NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

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MEETING ANNOUNCEMENT

DATE: **Wednesday, March 30, 2005**

LOCATION: **Orinda Masonic Center, 9 Altarinda Rd., Orinda**

TIME: **6:30 p.m. Social; 7:00 p.m. talk (no dinner) Cost: $5 per regular member; $1 student member**

RESERVATIONS: **Leave your name and phone number at 925-424-3669 or at *danday94@pacbell.net* before the meeting.**

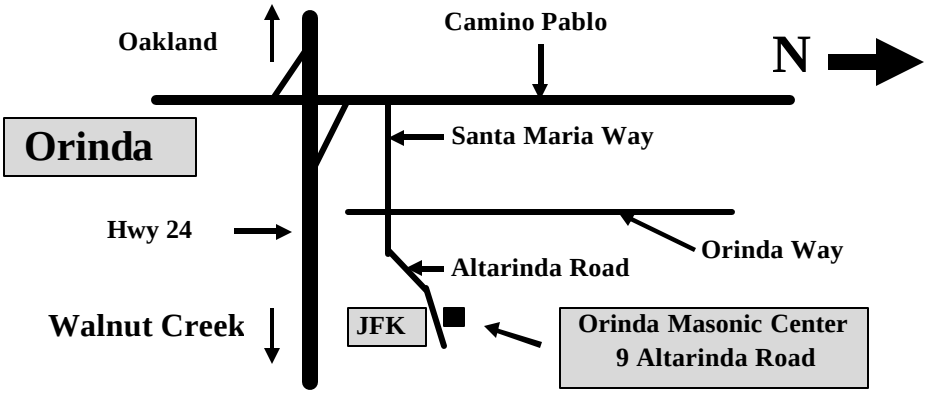
SPEAKER: **Dr. Barbara Bekins, *U.S. Geological Survey, Menlo Park, California***

Hydrogeology and the Weak Nature of Plate Boundary Faults

There is evidence for low frictional strength along many plate-boundary faults, including the San Andreas and the Cascadia subduction megathrust. High pore pressure is a leading hypothesis to explain this behavior. Proposed mechanisms for generating excess pore pressures include consolidation, tectonic strain, metamorphic dehydration, mantle degassing, hydrocarbon generation, thermal expansion, and pressure solution. Regional-scale flow and transport models constrained by observations of fluid chemistry, heat flow, and pore pressure data can be used to test various pressure generation hypotheses. Ultimately, these results may be coupled to models of other processes such as frictional heating or strain to understand the importance of fluids.

In subduction zones, very high pressures result from rapid loading of saturated seafloor sediments during accretion and subduction. Evidence for excess fluid pressure includes direct measurements, mud volcanism, and dilated faults. The Ocean Drilling Program has installed seven seafloor wells in subduction zones. Data from the Cascadia margin off central Oregon shows that flow is both transient and focused along faults. In the Barbados complex, pore water chloride anomalies indicate that clay dehydration fluids flow from deep in the complex to the seafloor along the plate-boundary thrust. Model results constrain the duration of flow and the distance of transport. Future models will quantify deeper fluid sources, evaluate mechanisms for transient flow, and changes in pore pressure through the earthquake cycle.

Meeting Location



Biography

Barbara Bekins obtained a B.S. in mathematics from UCLA, an M.S. in mathematics from San Jose State University, and a Ph.D. in Geology from University of California, Santa Cruz. Currently, she is a research hydrologist with the USGS specializing in transport and biotransformation of organic contaminants in groundwater. Her published work includes results from a creosote site at Pensacola, Florida, and a crude oil spill at Bemidji, Minnesota. From 1998-2000, she was a member of a National Research Council Committee on Intrinsic Remediation. The committee's report, Natural Attenuation for Groundwater Remediation, describes the capabilities of natural attenuation and the adequacy of the published guidelines for documenting its effectiveness. More recently, she has been working with the USGS NAWQA program planning studies on the fate of agricultural chemicals in the environment. In 2002 she sailed on Ocean Drilling Program Leg 201 to investigate how fluid flow provides essential nutrients to buried microbial populations in the sediments of the equatorial Pacific and Peru margin.

