NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

NCGS FIELD TRIP

TO

THE SIERRA NEVADA FRONTAL FAULT ZONE

Saturday / Sunday July 7 & 8, 2007

Leader: Dylan Rood; LLNL and UC Santa Barbara

Up to 25% of the plate boundary deformation in the western US is currently localized within a ~100-150 km wide dextral shear zone referred to as the Eastern California Shear Zone (ECSZ) and Walker Lane Belt (WLB). Active deformation near the western edge of the Great Basin is demonstrated by Quaternary fault patterns, seismicity, and geodetic data. The Sierra Nevada Frontal Fault Zone (SNFFZ) is located on the westernmost margin of the Great Basin, at the tectonic boundary between the relatively undeformed Sierra Nevada block and WLB. In the central-eastern Sierra Nevada, the SNFFZ consists of a series of left-stepping fault-bounded basins produced by normal or oblique-slip faulting. Little is known about either the long-term history of slip on many of these faults or the variation in slip rates through time. The major focus of this field trip will be to examine and discuss the location, geometry, kinematics, and rates of deformation across the transition from the Sierra Nevada to the Walker Lane belt (WLB) in the region of the eastern Sierra Nevada from Sonora Pass to Mono Basin.

On this field trip, we will discuss the deformation history of the SNFFZ during Tertiary through Quaternary time. The field trip area is unusual, if not unique, in the Sierra Nevada and western Great Basin, because it offers distinctive strain markers spanning the past 10 My. Well-preserved and regionally extensive Late Tertiary, Pleistocene, and Late Quaternary markers provide accurate estimates of cumulative slip across faults (both vertical and horizontal). We will visit several localities where we constructed fault slip rates by combining geologic and/or geomorphic mapping, GPS surveying, and various geochronologic methods (including $^{40}Ar/^{39}Ar$ and cosmogenic ^{10}Be exposure dating).

Specifically, we will observe:

(1) Evidence for Miocene (~10 Ma) faulting along the SNFFZ within the Ancestral Cascades Arc by looking at an angular unconformity exposed within the unique Tertiary volcanic stratigraphy of the Sonora Pass region.

(2) A long record of Quaternary normal faulting preserved in a suite of glacial deposits in the Sonora Junction area. With differential displacements along the same fault system ranging in age from 10 Ma to 10 ka, we can compare Tertiary and Quaternary fault slip rates.

(3) Tertiary and Quaternary deformation in the Bridgeport Basin, where both normal and oblique-dextral faulting is expressed in offset Tertiary volcanic and Quaternary glacial/alluvial markers.

(4) Geothermal evidence for active faulting in the Bridgeport Basin by visiting the beautiful hot springs of this part of the eastern Sierra.

Sierra Nevada Frontal Fault Zone Field Trip **July 7 & 8, 2007**

Meeting Time and Place: 9:00 A.M. on July 7 at Buckeye Campground

Directions to Buckeye Campground: Follow Highway 395 south from Bridgeport, turn left and travel approximately seven miles on Twin Lakes Road. Turn right on Buckeye Road at Doc and Al's Resort and travel about 3 miles. Turn left at fork and travel another mile to campground.

Camping/Motel: We will be camping at Buckeye campground on Friday and Saturday nights. Otherwise, motels are available in the Bridgeport area.

Because of differences in arrival times, you will be responsible for Friday night's dinner. Breakfast and lunch on Saturday and Sunday will be provided. There will be a NCGS sponsored dinner on Saturday Night. Get your BBQ aprons on, or be prepared otherwise to help out!

Cost: $115 **Limit: 30 People**

************REGISTRATION FORM (Sierra Nevada Frontal Fault Zone Field Trip) ********************

Name:_____ E-mail:_____

Address:_____ Phone (day): _____ Phone (evening):_____

Lunch: Regular:_____ Vegetarian: _____ (Please check one) Check Amount: _____

Please mail a check made out to **NCGS** to: **Rob Nelson**
269 College View Drive,
Rohnert Park, CA 94928

Carpooling is suggested for this fieldtrip.

Questions: e-mail: rlngeology@sbcglobal.net Phone: (707) 795-8090 (evening)
(707) 548-3268 (day)