

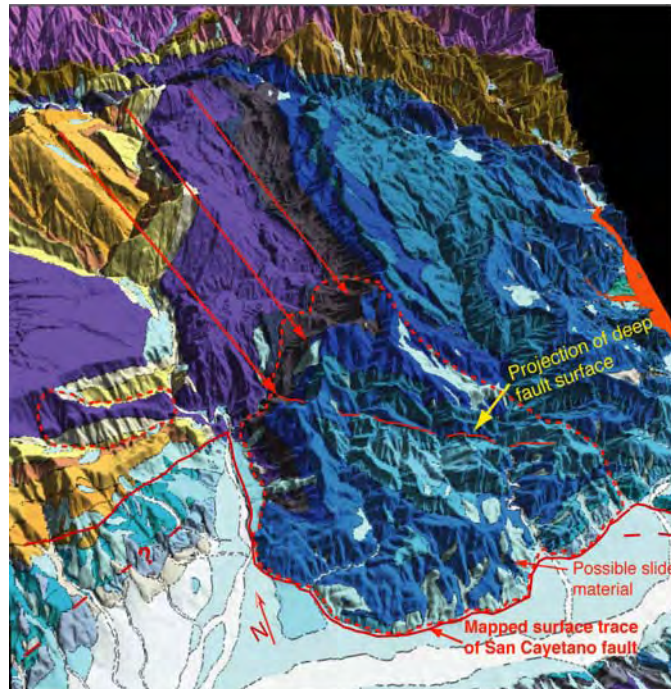
## CGS Monthly Meeting

Tuesday May 20, 2008

“Subsidence, Compaction and Gravity-Sliding: Implications for 3D Geometry, Dynamic Rupture and Seismic Hazard of Active Basin-Bounding Faults in Southern California”

Presented by:

**Dr. Craig Nicholson**  
**UCSB**



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**MEETING INFO: 3<sup>RD</sup> TUESDAY OF EVERY MONTH (DARK IN JULY & AUGUST)**

**BIEDERMANN HALL AT SACRED HEART CHURCH**

**10800 Henderson Road Ventura, CA 93004**

*(See the MAP at the end of this Newsletter for directions.)*

**Reservation Deadline: 4:00 PM on THURSDAY before the meeting.**

**E-mail Reservations to: [secretary@coastgeologicalsociety.org](mailto:secretary@coastgeologicalsociety.org) or visit the CGS website**

**\*\*\*Please specify your dinner choice: Tri-Tip, BBQ Chicken or Vegetarian Lasagna,**

Social Happy Hour - 6:00 p.m., Dinner - 7:00 p.m., Speaker – 8:00 p.m.

\$18 – With Reservation, \$25 - Without Reservation, \$ 10 - For Students and K-12 Teachers



Diagram Caption: Oblique 3D view looking northeast across the surface trace of the San Cayetano fault showing digital topography (DEM) overlaid with mapped surface geology [Dibblee, 2002]. The unusual lobate shape (Modelo Lobe) of this section of the fault is inferred to be the result of a mega-landslide caused by basin subsidence and mountain uplift.

Co-authored with:

**Marc J. Kamerling, Christopher C. Sorlien, Thomas E. Hopps and Jean-Pierre Gratier**

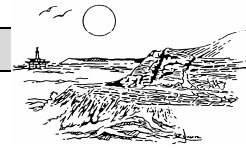
**Abstract:** In southern California, high rates of measured geodetic shortening occur across the Los Angeles and Ventura basins. These deep, subsiding basins are often bounded by oblique reverse faults that thrust early-Cenozoic rocks over young unconsolidated sediments. This implies that compaction, subsidence and other non-elastic processes of footwall deformation can play an important role in contributing to the high rates of observed crustal strain. Even in the absence of active tectonic shortening, sediment compaction alone can produce surficial motions that mimic deep fault slip or elastic strain accumulation. Differential compaction and subsidence of footwall sediments relative to hanging-wall rocks can lead to increased vertical separation, basinward collapse and fault rotation about horizontal axes. Such effects contribute to net horizontal and vertical motions in both geologic and geodetic data, and—if not properly accounted for—result in incorrect estimates of the inferred seismic hazard.

Subsidence and compaction also increase the potential for gravity-sliding towards the basin and the development of significant non-planar 3D fault geometry. A prime example occurs along the San Cayetano fault that bounds the eastern Ventura basin. At shallow levels, a large thrust sheet (the Modelo Lobe) with low dip extends out in front of the more steeply dipping fault segment by over 4 km, is nearly 2 km thick, and occupies over 60 cubic km. This geometry is strongly indicative of gravity-driven failure resulting from hanging-wall uplift, basinward tilt and collapse, enhanced by footwall subsidence and compaction. Failure of this mega-slide off the hanging-wall block most likely occurred within the Rincon Formation, a ~400-m thick ductile shale sequence that often accommodates bedding-plane or detachment slip. This 3D geometry has significant implications for how the fault may behave during dynamic rupture, and implies that additional care should be taken in extrapolating near-surface measurements or estimates of fault slip and dip to seismogenic depths.