Northern California Geological Society
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Would you like to receive the NCGS newsletter by e-mail? If you are not already doing so, and would like to, please contact **Dan Day** at danday94@pacbell.net to sign up for this service.

NCGS 2004-2005 Calendar

Wednesday March 30, 2005
Dr. Barbara Bekins, U. S. Geological Survey
Hydrogeology and the Weak nature of Plate Boundary Faults
7:00 pm at Orinda Masonic Center

Wednesday April 27, 2005
Dr. Michael Manga, University of California, Berkeley
An Explosive Theory About Volcanoes
7:00 pm at Orinda Masonic Center

Wednesday May 25, 2005
TBA
7:00 pm at Orinda Masonic Center

Wednesday June 29, 2005
TBA
7:00 pm at Orinda Masonic Center

Upcoming NCGS Field Trips

May 21, 2005	***Robert Sibley Volcanic Regional Preserve in Berkeley Hills*** **Stephen Edwards,** Director, Tilden Regional Botanic Garden
June 25 - 26, 2005	***Blueschists and Breweries (BrewschistsII)*** **John Wakabayashi**, Consultant

(Please be aware that not all details for this field trip are known. For currently available stop by stop details please refer to the February 2005 newsletter. **Please contact Tridib Guha at** aars@netscape.com **for reservations.**)

Upcoming Meetings of Interest – Bay Area Geophysical Society

Thursday March 24th, 2005
Dr. David Morrison, NASA Astrobiology
Cosmic Impacts: The Ultimate Environmental Catastrophe
Location: ChevronTexaco Park, 6001 Bollinger Canyon Road, San Ramon, CA 94583
Lunch: 11:30 a.m., ChevronTexaco Cafeteria
Talk: 12:30 p.m. Building D, Room D2193
In order to get visitor access to ChevronTexaco campus we ask that you contact either Warren King at (Warren.King@chevrontexaco.com) or Peeter Akerberg at (peeter@chevrontexaco.com), preferably a day or more ahead of the talk. One of us will request a visitors badge for you which can be picked up at the front desk in the main lobby the day of the talk.
Directions : Please follow these directions!
Map: Map of ChevronTexaco Campus
Abstracts, biographies, directions, and maps can be found at: http://sepwww.stanford.edu/bags/calendar

$500 NCGS Undergraduate College Scholarship Award

The Northern California Geological Society is pleased to announce that Ms. Sunshine Mansfield at Humboldt State University has been awarded the Society's $500 Undergraduate College Scholarship for the Year 2004 - 2005.

Ms. Mansfield's proposal "Structural and Petrologic investigation of the Cooksie Shear Zone, Mendocino Triple Junction, California" describes an analysis of an important and interesting problem relevant to Northern California geology. Her proposal was selected from a field of well designed and highly competitive applications. We look forward to a presentation of her research findings at a future meeting of the NCGS in the year 2005.

$500 NCGS K – 12 Geoscience Teaching Award

The Northern California Geological Society is pleased to announce that Ms. Tamara Garcia who teaches at the John O'Connell High School in San Francisco has been awarded the Society's $500 K – 12 Geoscience Teaching Award for the Year 2004 - 2005. The award is intended to assist and facilitate local teachers interested in teaching in the geosciences. Ms. Garcia graduated from UCSB with a degree in Geophysics. While an undergraduate at UCSB she participated in a research cruise in the Ross Sea in Antarctica. She obtained her teaching credential at SFSU and has been teaching 9th Grade Earth Science for four years. Ms. Garcia is a member of the California Science Teacher Association and an avid participant of Geoscience conferences and workshops in the Northern California region. Teaching at an underperforming school, most of her students have a difficult time reading, and her experience has been that these students learn much better with hands on activities. Therefore, her intent is to acquire lab materials for a unit on California geology based on California Earth Science Standard Number 9 on California Geology. Ms. Garcia also forwarded her Year Plan for the class for a judgment of the detail and suitability of the course work. The award was presented in person to Ms. Garcia at the regular February 2005 meeting.

