



**AEG SAN JOAQUIN VALLEY CHAPTER**

**APRIL 2009**

## ***AD Hoc Committee***

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## ***Message from the Ad Hoc Chair***

Greetings to the members and associates of the San Joaquin Valley AEG Chapter!

Our SJV Chapter is growing and we had our largest number of attendees so far with 43 people at the last meeting. Our March speaker was Mr. Mark Molinari, the AEG National President. Mark is employed with URS in Seattle and works internationally on geological hazards and engineering geology projects. Mark presented a very interesting talk on applications of LiDAR remote sensing technologies to Environmental and Engineering Geology. He showed several excellent examples of situations where LiDAR was used to help identify geological features that elude traditional geologic mapping methods. One of his most fascinating examples was the use of LiDAR to identify a Holocene fault scarp on the Toe Jam Hill Fault on Bainbridge Island, Washington. The Toe Jam Hill Fault is part of the active and poorly understood Seattle Fault Zone and its exact position had been uncertain prior to the use of LiDAR for determining its location. After seeing Mark's Toe Jam Hill Fault example, many of the meeting attendees were relieved to be living in the San Joaquin Valley instead of on Bainbridge Island! Thanks again to the AEG Student Chapter / Fresno State Earth & Environmental Sciences for sponsoring and organizing Mark's visit.

Mark brought up an excellent point regarding AEG membership during his talk: AEG is now the Association of Environmental and Engineering Geologists (historically, AEG was limited to Engineering Geology only). As this is a relatively recent change in the Charter, it is not widely recognized that AEG now includes Environmental Geology as well. This is an important distinction to make with respect to our membership drive — if you participate in Environmental or Engineering Geology, please consider becoming an AEG member. If you know someone who would like to join AEG and/or receive the Newsletter, please have them contact Richard Fink (rfink@kleinfelder.com) to be added to the mailing list.

Please mark your calendars for April 16th, our next meeting at the Old Spaghetti Factory. Chris Kemp, a graduate student at Fresno State will present his talk on Tectonic and Geomorphic Evolution of the Sierra Nevada. We look forward to learning about Chris' research in this area.

The upcoming meeting is also important in that we will nominate and elect our 2009 Officers. We have had ad Hoc Officers in place since our Chapter formation in late 2008 and we are soliciting nominations from active/current AEG members (only active AEG members can vote) for formal elections. The Ad Hoc officers are nominated to continue their positions but any additional nominations are welcome. Please email any nominations to Richard Fink at rfink@kleinfelder.com by no later than noon on April 13 (Monday).

***Chair Message cont. on page 4***

# The Sierra Nevada Frontal Fault system: Kinematics and associated landscape evolution

Christopher D. Kemp Graduate student CSU, Fresno

April 16, 2009 Old Spaghetti Factory, 6-9 PM

The Sierra Nevada Frontal Fault system (FFS) bounds the western Basin and Range province and defines the eastern margin of the Sierra Nevada microplate. The FFS's role in the uplift of the Sierra Nevada, however, remains enigmatic and little is known of its temporal and spatial evolution along the range front. We present new field, geochronologic, and computational data that constrain evolution of the FFS, uplift, and topography in the Feather River region of the northern Sierra Nevada, CA; these data also have range-wide implications.

South of the North Fork Feather River, the FFS is clearly expressed from Mohawk Valley to the well-defined range crest. Unique piercing points defined by the contact between overlying Miocene-Pliocene Mehrten Formation and the paleo-Feather River channel record ~705 m of vertical separation across the FFS. Vertical separation began after 5 Ma and has nearly ceased since 1.2 Ma. Similarly, the North Fork Feather River has incised 713 m into basement underlying the paleo-Feather River since ~5 Ma, recording uplift that the FFS has almost completely accommodated. Stream profiles and quantitative landscape analyses indicate that incision robustly records tectonically-driven uplift in trunk streams of the North Fork Feather River watershed.

