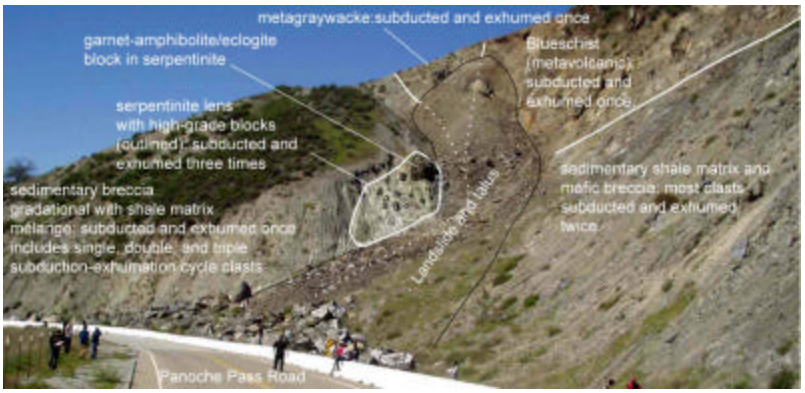
NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

MEETING ANNOUNCEMENT

DATE: June 29, 2011
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: Dr. John Wakabayahsi; Department of Earth and Environmental Sciences, California State University Fresno

Franciscan Mélanges: Evidence for Sedimentary Origins, Multiple Subduction-Exhumation Cycles, Subduction Accretion, Subduction Erosion and Non Accretion



Mélanges give insight into large-scale convergent plate margin processes. A field geologist may easily recognize the sedimentary origins of little-deformed mélanges, but mélanges within accretionary prisms have undergone significant deformation. Shale and serpentinite matrix mélanges of the Franciscan subduction complex of California have a foliated and seemingly intact matrix. Such exposures contrast sharply with the (generally) granular undeformed sedimentary serpentinite mélanges of the coeval Great Valley Group forearc basin deposits that depositionally overlie Coast Range Ophiolite (that structurally overlies the Franciscan). Nonetheless, Franciscan mélanges display evidence of sedimentary origins, including sedimentary breccias with exotic blocks that grade with increasing strain into shale matrix mélange, serpentinite sandstone and conglomerate. Huge displacement associated with past positions of the subduction megathrust appears accommodated on the upper contact of mélanges rather than within them as commonly proposed. Some mélanges record resubduction of earlier exhumed, high-pressure blueschist, amphibolite and eclogite, to blueschist facies depth, so they record at least two burial-exhumation cycles. One mélange/breccia in the Panoche Pass area may have components that record three cycles. Estimates of exhumation rates for the various cycles range from 2-10 mm/yr. The Tiburon Peninsula mélange represents the structurally highest horizon in the Franciscan of the San Francisco Bay area with an apparent depositional age of ~100 Ma. This suggests that 65 m.y. of subduction erosion/non accretion followed initiation of Franciscan subduction there, longer than the 40-45 m.y. non-accretion period proposed for the Franciscan of the northern Coast Ranges. Subduction erosion may have facilitated reworking of forearc sedimentary serpentine deposits into the trench. …*Continued on back…*

NCGS 2010 – 2011 Calendar

Wednesday June 29, 2011
Dr. John Wakabayahsi
Franciscan Mélanges: Evidence for Sedimentary Origins, Multiple Subduction-Exhumation Cycles, Subduction Accretion, Subduction Erosion and Non Accretion
7:00 pm at Orinda Masonic Lodge

Our Usual Summer Break!

September 28, 2011
TBA
7:00 pm at Orinda Masonic Lodge

October 9 – 15, 2011
Earth Science Week
TBA

October 26, 2011
TBA
7:00 pm at Orinda Masonic Lodge

Upcoming NCGS Events

June 25 & 26, 2011 Geology of Lake Tahoe Region, **Dr. Richard Schweickert**, Emeritus, University of Nevada, Reno

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@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. Please check the website for current details.

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.

