

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



Website: www.ncgeolsoc.org

NCGS OFFICERS

President:

Tom Barry,
tom.barry@shawgrp.com
Shaw Group, Inc.

President-Elect:

Phil Reed, Consultant
philecreed@yahoo.com

Director Field Trips:

Tridib Guha, Consultant
tridibguha@yahoo.com

Treasurer:

Phil Reed, Consultant
philecreed@yahoo.com

Program Director:

John Karachewski, Department of
Toxic Substance Control
cageo@sbcglobal.net

Scholarship:

Phil Garbutt, Retired, Cal State
East Bay, plgarbutt@comcast.net

K-12 Programs:

Paul Henshaw, Retired, K-12
education
Drphenshaw@comcast.net

Membership:

Rob Nelson, Clearwater Group, Inc.
rlngeology@sbcglobal.net

NCGS Newsletter & Website Editor:

Mark Detterman, Alameda County
Environmental Health
mdetter1@gmail.com

Recording Secretary:

Dan Day, VA Engineering, Inc.
NCGS Voice Mail: 925-424-3669
danday94@pacbell.net

COUNSELORS

Mel Erskine, Consultant
mcerskine@comcast.net

Ray Sullivan, Emeritus, San
Francisco State University
sullivan@lucasvalley.net

Barbara Matz, Shaw Group, Inc.
Barbara.Matz@shawgrp.com

MEETING ANNOUNCEMENT

DATE: September 26, 2012

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 per student or K – 12
teachers

SPEAKER: Cynthia (Cindy) Pridmore
California Geological Survey

California Tsunamis: State Inundation Maps and Lessons Learned from the Japan 2011 Earthquake and Tsunami

The presentation is an overview of California's tsunami risk, the state's official inundation maps, preparedness efforts, and lessons learned from the 2011 Japan event. More than eighty tsunamis have been observed or recorded in California in historic times. Fortunately, most of these have been small and did little or no damage. Though damaging events have occurred infrequently, they are a possibility that must be considered in coastal communities. Both local and distant tsunami sources are of concern for our state coastline. The Japan 2011 event resulted in 27 harbors damaged statewide with more than \$50 million in Federal disaster claims from three California counties. Our state's worst case scenario is more likely a 9.0M earthquake originating in the Alaskan Aleutian subduction zone creating a tsunami that would reach our coastline in approximately five hours. For the Bay Area, portions of the San Francisco coastline could likely experience inundation up to 15 feet above sea level at high tide. CGS works closely with the Earthquake and Tsunami Preparedness Branch of Cal EMA and with the coastal NWS offices to assist communities and emergency managers in understand their tsunami risk and strengthening their tsunami emergency plans.

Ongoing work also includes CGS and CalEMA working with NOAA and FEMA to implement a plan to increase awareness of tsunami generated hazards to the maritime community (both ships and harbor infrastructure) through the development of in-harbor hazard maps, offshore safety zones for boater evacuation, and associated guidance for harbors and marinas before, during and following tsunamis.

...Continued on back...

NCGS 2010 – 2011 Calendar

September 26, 2012

Cindy Pridmore, California Geological Survey,
*California Tsunamis: State Inundation Maps and
Lessons Learned from the Japan 2011 Earthquake and
Tsunami*

7:00 pm at Orinda Masonic Lodge

October 24, 2012 (**ONE WEEK EARLY!**)

Dr. Ray Wells, US Geological Survey
*Revolutionary tectonics in the Pacific Northwest: Role
of rotating microplates and mega-blocks in Cascadia*

7:00 pm at Orinda Masonic Lodge

November 28, 2012

Dr. Patrick Muffler, US Geological Survey, Geologist
Emeritus

*Lassen Volcanic National Park -- a wonderland of
volcanoes and thermal features*

Our Usual December Break

January 30, 2013

TBA

February 27, 2013

TBA

March 27, 2013

TBA

April 24, 2013

TBA

Upcoming NCGS Events

Do you have a place you've wanted to visit for the geology? Let us know. We're definitely interested in ideas. For those suggestions, or for questions regarding field trips, please contact Tridib Guha at: TridibGuha@yahoo.com.

Peninsula Geologic Society

Upcoming meetings

For an updated list of meetings, abstracts, and field trips go to <http://www.diggles.com/pgs/>. The PGS has also posted guidebooks for downloading, as well as photographs from recent field trips at this web address. Please check the website for current details.

