NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

NCGS Newsletter & Website Editor:
Mark Detterman
mdetterman@blymyer.com

Secretary:
Dan Day: danday94@pacbell.net
***NCGS Voice Mail:* 925-424-3669**

Website: www.ncgeolsoc.org

NCGS OFFICERS

COUNSELORS

MEETING ANNOUNCEMENT

DATE: **Wednesday, September 26, 2007**

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

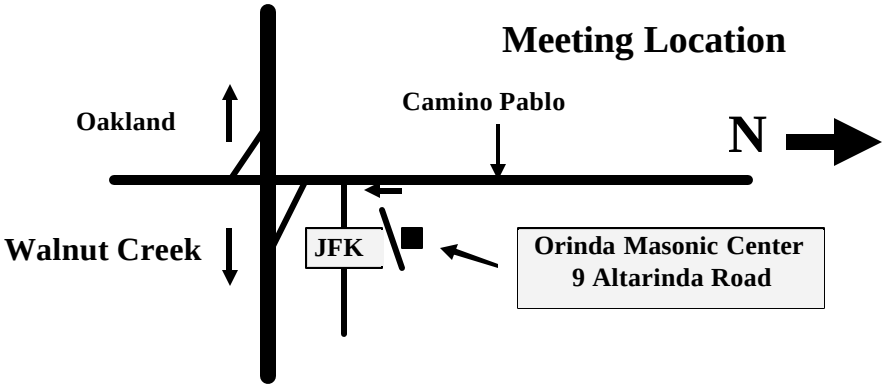
TIME: **6:30 p.m. social; 7:00 p.m. talk (no dinner) Cost: $5 per regular member, $1 per student, and $1 per K – 12 teachers (new!)**

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

SPEAKER: **Dr. Eric Cowgill,** U.C. Davis

Long-Term Slip on an Orogen-Scale Fault System: Northwestern Tibet

The extent to which continental deformation is localized along major faults (block-like), or continuously distributed (fluid-like), has been debated for decades. This dispute has centered on the kinematics of the Himalayan-Tibetan collision zone, and particularly whether the Altyn Tagh Fault (ATF) slips at ~10 or ~30 mm/yr. This active, left-slip fault, which is as long as the San Andreas Fault, is the most important structure accommodating Indo-Asian convergence north of the Himalayas and extends for over 1300 km along the north-western margin of the Tibetan Plateau. Here we use ^14 C dates from faulted Holocene landforms (fluvial terrace risers) to determine the first tightly bracketed millennial slip rate for the ATF, and in particular, show that the fault slipped at only 9-13 mm/yr over the last 6-4 ka. This result is incompatible with models in which continental deformation is localized on a few fast-slipping faults, and when combined with GPS and geologic observations, also fails to support models in which deformation is continuously distributed. As a result, we propose a new model of continental deformation in which first-order faults like the ATF define long-lived and steadily slipping domain boundaries with minimal earthquake clustering, whereas the domain interiors are broken into blocks by second-order faults that slip episodically, with strongly clustered seismicity. Although deformation in the domain interiors appears block-like at decadal to centennial time scales, migration of slip within the network of secondary faults continuously reorganizes the block boundaries, producing transient block geometries that are constantly morphing. This model reconciles previous views of continental tectonism by explaining how deformation can simultaneously appear both block-like and distributed.



Biography: **Dr. Eric Cowgill** is an Assistant Professor in the Department of Geology at the University of California, Davis. Eric obtained is BA degree in Geology from Carleton College in Minnesota in 1991, an MS degree with Darrel Cowan at the University of Washington in 1994, and his PhD with An Yin at the University of California, Los Angeles in 2001. He started at UC Davis in the fall of 2003 following a 2-year postdoc with Kerry Sieh at the California Institute of Technology. To gain insight into the deformational processes controlling the first-order structural architecture of continental deformation zones, his research seeks to quantify the magnitudes and rates of deformation along major (500-1000 km long) intracontinental fault systems to understand their geometric and kinematic evolution. Eric's approach is to integrate field-based structural and neotectonic studies with geochronologic investigations to quantify the deformational behavior of active fault systems, particularly in the poorly understood time interval that lies between the earthquake cycle (~10^2 yr) and the growth of mountain belts (~10^7 yr). Subjects of his work include the active, left-slip Altyn Tagh Fault, the right-slip Karakoram Fault and the Pamir salient in the Indo-Asian collision, as well as thrust belts within the Greater Caucasus and Tarus-Zagros Mountains in the Arabia-Eurasia collision.