- June 14, 2011; **David W. Bieber, PG, PGP, CEG, CHG; Geological Services Manager Geocon Consultants, Inc.:** ***Case studies on the application of engineering geology and rock mechanics to hardrock aggregate mining in the operations and closure process***

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/

- June 30, 2011; California Seafloor Mapping Program; Sam Johnson
- July 2011; Climate Variability/Change & SF Bay-Delta; Jim Cloern Ecosystem

Bay Area Science

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

This website came to our attention recently and we wanted to pass the information along to members. The 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).

NCGS Officer Nominations

(Come vote on the Nominations at the June Meeting)

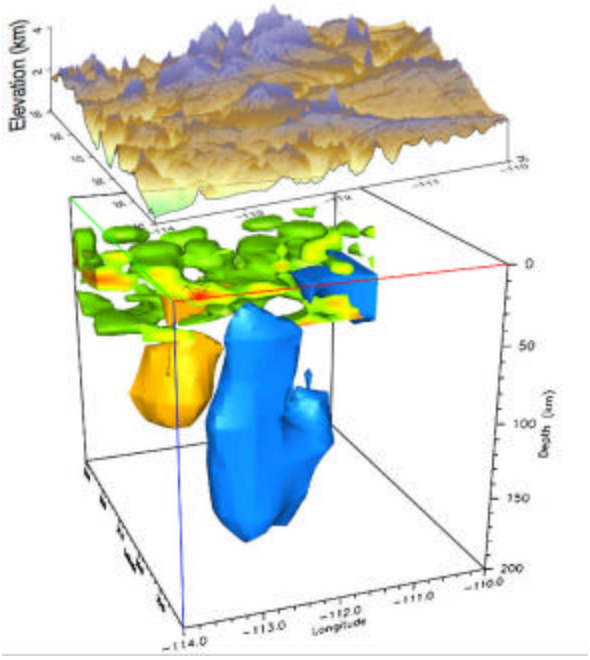
Phil Reed, Barb Matz, and Don Lewis constituted the officer nominating committee this year. They struggled mightily, faced severe odds and repeated rejections to their entreaties but have soldiered through and have assembled a slate for the 2011 – 2012 year (September to September). The following slate was approved by vote by the Executive Committee at the May 14th NCGS Board Meeting. The same candidate slate was officially introduced for member consideration at the May 25th NCGS Dinner Meeting, and will be offered for a formal vote by all members present at the June 29th meeting. **Come to the last meeting of the current year and VOTE**. Thus, for 2011-12 we have:

Officers:	
President:	**Tom Barry**
President-elect:	**Phil Reed**
Program director:	**John Karachewski**

Field trip director:	**Tridib Guha**
Membership secretary:	**Rob Nelson**
Recording secretary:	**Dan Day**
Treasurer:	**Phil Reed**
Editor:	**Mark Detterman**
Committee chairs:	
K-12 programs:	**Paul Henshaw**
Scholarship:	**Phil Garbutt**

Geologists Solve Mystery of the Colorado Plateau

ScienceDaily — A team of scientists led by Rice University has figured out why the Colorado Plateau -- a 130,000-square-mile region that straddles Colorado, Utah, Arizona and New Mexico -- is rising even while parts of its lower crust appear to be falling. The massive, tectonically stable region of the western United States has long puzzled geologists.



A convective "drip" of lithosphere (blue) below the Colorado Plateau is due to delamination caused by rising, partially molten material from the asthenosphere (gold), as plotted by Rice University researchers and their colleagues and described in a new paper in the journal Nature. (Credit: Levander Lab/Rice University)

A paper published April 27 in the journal *Nature* shows how magmatic material from the depths slowly rises to invade the lithosphere -- Earth's crust and strong uppermost mantle. This movement forces layers to peel away and sink, said lead author Alan Levander, professor and the Carey Croneis Chair in Geology at Rice University.

But when the asthenosphere finds a means to, it can invade the lithosphere and erode it from the bottom up. The partially molten material expands and cools as it flows upward. It infiltrates the stronger lithosphere, where it solidifies and makes the brittle crust and uppermost mantle heavy enough to break away and sink. The buoyant asthenosphere then fills the space left above, where it expands and thus lifts the plateau.