Bay Area Science

(<http://www.bayareascience.org/>)

This website provides a free weekly emailed newsletter consisting of an extensive listing of local science based activities (evening lectures, classes, field trips, hikes, and etc).

Association of Engineering Geologists

San Francisco Section

Upcoming Events

Meeting locations rotate between San Francisco, the East Bay, and the South Bay. Please check the website for current details. To download meeting details and registration form go to: <http://www.aegsf.org/>.

USGS Evening Public Lecture Series

The USGS Evening Public Lecture Series events are free and are intended for a general public audience that may not be familiar with the science being discussed. Monthly lectures are usually scheduled for the last Thursday evening of each month during most of the year but are occasionally presented on the preceding Thursday evening to accommodate the speakers. For more information on the lectures, including a map of the lecture location (Building 3, 2nd floor; Conference Room A) go to: <http://online.wr.usgs.gov/calendar/>

Thursday, September 27, 2012 [Watch Live at 7pm PDT](#)

USGS, Conference Room A, Bldg 3, Menlo Park

- *Pacific Nearshore Ecosystem Mysteries – From Kelp Forests to Fisheries, Sea Otters aid in Studying Ocean Vitality*; USGS Research Wildlife Biologist James Bodkin

THIS WEEK IN SCIENCE

August 24, 2012

A Family of Languages

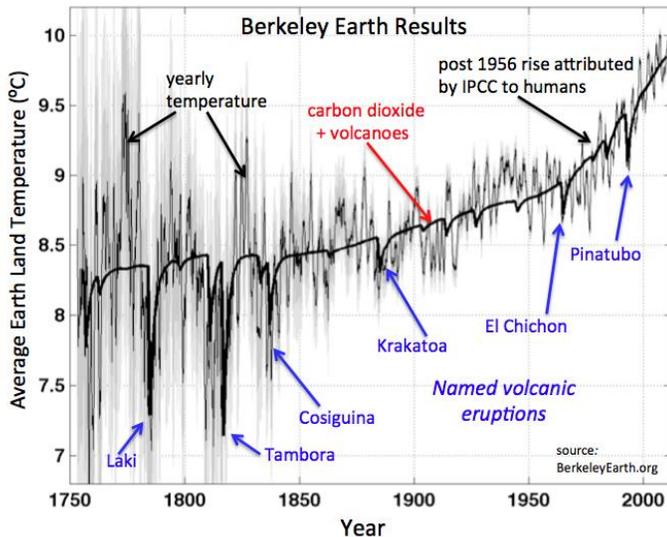
English is part of the large Indo-European language family, which includes Celtic, Germanic, Italic, Balto-Slavic, and Indo-Iranian languages. The origin of this family is hotly debated: one hypothesis places the origin north of the Caspian Sea in the Pontic steppes, from where it was disseminated by Kurgan semi-nomadic pastoralists; a second suggests that Anatolia, in modern-day Turkey, is the source, and the language radiated with the spread of agriculture. Bouckaert *et al.* (p. 957) used phylogenetic methods and modeling to assess the geographical spread of the Indo-European language group. The findings support the suggestion that the origin of the language family was indeed Anatolia 7 to 10 thousand years ago—contemporaneous with the spread of agriculture.

250 Years of Global Warming: Berkeley Earth Releases New Analysis

According to a new Berkeley Earth study released July 29, 2012, the average temperature of Earth's land has risen by 1.5 °C over the past 250 years. The good match between the new temperature record and historical carbon dioxide records suggests that the most straightforward explanation for this warming is human greenhouse gas emissions.

Together with their most recent results and papers, Berkeley Earth also released their raw data and analysis programs. They will be available online at BerkeleyEarth.org on July 30.

The new analysis from Berkeley Earth goes all the way back to 1753, about 100 years earlier than previous groups' analyses. The limited land coverage prior to 1850 results in larger uncertainties in the behavior of the record; despite these, the behavior is significant.