2005 Annual Meeting
Cordilleran Section, GSA
Pacific Section, AAPG

Bay, Basins, Basement, and Beyond

Fairmont Hotel, San José, California
April 29 – May 1, 2005

The 2005 annual meetings of the Cordilleran Section, GSA and the Pacific Section, AAPG, will be held jointly at the Fairmont Hotel in San José, hosted by the Department of Geology, San José State University. Up-to-date information about the meeting can be found at:
www.geosociety.org/sectdiv/sections.htm

REGISTRATION
Preregistration deadline: March 25, 2005
GSA Headquarters will handle preregistration. Registration details were published in the January 2005 issue of *GSA Today* and are available at www.geosociety.org

FIELD TRIPS
For a full description of the field trips and up to date details on the field trips, including leader contact information, please visit:
www.geosociety.org/sectdiv/sections.htm

PRE-MEETING

1. Seismic Hazard of the Front Range Thrust Faults, Santa Cruz Mountains. 1 day, April 26, 2005. Drew Kennedy, Sanders & Associates, Geostructural Engineering, Inc., Chris Hitchcock, Lettis & Assoc.

2. Neoproterozoic Paleogeography of Southern Death Valley: Adding Some New Pieces to an Old Puzzle. 3 days, April 26-28, 2005. Matt McMackin, San José State University, Bennie Troxel, Lauren Wright, and Martin Kennedy.

3. Point Lobos to Point Reyes: Evidence of ~180 km Offset of the San Gregorio and Northern San Andreas Faults. 2 days, April 27-28, 2005. Kathleen Burnham, Stanford University, Jean Moran

4. Jurassic - Cretaceous Assembly of Central California. 2 days, April 27-28, 2005. Russell Graymer, U.S. Geological Survey.

5. Geology of Mount Diablo. 1 day, April 28, 2005. Ron Crane, Consultant

6. An Extensive Paleocene Cold Seep System: Clastic Dikes, Carbonates, and Chemosynthetic Communities in the Moreno Formation, Panoche Hills, Western San Joaquin Valley. 1 day, April 28, 2005. Hilde Schwartz, U.C. Santa Cruz, Casey Moore, U.C. Santa Cruz, James Sample, Northern Arizona University.

7. The Dirt on Wine, Geology, Soils, and Wine Quality in the Santa Clara Valley. 1-day, TBA. Terry Wright, California State University, Sonoma.

8. Microbialite Sediments in Death Valley. 3 days, April 26-28, 2005. Thomas Anderson, California State University, Sonoma; Russell Shapiro, Melissa Hicks.

POSTMEETING

9. Miocene Volcano-Plutonic Systems, Southern Nevada: A Window into Upper Crustal Magmatic Processes. 3 days, May 2-4, 2005. Calvin Miller, Vanderbilt University, Jonathan Miller, San José State University, Jim Faulds.

10. Late Neogene Transition from Transform to Subduction Margin East of the San Andreas Fault, Petaluma to Willits, California. 3 days, May 2-4, 2005. Bob McLaughlin, U.S. Geological Survey, Dave Wagner, California Geological Survey, Harvey Kelsey.

11. Large Dextral Offset Across Owens Valley, California, from 148 Ma to 1872 A.D. 3 days, May 2-4, 2005. Allen Glazner, University of North Carolina, Jeffrey Lee, John Bartley; David Greene; Drew Coleman; Andrew Kylander-Clark.

12. Outcrop Geology of Some Cretaceous and Tertiary Gas-Producing Strata of the Sacramento Basin. 3 days, May 1-3, 2005 (leaves after meeting). Douglas Imperato, Consulting Geologist, Tor Nilsen.