Levander and his fellow researchers know this because they've seen evidence of the process from data gathered by the massive USArray seismic observatory, hundreds of observatory-quality seismographs deployed 45 miles apart in a mobile array that covers a north/south strip of the United States. The seismographs were first deployed in the West in 2004 and are heading eastward in a 10-year process, with each seismograph station in place for a year and a half. Seismic images made by Rice that are analogous to medical ultrasounds were combined with images like CAT scans made by seismologists at the University of Oregon; the resulting images revealed a pronounced anomaly extending from the crust well into the mantle.

The invading asthenosphere is two-faced. Deep in the upper mantle, between about 60 and 185 miles down, it's usually slightly less dense and much less viscous than the overlying mantle lithosphere of the tectonic plates; the plates there can move over its malleable surface.

Levander said the combined Colorado Plateau images show the convective "drip" of the lithosphere just north of the Grand Canyon; the lithosphere is slowly sinking several hundred kilometers into the Earth. That process may have helped create the canyon itself, as lifting of the plateau over the last 6 million years defined the Colorado River's route.

Levander said USArray has found similar downwellings in two other locations in the American West; this suggests the forces deforming the lower crust and uppermost mantle are widespread. In both other locations, the downwellings happened within the past 10 million years. "But under the Colorado Plateau, we have caught it in the act," he said.

"We had to find a trigger to cause the lithosphere to become dense enough to fall off," Levander said. The partially molten asthenosphere is "hot and somewhat buoyant, and if there's a topographic gradient along the asthenosphere's upper surface, as there is under the Colorado Plateau, the asthenosphere will flow with it and undergo a small amount of decompression melting as it rises."

It melts enough, he said, to infiltrate the base of the lithosphere and solidify, "and it's at such a depth that it freezes as a dense phase. The heat from the invading melts also reduces the viscosity of the mantle lithosphere, making it flow more readily. At some

point, the base of the lithosphere exceeds the density of the asthenosphere underneath and starts to drip."

Levander said the National Science Foundation-funded USArray is already providing a wealth of geologic data. "I have quite a few seismologist friends in Europe attempting to develop a EuroArray, one of whom said, 'Well, it looks like you have a machine producing *Nature* and *Science* papers.' Well, yes, we do," he said. "We can now see things we never saw before."

Co-authors of the paper are Cin-Ty Lee, associate professor of Earth science, and graduate student Kaijian Liu, both of Rice; Eugene Humphreys, professor of geophysics, and graduate student Brandon Schmandt of the University of Oregon; former Rice postdoctoral researcher Meghan Miller, now an assistant professor of Earth sciences at the University of Southern California; and Professor Karl Karlstrom and graduate student Ryan Crow of the University of New Mexico.

National Science Foundation EarthScope grants and the Alexander von Humboldt Foundation Research Prize to Levander funded the research.

Story Source: The above story is reprinted (with editorial adaptations by Science*Daily* staff) from materials provided by Rice University.

Journal Reference: A. Levander, B. Schmandt, M. S. Miller, K. Liu, K. E. Karlstrom, R. S. Crow, C.-T. A. Lee, E. D. Humphreys. **Continuing Colorado plateau uplift by delamination-style convective lithospheric downwelling**. *Nature*, 472, 461-465 (27 April 2011).

Earth Recovered from Prehistoric Global Warming Faster Than Previously Thought

ScienceDaily — Earth may be able to recover from rising carbon dioxide emissions faster than previously thought, according to evidence from a prehistoric event analyzed by a Purdue University-led team.

When faced with high levels of atmospheric carbon dioxide and rising temperatures 56 million years ago, Earth increased its ability to pull carbon from the air. This led to a recovery that was quicker than anticipated by many models of the carbon cycle -- though still on the order of tens of thousands of years, said Gabriel Bowen, the associate professor of earth and atmospheric sciences who led the study.