**Biography:** Dr. Craig Nicholson graduated from Amherst College, St. Louis University and Columbia University. His primary focus is understanding the structure, stratigraphy, and tectonic deformation of the California margin and he is currently working with colleagues to utilize this unique tectonic and oceanographic setting to acquire ultra-high resolution paleoclimate records from the Santa Barbara Basin. He is a Research Geophysicist with the Marine Science Institute and Adjunct Associate Professor with the Department of Earth Science at UC Santa Barbara.

**RESERVATIONS:** E-mail [Secretary@coastgeologicalsociety.org](mailto:Secretary@coastgeologicalsociety.org) or visit the CGS website by the Thursday before the meeting at 4 pm. Please include name and menu choice (Tri Tip, Chicken, or Vegetarian Lasagna) for each person attending. If you don't make a reservation, it's possible there will not be a meal available for you the day of the meeting.

**MARK YOUR CALENDAR:**



- **Upcoming CGS meetings:**

June 17, 2008: **Mark Legg, Legg Geophysical:** "Tsunami Hazards in the Southern California Region - Surf City Tsunami Ready?"

### UPCOMING EVENTS:

- FRITSCHÉ'S GEOTREK III – 2008 (Letter to CGS Membership from Gene Fritsche)

Final plans for GeoTrek III are complete. By the time of the May CGS meeting the first day of the hike will have been completed and the second day's hike will begin the following morning. All details regarding the GeoTrek are now posted on the CGS website at <http://www.coastgeologicalsociety.org/>. Click the GeoTrek button on the CGS home page to find GeoTrek dates, meeting places, itineraries, and routes plotted on GoogleEarth perspective views and on Dibblee geologic maps.

The Fritsche's, some of your CGS colleagues, and perhaps even you will be doing all the hard work by hiking all or part the GeoTrek route. Your part is to support the GeoTrek by donating a generous monetary contribution to the CGS Geology Student Scholarship Funds. If you did not get a chance to pledge your support for the GeoTrek at the April CGS meeting, please email Gene at [a.eugene.fritsche@csun.edu](mailto:a.eugene.fritsche@csun.edu) with your pledge amount. If your employer is one of those who provide matching funds for your charitable contributions, please be sure to fill out any necessary paperwork to claim these funds.

If you would like to join Gene and Sue on one or more of the GeoTrek hike days, check out the dates and routes on the website, and then let Gene know via email in advance at [a.eugene.fritsche@csun.edu](mailto:a.eugene.fritsche@csun.edu) so that he can ensure adequate shuttle vehicle space at the end of the hike to take you back to your vehicle at the beginning. Note the early response time of May 15 required for May 31 and June 2. On those two days we will be traversing private property and time is needed for clearance of all participants.

Sue and I look forward to hearing of your possible participation and to receiving your generous pledge of support for the CGS Geology Student Scholarship Funds. See you at the May CGS meeting.

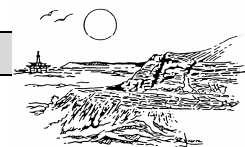
Gene Fritsche

- Geology and Mining History Field Trips Co-Sponsored by Bureau of Land Management and Buena Vista Museum of Natural History:

Visit website at [www.blm.gov/ca/st/en/fo/bakersfield/Programs/geology/fieldtrips.html](http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/geology/fieldtrips.html) or call Dr. Greg Wilkerson at 661-391-6081 or at [gwilkerson@blm.gov](mailto:gwilkerson@blm.gov).

**Aug. 2, 2008: San Joaquin Valley: Westside Stratigraphy**

The geology of Wheeler Ridge, White Wolf Fault, Maricopa and McKittrick Brea Pits, Oil Mining (diatomite), Lake View Gusher, Elk Hills Naval Petroleum Reserve and South Belridge oil field are discussed. Includes a display of core at the California Well Sample Repository, California State University, Bakersfield.

**Sept. 13, 2008: Ventura-Ojai-Santa Paula-Lake Piru**

This trip includes stops at the Olivas Adobe, Ventura Historical Society Museum, Ventura Avenue Oil Field, Ojai Valley, Union Oil Museum (Santa Paula), Bardsdale and Blue Point on Lake Piru. We learn about the history of oil development in Ventura County, the oil mines of Sulfur Mountain, the effects of the St Francis Dam disaster and the ecology of Lake Piru.

**Oct. 13-15, 2007: Mother Lode III: Northern Mines**

This 3-day field conference looks at the structure, stratigraphy and geologic history of the Northern Mines of the Mother Lode in Sierra and Plumas Counties. Friday's trip in Grass Valley where we see the North Star Power house and Empire Mine. Saturday we journey to Edward's Crossing, Malikoff Diggings, Forest Hill, Downieville, and the Kentucky Mine. We end Saturday in Quincy. Sunday's trip will be from Quincy to the Walker Basin. We will go through Taylorsville, see the Englesmine and other mines of the Walker Basin. The program ends in Portola.