In contrast, north of the North Fork Feather River, the FFS's topographic expression is convoluted and does not reveal a well-defined range crest. Unlike areas farther south, vertical separation across the FFS is relatively minimal (~170 m). Volcanic terraces perched on canyon walls and 2.8 Ma Yana Formation andesites capping upland surfaces reveal tectonically-driven incision that began after 2.8 Ma and reached maximum incision rates at 1.2 Ma; maximum incision rates have slowed very little into the present. The volcanics also record ~450 m of tectonically-driven stream incision into basement. Therefore, tectonically-driven stream incision has outpaced measurable vertical separation. Vertical separation rates south of the North Fork Feather River (0.19 mm/yr between 5 Ma and 1.2 Ma) are more than triple than those from north of the river (~0.06 mm/yr since 2.8 Ma). We thus conclude that the northernmost FFS is an incipient fault zone that has only recently begun to accommodate past and contemporary uplift.

The differential vertical separation and uplift relations between the regions north and south of the North Fork Feather River suggest that range-front faulting is propagating northward. Previous authors conclude that rapid, tectonically-driven incision began before ~3 Ma in the southern Sierra and slowed nearly to a halt by ~1.5 Ma. We posit, then, that development of the FFS and peak uplift rates have propagated northward through the Sierra Nevada indicating that the block-tilt model for range uplift may not be ideal; these data also have implications for what mechanism drives Sierra uplift such as Basin and Range extension or northward passage of the slab window associated with the Mendocino Triple Junction.



Overlook of Soda Creek - view towards Red Hill, northern Sierra Nevada (photo credit: J. Wakabayashi)

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Christopher D. Kemp is a M.S. Geology candidate at California State University, Fresno. His research is advised by Dr. John Wakabayashi and focuses on the tectonic and geomorphic development of the northern Sierra Nevada.

## ***Sponsorship Opportunities***

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to describe company

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### **Gold - \$500/year**

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to describe company

Set up a booth at one meeting

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2009 – 2010 newsletters

For more information contact our treasure, Richard  
Fink, at [rfink@kleinfelder.com](mailto:rfink@kleinfelder.com)



Richard C. Fink, CEG, REA II  
Principal Geologist

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# April 2009 AEG Meeting RSVP Sheet

Fax or E-mail to the address below:

To: Richard Fink  
Fax: 559.442.5081

E-mail: [rfink@kleinfelder.com](mailto:rfink@kleinfelder.com)

From:

E-mail:

Subject: April AEG San Joaquin Valley Chapter Meeting

Date: April 16, 2009

Place: Old Spaghetti Factory (Located on the northern side of Shaw Ave. between Cedar and First)

Time: 6:00 - 7:00 PM - Sign in & Social hour

7:00 - 7:30 PM - Dinner & Announcements

7:30 - 8:30 PM - AEG meeting & Speaker presentation

8:30 - 9:00 PM - Questions & Answers

On the Menu: Choice of: Spinach and cheese tortellini, Manager's Favorite, or Spaghetti Vesuvius;  
Salad with Pesto Dressing or Balsamic Vinaigrette; Bread; Beverages (free refills); Ice Cream

Cost (circle one):    \$10 for students            \$25 for non-students



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## *Chair Message*

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The positions to be elected include:

- Chair
- Co-Chair
- Treasurer/Secretary
- Treasurer Assistant

A list of the nominees will be prepared and sent out that afternoon or Tuesday morning. Please be prepared to vote at the meeting on Thursday 4/16. Those active AEG members of the chapter who cannot attend the meeting to vote in person can still email their vote by 12 pm on the 16th.

We look forward to seeing you at the Old Spaghetti Factory on April 16!

Warm regards,

*Lynne Baumgras, Ph.D., PG, CEG*  
Ad Hoc Chair

## *Calendar of Events*

**April 16, 2009**

*Chris Kemp, Graduate Student*

*California State University, Fresno*

Topic: Tectonic & Geomorphic Evolution of the Sierra Nevada

**April 28, 2009**

*AEG Student Night in Sacramento*

**June 18, 2009**

*Tim McCrink, Senior Engineering Geologist*

*California Geological Survey (CGS), Sacramento*

Topic: Stereo Mapping Using NAIP Imagery –

Development of a 3D mapping system using ADS40 imagery