"We found that more than half of the added carbon dioxide was pulled from the atmosphere within 30,000 to 40,000 years, which is one-third of the time span previously thought," said Bowen, who also is a member of the Purdue Climate Change Research Center. "We still don't know exactly where this carbon went, but the evidence suggests it was a much more dynamic response than traditional models represent."

Earth may be able to recover from rising carbon dioxide emissions faster than previously thought, according to evidence from a prehistoric event. When faced with high levels of atmospheric carbon dioxide and rising temperatures 56 million years ago, Earth increased its ability to pull carbon from the air. (Credit: © Argus / Fotolia)

Bowen worked with James Zachos, a professor of earth and planetary sciences at the University of California, Santa Cruz, to study the end of the Palaeocene-Eocene Thermal Maximum, an approximately 170,000-year-long period of global warming that has many features in common with the world's current situation, he said.

"During this prehistoric event billions of tons of carbon was released into the ocean, atmosphere and biosphere, causing warming of about 5 degrees Celsius," Bowen said. "This is a good analog for the carbon being released from fossil fuels today."

Scientists have known of this prehistoric event for 20 years, but how the system recovered and returned to normal atmospheric levels has remained a mystery.

Bowen and Zachos examined samples of marine and terrestrial sediments deposited throughout the event. The team measured the levels of two different types of carbon atoms, the isotopes carbon-12 and carbon-13. The ratio of these isotopes changes as carbon dioxide is drawn from or added to the atmosphere during the growth or decay of organic matter.

Plants prefer carbon-12 during photosynthesis, and when they accelerate their uptake of carbon dioxide it shifts the carbon isotope ratio in the atmosphere. This shift is then reflected in the carbon isotopes present in rock minerals formed by reactions involving atmospheric carbon dioxide, Bowen said.

"The rate of the carbon isotope change in rock minerals tells us how rapidly the carbon dioxide was pulled from the atmosphere," he said. "We can see the fluxes of carbon dioxide in to and out of the atmosphere. At the beginning of the event we see a shift indicating that a lot of organic-derived carbon dioxide had been added to the atmosphere, and at the end of the event we see a shift indicating that a lot of carbon dioxide was taken up as organic carbon and thus removed from the atmosphere."

A paper detailing the team's National Science Foundation-funded work was published in *Nature Geoscience.*

It had been thought that a slow and fairly constant recovery began soon after excess carbon entered the atmosphere and that the weathering of rocks, called silicate weathering, dictated the timing of the response.

Atmospheric carbon dioxide that reacts with silicon-based minerals in rocks is pulled from the air and captured in the end product of the reaction. This mechanism has a fairly direct correlation with the amount of carbon dioxide in the atmosphere and occurs relatively slowly, Bowen said.

The changes Bowen and Zachos found during the Palaeocene-Eocene Thermal Maximum went beyond the effects expected from silicate weathering, he said.

"It seems there was actually a long period of higher levels of atmospheric carbon dioxide followed by a short and rapid recovery to normal levels," he said. "During the recovery, the rate at which carbon was pulled from the atmosphere was an order of magnitude greater than the slow drawdown of carbon expected from silicate weathering alone."

A rapid growth of the biosphere, with a spread of forests, plants and carbon-rich soils to take in the excess carbon dioxide, could explain the quick recovery, Bowen said.

"Expansion of the biosphere is one plausible mechanism for the rapid recovery, but in order to take up this much carbon in forests and soils there must have first been a massive depletion of these carbon stocks," he said. "We don't currently know where all the carbon that caused this event came from, and our results suggest the troubling possibility that widespread decay or burning of large parts of the continental biosphere may have been involved."

Release from a different source, such as volcanoes or sea floor sediments, may have started the event, he said.

"The release of carbon from the biosphere may have occurred as a positive feedback to the warming," Bowen said. "The forests may have dried out, which can lead to die off and forest fires. If we take the Earth's future climate to a place where that feedback starts to happen we could see accelerated rates of climate change."