13. The Miocene Hydrocarbon Migration System: Clastic Intrusions and Carbonate Seep Structures in the Santa Cruz Area, California. 1 day, May 2, 2005. Robert Garrison, U.C. Santa Cruz, Casey Moore, U.C. Santa Cruz, Ivano Aiello.

14. San Francisco Bay: Floating Classroom on an Urban Estuary. 1 day, May 2, 2005. Matt McMackin, San José State University.

15. Franciscan Complex and Coast Range Ophiolite, Eastern San Francisco Bay Area: A Record of Processes Along a Complex Active Plate Margin. 1 day, May 2, 2005. John Wakabayashi, Geologic Consultant.

TECHNICAL SESSIONS

In addition to general technical sessions, the program will include a variety of symposia and theme sessions. Detailed description of symposia and theme sessions can be found at:
www.geosociety.org/sectdiv/sections.htm.

SYMPOSIA

1. Alaskan Energy Resources: New Assessments and Related Geological, Geophysical, and Geochemical Studies. Rick Stanley, U.S. Geological Survey.

2. Tectonics of the U.S. Cordillera, SWEAT Connection and Beyond – a Symposium in Honor of Eldridge Moores. *Sponsored by GSA Cordilleran Section*. Yildirim Dilek, Miami University, Department of Geology, John Wakabayashi.

3. Crowding the Rim – Dealing with Energy Needs, Food, and Other Living Resources and Natural Calamities Around the Pacific. *Sponsored by the Circum Pacific Council*. David G. Howell, USGS, H. Gary Greene, Moss Landing Marine Laboratories, Nahum Schneidermann, Chevron Texaco Overseas Petroleum, Inc.

4. Ophiolites, Batholiths, and Regional Geology: a Symposium in honor of Cliff Hopson; Jim Wright, University of Georgia.

5. Plutons and their Host Rocks in the Sierra Nevada Batholith: a Forum and Discussion on Magma Emplacement, Magmatic Differentiation, and Pluton Solidification; Drew Coleman, University of North Carolina, William Hirt, College of the Siskiyous, Aaron Yoshinobu, Texas Tech University.

THEME SESSIONS

CORDILLERAN SECTION, GSA:

1. Provenance of Sediments and Sedimentary Rocks in the Cordillera. Andrew Barth, Department of Geology**,** Indiana University~Purdue Nancy Riggs, Department of Geology, Northern Arizona University.

2. Late Cenozoic Transition from Subduction to Transform Margin Inboard of the San Andreas Fault: Northern San Francisco Bay Area to Cape Mendocino. Robert J. McLaughlin, USGS, David L. Wagner, California Geological Survey.

3. **Earthquakes, Past and Future, in the San Francisco Bay Region**. David P. Schwartz, USGS, William Lettis, William Lettis & Associates**.**

4. Transpressional Neotectonics of the Central and Northern California Coast Ranges. Jeff Unruh, William Lettis & Associates, Inc.

5. Crustal cross sections from the western North America Cordillera and Elsewhere--Implications for Tectonic and Petrologic Processes. Art Snoke, University of Wyoming.

6. Hydrogeology of Alluvial Aquifers in the Western U.S. June Oberdorfer, San José State University.

7. Recent Advances in the Science of Floodplain and Channel Processes and Restoration. Douglas Smith, Watershed Institute/Div. of Science and Environmental Policy, California State University Monterey Bay, Joan Florsheim, Geology Department, University of California, Davis.

8. Naturally Occurring Asbestos Hazards: Geology, Regulatory Issues, and Methods of Identification and Assessment. Mark Bailey.

9. Ethics in the Geological Community. John Williams, San José State University.

10. Earth Science for Everyone: Diverse Student Populations: Recruiting Techniques for Attracting Them, Curricular and Extracurricular Strategies for Retaining Them. Ellen Metzger, San José State University; Richard Sedlock, San José State University.

