



February 2005

Los Angeles Basin Geological Society Newsletter

February Meeting: Mark Legg

Will speak on

TSUNAMI HAZARDS FROM STRIKE-SLIP EARTHQUAKES AND THE SOUTH COAST THREAT

Speaker Synopsis / Abstract

Mark R. Legg received a B.S. in Space Sciences & Mechanical Engineering, with graduate work in Physical Oceanography, from the Florida Institute of Technology in 1973. He received his M.S. in Oceanography at the Scripps Institution of Oceanography in 1980 and earned a Ph.D. in Geological Sciences in 1985 from the University of California, Santa Barbara. Mark has worked for Amoco Research, the USGS, and the UCSB Institute of Crustal Studies where he was able to focus on offshore geology, tectonics, and earthquake studies. As President of Legg Geophysical, a small consulting firm that specializes in Earth Sciences and Risk Analysis, Dr. Legg is involved in many diverse projects relating to geophysical investigations of shallow crustal structure, marine geology and geophysics, and natural and man-made hazards funded by both government and commercial agencies. He is a participating scientist with the Southern California Earthquake Center, an adjunct professor at San Diego State University, and a Visiting Assistant Research Geophysicist at UC Santa Barbara. In 2002, Mark worked with Professor Costas Synolakis at USC to study tsunami hazards from southern California offshore faults. Mark is a California Registered Geophysicist and Geologist, and an active member of the AGU, SSA, GSA, SEG, and AAPG. Mark is an active in the LABGS and SCGS has served as president of both.

Strike-slip faulting is often considered unfavorable for tsunami generation during large earthquakes. Although large strike-slip earthquakes triggering landslides and then generating substantial tsunamis are now recognized hazards, many continue to ignore the threat from submarine tectonic displacement during strike-slip earthquakes. Historical data record the occurrence of tsunamis from strike-slip earthquakes, for example, 1906 San Francisco, California, 1994

Mindoro, Philippines, 1999 Izmit, Turkey, and 1989 and 2004 Macquarie Ridge, Southeast Pacific Ocean. Recognizing that strike-slip fault zones are often curved and comprise numerous en echelon step-overs, we model tsunami generation from realistic strike-slip faulting scenarios. We find that tectonic seafloor uplift, at a restraining bend or "pop-up" structure, provides an efficient mechanism to generate destructive local tsunamis; likewise for subsidence at divergent pull-apart basin structures. Large earthquakes on complex strike-slip fault systems may involve both types of structures. The California Continental Borderland is a high-relief submarine part of the active Pacific-North America transform plate boundary. Natural harbors and bays created by long-term vertical motion associated with strike-slip structural irregularities are now sites of burgeoning population and major coastal infrastructure.

Significant local tsunamis generated by large strike-slip earthquakes pose a serious, and previously understated threat. We model several restraining bend pop-up structures offshore southern California to quantify the local tsunami hazard. Maximum runup derived in our scenarios ranges from one to several meters, similar to run-up observed from the 1994 Mindoro, Philippines, (M=7.1) earthquake. The runup pattern is highly variable, with local extremes along the coast. We only model the static displacement field for the strike-slip earthquake source; the dynamic effects of moving large island or submerged banks laterally during strike-slip events remain to be examined. Landslide tsunami sources may create large coastal runup in the areas adjacent to the offshore landslide source. Large submarine slope failures offshore Palos Verdes and along other steep submarine banks and ridges supply additional threat to densely populated coastal areas and major coastal infrastructure.

(continued on next page)

Depending on the size, recurrence of Southern California tsunamis from submarine strike-slip faults is estimated at a few hundred to few thousand years, similar to return periods estimated for large earthquakes on other active faults within the urban area. The combined probability from onshore and offshore hazards including triggered submarine landsliding may be significantly higher.

With the catastrophe recently witnessed in the Indian Ocean, it is critical to provide a more accurate and comprehensive assessment of this risk to coastal southern California.

Time & Place

Time:

Thursday, February 24, 2005

Typical Meeting Agenda

Lunch Served: 11:30 AM to 12:00PM

Announcements: 11:50 AM to 12:15 PM

Guest Speaker: 12:15 PM to 12:45 PM

Place:

The Grand at Willow Street Conference Center located at 4101 East Willow Street, Long Beach, CA. (562-426-0555). Take Lakewood Boulevard south from the San Diego Freeway (405), turn west onto Willow Street and turn right onto Grand Avenue at the sign for the Center. Park free in the garage structure.

Cost

Cost:

Lunch and Speaker: \$20.00 with reservations

\$23.00 without reservations

Student: \$ 5.00 (Lunch and Speaker)

Reservations:

Make your reservations using our web site at www.labgs.org, emailing iaburto@breitburn.com or calling Ivan Aburto at (213) 225-5900 ext. 234.