The team continues to work on new models of the carbon cycle and is also investigating changes in the water cycle during the Palaeocene-Eocene Thermal Maximum.

"We need to figure out where the carbon went all those years ago to know where it could go in the future," he said. "These findings show that the Earth's response is much more dynamic than we thought and highlight the importance of feedback loops in the carbon cycle."

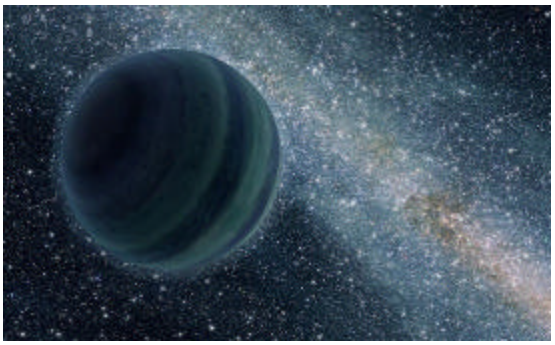
Story Source: The above story is reprinted (with editorial adaptations by Science*Daily* staff) from materials provided by Purdue University.

Journal Reference: Gabriel J. Bowen, James C. Zachos. **Rapid carbon sequestration at the termination of the Palaeocene–Eocene Thermal Maximum**. *Nature Geoscience*, 2010; 3 (12): 866.

Free-Floating Planets May Be More Common Than Stars

NASA Science News

Astronomers have discovered a new class of Jupiter-sized planets floating alone in the dark of space, away from the light of a star. The team believes these lone worlds are probably outcasts from developing planetary systems and, moreover, they could be twice as numerous as the stars themselves.



This artist's concept illustrates a Jupiter-like planet alone in the dark of space, floating freely without a parent star.

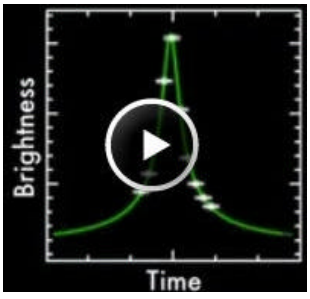
"Although free-floating planets have been predicted, they finally have been detected," said Mario Perez, exoplanet program scientist at NASA Headquarters in Washington. "[This has] major implications for models of planetary formation and evolution."

The discovery is based on a joint Japan-New Zealand survey that scanned the center of the Milky Way galaxy during 2006 and 2007, revealing evidence for up to 10 free-floating planets roughly the mass of Jupiter. The isolated orbs, also known as orphan planets, are difficult to spot, and had gone undetected until now. The planets are located at an average approximate distance of 10,000 to 20,000 light years from Earth.

This could be just the tip of the iceberg. The team estimates there are about twice as many free-floating Jupiter-mass planets as stars. In addition, these worlds are thought to be at least as common as planets that orbit stars. This adds up to hundreds of billions of lone planets in our Milky Way galaxy alone.

"Our survey is like a population census," said David Bennett, a NASA and National Science Foundation-funded co-author of the study from the University of Notre Dame in South Bend, Ind. "We sampled a portion of the galaxy, and based on these data, can estimate overall numbers in the galaxy."

The study, led by Takahiro Sumi from Osaka University in Japan, appears in the May 19 issue of the journal Nature. The survey is not sensitive to planets smaller than Jupiter and Saturn, but theories suggest lower-mass planets like Earth should be ejected from their stars more often. As a result, they are thought to be more common than free-floating Jupiters.



A video from JPL describes the microlensing technique astronomers used to detect the orphan planets.

Previous observations spotted a handful of free-floating planet-like objects within star-forming clusters, with masses three times that of Jupiter. But scientists suspect the gaseous bodies form more like stars than planets. These small, dim orbs, called brown dwarfs, grow from collapsing balls of gas and dust, but lack the mass to ignite their nuclear fuel and shine with starlight. It is thought the smallest brown dwarfs are approximately the size of large planets.

