



## JUNE 2001 PROGRAM:

### **A GEOLOGIC TRAIN RIDE DOWN THE SAN MATEO COUNTY COAST: ACTIVE COASTAL PROCESSES AND IRRESPONSIBLE LAND USE, by Kenneth R. Lajoie, USGS Retired**

Sea level rose rapidly at the end of the last ice age and stabilized in roughly its present position only about five thousand years ago. Consequently, all active coastal landforms, such as sea cliffs, beaches, and dunes, are less than five thousand years old. The sea-cliff erosion cycle initiated at that time is still active today and, consequently, sea cliffs are still retreating. Unfortunately, development along the central and northern San Mateo County coastlines over the past century ignored clear evidence of this fact, thus creating numerous hazardous conditions and leading to extensive but ultimately futile armoring of the sea cliffs. Indeed, the breakwater at Princeton harbor caused cliff retreat to the south to accelerate from 0.1- to 3.0-feet/yr. Sea-cliff retreat ranging from 0.3- to 1-foot/yr has undercut and threatened numerous structures, including highways.

However, retreat occurs episodically, not continuously, thus creating a false sense of security for a decade or longer. Large, damaging erosion events appear to be random in space and time. However, the entire central and northern coastlines were hit very hard during the 1982-83 and 1997-98 El Nino storm seasons. Historical climatic records suggest that El Nino events will become more frequent and severe in the future. Also, continuing and maybe accelerating sea-level rise will exacerbate the erosion hazard. Experience shows that more rip-rap will not solve the problem. It is may be time to literally step back from the edge of the sea cliff.

## **SPEAKER'S BIOGRAPHY**

**Dr. Kenneth R. Lajoie** received his Bachelor and Ph.D. degrees in Geology from UC Berkeley in 1963 and 1968, respectively. His Ph.D. work focused on Quaternary geology and tectonics, including the Late Quaternary fluctuations of Mono Lake, chemical fingerprinting of young volcanic ashes, and potassium-argon dating of young volcanic rocks. He completed an NSF Post doctorate fellowship at Lamont/Doherty Geological Observatory of Columbia University from 1968-1970 where he studied dry lakes in the southern hemisphere and dated volcanic ash from East Africa. In 1970 he joined the US Geological Survey. His work focused on the environmental geology of the San Francisco Bay region, coastal tectonics, coastal erosion, earthquake hazards, dating marine fossils using amino-acid data, Quaternary tectonics of the Los Angeles Basin, dating and correlating young volcanic ashes, and mapping earthquake ground ruptures. He retired from the USGS in April of 2000 after 30 years of service.

Dr. Lajoie's interests and hobbies include international travel, wilderness conservation, history of science, origin of religions, Native American history, California history, astronomy, Near-Eastern archeology, steam trains, kayaking, bicycling, camping, photography, modeling, and gardening. He resides in Menlo Park with his wife.

### Meeting Details:

- Tuesday, June 12<sup>th</sup>
- Spaghetti Factory, Jack London Square, Oakland
- 6:00pm – Cocktail Hour
- 7:00pm – Dinner
- 8:00pm – Program Talk
- \$30 members, students ½ off who call Dr. Williams, 408-924-5050.
- **Reservations due by Friday, June 8th. See back cover for RSVP form.**

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aegnews@visto.com

The AEG San Francisco Section Newsletter is a monthly publication of the San Francisco Section of the Association of Engineering Geologists.

### **Submittals:**

Deadline is the 20<sup>th</sup> of each month for the following issue. Contact Gretchen Mora by email (aegnews@visto.com) for submittal. All submittals are subject to editing for space. Job ads are free if brief.

**Address changes:** Please submit to Section Secretary, Anne Rosinski at 415-904-7730.

### **Advertisements:**

The newsletter's circulation is about 360 within northern California. Use these low rates to expand your market:

	<u>Monthly</u>
Business card	\$ 15
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### **Sponsorship:**

Become a Section Corporate Sponsor! Donate to the Section and receive free advertisement each month, recognition for your donation at Section Meetings, and more! For more info on Section Sponsorship, Contact Jason Preece.