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

It's a New Year at NCGS - Please Renew Your Membership!!
(Renewal Form Attached)

NCGS 2007 Calendar

The Start of the NCGS Year!!
Wednesday September 26, 2007
Dr. Eric Cowgill, U.C. Davis
Long-term slip on an orogen-scale fault system: Uplift history of the northwestern Himalayan Mountains
7:00 pm at Orinda Masonic Center

TUESDAY October 16, 2007 Early Date!!
Visiting AAPG Distinguished Lecturer
See Attached Flyer
Dr. Kirk Johnson, Denver Museum of Nature and Science
Crocodiles in Greenland and Hippos in London: A Fossil-Fueled Tour of Past and Future Climates
7:00 pm at Orinda Masonic Center

Wednesday November 28, 2007
7:00 pm at Orinda Masonic Center

Wednesday January 30, 2008
7:00 pm at Orinda Masonic Center

Wednesday February 27, 2008
7:00 pm at Orinda Masonic Center

Wednesday March 26, 2008
7:00 pm at Orinda Masonic Center

Wednesday April 30, 2008
7:00 pm at Orinda Masonic Center

Wednesday May 28, 2008
7:00 pm at Orinda Masonic Center

Wednesday June 25, 2008
7:00 pm at Orinda Masonic Center

As Usual – Our Summer Break!

Upcoming NCGS Events

October 2007 Teachers' Workshop	***Geological Field Trip on Mount Diablo***; **Please forward attached flyer to teachers who may be interested** (This is not a member field trip).
May 2008 Field Trip	***Point Lobos to Point Reyes: Evidence of ~180 km Offset of the San Gregorio & Northern San Andreas Faults,*** **Kathleen Burnham**, Independent Researcher

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 Rob Nelson at: rlngeology@sbcglobal.net

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. Recent field trips include: *The 1906 Earthquake and the San Andreas Fault on the San Francisco Peninsula* (2006), Granites in the Franciscan (Fall 2005), San Andreas Fault - Carrizo Plain (Spring 2005), Panoche and Tumey Hills (2004), White-Inyo Range (2002), Napa Wine County (December 2001), Mount Shasta and the Klamath Mountains (May 2001), Big Sur (*Salina / Nacimento Amalgamated Terrane, Big Sur coast Central California*, 2000), and the Northern Sierra Nevada (*Geologic Transect of the Northern Sierra Nevada Along the North Fork of the Yuba River*, 1982). Posted upcoming meetings include the following topics and dates:

- **Tuesday October 9, 2007**; Dr. Jim Moore, USGS Emeritus Scientist; *Growth of Giant Potassium Feldspar Crystals in Sierra Nevada Granite*

Association of Engineering Geologists San Francisco Section
Upcoming meetings

Meeting locations have been rotating between San Francisco, the East Bay, and the South Bay. For further meeting details go to: http://www.aegsf.org/.

- **September 11, 2007**, *Geologic Highlights of the Bay Area;* Doris Sloan and John Karachewski
- **November 13, 2007**; *Ferguson Rockslide on Highway 140 Near Yosemite* Tim Beck & Bruce Hilton, Kleinfelder
- **December 11, 2007**; *Liquifaction*; Ross Boulanger, UC Davis
- **January 8, 2008**; TBA
- **February 12, 2008**; *Dam Removal and River Restoration;* Leonard Sklar, San Francisco State University

The Northern California Geological Society (NCGS)

in association with
the Mount Diablo Interpretive Association (MDIA), Mount Diablo State Park,
and the Bay Area Earth Science Institute (BAESI),
presents

Geological Field Trip on Mount Diablo – A Teachers' Workshop

Saturday, October 20th, 2007
8:30am –4:30pm

In this full-day workshop keyed to the California Earth Science Standards, you'll learn the geology of Mount Diablo and experience 2 half-day field trips that you can run for your students to help them understand:

Earth's history
plate tectonics
erosion and mountain-building.

As a highly visible landmark in the East Bay, Mount Diablo represents an excellent place to let students see geology first-hand. With igneous, metamorphic, and sedimentary rocks formed in a variety of conditions and demonstrating a changed environment through time, Mount Diablo is readily accessible for day trips and offers several resources to assist teachers in running class field trips.

The workshop, which is particularly targeted to sixth grade science teachers, will be limited to 25 teachers.
We will meet at the Rock City Training Center in the park, have a lecture on the geology of the mountain, and then hike a 3-mile downhill trail to see the lower part of the mountain, including a mapping exercise for students. Following a BBQ lunch provided by NCGS, we will drive to the summit of the mountain for a 2-mile trail hike, views of the surrounding areas, and a tour of the excellent Summit museum. The day will end at 4:30pm following a talk on the natural history of Mount Diablo by a Park Ranger and discussion of resources available to teachers.

Participants will receive road logs describing the outcrops along the road up the mountain, a report describing the geology of the mountain, and brochures on resources available for teachers from the Lindsay Museum (rock kits), the State Park (trip guides, fee waivers), MDIA (publications) and NCGS (field trip leaders).