On the other hand, it is likely that some planets are ejected from their early, turbulent solar systems, due to close gravitational encounters with other planets or stars. Without a star to circle, these planets would move through the galaxy as our sun and others stars do, in stable orbits around the galaxy's center. The discovery of 10 free-floating Jupiters supports the ejection scenario, though it's possible both mechanisms are at play.

"If free-floating planets formed like stars, then we would have expected to see only one or two of them in our survey instead of 10," Bennett said. "Our results suggest that planetary systems often become unstable, with planets being kicked out from their places of birth."

The observations cannot rule out the possibility that some of these planets may be in orbit around distant stars, but other research indicates Jupiter-mass planets in such distant orbits are rare.

The survey, the Microlensing Observations in Astrophysics (MOA), is named in part after a giant wingless, extinct bird family from New Zealand called the moa. A 5.9-foot (1.8-meter) telescope at Mount John University Observatory in New Zealand is used to regularly scan the copious stars at the center of our galaxy for gravitational microlensing events. These occur when something, such as a star or planet, passes in front of another more distant star. The passing body's gravity warps the light of the background star, causing it to magnify and brighten. Heftier passing bodies, like massive stars, will warp the light of the background star to a greater extent,resulting in brightening events that can last weeks. Small planet-size bodies will cause less of a distortion, and brighten a star for only a few days or less.

A second microlensing survey group, the Optical Gravitational Lensing Experiment (OGLE), contributed to this discovery using a 4.2-foot (1.3 meter) telescope in Chile. The OGLE group also observed many of the same events, and their observations independently confirmed the analysis of the MOA group.

For more information about exoplanet research, visit http://planetquest.jpl.nasa.gov/

Protein from Bones of 600,000-Year-Old Mammoth Extracted Successfully

ScienceDaily — Researchers from the University of York and Manchester have successfully extracted protein from the bones of a 600,000-year-old mammoth, paving the way for the identification of ancient fossils.

Using an ultra-high resolution mass spectrometer, bio-archaeologists were able to produce a near complete collagen sequence for the West Runton Elephant, a Steppe Mammoth skeleton which was discovered in cliffs in Norfolk in 1990. The remarkable 85 per cent complete skeleton -- the most complete example of its species ever found in the world -- is preserved by Norfolk Museums and Archaeology Service in Norwich.

Artist's rendering of Steppe Mammoth (Mammuthus trogontherii)

Bio-archaeologist Professor Matthew Collins, from the University of York's Department of Archaeology, said: "The time depth is absolutely remarkable. Until several years ago we did not believe we would find any collagen in a skeleton of this age, even if it was as well-preserved as the West Runton Elephant.

"We believe protein lasts in a useful form ten times as long as DNA which is normally only useful in discoveries of up to 100,000 years old in Northern Europe. The implications are that we can use collagen sequencing to look at very old extinct animals. It also means we can look through old sites and identify remains from tiny fragments of bone."

Dr Mike Buckley, from the Faculty of Life Sciences at the University of Manchester, said: "What is truly fascinating is that this fundamentally important protein, which is one of the most abundant proteins in most (vertebrate) animals, is an ideal target for obtaining long lost genetic information."

The collagen sequencing was carried out at the Centre for Excellence in Mass Spectrometry at the University of York and is arguably the oldest protein ever sequenced; short peptides (chains of amino acids) have controversially been reported from dinosaur fossils.

The research formed part of a study into the sequencing of mammoths and mastodons, which is published in the journal *Geochimica et Cosmochimica Acta*. The West Runton Elephant was compared with other mammoths, modern elephants and mastodons. Despite the age of the fossil, sufficient peptides were obtained to identify the West Runton skeleton as elephantid, and there was sufficient sequence variation to discriminate elephantid and mammutid collagen.

Nigel Larkin, co-author and Research Associate with Norfolk Museums and Archaeology Service, said: "The West Runton Elephant is unusual in that it is a nearly complete skeleton. At the time this animal was alive, before the Ice Ages, spotted hyenas much larger than those in Africa today were scavenging most carcases and devouring the bones as well as meat. That means most fossils found from this time period are individual bones or fragments of bone, making them difficult to identify. In the future, collagen sequencing might help us to determine the species represented by even smallest scraps of bone.

