1983-043401

259. Database GeoRef

Title **Changes in the discharge characteristics of thermal springs and fumaroles in the *Long Valley* caldera, California, resulting from earthquakes on May 25-27,1980**

Author Sorey, M L; Clark, M D

Affiliation U. S. Geol. Surv., USA, (United States)

Source Open-File Report - U. S. Geological Survey, Report: OF 81-0203, 25 pp., 1981

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1981

Publication Type Serial; Report; Monographic

Accession Number 1981-052478

260. Database GeoRef

Title ***Long Valley*-Mono basin geothermal area, California**

Author Bailey, R A (investigator)

Source U. S. Geological Survey Professional Paper, Report: P 1275, pp.160-161, 1981

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1275. djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1981

Publication Type Serial; Report; Analytic; Abstract only

Accession Number 1982-023934

261. Database GeoRef

Title **Structural and petrologic evolution of the *Long Valley*, Mono Craters, and Mono Lake volcanic complexes, eastern California**

Author Bailey, Roy A

Affiliation U. S. Geol. Surv., Reston, VA, United States (USA)

Author Anonymous

Source Eos, Transactions, American Geophysical Union, vol.61, no.46, pp.1149, 11 Nov 1980

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1980

Publication Type Serial; Conference document; Analytic; Abstract only

Accession Number 1985-037706

262. Database GeoRef

Title **Recent *volcanism* in the Mono Basin-*Long Valley* region of Mono County, California**

Author Kilbourne, Richard T; Chesterman, Charles W; Wood, Spencer H

Affiliation Calif. Div. Mines Geol., San Francisco, CA, United States (USA)

Affiliation Calif. Acad. Sci., United States (USA); Boise State Univ., United States (USA)

Affiliation Calif. Div. Mines Geol., Sacramento, CA, United States (USA)

Source Special Report - California Division of Mines and Geology, no.150, pp.7-22, May 1980

Publisher California Division of Mines and Geology, Sacramento, CA, United States (USA)

Publication Year 1980

Publication Type Serial; Analytic

Accession Number 1981-039553

263. Database GeoRef

Title ***Volcanism*, structure, and petrology of *Long Valley* Caldera, California**

Author Bailey, R A

Publication Year 1978

Publication Type Thesis or dissertation; Doctoral; Monographic

Accession Number 1978-040708

264. Database GeoRef

Title **Owens *Valley*; a major rift between the Sierra Nevada Batholith and Basin and Range Province, U.S.A.**

Author Sheridan, M F

Affiliation Arizona State Univ., Dep. Geol., Tempe, Ariz., United States (USA)

Source NATO Advanced Study Institutes Series. Series C: Mathematical and Physical Sciences, vol. 37, pp.81 -88, 1978

Publisher D. Reidel Publishing Company, Dordrecht-Boston, International (III)

Publication Year 1978

Publication Type Serial; Conference document; Analytic

Accession Number 1980-015321

265. Database GeoRef

Title **Petrology of post-caldera rhyolites in *Long Valley*, California**

Author Bailey, R A (investigator)

Source U. S. Geological Survey Professional Paper, Report: P 1100, pp.182, 1978

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1100. djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1978

Publication Type Serial; Report; Analytic; Abstract only

Accession Number 1978-042964

266. Database GeoRef

Title **The hydrothermal system of *Long Valley* Caldera, California**

Author Sorey, M L; Lewis, R E; Olmsted, F H

Source U. S. Geological Survey Professional Paper, Report: P 1044-A, 60 pp., 1978

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1044_a.djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1978

Publication Type Serial; Report; Map; Monographic

Accession Number 1978-046699

267. Database GeoRef

Title **The hydrothermal system of *Long Valley* caldera, California**

Author Sorey, M L; Lewis, R E; Olmsted, F H

Affiliation U. S. Geol. Surv., USA, (United States)

Source U. S. Geological Survey Professional Paper, Report: P 1044-A, pp.A1-A60, 1978

Resource Location http://pubs.er.usgs.gov/djvu/PP/pp_1044_a.djvu

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Publication Year 1978

Publication Type Serial; Map; Monographic

Accession Number 1984-010755

268. Database GeoRef

Title **A zoned pluton at the eruptive stage; the *Long Valley* magma chamber (California) as evidenced by eruption of the Bishop Tuff**

Author Hildreth, E H

Affiliation Univ. Calif., Dep. Geol. and Geophys., Berkeley, CA, United States (USA)

Affiliation Shinshu Univ., Shinshu, Japan (JPN)

Publisher Circum-Pac. Plutonism Proj., Toyama, Japan (JPN)

Publication Year 1977

Publication Type Book; Conference document; Analytic

Accession Number 1988-059919

269. **Database** GeoRef

Title **Distribution, correlation, and radiocarbon dating of late Holocene tephra, Mono and Inyo craters, eastern California**

Author Wood, S H

Affiliation Calif. Inst. Technol., Div. Geol. Planet. Sci., Pasadena, Calif., United States (USA)

Source Geological Society of America Bulletin, vol.88, no.1, pp.89-95, Jan 1977

Resource Location http://www.gsajournals.org/

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1977

Publication Type Serial; Analytic

Accession Number 1977-015633

270. **Database** GeoRef

Title **The Bishop Tuff; compositional zonation in a silicic magma chamber without crystal settling**

Author Hildreth, W

Affiliation Univ. Calif., Berkeley, Calif., United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.8, no.6, pp.918, Sep 1976

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1976

Publication Type Serial; Conference document; Analytic

Accession Number 1977-042192

271.Database GeoRef

Title **On the mechanisms of postsubsidence central doming and *volcanism* in resurgent cauldrons**

Author Bailey, R A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Abstracts with Programs - Geological Society of America, vol.8, no.5, Rocky Mountain Section 29th annual meeting, pp.567, Apr 1976