Participants will need to dress in layers and bring sunscreen and a light rain jacket. In the event of heavy rain, the workshop will be rescheduled.

The workshop is free, but you must submit a $20 fee along with your application. The fee will be refunded in full upon completion of the workshop. If you wish to earn academic credit, for an additional fee of $44 and attendance at another full-day workshop, you will be eligible to earn 1 unit of Geology 104 at SJSU.

Questions? Call 408-924-5048. Or contact Ellen Metzger at metzger@geosun.sjsu.edu.

To apply, fill out this form and return to: **BAESI, Department of Geology, San José State University, San José, CA 95192-0102.** Or, **FAX to 408-924-5053 Attn: BAESI**

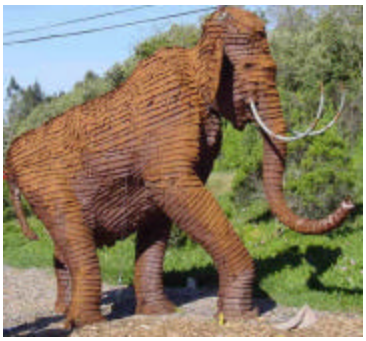
Name_____School_____

Grade level(s) taught: _____

Address: _____

_____

Phone # _____E-mail: _____



Children's Natural History Museum

Return of the Boy Paleontologists

hosted by ***Bob Wieckowski,*** *City of Fremont Councilmember*
Masters of Ceremony ***William Gordon Charles*** *(left) and* ***Phil Gordon*** *(right)*

RECEPTION
Math Science Nucleus
4074 Eggers Drive, Fremont
September 28, 2007
Friday, 6:30-9:00 pm
6:30 - Wine, appetizers
7-8 - Herbivore Buffet
8:00 - Stories of the Boy Paleontologists

DONATION: $75.00
Silent Auction

FIELD TRIP
Sabercat Creek, Fremont
September 29, 2007
Saturday, 10-12:00
Sabercat Creek, Fremont
Meet at Paseo Padre,
DONATION: $50
(includes T-shirt designed by Laura Cunningham)
to register online

Wes Gordon and his boy paleontologists were nationally recognized throughout the United States in the 1940's. A band of boys ranging in age from 7 to 13 unearthed one of the best preserved fossil sites in North America. Fossils from the Irvington District created such an international event, that a section of time was honored as the Irvingtonian Stage (1.8-.3 million years ago).

This collection is located in the Children's Natural History Museum managed by the Math Science Nucleus, a non profit organization, so children can enjoy and learn from the collection. Please join us for a reception or field trip to meet the boy paleontologists and help raise funds to preserve a very ancient part of Fremont's history. On Saturday's walk you can visit the exact site and see the setting through their eyes.

FOR BOTH EVENTS:
(includes T-shirt)

$110 per person

CORPORATE SPONSORSHIP
(please contact us)
Mammoth $5000.00
Saber tooth cat: $1000.00
Mastodon: $500.00

Proceeds from this reception will go for several much needed improvements to the museum. These will include: expansion of 1,000 square foot to include how the Hayward Fault helped unearth the fossils while contributing to the large mammal extinction; redoing our entrance to allow more students to come at one time; refurnishing our classroom/laboratory room; new exhibits; help fund a 13 foot replica of a Columbian mammoth which will become not only a landmark, but educational tool; the metal structure will cost about $9,000 and will be similar to the Wooly Mammoth above.

Geologic Mapping in a High Tech World

Submitted by Dan Day

Several dozen NCGS members, spouses, and guests assembled on September 16, 2006, at the Sibley Volcanic Preserve in Oakland's East Bay Hills to participate in a demonstration of computer-based mapping technology. ***Digital Geological Mapping Methods*** was led by University of California Berkley professor George Brimhall and three of his graduate students. Dr. Brimhall advocates developing strong geologic field skills, which are slowly disappearing at the university level. Brimhall and his student docents used the local volcanic terrrain to showcase mapping software that he has developed and markets through Rubicon Digital Mapping Associates.