"Therefore this research has important implications for bones and bone fragments in all archaeological and palaeontological collections in museums and archaeology units around the world, not just those of Norfolk Museums and Archaeology Service in Norwich."

Story Source: The above story is reprinted (with editorial adaptations by Science*Daily* staff) from materials provided by University of York.

Journal Reference: M. Buckley, N. Larkin, M. Collins. **Mammoth and Mastodon collagen sequences; survival and utility**. *Geochimica et Cosmochimica Acta*, 2011; 75 (7): 2007.

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

"GEOLOGY OF THE LAKE TAHOE REGION, NEVADA and CALIFORNIA"

NCGS LAKE TAHOE FIELD TRIP

Saturday, June 25 and Sunday, June 26, 2011

Field Trip Leader:

Dr. Richard Schweickert, Professor Emeritus of Geology
University of Nevada, Reno

Field Trip Coordinator:
Tridib Guha

Field Trip Leader's Biography:

Dr. Richard Schweickert received his Ph.D. in Geology at Stanford University, and was an Associate Professor at Columbia University and then Professor of Geology at the University of Nevada, Reno until his retirement in January 2010. He was a Foundation Professor at the University since 1993. He specializes in research on structural geology and tectonics, with special emphasis on the Sierra Nevada and the western U.S. With NSF funding, he has carried out research in Alaska, California, Nevada, Chile, Argentina, Newfoundland, Italy, and Corsica. His ongoing research includes: active faults, landslides, and tsunamis in the Lake Tahoe basin involving detailed structural mapping, trenching, drilling, submarine geology, soil gas profiling, and stratigraphic studies; volcanic stratigraphy of the Lake Tahoe basin; stratigraphy, structure, and geologic history of the Tahoe City area; and structure and stratigraphy of the Saddlebag Lake pendant and adjacent areas in the High Sierra.

Major discoveries by Schweickert and his students since the early 1980's include:

- regional thrust faults in the eastern Sierra Nevada
- a Triassic caldera near Tioga Pass, Yosemite National Park
- a major syn-batholithic dextral strike-slip fault system with over 400 km displacement
- Paleozoic and Mesozoic subduction complexes and island arcs in the Sierra Nevada region
- active faults, mega-landslides, and past tsunamis in the Lake Tahoe basin

Lake Tahoe Field Trip Synopsis:

The Lake Tahoe basin is an active half-graben at the Sierra Nevada-Great Basin boundary. The basin was dammed near its present outlet by basaltic shield volcanoes about 2 Ma and ~900 Ka. Three main active fault zones lie within the basin and are capable of M7 earthquakes. Such earthquakes would likely generate significant tsunamis. A mega-landslide along the western edge of the lake removed latest Pleistocene glacial moraines, produced a ~10 km^3 debris avalanche, and generated a tsunami at least 30m high. Giant boulder mega-ripples were produced on shallow shelves north and south of the mega-landslide. The age of the mega-landslide is uncertain, but likely is between 15 Ka and 7 Ka. This fieldtrip will feature stops at South Lake Tahoe, Emerald Bay, Meeks Bay, Sugar Pine Point, Eagle Rock, Tahoe City, and Kings Beach. Evidence of active faults, landslides, glaciation, basaltic volcanism, and tsunamis will be emphasized.

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

This 2-day field trip will start from Pleasant Hill, go to Sacramento (pick up), and continue to South Lake Tahoe via Hwy 50, where we will meet the Field Trip Leader. Camping will be provided at Sugar Pine State Park

Time & Departure: 7:00 am Saturday June 25, 2011 at the Sun Valley Mall Sears Co. parking lot, Pleasant Hill (corner of Contra Costa Blvd and Willow Pass Road) – The Sacramento pick up place will be announced later.