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1977-021127

272. **Database** GeoRef

Title ***Volcanism*, structure, and geochronology of *Long Valley* Caldera, Mono County, California**

Author Bailey, R A; Dalrymple, G B; Lanphere, M A

Affiliation U. S. Geol. Surv., Reston, Va., United States (USA)

Source Journal of Geophysical Research, vol. 81, no. 5, pp.725-744, 10 Feb 1976

Publisher American Geophysical Union, Washington, DC, United States (USA)

Abstract ***Long Valley*** caldera, a 17- by 32-km elliptical depression on the east front of the Sierra Nevada, formed 0.7 m.y. ago during eruption of the Bishop tuff. Subsequent intracaldera ***volcanism*** included eruption of (1) aphyric rhyolite 0.68-0.64 m.y. ago during resurgent

doming of the caldera floor, (2) porphyritic hornblende -biotite rhyolite from centers peripheral to the resurgent dome at 0.5, 0.3, and 0.1 m.y. ago, and (3) porphyritic hornblende -biotite rhyodacite from outer ring fractures 0.2 m.y. ago to 50,000 yr ago, a sequence that apparently records progressive crystallization of a subjacent chemically zoned magma chamber. Holocene rhyolitic and phreatic eruptions suggest that residual magma was present in the chamber as recently as 450 yr ago. Intracaldera hydrothermal activity began at least 0.3 m.y. ago and was widespread in the caldera moat; it has since declined due to self-sealing of near -surface caldera sediments by zeolitization, argillization, and silicification and has become localized on recently reactivated north-west-trending Sierra Nevada frontal faults that tap hot water at depth.

Publication Year 1976

Publication Type Serial; Analytic

Accession Number 1976-031713

273. **Database** GeoRef

Title **Post-Subsidence *Volcanism* And Structure Of *Long Valley* Caldera, California**

Author Bailey, Roy A

Source Abstracts with Programs - Geological Society of America, vol.5, no.1, pp.7, 1973

Publisher Geological Society of America (GSA), Boulder, CO, United States (USA)

Abstract Eruptions, Bishop Tuff, faults

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1973-012091

274. **Database** GeoRef

Title ***Volcanism* and Geochronology of *Long Valley* Caldera, Mono County, California**

Author Bailey, Roy A; Lanphere, Marvin A; Dalrymple, G Brent

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038967

275. **Database** GeoRef

Title **Structure of the *Long Valley* Caldera from Detailed Seismic-Refraction Measurements**

Author Hill, David P; McHugh, Stuart; Pakiser, L C

Source Eos, Transactions, American Geophysical Union, vol.54, no.11, pp.1211, 1973

Publisher American Geophysical Union, Washington, DC, United States (USA)

Publication Year 1973

Publication Type Serial; Analytic; Abstract only

Accession Number 1974-038968

276. **Database** GeoRef

Title **Application of remote sensing to geothermal prospecting**

Author Hodder, D T

Affiliation North American Rockwell, Space Division, Advanced Programs, Downey, CA, United States (USA)

Source Geothermics, vol.Special issue 2, no.Part 1, pp.368-380, 1970

Publisher Elsevier, Oxford -New York, International (III)

Publication Year 1970

Publication Type Serial; Conference document; Analytic

Accession Number 2007-069985

277. Database GeoRef

Title **A gravity study of *Long Valley***

Author Pakiser, Louis C

Author Rinehart, C D; Ross, D C

Source U. S. Geological Survey Professional Paper, Report: P 0385, pp.85 -89, 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Clastic and volcanic deposits of Cenozoic age, filling ***Long Valley*** to a depth of 12,000 feet, have a much lower average density than crystalline rocks of surrounding mountains, and somewhat higher than the muds of Searles Lake basin. The gravity relief rivals great minimum anomalies found in basins between the Coast Ranges. The gravity map suggests a crescentic structural basin bounded on all sides by nearly vertical faults along which it

subsided. A pronounced high near the center could represent a mass of dense rock within the pre-Cenozoic bedrock, or a volcanic neck.

Publication Year 1964

Publication Type Serial; Report; Analytic

Accession Number 1964-005751

278.Database GeoRef

Title **Structural geology and *volcanism* of Owens *Valley* region, California; a geophysical study**

Author Pakiser, L C; Kane, M F; Jackson, W H

Source U. S. Geological Survey Professional Paper, Report: P 0438, 68 pp., 1964

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract Gravity and seismic measurements in Owens ***Valley***, ***Long Valley***, and Mono Basin, which are directly east of the Sierra Nevada, Calif., show these depressions to be downdropped blocks filled with thousands of feet of Cenozoic deposits. Magnetic measurements suggest locations of buried volcanic rocks. A theory relating ***volcanism*** to stress reduction associated with faulting is presented. ***Long Valley*** and Mono Basin are identified as volcano-tectonic depressions.

Publication Year 1964

Publication Type Serial; Report; Monographic

Accession Number 1964-013239

279.Database GeoRef

Title **Gravity, *volcanism*, and crustal deformation in *Long Valley*, California; Article 106**

Author Pakiser, L C

Source U. S. Geological Survey Professional Paper, Report: P 0424-B, pp.B250-B253, 1961

Publisher U. S. Geological Survey, Reston, VA, United States (USA)

Abstract A large gravity low, flanked by steep gravity gradients, in the ***Long Valley*** area, can be explained by an ellipse-shaped subsided block, bounded on all sides by a vertical fault zone and the depression filled with 18,000 + or - 5000 ft. of low-density Cenozoic deposits. The structural feature may be a volcano-tectonic depression similar to Mono Basin, California.

Publication Year 1961

Publication Type Serial; Report; Analytic

Accession Number 1961-011933