The temperature of the Earth's land surface, as determined from over 36,000 temperature stations around the globe. The data is well fit by a simple model containing only known volcanic eruptions and carbon dioxide (dark line). No contribution from solar variability was necessary to make a good match. The rapid but short (decadal) variations are believed to be due to changes in ocean flows, such as El Nino and the Gulf Stream. (Credit: Image courtesy of Berkeley Earth Surface Temperature)

Robert Rohde, Lead Scientist for Berkeley Earth and the person who carried out most of the analysis, noted that "Sudden drops in the early temperature record (1753 to 1850) correspond to known volcanic events." Volcanoes spew particles into the air, which then reflect sunlight and cool the earth for a few years. In the Berkeley Earth temperature plot, sudden dips in temperature caused by large volcanic explosions are evident back to the late 1700s.

Berkeley Earth compared the shape of the gradual rise over 250 years to simple math functions (exponentials, polynomials) and to solar activity (known through historical records of sunspot numbers), and even to rising functions such as world population.

Richard Muller, Founder and Scientific Director of Berkeley Earth, notes "Much to my surprise, by far the best match was to the record of atmospheric carbon dioxide, measured from atmospheric samples and air trapped in polar ice." He emphasizes that the match between the data and the theory doesn't prove that carbon dioxide is responsible for the warming, but the good fit makes it the strongest contender. "To be considered seriously, any alternative explanation must match the data at least as well as does carbon dioxide."

In its 2007 report the IPCC concluded only that "most" of the warming of the past 50 years could be attributed to humans. It was possible, according to the IPCC, that increased solar activity could have contributed to warming prior to 1956. Berkeley Earth analyzed about 5 times more station records than were used in previous analyses, and this expanded data base along with its new statistical approach allowed Berkeley Earth to go about 100 years farther back in time than previous studies. By doing so, the Berkeley Earth team was able to conclude that over 250 years, the contribution of solar activity to global warming is negligible.

Some of the scientists on the Berkeley Earth team admit surprise that the new analysis has shown such clear agreement between global land--temperature rise and human--caused greenhouse gases. "I was not expecting this," says Richard Muller, "but as a scientist, I feel it is my duty to let the evidence change my mind."

Elizabeth Muller, co--Founder and Executive Director of Berkeley Earth, says that "One of our goals at Berkeley Earth is complete transparency -- we believe that everyone should be able to access raw climate data and do their own analysis. Scientists have a duty to be 'properly skeptical', and we are trying to lower the barriers to entry into the field."

Robert Rohde created an online feature that allows look up temperature records by location. "If you want to know what the temperature change has been in your city, your state, or even your country, you can now find this online at BerkeleyEarth.org" says Rohde. He adds, "We hope people will have a lot of fun interacting with the data." This feature should be available to the public by Monday, July 30.

A previous Berkeley Earth study, released in October 2011, found that the land--surface temperature had risen by about 0.9 °C over the past 50 years (which was consistent with previous analyses) and directly addressed scientific concerns raised by skeptics, including the

urban heat island effect, poor station quality, and the risk of data selection bias.

The Berkeley Earth team values the simplicity of its analysis, which does not depend on the large complex global climate models that have been criticized by climate skeptics for their hidden assumptions and adjustable parameters. The conclusion that the warming is due to humans is based simply on the close agreement between the shape of the observed temperature rise and the known greenhouse gas increase.

Elizabeth adds, "The current data does not include ocean temperatures; these will be added in the next phase of the Berkeley Earth studies. Another next step for our team is to think about the implications of our findings."

Story Source: The above story is reprinted from materials provided by Berkeley Earth Surface Temperature.

Homing in On a Potential Pre-Quake Signal

Changes in seismic velocity--changes in the speeds at which seismic waves move through Earth's crust--have been identified during and after many earthquakes. But do these changes also happen before an earthquake, and could they be measured as a way to predict a quake on the way? The search for a clear and measurable pre-quake signal has been called "the holy grail of seismology."

In a new analysis of the 2004 magnitude 6.0 Parkfield earthquake in California, David Schaff suggests some limits on how changes measured by ambient seismic noise could be used as a pre-earthquake signal. Ambient seismic noise refers to the "background hum" of Earth--the surface waves found all over the planet's crust that are caused mostly by wind and ocean waves. Changes in seismic velocity can be measured using seismic noise observations, which are often recorded continuously at seismic stations and therefore can provide a detailed record of a pre-earthquake time period.

Using a complete set of noise data from the Parkfield earthquake, Schaff was able to search for a pre-seismic signal to the quake. He was unable to detect any pre-seismic velocity change for Parkfield using the noise data, but he notes that any pre-seismic signal may have been too small, too short in duration, or in a different area outside of the network of seismic monitors. The analysis did allow Schaff to place an upper limit on how large such a signal might be, depending on how many days it might be observed before the main quake.