11. Undergraduate Research Posters. Karen Grove, Dept of Geosciences, San Francisco State University.

PACIFIC SECTION, AAPG:

1. Sacramento Valley Gas Exploration and Production. Rick Blake, Lawrence Livermore National Laboratory.

2. Application of New Technologies to Petroleum Reservoirs: A. Implications for Exploration. Tim McHargue, ChevronTexaco, Bryan Bracken, ChevronTexaco, **B. Implications for Production.** Bryan Bracken, ChevronTexaco, Tim McHargue, ChevronTexaco.

3. CO_2 Sequestration: Science and Opportunity in the West. S. Julio Friedmann, Lawrence Livermore National Laboratory.

4. A New Three-Dimensional Look at the Geology, Geophysics, and Hydrology of the Santa Clara Valley, California: A Showcase of Urban Earth Science. Randall T. Hanson, U. S. Geological Survey; Bob Jachens, U.S. Geological Survey.

5. Data Visualization, 3D Mapping, and Property Modeling: Vic Madrid, Lawrence Livermore National Laboratory.

6. Ground Water and Surface Water Interactions: Hydrogeology and Water Quality in the San Francisco Bay Region. Alec Naugle, San Francisco Bay Regional Water Quality Control Board.

PACIFIC SECTION, SEPM:

1. **Estimating Recharge.** Karin A. Hoover, Department of Geological and Environmental Sciences, California State University, Chico.

2. Sediment Delivery to Streams: Mechanisms, Volumes and Timing. Karin A. Hoover, Department of Geological and Environmental Sciences, California State University, Chico.

3. **The Hydrobiogeochemical Cycle of Mercury**. William M. Murphy, Department of Geological and Environmental Sciences, California State University, Chico; Ronald K. Churchill, California Geological Survey.

4. Tectonics and Sedimentation: New Models and Recent Advances. Dave Barbeau, Department of Geological Sciences, University of South Carolina; Boyan Vakarelov, Department of Geosciences, University of Texas at Dallas.

5. Beds to Basins in Turbidite Systems. Stephan A. Graham, Department of Geological and Environmental Sciences, Stanford University; Donald R. Lowe, Department of Geological and Environmental Sciences, Stanford University.

6. Volcaniclastic Strata: Process, Paleogeography and Tectonic Reconstructions. Cathy Busby, Department of Geological Sciences, University of California, Santa Barbara; Ian Skilling, Department of Geology and Planetary Sciences, University of Pittsburgh, Pittsburgh.

7. Fault-Related Diagenesis and Fluid Flow: Hilario Camacho, Signal Hill Petroleum, Jim Sample, Department of Geology.

WORKSHOPS

Roy J. Shlemon Mentor Program in Applied Geoscience. *Sponsored by GSA Foundation*

The John Mann Mentors in Applied Hydrogeology Program. *Sponsored by GSA Foundation*

SHORT COURSES

1. Groundwater Age-Dating: Application and Interpretation of Tritium and the Noble Gases for Water Resource Investigations. G. Bryant Hudson, Lawrence Livermore National Laboratory; Jean E. Moran, Lawrence Livermore National Laboratory; Andrew F. Tompson, Lawrence Livermore National Laboratory.

2. Application of Sequence Stratigraphy to Define the Aquifer Architecture of Groundwater Resources. Morgan Sullivan, Department of Geosciences, CSU Chico; Kenneth Ehman, Skyline Ridge, Inc.; Brian Edwards, U. S. Geological Survey.

3. **Quantitative P-T-t Paths from Integrated Thermodynamic Modeling, Geochronology, and Metamorphic Textures.** Dr. Harold Stowell, Department of Geological Sciences, The University of Alabama; Dr. Douglas Tinkham, The University of Calgary; Carlos Zuluaga, The University of Alabama.

4. Half-day Bay Area Earth Science Institute (BAESI) Teacher Workshop. Ellen Metzger, San José State University; Richard Sedlock, San José State University.