Reservations must be made prior to Tuesday before the meeting.

LABGS Future Meetings

Lunch meetings are held at *The Grand at Willow Street Conference Center*. Lunch starts at 11:30 AM

2005 Speaker Schedule

February 24, 2005 – Mark Legg, Legg Geophysical
Tsunami Hazards From Strike-Slip Earthquakes
and the South Coast Threat

March 24, 2005 – TBA

April 28, 2005 – Dan Francis, CSULB
Offshore Palos Verdes Fault

May 26, 2005 – Jim Dolan
Faults of the LA Basin

June 23, 2005 – TBA

Announcements / Information



**Guidebooks from the 2004 LABGS
Field Trip Examining the Catalina
Schist and the Palos Verdes Peninsula
are now on sale!**

The guidebook will be available at the LABGS meeting on February 24, 2005. The cost of the guidebook is \$20. The book is 179 pages and printed in color. There is enough detail to allow you to recreate the trip on your own. The Guidebook was edited by Dick Brown who organized and led the trip on June 26, 2004. You may also purchase a copy by contacting Dick Brown, via email or by phone (see list of contacts, this newsletter). Photos of the trip are now posted on our web site at www.labgs.org. Check them out!

Nominations being taken for the 2005 LABGS Teacher of the Year Award

The Los Angeles Basin Geological Society is pleased to offer a Teacher of the Year award as a form of encouragement and recognition to those teachers who show dedication and passion to the field of Geoscience. It is our goal to spur teachers and future geoscientists on in their pursuits. If you know of any deserving teacher, you may nominate them by going to our web site, www.labgs.org for a nomination form. **Nominations close February 21, 2005 so don't delay.**

Award Description and Requirements

Award for Excellence in the Teaching Of Natural Resources in the Earth Sciences

This award is intended to recognize and encourage excellence in teaching earth science at the K-12 level. It consists of a \$250 cash gift (for the teacher's discretionary use), and is given to an outstanding K-12 earth science teacher in the Los Angeles Basin area. Funding for this award comes from the Pacific Section of the American Association of Petroleum Geologists, our parent organization.

This is an annual monetary award that is presented to the Kindergarten through 12th Grade Teacher who best employs and furthers the knowledge of the earth sciences to students, or who has designed a curriculum that emphasizes the teaching of geology or related natural science subjects.

Teachers in the Elementary, Middle School (Junior High), or High School level may nominate themselves or be recommended by a colleague. The requirements are listed here:

- 1) A minimum of three full years of full-time teaching experience at any level K-12.
- 2) Teaching at least one unit per year on natural resources. Natural resources are defined as Earth materials used by civilizations past and present, such as:
 - a) Inorganic substances found in the Earth; water, mineral ores, building stone, aggregate, rocks and sediments.
 - b) Organic materials such as oil, gas, coal, and soil
- 3) Teaching should include scientific study of these resources, their origin, discovery, extraction, and historical and present uses. It should also include the preservation of the environment, reclamation and the conservation of resources.
- 4) Entries must include a statement of the teacher's philosophy of the teaching of natural resources, a description of the unit with outline, Vita, and two letters of recommendation: one from a colleague and one from an administrator.

- 5) The unit will be evaluated on depth and breadth of concepts (resource origin, discovery, processing, usage, and reclamation), creativity of presentation, and balanced treatment of information regarding societal needs and environmental issues.

BAY, BASINS, BASEMENT & BEYOND

Mark your Calendar for the 2005 Joint Meeting of the Pacific Sections of AAPG, SPEM, SEG and the Cordilleran Section of GSA



The Pacific Sections of AAPG, SEPM, SEG and the Cordilleran Section of GSA are planning for a combined annual meeting in 2005, which will be held in San Jose, CA April 29 - May 1. The theme is "Bay, Basins, Basement, and Beyond". This will be a most impressive meeting of geoscientists from all over the western US. For more information on the scheduled program and a copy of the abstract submittal form, go to the www.psaapg.org web site and visit the "convention" tab.

LABGS Annual Field to San Clemente Summer 2005

Plans are under way to get our annual field trip organized. Mark Legg will be leading a trip along the coast near San Clemente and San Onofre. The purpose will be to examine turbidite rocks along with tectonic evidence of the south coast. A final date will be forth coming.

Your Name Here!

*Advertising in this newsletter is now available!
Advertising rates for a business card size add
are \$60.00 for six issues. These fees help offset
our publishing costs. If interested, please
contact Dalton Lockman*

LABGS Membership Info!