The paper, "Placing an Upper Bound on Preseismic Velocity Changes Measured by Ambient Noise Monitoring for the 2004 Mw 6.0 Parkfield Earthquake

(California)" will appear in the August issue of the *Bulletin of the Seismological Society of America*.

Story Source: The above story is reprinted from materials provided by Seismological Society of America, via EurekAlert!, a service of AAAS.

Groundwater responsible for nearly half of sea level rise?

You can't believe everything you read, even if it's peer-reviewed.

by Scott K. Johnson



No, you don't need to check the prescription on your eyeglasses (or medications)—we really are talking groundwater depletion and sea level rise again. Just a few weeks ago, we covered [a recent study](#) on the topic published by researchers from Taiwan and the Netherlands and compared it to one from [last year](#) that was done by Leonard Konikow of the United States Geological Survey. There's a good reason that we're back at it again. But first, for those who didn't take notes—what are we talking about?

In many places, the water table is dropping as groundwater is depleted. When groundwater is pumped up for use, whether for drinking water or irrigation, some portion of it fails to infiltrate back down into the ground. (In drier regions, the portion that infiltrates approaches nil). Instead, the water evaporates into the atmosphere or ends up in surface streams. In either case, most of it eventually makes its way to the ocean. In

many places, the amount of precipitation that infiltrates into the ground is too small to make up for that loss. And as the volume of groundwater decreases, sea level must rise in turn. It's an awfully big planet we're on, though. Most of its surface is ocean, so you might not expect this to add up to much.

That's where these studies become so interesting. They estimated that, currently, the volume of groundwater being depleted is equivalent to about 13 to 20 percent of the ocean volume change. This isn't the whole story, however. The construction of dams on rivers creates large reservoirs (or lakes) behind them, increasing the storage of water on land. As long as you keep building new dams, you continually counteract some portion of sea level rise.

The sea level breakdown in the 2007 IPCC report assumed that dams and groundwater depletion roughly cancelled each other out. Another study (that Konikow contributed to) found that the net result *offset* about 6 percent of sea level rise between 1972 and 2008. But the study out of Taiwan and the Netherlands used a larger estimate of groundwater depletion. It shows the net contribution for that same period could have been positive—*adding* about 6 percent to the total rate of sea level rise.

A study published by a group of Japanese researchers in *Nature Geoscience* a few days after our last story, however, came to an astonishingly different conclusion than either of those. Over the period of 1961 to 2003, they estimated the average contribution to be a whopping 42 percent of the total. (For a more direct comparison, that latest study we covered estimated the contribution to be slightly *negative* over that timespan).

The Japanese estimate was produced by a global model not completely unlike the one used by the group from Taiwan and the Netherlands. Available climatic and water management data is fed into these models, and they simulate a water balance. So how could they generate such different answers? It's all about the types of data that are used and the assumptions that are relied upon.

The primary difference between the previous estimates and this most recent one is in the amount of groundwater depletion. Konikow authored last year's study and told *Ars* the difference is due to "seriously flawed conceptual models." These yielded answers that "are not based on or consistent with observed changes in [ground]water levels." The Japanese model calculated a loss of around four times as much groundwater as Konikow's study estimated.

Because good, global data on water use is hard to come by, they calculated total water demand based on a number of factors. If nearby surface water could not fulfill that demand, they assumed the remainder was

withdrawn from groundwater and that nearly all of the groundwater that was pumped ended up in the ocean. That ignores surface water brought in from outside the immediate area, whether through canals or desalination of seawater. In addition, there's no limit to the amount of groundwater that can be withdrawn in the model—even if there isn't that much available in the real world.

It also runs afoul of a problem long known to haunt estimates based purely on simple budgets. As the actual water table drops, less groundwater will flow into streams and lakes, partially offsetting the impact of withdrawals. (A bit like how reducing your spending can soften the budgetary blow of a pay cut). This is why Konikow's study relied so heavily on difficult-to-obtain measurements of groundwater level data and detailed groundwater basin models. It's also a big reason why his estimates of groundwater depletion are the smallest.