Cost: $120/person. Includes transportation by chartered bus, guidebook, morning coffee & pastries, lunches, and refreshments, BBQ dinner with vino & beer on Saturday night. Camping is included.

A list of participants will be circulated so that you can arrange carpools to the departure location.

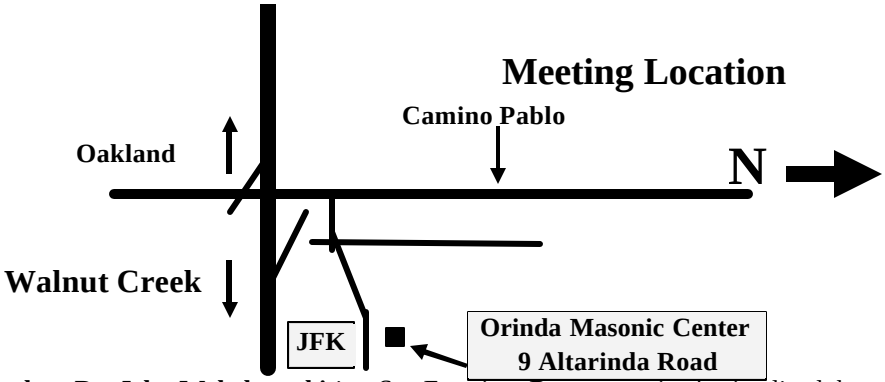
**************************REGISTRATION FORM - Lake Tahoe Field Trip) *********************

Name:_____ E-mail:_____

Phone :_____ Phone (cell):_____ Meals: Regular : ( ) or Veg: ( )

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

Questions: e-mail: tridibguha@sbcglobal.net Phone: (925) 370-0685 (evening), (925) 451-1999 (day)



Biography: Dr. John Wakabayashi is a San Francisco Bay area native having lived there for 45 years before moving to Fresno to join the Earth and Environmental Sciences Department of Fresno State where he is now an associate professor of geology. He received his bachelors' degree in geology from UC Berkeley in 1980, and his undergraduate study culminated with a 10-week field camp that included a 3 week mapping project in mélanges in the central Sierra Nevada foothills. That field training stood him in good stead when he did his PhD research at UC Davis on Franciscan Complex rocks of the San Francisco Bay area under the advisorship of Eldridge Moores. That project which began with John introducing himself and telling Eldridge what he would do for his thesis (good shock factor) concluded with him receiving his PhD in 1989. However, nobody ever smitten by Franciscan geology can ever get enough of it. John worked in the engineering/environmental geology field for the next 16 years, including the last 13 as an independent consultant based in Hayward. In his non-billable time (lots of it during his independent years) he continued research on the Franciscan geology while branching into other avenues of research, including active tectonics, tectonic models for development of metamorphic PT paths, ophiolites and subduction initiation, evolution of strike-slip fault systems, and tectonic geomorphology of the Sierra Nevada. He looks back with some nostalgia at the "affiliation" on his AGU and GSA meeting badges of that era that read "Hayward Brewing Company" a statement of independence and his love of consuming and brewing beer. At Fresno State, he teaches introductory geology, geomorphology, structural geology, and an advanced field mapping course he claims is the most difficult field exercise taught in the USA (yes, the students have to map mélange). He supervises student research in the Coast Ranges and the Sierra Nevada, with projects ranging from Franciscan mélanges to northern Sierra Nevada ophiolites to Sierra Nevada landscape evolution. When not obsessing over geology or drinking beer, his other hobbies include high country trout fishing (has fished over 700 different wilderness lakes) and associated hiking (especially off trail hiking), writing fiction (excluding that which others no doubt call geologic fiction), cooking, fine wine, and trying not to injure himself playing with his kids. His current talk comes from what he considers his most exciting voyage of discovery in his 30 years as a researcher. This began with him finding key exposures while teaching his field class in March 2009 and (?)climaxed(? perhaps not yet) with a series of field excursions from late December 2010 to late April 2011 where it seemed as if every trip resulted in a major change of his understanding.

Northern California Geological Society
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