ADDITIONAL INFORMATION

To obtain the complete descriptions and up-to-date information, visit:
www.geosociety.org/sectdiv/sections.htm

Living With Volcanic Risks

Contributed by Dan Day

The NCGS hosted USGS volcanic hazards expert **Dr. Robert I. Tilling** at its February 23, 2005 meeting. As a member of the USGS Volcanics Hazards Team, Dr. Tilling has spent over 40 years studying volcanic eruptions around the globe. His presentation ***Confronting Volcanic Hazards*** addressed the consequences of living in close proximity to active volcanoes, and the steps scientists have taken to monitor these risks and inform the public when danger threatens.

All told, there are approximately 550 active volcanoes in the world today, with an average of 50 to 70 erupting each year. Aside from the occasional intraplate volcanoes like the Hawaiian Islands, most volcanoes are concentrated at or near tectonic plate boundaries, which comprise about 1% of the earth's surface. Most volcanoes are associated with subduction activity and occur either as oceanic island arcs (Japan, the Aleutian Islands) or as continental mountain chains like the Cascade Range, the trans-Mexican volcanic belt, and the backbone of Central America. Lesser activity is affiliated with spreading ridges (Iceland). Monitoring volcanism involves some fairly sophisticated data acquisition equipment and technical expertise. This part is relatively simple compared with the task of working with local administrators, social scientists, and governments to develop an acceptable procedure for alerting the public to volcanic hazards. Another danger that has become more apparent as global travel expands is the threat to commercial airliners from volcanic ash clouds. There have been several close encounters in recent years that have made carriers cognizant of the threats posed by high altitude ejecta.

The ground level threats from volcanic eruptions have been recognized for centuries. Santorini (Crete), Pompeii (Italy), and more recently, Mount Pelée in Martinique (1902) have emphasized the awesome powers unleashed by explosive events. The latter are commonly associated with intermediate to acid volcanics, viscous magmas containing entrained gases. Explosive events occur when the trapped gases are suddenly released, triggering various types of pyroclastic phenomena. The nuée ardant, a dense, hot

ash cloud that killed 36,000 people in the 1902 Mount Pelée tragedy, flowed like a glowing avalanche down the mountain slope and smothered everything in its path. The Roman city of Pompeii near Naples suffered a similar fate in A.D. 79. The May 18, 1980 Mount St. Helens eruption in southern Washington state is a modern day reminder of the forces that can literally move a mountain.

Volcanic phenomena cannot be stopped but ideally they can be monitored and studied to determine when explosive eruptions are near at hand. Post eruptive hazards like lahars (hot mudflows) and conventional mudflows are likewise possible, but loss of life can be prevented by careful surveillance and taking the appropriate safety measures. Protecting the public and providing both warning and acceptable evacuation procedures for high-risk areas are formidable challenges for today's volcanologists.

To confront volcanic hazards one must know the telltale signs of impending eruptions. To acquire a meaningful volcanologic dataset, the USGS has established five volcanic observatories in the United States: Hawai'i, Alaska, the Cascades, Long Valley California, and Yellowstone National Park in Wyoming. Information from these observatories helps scientists understand the seismological and physical precursors to eruptive events.

A semi-empirical comparative rating system, called the Volcanic Eruption Index (VEI), has been developed to rank volcanic events. Events have been rated from 1 to 6 (higher values are possible) based on the volume of material released and the atmospheric height of the ash plume. For instance, the Krakatoa eruption (1887), the largest in recent times, is rated a 6 on this scale. This volcano is part of the famous Pacific "Ring of Fire," a series of subduction zone volcanoes which bounds the Pacific plate on the north, west, and east. Much of the world's volcanic activity is associated with this system. In perspective, the Mount St. Helens eruption was smaller than the Pinutabo event, and both were significantly smaller than the remote 1912 Katmai (Alaska) event that produced the Valley of Ten Thousand Smokes.