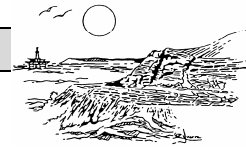
**Nov. 1, 2008: San Andreas Fault: Ft. Tejon to Pallet Creek**

This segment of the San Andreas fault takes us to several sag ponds and offset streams. Stops are made at Ft. Tejon, Quail Lake, Devil's Punchbowl and Wrightwood. Carbon 14 radiometric dating and its application to understanding the frequency of earthquakes along the San Andreas Fault is considered at the Pallet Creek paleoseismic site. Examples of the interaction between ecosystems and fault systems are discussed

**Jan. 26, 2009 : Santa Maria-Carrizo Plain-Cuyama Valley**

This trip starts in Santa Maria and investigates the ecology of the Santa Margarita Lake region including the Rinconada and La Panza mining districts. The tour continues on Highway 58 to the Carrizo Plains for a look at the San Andreas Fault.

- The Statewide Golden Bear Gem & Mineral Show: 69th Annual Show of the California Federation of Mineralogical Societies. Dates & Times: Fri., June 27 - Sun., June 29, 2008 (10 AM - 5 PM each day) Admission: \$5 adults, \$4 Seniors (60+), \$3 students, Kids under 12 free with paid adult. Location: Seaside Park, Ventura County Fairgrounds, 10 W. Harbor Blvd, Ventura. Contact Person: Bural LaRue, Show Chair, (909) 874-5664, [bplarue@earthlink.net](mailto:bplarue@earthlink.net) or [www.cfmsinc.org](http://www.cfmsinc.org). Features: over 100 gem, mineral, rock, fossil & jewelry exhibits, including exhibits entered into statewide competition; 50 dealers; demonstrations of jewelry making; informative speakers; door prizes & silent auctions; kids activities; and the official State Gemstone, State Fossil, State Rock, and State Mineral on display. This is informally known as "the Super Bowl" of California gem shows!
- The 2009 Pacific Section AAPG Convention will be hosted by the Coast Geological Society May 3 - 7, 2009 at the Ventura Marriott. Tom Hopps will serve as the Convention Chairman and Gene Fritsche will be the Technical Chairman.
- Upcoming Events at the California Oil Museum: See [www.oilmuseum.net](http://www.oilmuseum.net)



**CGS MEMBERSHIP:** CGS membership is through Pacific Section AAPG. Be sure to select **Coast Geological Society** as your local affiliated society. To join CGS, please go to: [www.psaapg.org/member.html](http://www.psaapg.org/member.html)

### **CGS OFFICERS DIRECTORY:**

President: **Bob Ballog**, Hueneme HS 805-498-6294/805-402-1173, [president@coastgeologicalsociety.org](mailto:president@coastgeologicalsociety.org)

Past Pres: **John Minch**, SB Museum of Natural History. 805-682-4711 x137,  
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Vice-Pres: **Bill Bilodeau**, California Lutheran University, 805-493-3264,  
[vpresident@coastgeologicalsociety.org](mailto:vpresident@coastgeologicalsociety.org)

Treasurer: **Muriel Norton**, Subsea Systems USA 805-658-1550, [treasurer@coastgeologicalsociety.org](mailto:treasurer@coastgeologicalsociety.org)

Secretary: **Christine White**, DCOR, LLC 805-535-2074, [secretary@coastgeologicalsociety.org](mailto:secretary@coastgeologicalsociety.org)

### **NOTICES**

1. *No-Cost* Employment Announcements (Help Wanted & Job Wanted) are available on our website! Also, business card ads and employment ads available in the newsletter! Contact [secretary@coastgeologicalsociety.org](mailto:secretary@coastgeologicalsociety.org)
2. If you forward the email notice to another party, cc: [secretary@coastgeologicalsociety.org](mailto:secretary@coastgeologicalsociety.org) in the email, we will put your party on the monthly notification list. There is no cost to receive CGS email notifications.
3. Buy your raffle tickets! Money generated goes toward scholarships, field trips, etc., to promote the advancement of Geosciences. Check the CGS supported activities on our website (3 Tickets for \$1).
4. Always needed: **Sponsors for our meetings!** Sponsors get a beautiful colored banner hung at the meeting, and the opportunity to distribute their literature and introduce their businesses, as well as the satisfaction of having supported a great organization! Sponsorships are \$300 per meeting and may be shared between two individual sources. Contact [vicepresident@coastgeologicalsociety.org](mailto:vicepresident@coastgeologicalsociety.org) for info.

### **MEETING PLACE: MAP AND DRIVING DIRECTIONS**

Meetings are held at the Sacred Heart Church, Biedermann Hall, 10800 Henderson Road, Ventura, CA 93004.

The location is off Hwy 126 at the Wells Road/Route 118 Exit. Click on the map below for a more detailed view and directions.