## CHAIR'S MESSAGE

I'm sure all of you missed a message from me in last month's newsletter (Awe, I should flatter myself!). Honestly, I apologize for not pulling one together. As it turned out, I didn't have the foresight to do it well before I departed on a week vacation to Oregon at the same time of the newsletter deadline.

Well, it seems I don't have much to report this month either except things are going smoothly with Section activities.

As you know Chris Hundemer represented us at the mid-year board meeting in Kansas City. Look for his report on the meeting's activities and the Association's status. Thanks Chris for a job well done. I hear the meeting was a success.

Be sure to check out the upcoming schedule for field trips. Drew Kennedy has one organized for this early June and others are in the works.

J.C. Isham has been tracking the legislative front. According to him and our lobbyist, SB136 will go to the senate appropriations committee on May 21<sup>st</sup> and could hit the floor in a couple of weeks. Check with J.C. if you are interested in details about this bill and other California bills AEG is tracking.

I hear Patrick Drumm, our Publications Chair, is looking for ideas and assistance with planning a focused technical publication or the likes.

Finally, we are in the process of organizing a chapter in the Eureka/Arcata area. Jim Falls has volunteered to be the point person for the chapter and plans on pulling a meeting or two together, perhaps to view the last two Section talks I have recorded. I will do my best to provide taping of the talks for the chapter's or others' use but will need assistance in the video department. They would like to call themselves the Bigfoot Chapter of the San Francisco Section. I look forward to hearing of their activities and will keep you posted.

I look forward to meeting and talking with you at our monthly Section meetings. Please feel free to introduce yourself to others and me. The speaker will be excellent and we are doing our best to shift the meeting locations around the Bay. This month's meeting will be in Oakland. I hope many of you can make it.

JASON PREECE, San Francisco Section Chair

## JUNE SECTION MEETING DETAILS

The June Section Meeting will be held at the Old Spaghetti Factory, located in Jack London Square, in Oakland. Jack London Square is at the west end of Broadway in Oakland. There is validated parking for 2 hours in a lot immediately south of the restaurant, valet parking adjacent to the Barnes and Noble bookstore, or parking at meters on the street.

**Please make your reservations by Friday, June 8th! See the back cover for the RSVP form.**

## MAY SECTION MEETING NOTES

Victor S. Romero holds a B.S. in Geological Engineering from the Colorado School of Mines and a M.S. in Geotechnical Engineering from the University of California at Berkeley. He is a registered Civil Engineer (P.E.) in California, Massachusetts, Utah, Washington and Puerto Rico, and is a Certified Engineering Geologist in California. On the Rio Piedras Contract, Mr. Romero, an Associate with Jacobs Associates in San Francisco, was Project Manager for tunnel design. During construction, he assumed the role of Design Resident Engineer, responsible for all aspects of subway design during construction, including tunnels, cut-and-cover structures, mechanical, electrical, and architectural work.

## May Section Meeting Notes (continued)

The Tren Urbano is a new 17.2 km transit system in San Juan, Puerto Rico. The Hato Rey Formation, through which most of the underground sections of the project are constructed, is highly lenticular, has a deep weathering profile, and includes an upper clay layer, mixed lenticular middle layer and a lower sand layer. In addition, tropical soils and karst topography were also encountered during construction. The project required four tunneling methods, cut-and-cover, an Earth Pressure Balance Tunnel Boring machine, the New Austrian Tunneling Method, and stacked-drift mining techniques. The project is scheduled to begin revenue service this year.

ANNE ROSINSKI, Section Secretary

## DO YOU WANT MORE SHORT COURSES?!

I would appreciate ideas, suggestions, and requests for future short courses. Volunteer instructors and venues would be really nice. Examples of what has worked so far: Sandy Figuers volunteered to teach a contouring class and Chris Alger volunteered his employer's offices as a venue – a belated thanks to both. Charlie Kissick requested a class on expansive soils; the class was taught by one of our more enlightened geotechnical engineers, Dick Volpe, at the Santa Clara Valley Water District offices. Dick also helped arrange for the facilities. Thanks, Dick. Please forward all suggestions for or offers to teach/lead interesting short courses to: [esolo@earthlink.net](mailto:esolo@earthlink.net).