There are definitive physical changes that are associated with pre-eruptive volcanic activity. Hence, volcanologists monitor specific phenomena to track volcanic activity and attempt to predict when eruption will occur. Surface tilt (swelling), tensile "stretching," and microseismic activity generated as the magma chamber fills are carefully tracked. In spite of man's attempts, however, volcanoes are very difficult to decipher. Eruption durations and timing are often irregular; seismic activity buildup and ground uplift could indicate an eruption is near; but experts cannot guarantee an eruption will not occur. These statements clearly define the predictive capabilities of modern volcanologists, and the unique behavior of individual volcanoes. To emphasize the potential consequences of ignoring nature's warnings, Dr. Tilling projected a sequence of photographs taken by Gary Rosenquist during the dramatic May 18, 1980, Mount St. Helens eruption. Rosenquist narrowly escaped the ash cloud that rapidly descended on the area; several others in the campground where he stayed perished. It was a grim reminder of the unpredictable, often underestimated power of nature.

The hazards associated with volcanic eruptions include lava flows, ejecta, nuée ardants (ignimbrites or ground-hugging avalanches of incandescent pyroclastic material), and mudflows or lahars (hot mudflows). In 1985, a mudflow triggered by a rather mild eruption in Ruiz, Colombia, killed several thousand villagers down slope. Tragically, local officials had been warned of this potential threat by experts monitoring the event. Had their warnings been heeded, the affected towns could have been evacuated and many lives saved.

A new generation of devices have been designed to monitor volcanoes and relay the data to base stations, sparing scientists life-threatening risks. One of the newest monitoring devices is "Spyder," a 4-legged deployable remote monitoring system that tracks seismic activity and samples gases in close proximity to eruptive centers. Spyders are also equipped with forward-looking infrared sensors to measure ambient temperatures and a camera unit to transmit video back to the ground base data acquisition center. Several of these pods were recently placed on Mount St. Helens to survey dome emplacement using a state-of-the-art global positioning systems (GPS). After exemplary performance, violent volcanic explosions destroyed many of the Spyder devices.

Volcanic eruption patterns are often difficult to predict. "False alarms" are not unusual and complicate the task of explaining to the public why the initial concern was warranted. The Campi Fleigri caldera in Naples began a potential eruptive cycle in 1980. Activity increased over a three-year period, with physical growth and seismicity suggesting that an eruption was imminent. Mysteriously, the activity

subsided and the volcano went dormant again. Rabaul in Papua, New Guinea, has communities situated in its caldera, which forms part of a coastal bay. In 1983-85 activity reached a stage 2 alert, accompanied by one meter of ground uplift and a sharp spike in seismicity. This unrest was sustained for several years as scientists watched and waited. Then in September, 1994, seismic activity increased dramatically over a 72 hour period, culminating with the long anticipated eruption. Fortunately the citizens were aware of the impending danger and self-evacuated without any casualties.

There are many other restless volcanic sites. Two are the Long Valley caldera on the east slide of the Sierras, and the other is Yellowstone National Park in Wyoming. Long Valley has had a history of spectacular eruptions. The most recent and well-documented one occurred about 750,000 years ago and deposited the Bishop Tuff. This enormous explosive event blanketed the surrounding area with a thick layer of welded tuff and laid down an ash layer in the Plains States over 1,000 miles away. Recent volcanism began in Long Valley in the early 1980's, and triggered extensive USGS monitoring activity. Volcanologic activity increased and plateaued in the early 1990's. It increased again in 1997, when many experts felt that an eruption was inevitable. However, Mother Nature intervened, and activity has been waning.

Yellowstone has, in the past, been one of the largest eruptive centers in North America. In 1996-2000, the area was restless, and the topography bulged. Currently, experts cannot tell if the activity is ramping up or subsiding.

Another area of interest is the Three Sisters volcanoes in Oregon. The last eruption was about 1,700 years ago. Between August 1996 and October 2002 the region experienced 3 cm./yr. aseismic uplift. The area is currently being monitored.