Yoshihide Wada, a researcher from the Netherlands group, explained that their model used actual data on groundwater use rather than calculating it from total water demand. But they still ran into some of the same problems. When they compared estimates of groundwater depletion to more detailed regional numbers, they found that their model overestimated depletion in non-arid regions. To bring their numbers into line, they applied a correction factor. "Since our corrected groundwater depletion estimate [agrees well] with reported depletion estimate per region," Wada wrote, "I would expect that their modeled groundwater depletion is likely overestimated."

Other researchers in the field can spot dodgy methods in a paper like the mascot in a cereal box knock-off of *Where's Waldo?*

The Japanese researchers point to the 2007 IPCC report in support of their higher number. In that report, estimates of the various contributions to sea level rise only amounted to about 60 percent of the observed trend. Since this estimate of the groundwater/reservoir contribution comes in at around 40 percent, it must have been the missing piece, right? Well, the error bars on those IPCC estimates were massive. [More recent research](#) has seemingly closed that gap without the need for stunning amounts of groundwater depletion.

So what happens when a sticks-out-like-a-sore-thumb study like this is published (in a high-visibility journal, no less)? Are scientists thrown into confusion? Is the whole subject automatically downgraded to "unsettled?" Not so much. Other researchers in the field can spot dodgy methods in a paper like the mascot in a cereal box knock-off of *Where's Waldo?* Scientists know that every study is imperfect or incomplete in some way and are especially skeptical of results that contradict—rather than build upon—the existing science.

When lots of data has been published supporting one conclusion, and then a single data set points in a different direction, the most likely explanation is that something is wrong with that rogue data set. Of course, this isn't always true, but as Carl Sagan was fond of saying, "Extraordinary claims require extraordinary evidence." Groundwater depletion accounting for nearly half of sea level rise isn't quite as far out there as faster-than-light neutrinos, but it would be fair to call it extraordinary.

Konikow told Ars he plans to submit a comment to *Nature Geoscience* laying out his objections to the study's methods in detail. If it's accepted (and it would be surprising if it wasn't), the Japanese researchers will be given the chance to write a reply, and the two will be published together. The next IPCC report will probably cite all three of these studies, but will carefully take into account which were done most carefully and are best supported by the evidence. Unlike in the food industry, a scientific sausage is always judged by what went into it.

Nature Geoscience, 2012.

Earth-Bound Asteroids Carried Ever-Evolving, Life-Starting Organic Compounds

Detailed analysis of the most pristine meteorite ever recovered shows that the composition of the organic compounds it carried changed during the early years of the solar system. Those changed organics were preserved through billions of years in outer space before the meteorite crashed to Earth.

The research team, led by University of Alberta geologist Chris Herd, analyzed samples of a meteorite that landed on Tagish Lake in northern British Columbia in 2000. Variations in the geology of the meteorite samples were visible to the naked eye and indicated the asteroid, from which the meteorite samples originated, had gone through substantial changes.

The researchers began looking for variations in the organic chemistry that corresponded with variations in the meteorite's geology. Herd says they found a surprising correlation, which gave researchers a snapshot of the process that altered the composition of organic material carried by the asteroid. Among the organic compounds studied were amino acids and monocarboxylic acids, two chemicals essential to the evolution of the first, simple life forms on Earth.

Herd says the finding shows the importance of asteroids to Earth's history.

"The mix of prebiotic molecules, so essential to jump-starting life, depended on what was happening out there

in the asteroid belt," said Herd. "The geology of an asteroid has an influence on what molecules actually make to the surface of Earth."

Herd says that, when the asteroid was created by the accumulation of dust around the infant sun, it contained ice. The ice warmed and turned to water, which began percolating and altering the organic compounds buried in the rock.

The Tagish Lake meteorite is considered to be one-of-a-kind because of its landing and handling. It was January when the meteorite exploded at an altitude of 30 to 50 kilometres above Earth and rained meteorite fragments down on the frozen, snow-covered lake. The individual who recovered the samples consulted with experts beforehand and avoided any contamination issues.

Herd says the meteorite's pristine state enabled the breakthrough research. "The variations in the organic makeup are true to what was happening inside the asteroid," said Herd. "This is exactly what has been orbiting in the asteroid belt for the last 4.5 billion years."

Story Source: The above story is reprinted from materials provided by University of Alberta, via EurekAlert!, a service of AAAS.