ERNEST SOLOMON, Short Course Chair

## SPONSORS SOUGHT

We are still in need of sponsors for the Engineering Geology Practice in Northern California. The Sacramento and San Francisco Sections are looking for sponsors to help with the publication of this volume. Please contact Bob Anderson (916-654-3836 or [banderson@energy.state.ca.us](mailto:banderson@energy.state.ca.us)) to help fund the cost of this joint volume.

## FULBRIGHT AWARDS FOR GEOLOGY

The Fulbright Scholar Program is offering 11 lecturing/research awards in Geology for the 2002-2003 academic year. Awards for both faculty and professionals range from two months to an academic year or longer. While foreign language skills are needed in some countries, most Fulbright lecturing assignments are in English. Applications for Fulbright traditional lecturing and research grants worldwide will be accepted until August 1, 2001.

For an application, contact The Council for International Exchange of Scholars, 3007 Tilden St., N.W., Suite 5-L, Washington, D.C. 20008. Phone: 202-686-7877; email: [apprequest@cies.iie.org](mailto:apprequest@cies.iie.org). For more information, visit the website at: [www.cies.org](http://www.cies.org).

## MEMBER NEWS

Peter Anderson from Pacific Geotechnical Engineering in Morgan Hill replies to a news item published in the April edition of the AEG SF Section Newsletter:

The reports of my death are greatly exaggerated. While it is true that a very low phi angle substrate caused the Factor of Safety of my ladder to fall <1.0, the resulting injury did not cost me my life or my job. I have been working for Pacific Geotechnical in Morgan Hill for the past 13 years, and continued employment is assured, pending maintenance of adequate health benefits and purchase of a better ladder. Reports of me working for Anderson Consulting are inappropriate, because having two dump Swedes (I can say that since I are one) in one office is too two many. Besides, working beside fellow AEG members Reid Fisher, Corinne Stewart, and Stephanie Clark has kept me in backhoe trenches and large-diameter boreholes, and out of trouble. Nevertheless, if I am wrong, and reports of my death are not exaggerations, I wish that those viewing my open casket would remark: "Oh look, he's breathing!"

As reported last month, there are many San Francisco Section Members out there with 20 or more years as a member of AEG. A member since 1978, **David W. Abbott** joins our listing of those who have contributed and maintained a strong connection to the Section.

*If you have been a member of AEG for 20 years or more, please send a note to the Newsletter Editor ([aegnews@visto.com](mailto:aegnews@visto.com)).*

## THREE SISTERS SHOW GROUND DEFORMATION – USGS Press Release

There has been a slight swelling, or uplift, of the ground surface over a broad area of central Oregon, centered five kilometers, or three miles, west of the South Sister volcano in Three Sisters region of the Oregon Cascade Range, according to scientists at the U.S. Geological Survey. The Three Sisters region is located 35 kilometers (22 miles) west of Bend, Ore., and 100 kilometers (60 miles) east of Eugene. The uplift, which scientists say occurred between 1996 and 2000, covers an area about 15 to 20 kilometers (9 to 12 miles) in diameter. The maximum amount of uplift at its center is about 10 centimeters (4 inches). It is too broad and low to be noticed from the ground, and several close aerial inspections of the area have revealed no unusual surface features.

**Continued on page 4**



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### Three Sisters Ground Deformation (continued)

The USGS scientists discovered the bulge through use of a relatively new technique called Satellite Radar Interferometry (InSAR), which uses satellite data to make radar images of a portion of the Earth's surface. Through this process, images acquired at different times, but from the same location in space, can be used to detect even minor changes a few centimeters in the elevation of the ground. The images that reveal the 10-centimeter uplift near South Sister were obtained in 1996 and 2000. The exact timing of the uplift, or whether it is continuing at present, is unknown, but is being studied further.