So how does man reduce volcanic risk? Conventional mapping is needed to identify high-risk areas and prohibit development there. Unfortunately, many of these recognized high-risk areas are already densely populated (Mexico City being a prime example). There is a need to refine predictive models and to establish reasonable evacuation procedures. This will require opening communication channels between the public and administrators. Basic scientific studies of volcanoes are needed to characterize past eruptive patterns as guidelines to interpreting current volcanic behavior. This will require dating eruptive deposits to define their recurrence intervals.

In response to potential volcanic threats, the Volcanic Disaster Assistance Program (VDAP) has been established. The program quickly deploys volcanologist teams to suspect areas, establishes volcano observatories, trains local citizens to monitor activity, and educates the populace about volcanic hazards and what to do in threatening circumstances.

Overall, volcanologists' efforts appear to be paying off. As the world population continues to grow the death rate from volcanic activity and its aftermath has decreased. Monitoring sites, instrument sophistication, and volcanic disaster team response have been fine-tuned. Satellite monitoring has been implemented and field datasets are growing. The goal is to better understand eruption precursor events and to develop programs to alert and evacuate the public when danger threatens. Dr. Tilling feels the progress made by hurricane specialists should be a guideline for volcano experts. The key obstacle is winning the public's trust and the support of local administrators. Situations like the Philippine's Mount Pinutabo, whose behavior was successfully predicted, gives specialists confidence that they are making headway. The real threats in highly populated areas, such as Mount Vesuvius in the Naples metropolitan area, will require considerable disaster mitigation planning and coordinated efforts between scientists, citizens, and government officials.

The NCGS expresses its sincerest gratitude to Dr. Robert Tilling for an exciting and informative talk on the status of volcanic hazard assessment. Those interested can gather more information about volcano research at the USGS website **http://volcanoes.usgs.gov**, and the Survey's Hawaii Volcano Observatory website at: **http://hvo.wr.usgs.gov**.

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

NCGS FIELD TRIP and PICNIC (BBQ)

ROBERT SIBLEY VOLCANIC REGIONAL PRESERVE IN THE BERKELEY HILLS

Saturday May 21, 2005

Leader: Dr. Stephen Edwards, Director Tilden Park Regional Botanical Garden

The volcanic rocks at Robert Sibley Volcanic Regional Preserve are all late Miocene Moraga Fm. Garnis Curtis has studied this formation and this site for decades and believes this is a piece of the Quien Sabe Volcanics that has been transported north on the East Bay fault system. In terms of accessibility and exposure, Sibley is the showcase site for this volcanic complex, which is also represented by the Tolay Volcanics in Sonoma and probably Burdell Mountain in Marin County. We will be looking primarily at basltic-andesitic rocks, but with considerable textural and structural variety. A basaltic volcano (Round Top) dominates the landscape. Kaiser quarrying and erosion have exposed its deep interior and underpinning like no other volcano in California.

Following the field trip, geoscience family & friends gathering with BBQ (vegi & non-veg) at Tilden Park

THIS FIELD TRIP WILL BE LIMITED TO 70 PEOPLE

********** **Field Trip Logistics** **********

Time & Departure: Saturday May 21, 2005, 9:30 am (sharp), gathering place at the Visitor' Center.

Cost: $10/person for both members & non-members

********** **REGISTRATION FORM (Sibley Volcanics Field Trip & Picnic)** **********

Name:_____ E-mail:_____

Address:_____ Phone (day):_____ Phone (evening):_____

Lunch: Regular:_____ Vegetarian: _____ (Please check one) Check Amount: _____

Please mail a check made out to **NCGS** to: **Tridib Guha**
5016 Gloucester Lane,
Martinez, CA 94553

Questions: e-mail: aars@netscape.com Phone: (925) 370-0685 (evening - PREFERRED) (925) 363-1999 (day – emergency)
People who are willing to drive their car or SUV please indicate.