The Sibley Volcanic Preserve and geology of the East Bay Hills north of the Preserve have been well characterized by several generations of U.C. Berkeley field classes. Work began with A. C. Lawson's field studies in the early 1900's through Garniss Curtis's detailed mapping, radioactive dating, and interpretive activities in the 1940's through 1970's. Curtis's field classes provided structural detail and characterized many of the volcanic features exposed in this area. The Sibley Volcanic Preserve contains exposures of deep marine siliceous sediments and cherts of the mid to late Miocene Claremont (Monterey) Formation (c.a. 16 m.y. old), overlain by conglomerates, sandstones, and shales of the shallow marine to terrestrial upper Miocene Orinda Formation, This sequence represents a major regression and infilling of a pull-apart basin capped by the extrusive basalts and basaltic andesites of the Moraga Volcanics. The latter are exposed in the Sibley Preserve as flows and pyroclastics erupted from vents within the park. The Mio-Pliocene terrestrial Siesta Formation, with its lacustrine limestone member, overlies the Moraga Volcanics. These stratigraphic units are exposed in the Siesta syncline and the adjacent Glorietta anticline, formed by Pliocene deformation. Dr. Brimhall noted that volcanics in the northern Coast Range become younger to the north. This supports models that invoke a northward-migrating subducted triple junction as the driving force for pull-apart basin formation and magma generation. The Sibley Preserve eruptions occurred about 10 m.y. ago.

Before describing the mapping technology, George graciously acknowledged former Chevron employee Chuck Ramsden's generous estate donation to the U.C. Berkeley Earth and Planetary Science Department for undergraduate geological science development. This endowment allowed purchase of the powerful Fujitsu Stylistic laptop workstations that were specially designed by Fujitsu under Dr. Brimhall's guidance. These high end portable units cost $2100 each and sport spectacularly clear, readable screens, a real benefit for outdoor use. Laptop battery life is 8 hours. Add a GPS (global positioning satellite) card for $126 and the system is complete. The U.C. Berkeley laptops use a Trimble GPS system that is accurate to ±1 meter. Four satellite signals are needed to establish an accurate fix. The software package uses GeoMapper graphic user interface (GUI) developed by Dr. Brimhall. It resides on top of the PenMap software program sold by England's Stratus Software. This combination offers a powerful, flexible digital field mapping tool. GeoMapper provides click-on button selections for a complete selection of symbols, patterns, and mapping tools that can be customized to specific lithologies and field conditions. The latter matches symbol patterns used in Robert R. Compton's ***Manual of Field Geology***.

Orthoquads used for mapping can be downloaded from the USGS website. The software allows one to zoom in or out as necessary. The user can also determine what GPS satellites are triangulating on the current location. But Dr. Brimhall cautions that users should rely on the local topography as well as the GPS for locating themselves.

The GeoMapper software can be configured to plot points on the map as one walks a contact. An UNDO icon allows the user to correct any errors. The AUTOSAVE function ensures that valuable data is not lost. GeoMapper is a graphic user interface (GUI) that resides on top of the Pen-mapper Stratus software designed in England. U.C. Berkeley gets the software for one-third cost ($700). It is a marvelous mapping combination.

GeoMapper has a variety of toolbars available for custom field mapping conditions. One toolbar is available for sample labeling and collection site identification. Another toolbar addresses soil and water samples. And both require specimen labeling before the user can continue. Other toolbars focus on the lithology and geologic structures. Toolbars for

mining industries and mineral resources are also available. The Geotool Bar can even capture digital photo bitmaps and assign them to specific locations for presentations. This is a full GIS system capable of exporting a map file to a printer. The GIS provides base maps, user location, and what satellite signals are being accessed. Stereomaps can also be viewed using GeoMappper. Dr. Brimhall downloads his aerial photos to the laptop and then opens them with the software.

After this introduction to the laptop and mapping software, the trip members were divided into groups and assigned to one of three graduate students for a short field exercise. Our guide, **Kyle Brudvik**, booted up the computer and software, then uploaded a topographic map of the Berkeley Hills and Sibley Regional Park. He enlarged the map ten times (zoom function) to provide a workable scale for our field mapping. Next he checked the GPS information, station zoning, and satellite reception. Kyle noted that one should ensure that several satellites are giving a reading on the location. One wants a very strong satellite signal to provide an accurate position reading. As our group went uphill away from the Sibley visitor center, the GSP signal became stronger. Hence, the physical terrain can influence GPS signal intensity. This may require selecting other satellites if a consistently weak signal is being received. The laptop keyboard is designed for easy use. The computer has several USB ports for downloading files and connecting to peripherals.

Once on the trail, Kyle demonstrated the lithology toolbar. He selected the contact button then touched several spots on the laptop screen. The program immediately connected these points with straight lines. An appropriate reference point can then be selected and named for adding pertinent field information. During the demonstration Kyle commented that the "transflexive" laptop screen is quite visible in direct sunlight, and can be backlit in shady conditions or darkness. The laptop's 14" by 9" size allows it to fit into a field jacket vest pocket. Its compactness is ideal for field studies in geology, archeology, or other natural sciences. Sampling surveys are especially adaptable to this portable system.