The USGS scientists said the specific cause of the uplift is uncertain, but because the Three Sisters region is a volcanic area, the uplift may reflect intrusion of a small volume of magma, or molten rock, deep below the surface; probably at a depth of about seven kilometers, or four miles. Such a process, which keeps volcanic areas "alive" and prepares them for future eruptions, is a common occurrence under volcanoes, but until development of techniques such as InSAR, it has been difficult to detect. If intrusion of magma were to continue, it could eventually lead to a volcanic eruption; however, an eruption is unlikely without significant precursory activity. In addition to continued or accelerating uplift, precursors to an eruption would include earthquakes, typically swarms of small events generated by fracturing of rock as magma moves upward, and large emissions of volcanic gases, such as carbon dioxide, which are released from the magma. At present, earthquake activity and gas emissions appear to be at or near background levels. In order to be prepared to more accurately detect possible precursors and to better understand this uplift phenomenon, USGS plans to enhance the existing monitoring network. Installation of one or more additional seismometers and a Global Positioning System (GPS) receiver, resurvey of existing benchmarks and installation of new benchmarks, and periodic airborne and ground-based sampling of gases are currently being considered in consultation with managers of the Willamette and Deschutes National Forests.

A number of public officials and agencies in the State of Oregon and Lane and Deschutes counties have been briefed on these findings and they and scientists will work together to address any questions or concerns the public may have.

Additional information on the bulge, including maps and a volcanic-hazards assessment, may be found on the web at URL: <http://vulcan.wr.usgs.gov/Volcanoes/Sisters/framework.html> <http://volcanoes.usgs.gov/About/What/Monitor/Deformation/InSAR.html> and <http://www.geophys.washington.edu/SEIS/PNSN/>

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### YELLOWSTONE VOLCANO OBSERVATORY ESTABLISHED – USGS Press Release

May 14, 2001 – The U. S. Geological Survey (USGS), Yellowstone National Park and the University of Utah have signed an agreement to establish the Yellowstone Volcano Observatory to strengthen long-term monitoring of earthquakes and the slumbering volcano beneath Yellowstone National Park. This agreement provides for improved collaborative study and monitoring of active geologic processes and hazards of the Yellowstone volcanic field and caldera, site of the largest and most diverse collection of natural hot springs, mud pots and steam vents in the world.

"The new observatory will improve our efforts to monitor Yellowstone's extraordinarily large and long-lived volcanic system," said USGS scientist Robert L. Christiansen, Scientist-in-Charge of the new observatory. Christiansen was the Scientist-in-Charge of the Mount St. Helens monitoring effort during the 1980 eruption. "This agreement is a natural evolution of our collective work over the years to track and study Yellowstone's unrest. There is no increased threat of eruptive activity at Yellowstone to cause concern at this time. We will use YVO to share what we are learning with the public, Park visitors, and nearby residents, and to be in a better position to provide warning of any future hazardous activity."

The Yellowstone Volcano Observatory (YVO) is the fifth such observatory in the United States and will be based from existing facilities at the USGS, the University of Utah and Yellowstone National Park. The new observatory is modeled after the USGS volcano observatories in Hawaii, Alaska, California and the Pacific Northwest. The observatories employ a variety of ground-based instruments and satellite data to monitor active and restless volcanoes and conduct a variety of studies to understand their eruptive and seismic histories and potential hazards. Together, the five observatories monitor 43 of the 70 or so potentially hazardous volcanoes in the United States. The five observatories are operated under the auspices of the USGS Volcano Hazards Program.

The Yellowstone National Park and surrounding area encompass the largest active magmatic system in North America. The spectacular geysers, boiling hot springs, and mud pots that have made Yellowstone famous owe their existence to volcanic activity that has affected the region during the past 2 million years.

"The extensive thermal features of Yellowstone National Park are fueled by heat from a large magma chamber beneath the caldera. The chamber is fed from a magma source in the Earth's deep interior that collectively form the Yellowstone hotspot," said Robert B. Smith, University of Utah Coordinating Scientist of YVO.

**Continued on page 5**

**DEADLINE FOR THE**  
**JULY ISSUE is**  
**j u n e 20<sup>TH</sup>!!**

## Yellowstone Volcano Observatory (continued)

"In the past decades we've measured the ground across the youngest caldera rising as much as three feet and falling by a foot. This active deformation was accompanied by thousands of small earthquakes, marking the Park as a living geologic system."

Cataclysmic explosive eruptions 2 million, 1.3 million, and 640 thousand years ago ejected huge volumes of molten rock and formed large overlapping elliptical depressions called calderas. The youngest caldera in the Park, about 50 miles long and 30 miles wide, has been buried by the most recent eruptions of thick lava flows between about 75,000 and 150,000 years ago. Yellowstone region is seismically active. The 1959 Hebgen Lake earthquake (surface-wave magnitude 7.5), centered just outside the Park's northwestern boundary was responsible for 26 of the quake's 28 deaths. This event is one of the 15 strongest earthquakes ever recorded in the contiguous U.S.