Journal Reference: Christopher D. K. Herd, Alexandra Blinova, Danielle N. Simkus, Yongsong Huang, Rafael Tarozo, Conel M. O'D. Alexander, Frank Gyngard, Larry R. Nittler, George D. Cody, Marilyn L. Fogel, Yoko Kebukawa, A. L. David Kilcoyne, Robert W. Hiltz, Greg F. Slater, Daniel P. Glavin, Jason P. Dworkin, Michael P. Callahan, Jamie E. Elsil, Bradley T. De Gregorio, Rhonda M. Stroud. **Origin and Evolution of Prebiotic Organic Matter As Inferred from the Tagish Lake Meteorite.** *Science*, 2011; 332 (6035): 1304-1307 DOI: [10.1126/science.1203290](https://doi.org/10.1126/science.1203290)

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



2012-2013 RICHARD CHAMBERS MEMORIAL SCHOLARSHIPS

The Northern California Geological Society is pleased to announce the availability of their **Richard Chambers Memorial Scholarships** to help support graduate-level student research in geology during the 2012-2013 academic year. More than one scholarship may be awarded at each academic level.

\$ 1,000 Scholarships will be awarded to students working towards the Masters Degree.

\$ 2,000 Scholarships will be awarded to students working towards the Ph.D. Degree.

These scholarships will be awarded competitively, based upon our review of submitted summaries of proposed research. Funds are intended to support field and laboratory components of research programs. The research should be scheduled for completion during the 2012-2013 calendar years. Winners' may/will be invited to speak or otherwise present their research at a regular NCGS evening meeting in Orinda, California.

Funding priority for these scholarships will be directed to research focused on topics in general geology, geologic mapping, structural, economic, engineering and/or environmental geology, geophysics, stratigraphy, paleontology and/or paleoecology implemented in northern California and/or states immediately adjacent to northern California.

Application Procedure

Candidates may apply by forwarding a signed cover letter on department letterhead requesting the award, accompanied by a brief (no more than 2 pages) summary of their proposed research topic. The letter must include candidates contact information (both departmental and home mailing and email addresses, & telephone numbers).

The bottom of the candidate letter must bear this note (filled out):

Degree Program: _____, Approved by (Signature): _____,
(Printed name): _____

Title: _____, Telephone: _____, e-mail address: _____, and
date: _____

with the signature and printed name, title, telephone & e-mail of the department chair person or thesis advisor. Please indicate which scholarship (Masters or Ph.D.) you are applying for. No other application form is required. Please submit your letter and proposal by U.S. Mail postmarked **no later than DECEMBER 15, 2012** to:

Phillip Garbutt, Chair
NCGS Scholarship Committee
6372 Boone Drive
Castro Valley, CA 94552-5077
Issued: September 1, 2012

Voice: (510) 581-9098
e-mail: plgarbutt@comcast.net
NCGS website: <http://www.ncgeolsoc.org>

Scholarship Awards will be made on or about January 31, 2013

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



NORTHERN CALIFORNIA GEOLOGICAL SOCIETY and AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS

2011-2012 K-12 EARTH SCIENCE TEACHER OF THE YEAR AWARD

\$750 Northern California Geological Society

\$500 Pacific Section AAPG

\$5,000 National AAPG

Call for Nominations for 2012 - 2013 NCGS Competition

The Northern California Geological Society (NCGS) is seeking applications from candidates in Northern California for the 2011 - 2012 Earth Science Teacher of the Year Award. The \$750 NCGS award is intended to recognize pre-college earth science programs already in place, and to encourage their organization in districts where they have not been fully developed. Nominations of qualified K-12 teacher candidates are solicited from teachers, school administrators, teacher outreach programs, and other interested parties. The NCGS award will be announced February 2013.

The NCGS awardee's application will be submitted to a regional competition sponsored by the American Association of Petroleum Geologists (AAPG) Pacific Section. The Pacific Section winner will receive a \$500 award at the Pacific Section regional meeting in Monterey, CA, April 2013, plus up to \$250 toward meeting expenses. The regional winner's project will be submitted to AAPG headquarters for the national contest. The national award winner will receive an expense-paid trip to attend the AAPG meeting in Denver, CO, June, 2014.

At the national level, the AAPG Foundation presents an annual \$5,000 award to a K-12 teacher for *Excellence in the Teaching of Natural Resources in the Earth Science*. The award recognizes balanced incorporation of natural resource extraction and environmental sustainability concepts in pre-college Earth science curricula. It includes \$2,500 to the teacher's school for the winning teacher's use, and \$2,500 for the teacher's personal use.