The group proceeded past a faulted contact between the Moraga Volcanics and the Orinda Formation, then stopped at a fault juxtaposing conglomerate over massive sandstone in the Orinda Formation. Here Kyle took strike and dip readings on the units and showed how to plot them on the digital map. Further down the path more strikes and dips were measured at the conglomerate-sandstone contact, and entered onto the map. Kyle continued to describe the various map plotting functions as the party walked into the amygdaloidal lower Moraga Volcanic units. The group then headed east to take a short lunch break on a ridge that provided a spectacular view of Mount Diablo and Las Trampas Ridge to the south. After lunch, the field trip circled back to the park entrance, noting volcanic feaures of interest.

When everyone had assembled in the parking lot, a barbecue was set up, charcoal lit, and a delicious meal prepared by NCGS Field Trip coordinators **Tridib Guha** and **Rob Nelson**. The menu included marinated chicken, salmon, salads, and Tridib's coveted baked bean medley. Over sodas and beer the members socialized as the chicken and fish cooked. Everyone enjoyed the food and friendship as the sun crept over the ridge in the late afternoon sky. All were impressed with the laptop and software package that Dr. Brimhall and his students had demonstrated that day.

Many thanks to **Dr. George Brimhall** of the U.C. Berkeley Department of Earth and Planetary Sciences who graciously agreed to lead this field trip demonstrating his portable digital field mapping technology. The NCGS also wishes to acknowledge UCB graduate students **Kyle Brudvik**, **Scott Orton**, and **Jonathan Perkins** who accompanied the members in the field and demonstrated the laptop mapping systems. **Tridib Guha** deserves credit and accolades for another excellent field trip barbecue. He was helped by **Mark** and **Karel Detterman**, **Phil Reed**, and **Dan Day**.

Dr. Brimhall merits further recognition for his continuing efforts to promote field skills in the geological sciences. Cost considerations are gradually eroding geological field programs across the United States. This decline in a vital Geoscience discipline is a major concern to both academic institutions and industry. For more information on his programs to restore field techniques to geological science curricula, contact Dr. Brimhall at **brimhall@eps.berkeley.edu**.

2007-2008 AAPG Distinguished Lecture

Abstract

TUESDAY OCTOBER 16, 2007

EARLY MEETING DATE!!

DR. KIRK JOHNSON
Denver Museum of Nature and Science

Funded by the AAPG Foundation

Crocodiles in Greenland and Hippos in London: A Fossil-Fueled Tour of Past and Future Climates

Earth's climate is driven by the interaction of solar energy with land, sky, and oceans. While this has always been the case, shifting positions of continents and the ever-changing chemistry and currents of oceans and air have created a world with a complex history. Most of Earth history has occurred during greenhouse conditions when there were no polar ice caps. Less common were icehouse conditions when there were polar ice caps that waxed and waned between glacial and interglacial periods. This history is written in stone and told by fossils. Fossil plants from 50 million years ago show that the polar regions were ice free and densely forested and that tropical rainforests reached middle latitudes. The talk will take you from the Amazon Basin to the High Arctic and into Deep Time as he explains our planet's history by visiting fossil sites on different continents and using them to reconstruct lost worlds, extinct biomes, and ancient climates. Recent advances in geochronology allow the fossil record to be dated with increasing precision, thus providing some context for understanding climate change and global warming in the present and future.

Kirk Johnson

Education:

1989	PhD, Yale University
1985	MS, University of Pennsylvania
1982	BA, Amherst College

Experience:

2006-Present	Vice President of Research & Collections, Denver Museum of Nature & Science
2004-Present	Chief Curator, Denver Museum of Nature & Science
2001-06	Chairman, Department of Earth Science, Denver Museum of Nature & Science
1991-Present	Curator of Paleontology, Denver Museum of Nature & Science
1989-90	Postdoctoral Researcher, University of South Australia, Adelaide,.

Publications and Awards:

Johnson, K. R and Troll, R., Oct. 2007, *Cruisin' the Fossil Freeway: An epoch tale of a scientist and an artist on the ultimate 8,000 mile paleo road trip*, Fulcrum Press, Golden. CO.

Johnson, K. R. and Bonnell, M. A., July 2007, *Gas Trees and Car Turds, A Kids' Guide to the Roots of Global Warming*. Fulcrum Press, Golden. CO.

Johnson, K. R. and Stucky, R.K., 2006, *Prehistoric Journey: A History of Life on Earth*: Golden, Fulcrum Press, 144p., second edition.

Johnson, K. R. and Raynolds, R., 2006, *Ancient Denvers: Scenes from the past 300 million years of the Colorado Front Range*: Golden, Fulcrum Press, 32 p., second edition.

Wilf, P., C.C. Labandeira, K.R. Johnson, B. Ellis, 2006, Decoupled plant and insect diversity after the End-Cretaceous extinction. *Science*, vol. 313, p. 1112-1115.