"While the active geologic processes at Yellowstone do impart some risk to the public, they also make it a unique treasure – it is the volcanic and seismic energy that powers the geysers and hot springs, creates the mountains and canyons, and generates the unique ecosystems that support Yellowstone's diverse wildlife," notes Paul K. Doss, Yellowstone National Park Coordinating Scientist of YVO. "YVO will help the Park's interpretive and education programs with strong outreach efforts to inform the public about the impact of geological activity on the character of Yellowstone."

## EMPLOYMENT

### STAFF AND PROJECT GEOLOGISTS

Condor Earth Technologies is looking for Staff and Project Geologists for it's Stockton office. Condor is a professional service organization providing geotechnical engineering and environmental consulting and testing services. Please read about our open positions and application procedures on our web site at [www.condorearth.com](http://www.condorearth.com).

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## OTHER MEETINGS

### NCGS MEETING

**When:** Wednesday, June 27, 2001, 7:00pm talk

**Where:** Masonic Auditorium, 9 Altarinda Road, Orinda

**Who:** Bruce Jaffe, USGS Menlo Park

**Topic:** Mercury Contaminated Hydraulic Mining Debris in North San Francisco Bay: A Legacy of the Gold Rush

**Cost:** \$5.00

**RSVP:** [dday@nrmc.com](mailto:dday@nrmc.com) (Dan Day)

### ASCE GEOTECH GROUP MEETING

**When:** Thursday, June 14, 2001, 6pm social; 7pm dinner; 8pm program

**Where:** Spengers Restaurant in Berkeley, CA

**Who:** Dr. Jon Stewart, Associate Professor, UCLA

**Topic:** Volumetric Ground Deformation – Compacted Fills

**Cost:** \$30, Students half price

**Menu choice:** Breast of Chicken, Rainbow Trout, or Vegetarian

**RSVP:** 415-546-6546 by Monday, June 11, 2001

GRA, the Northern California Fuel Oxygenates Committee, and the Santa Clara Valley Water District Present:

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AEG members may register for this conference at the GRA member rate. We have an excellent line up of speakers on subjects you're sure to find interesting and relevant to your work, including several AEG members. I encourage you to register early as registration is proceeding at a rapid pace and seats are limited.

**When:** June 14 & 15, 2001

**Where:** Wyndham Hotel, 1350 North 1<sup>st</sup> St., San Jose

**Registration is Required.** Attendance is limited to 200 persons. Please go to the GRA website (at <http://www.grac.org>) to download a registration form and/or hotel information.

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**AEG June Newsletter**  
**June 12 – Monthly Section Meeting**  
**Old Spaghetti Factory, Jack London Square, Oakland**

**CHECK OUT THE AEG SF SECTION WEBSITE AT [WWW.AEGSF.ORG](http://WWW.AEGSF.ORG)!**

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**RESERVATION FORM – June 12, 2001 AEG Dinner Meeting, 6pm**  
**Old Spaghetti Factory, Jack London Square, Oakland**

**Please Fax your reservation to arrive before noon, Friday, June 8th**

Fax to Corinne Stewart, c/o Pacific Geotechnical Engineering (408-779-6879) - Check or Cash at the door – Do not mail or fax payment.

Dinner and Meeting Cost: \$30 – members or spouses    \$15 – student members    \$32 – others

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***PERMANENT RESERVATION FORM***

AEG San Francisco Section Monthly Dinner Meetings are usually but not always on the 2<sup>nd</sup> Tuesday of each month.

I will attend and make payment for each meeting. If I am unable to attend I will fax or mail a cancellation notice to Corinne Stewart (fax: 408-779-6879) by noon, the Friday before the meeting.

NAME \_\_\_\_\_ TELEPHONE NO. \_\_\_\_\_

BILLING ADDRESS \_\_\_\_\_

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

Dinner Costs are normally but not always: \$30 – members or spouses    \$15 – student members    \$32 - others

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