The deadline for application submittal by candidates for the \$750 NCGS award is Monday, January 11, 2013.

Interested candidates or nominators can request Application Information and an Entrant Application Form, or submit an application, by contacting:

Paul Henshaw
Chair, K – 12 Geosciences Education Committee
Northern California Geological Society
6 Rachel Ranch Court
Clayton, CA 94517 (925)
673-8745
candphenshaw@comcast.net

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

2013 K-12 GEOSCIENCE TEACHING AWARD

\$500

Call for Applications for 2012 - 2013 NCGS Competition

The Northern California Geological Society (NCGS) invites applications from candidates in the Northern California for 2012-2013 K-12 Geoscience Teaching Award. Applications may be submitted by any teacher regardless of experience. Entries will be judged in two categories: Grades K-8 and Grades 9-12

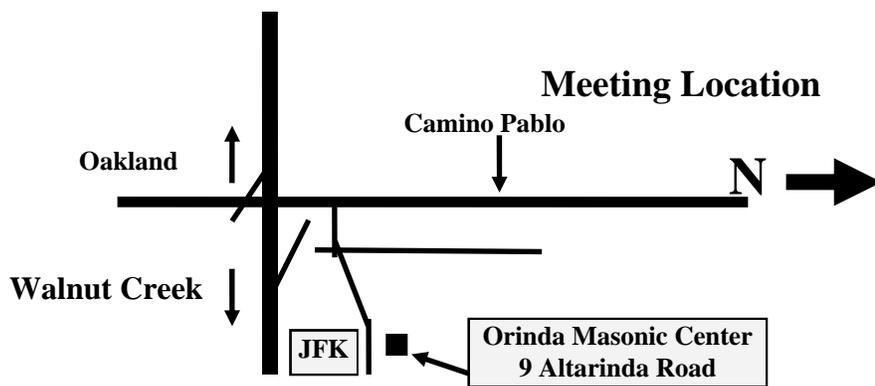
Applications should address teaching of units covering any of the earth or environmental sciences, including but not limited to mineralogy, petrology, economic geology, geomorphology, paleontology, hydrology, and planetary geology are invited from physical science, earth science, and geology teachers.

The deadline for application submittal by candidates for the \$500 NCGS award is Monday, January 11, 2013. **The application process is simple (see *Application Information and Application Form*).**

The winner will receive a \$500 award at a Northern California Geological Society meeting in Orinda in late February 2013.

Interested candidates can request an *Application Information* and an *Entrant Application Form* or submit an application by contacting:

Paul Henshaw
Chair, K – 12 Geosciences Education Committee
Northern California Geological Society
6 Rachel Ranch Court
Clayton, CA 94517 (925) 673-8745
candphenshaw@comcast.net



Speaker Biography: Cynthia (Cindy) Pridmore grew up in Southern California and attended Long Beach State (B.S. Geology, 1980) and San Diego State (M.S. Geology, 1983). As a grad student at SDSU I spent one summer doing reconnaissance work for Milchem, sampling stream sediments for barite in the eastern Klamaths and northern Sierra. My master's thesis was one of the many out of SDSU at the time that centered on mid Tertiary extensional detachment faulting along the Colorado River corridor. After a few post graduate years of considering the PhD programs at University of Washington and U.C. Santa Barbara, I left academics and went to work for Leighton and Associates, at their geotechnical field office in Riverside. I spent two years learning the ropes of engineering geology; then eventually went to work for the California Geological Survey (then known as Division of Mines and Geology). Since 1989 I have worked in a variety of CGS programs: mineral land evaluation, regional mapping, school site reviews, and for the last 18 years most of my work has been within seismic hazard mapping. More recently I have been involved with CGS's tsunami preparedness and outreach working jointly with Cal EMA. Throughout my career at CGS I have been actively involved with educational outreach to California teachers, teaching workshops and supplying maps and other materials.

Northern California Geological Society
 c/o Mark Detterman
 3197 Cromwell Place
 Hayward, CA 94542-1209

Would you like to receive the NCGS newsletter by e-mail? If you are not already doing so, and would like to, please contact **Rob Nelson** at rlngeology@sbcglobal.net to sign up for this free service.