Wilf, P., Labandeira, C.C., Johnson, K.R., and Cuneo, N.R., 2005, Richness of plant-insect associations in Eocene Patagonia: a legacy for South American biodiversity: *Proceedings of the National Academy of Science*, v. 102, no. 25, p. 8944-8948.

Wilf, P., and Johnson, K.R., 2004, Land plant extinction at the end of the Cretaceous: a quantitative analysis of the North Dakota megafloral record: *Paleobiology*, v. 30, no. 3, p. 347-368.

Johnson, K. R. and Ellis, B., 2002, A tropical rainforest in Colorado 1.4 million years after the Cretaceous-Tertiary boundary, *Science*, vol. 296, pp. 2379-2383.

Hartman, J., Johnson, K. R., Nichols, D. J., eds., 2002, The Hell Creek Formation and the Cretaceous-Tertiary Boundary in the northern Great Plains: An integrated Continental record of

the End of the Cretaceous: *Geological Society of America Special Paper* vol. 361, 520 p.

2002 Rocky Mountain Association of Geologists Distinguished Public Service to Earth Sciences Award.

2002 Geological Society of America Fellow

1999-2000 Paleontological Society Distinguished Lecturer

1996 American Association of Museums Curator's Choice Award: Best museum exhibit in 1995 for the *Prehistoric Journey* exhibit,.

Professional Memberships

American Association of Museums
Geological Society of America
Botanical Society of America
International Organization of Paleobotany

Professional Interests:

Kirk Johnson studies fossil plants, terrestrial stratigraphy, geochronology and dinosaur extinction and works in a museum environment where good science and public communication of science are equally valued. He has published many popular and scientific articles on topics ranging from fossil plants and modern rainforests to the ecology of whales and walruses. He is best known for his research on fossil plants that is widely accepted as some of the most convincing support for the theory that an asteroid impact caused the extinction of the dinosaurs. Since 1997, he has supervised the *Denver Basin Project*, a multidisciplinary NSF-funded effort to understand and interpret the paleontology, geology, and hydrology of the rocks beneath Denver. This work has led to the discovery and analysis of a 64 million-year-old tropical rainforest in Colorado. His research has also taken him to Alaska's Bering Sea, the Brazilian Amazon, the Canadian High Arctic, the rainforests of New Zealand, the Gobi desert, India, China, Patagonia, and the American West.

He is presently working on research projects in Patagonia, Manchuria, Wyoming, and Denver. Between 1990 and 1995, he led a team that planned, and built the Museum's award-winning exhibition *Prehistoric Journey* and he continues to design museum exhibits and other media to popularize Earth Sciences. Kirk loves to work with closely with artists to create accurate paintings, murals, and dioramas of prehistoric landscapes. The *Ancient Denvers* series of 14 images can be seen at the Denver Museum of Nature & Science and the *Ancient Colorado* series of ten paintings can be seen in the Colorado Convention Center. He is now involved in the initial stages of designing a new Hall of the Earth at the Denver Museum of Nature & Science.

Links:

Ancient Denvers
http://www.dmns.org/main/minisites/ancientDenvers/index.html
Ancient Colorado
http://www.dmns.org/main/en/General/Exhibitions/content/ancientColorado.html

---

Final Reminder
FRIENDS OF THE PLEISTOCENE PACIFIC CELL FIELD TRIP
October 4 – 7, 2007

Quaternary Stratigraphy, Drainage-Basin Development, and Geomorphology of the Lake Manix Basin, Mojave Desert

Principal trip leaders:
Marith Reheis, Dave Miller, Joanna Redwine, Stephanie Dudash

THE GUIDEBOOK HAS BEEN POSTED AND IS READY FOR DOWNLOAD! You will find a link to it on the Pacific Cell FOP website: http://esp.cr.usgs.gov/info/pacificfop2007/
or you can go straight to the USGS publications website: http://pubs.usgs.gov/of/2007/1281/

Remember, to save costs on this trip, FOP expects you to download and print your own guidebook copy to bring. FOP will print and bring a VERY FEW for purchase at camp if you are unable to print your own for some reason. The website has information on camping, lodging, logistics, and itinerary as well as a registration page. PLEASE DO NOT SEND MONEY NOW! FOP will collect money at the field trip. The pre-registration page on the website will be closed as of Thursday night, Sept. 27. You are probably already too late to have a T-shirt, but if there is enough demand, we will consider printing more; ask us at registration.

Information can be obtained using the Pacific Cell yahoo group; if you want to receive information make sure you are registered by sending your email address to friends_of_the_pleistocene@yahoogroups.com. Send questions to mreheis@usgs.gov or dmiller@usgs.gov.