Become a member of the LABGS and enjoy the benefits of membership. Our goal is to provide a value added service to the geologic community of the LA area at a reasonable cost. If you join the LABGS you also become a member of the PSAAPG and vice versa. The purpose of this is to reduce waste and duplicated effort. Check out the membership form for a list of the dual membership benefits. Membership is our primary source of income so I urge you all to join or renew. **To join or renew**, fill out the attached membership form and mail it in to PSAAPG or better yet bring it to the next meeting. This will ensure you are on our lists and the only way you can request a hard copy through the mail. The use of E-mail is our preferred method of distribution so please make sure we have your address.

LABGS T-Shirts NOW ON SALE

The LABGS sells T-Shirts to generate additional funds to help support our scholarship and field trip activities. The shirt display's the LABGS logo on the Back with the words "LA Rocks" on the Front. The Price for shirts are \$15.00 and available at our luncheon meetings or by contacting Ivan Aburto (see contact list in this newsletter). Sizes are limited to Medium, Large, and Extra Large. **Buy one at the February Meeting!**

New Dibblee Maps

This month the Dibblee Geology Center of the Santa Barbara Museum of Natural History will release 10 new maps of the San Joaquin Valley and SF bay area region. To purchase Dibblee maps, logon to the Museum's online store at www.sbnature.org/estore. To date the Dibblee Center has released 127 maps.

Contact Us – The LABGS board

President: Dalton Lockman (323) 298-2242
dlockman@plainsxp.com

Program Chair: Dick Brown (562) 598-0595
dickbrowngeo@adelphia.net

Secretary: Ivan Aburto (213) 225-5900, ext. 234
iaburto@breitburn.com

Treasurer: Steve Zigan, (949) 355-4467
szigan@eri-us.com

OUR WEB SITE ADDRESS IS:

www.labgs.org

WE'LL BE THERE



Epoch is one of the energy industry's leading suppliers of wellsite data gathering systems. Our drilling instrumentation products, well-site reporting software and mud logging services are industry leaders, and myWells.com allows you to access that information anytime, anywhere. That means you can make more timely decisions that deliver efficiency and economy. If real time, accurate wellsite information is important to you, call Epoch. We'll be there.

EPOCH

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www.epochwellservices.com • www.mywells.com



Los Angeles Basin Geological Society Membership Form

Join the LABGS and become a member of the Pacific Section AAPG all for one low price of \$12.00 per year - 2 West Coast Geoscience Organizations for the price of one



Membership Benefits

- LABGS Membership
- Monthly Luncheon Meetings with Strong Technical Programs
- Pacific Section AAPG Membership
- Pacific Section AAPG Bi-Monthly Newsletter
- Discounts for PSAAPG Bookstore Publications
- Bi-Annual West Coast Geoscience Directory - *next edition 6/03*
- Networking and Social Opportunities with Fellow Geoscientists

Current Annual LABGS/PSAAPG Dues	
1 Year Option = \$12.00	\$ _____
3 Year Option = \$36.00	\$ _____

Extended E-Mail Announcement List Fees	
To receive meeting notices from SJGS and CGS	
1 Year Option = \$12.00	\$ _____
3 Year Option = \$36.00	\$ _____

PSAAPG Foundation Contributions	
B. Hacker Publication Fund	\$ _____
Martin Van Couvering Fund	\$ _____
Dibble Map Foundation	\$ _____
California Well Sample Repository	\$ _____
John Kilkenny Scholarship Fund	\$ _____
PSAAPG Foundation Trust Fund	\$ _____

TOTAL PAYMENT	
Total Amount Enclosed	\$ _____

Essential Member Information	
Last Name	_____
First Name	_____
Middle Initial	_____
E-Mail Address	_____
Mail Address	_____
<i>Res or Bus ?</i>	_____

Additional Directory Information					
Employer	_____				
Position / Title	_____				
Bus Phone #	_____				
Res Phone #	_____				
Fax Phone #	_____				
Spouse's Name	_____				
Education	<table style="width: 100%; border: none;"> <tr> <td style="border: none; text-align: center;"><i>Highest Degree</i></td> <td style="border: none; text-align: center;"><i>Year</i></td> </tr> <tr> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> </table>	<i>Highest Degree</i>	<i>Year</i>	_____	_____
<i>Highest Degree</i>	<i>Year</i>				
_____	_____				
School	_____				

Signature _____

Annual membership is handled through PSAAPG and runs from July 1, through June 30. If you are already a current member of PSAAPG and you selected LABGS affiliation you are already a member of the LABGS.

**Please Make Checks out to PSAAPG and mail along with member form to:
PSAAPG P.O. Box 1072, Bakersfield, CA 93302**