October 4 (Thursday)--Optional pre-day for the energetic and physically fit to see critical evidence for pre-late Pleistocene shorelines and discharge predating the cutting of Afton Canyon, requiring 4WD and >1-hour one-way hike in rough terrain to access the outcrops. Possible half-day afternoon hike to view fan and lake stratigraphy south of the Mojave River.

October 5 (Friday)--Afton subbasin: Overview and deposits along North Afton beach ridge and older fan-

delta deposits; the "slackwater" deposits; evidence for large flood from upstream basin(s) and inception of first lake in Afton subbasin; stratigraphy and dating of late Pleistocene shoreline fluctuations.

October 6 (Saturday)--Manix subbasin: Buwalda Ridge, evidence for highstands exceeding 543 m and Manix fault; intersection of Manix Wash and Mojave River, including outcrop and core stratigraphy and dating; history of Mojave River, including inception of Manix basin and river evolution following demise of Lake Manix; faulting and uplift of lake deposits on SW flank of Harvard Hill.

October 7 (Sunday)--Coyote Lake subbasin: SE Coyote beach ridge deposits and record of fluctuating lakes during and after late Pleistocene Lake Manix; Coyote Wash barrier beaches and Mojave River channel deposits; history of post-Manix Coyote Lake.

Marith Reheis; U.S. Geological Survey, MS-980 Federal Center, Box 25046 Denver, CO 80225; phone: 303-236-1270; fax: 303-236-5349

On The Passing of John Cooper

The Geology Department of Cal State Fullerton is sad to announce the sudden passing of Professor Emeritus John Cooper. John was a legendary figure among geology students at Fullerton and a giant in the field of Sedimentary Geology. He touched many lives and will be sorely missed.

Dr. Cooper's research concerned stratigraphic analysis of Neoproterozoic and lower Paleozoic rocks in the southern Great Basin and Eastern Mojave Desert provinces. He was an expert in the use of sequence stratigraphy to investigate paleo sea-level, regional stratigraphic correlations, and continental margin evolution, and had supervised the theses of almost 60 students at Cal State Fullerton. John had served for several decades as a driving force in SEPM, the Society of Sedimentary Geology, serving as Treasurer and Managing Editor for the Pacific Section at the time of his death. In recent years, Dr. Cooper had led efforts to create a curatorial facility for the Orange County Archeology and Paleontology collection.

Donations can be made online by following this link.

We in the Geology Department know that many members of the community have worked closely with John through the years and wish to hold a memorial in his memory. The Department is currently working on a plan to appropriately honor John's life. We will post any memorial plans on this website; please periodically check here for more information or send an e-mail to: geology@fullerton.edu

GEOLOGY: Volcanic Shakeup

EDITORS' CHOICE: HIGHLIGHTS OF THE RECENT LITERATURE June 15 2007, 316 (5831)

The powerful Sumatra Andaman earthquakes of 2004 (magnitude 9.3) and a few months later in 2005 (8.7) caused considerable devastation in Indonesia and, as a result of a huge tsunami, the surrounding regions. Walter and Amelung now suggest that these earthquakes may trigger an additional hazard. Such large subduction-zone earthquakes have been followed within a few years by eruptions in the neighboring volcanic arc, in some cases from dormant or rarely erupting volcanoes; examples include eruptions after the major (magnitude 9.0 or higher) earthquakes of Kamchatka in 1952, Chili in 1960, and Alaska in 1964. Two volcanoes (Talang and Barren Island) erupted in Indonesia soon after the nearby 2005 quake. Although the overall incidents are few, the pattern for large quakes is consistent and, according to the authors' analysis, statistically significant. Their numerical modeling shows that generally such large earthquakes in subduction zones, which are produced by large oceanward slip of the overlying plate, induce some extension in the volcanic arc further landward. Such extension can lower the pressure on trapped magma, inducing or hastening eruptions or leading to further melting. The authors recommend a close watch of generally quiet volcanoes in Indonesia over the next few years. -- Brooks Hanson

Geology **35**, 539 (2007)

CLIMATE SCIENCE: Early Reversals

Editors' Choice: Highlights of the recent literature SCIENCE, Volume 316, Issue 5832

Over the Pleistocene epoch, sea level was more than 100 m lower during some glacial periods than it is now; even within cold intervals, it may have varied by tens of meters. During the last interglacial, global average temperatures were near where they are expected to be in the coming century, and sea level was 4 to 6 m higher. Thus, conditions in that period seem relevant to our near future. Recently compiled evidence suggests that sea levels fluctuated by as much as 30 to 40 m during the beginning of that warm interval, but the large changes inferred have been controversial due to a lack of corroborating records. Andrews *et al.* have confirmed the variability using deposits that record the relative elevations of the Greek shoreline. By precisely

determining the sample ages via U/Th dating, they found that sea level twice dropped precipitously between 136,000 and 135,000 years ago, near the end of deglaciation, an observation that supports earlier findings from the Red Sea and from Papua, New Guinea. Their results also help to constrain the timing of sea-level rise during the penultimate deglaciation. -- H. Jesse Smith

Earth Planet. Sci. Lett. 10.1016/j.epsl.2007.05.005 (2007)

CLIMATE SCIENCE: Warming to Coastal Erosion

Editors' Choice: Highlights of the recent literature
July 13 2007, 317 (5835)

High northern latitudes are displaying, as predicted, exceptional sensitivity to recent climate warming, as temperatures there have soared more quickly than in any other part of the world. The effects of these rising temperatures are likely to be dramatic. For example, huge expanses of permafrost are in imminent danger of melting, which would have a tremendous impact on such areas as biogeochemical processes involving greenhouse gases, the physical stability of structures built on the previously frozen ground, and the geomorphology of the region. Mars and Houseknecht have combined data from topographic maps and satellite images to document how coastal land loss and thermokarst lake expansion and drainage have affected a segment of the Beaufort Sea coast of Alaska over the past 50 years. They find that coastal erosion rates more than doubled between the early and later parts of that period, and that the acceleration of coastal erosion rates is due to the longer warm seasons, as open water and wave action associated with earlier pack ice breakup affect the coast. – H. Jesse Smith

Geology **35**, 583 (2007)

GEOPHYSICS: Slip Sliding Away

Editors' Choice: Highlights of the recent literature
August 17 2007, 317 (5840)

During earthquakes, very high stresses within the crust press the two sides of the fault together so hard that they should be effectively locked together by friction. In the laboratory, rocks are similarly difficult to rip apart. Yet in the landscape setting, faults rupture suddenly and easily. Various explanations for this conundrum have been put forward, including fault lubrication by fluids or weakening by seismic vibrations. Recent experiments suggested that the rocks themselves may become slippery during rupture if they are heated or interact with fluids; silica gel may lubricate quartz rocks and fine powder may ease sliding in carbonate rocks. Hirose and Bystricky have found support for another hypothesis: fault weakening through dehydration of embedded phyllosilicate clays. They carried out high-velocity friction experiments on natural serpentinite (a phyllosilicate) under conditions mimicking an earthquake and measured the heat generated by friction and the resulting rock strength. An observed increase in humidity implied that water was lost from the serpentinite during sliding. Dehydration requires temperatures of about 500°C, which the authors argue might be attained where bumpy asperities rub together. -- Joanne Baker

Geophys. Res. Lett. **34**, L14311 (2007)

GEOPHYSICS: Electric Aftershocks

Editors' Choice: Highlights of the recent literature
July 20 2007, 317 (5836)

Earthquake ruptures are expected to generate electromagnetic activity within the surrounding rocks, but direct evidence for this effect has been lacking. Laboratory experiments on real rocks do generate currents due to fluid movement and piezoelectric effects, but they are weak and in the geological setting it is hard to disentangle them from anthropogenic signals or more ambient electronic noise. Park *et al.* report possible detection of a characteristic electrical signal using an electrode array placed on the San Andreas Fault at Parkfield, California. Electrical disturbances lasting 3 hours were picked up within 250 m of the fault immediately after a magnitude 6.0 earthquake that occurred in September 2004; signals of opposite polarity were subsequently detected after two magnitude 5.0 aftershocks. Although similar electromagnetic changes do occur on a daily basis in this area, the team argue that the localization, timing, and unusual polarity of their signals support association with the earthquake rupture process. They propose fluid movements as the most likely cause of the electrical signals, although they are unable to explain the rapid onset. No precursor signals were observed, so this technique may not ultimately help with earthquake prediction. -- Joanne Baker

J. Geophys. Res. **112**, 10.1029/2005JB004196 (2007)

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

2007-2008 Renewal Form

(September 2007 –August 2008)

Please fill out this form and attach your check made out to NCGS.

Mail to:

Phil Reed
NCGS Treasurer
488 Chaucer Circle
San Ramon, CA 94583-2542

Dues		
	Regular ($15)	**$_____**
	Student ($ 5)	**$_____**
Contribution		
	Scholarship	**$_____**
	Teacher Award	**$_____**
Total		**$_____**

Please provide the following information:

Name: _____

e-mail: _____

I would like to receive the monthly newsletter via: E-mail _____ Regular mail _____

I can help with:

Programs_____ Field Trips_____ Newsletter_____ Web Site_____

K-12 Programs_____ Scholarships_____ AAPG Delegate_____ Membership_____

Please complete the following *only* if there are changes since last year:

Address _____

City, State, Zip _____

Phone: Home (____)_____Work (____)_____Fax (____)_____

Employer _____**Job Title**_____