San Joaquin Geological Society

Date: **Tuesday, June 11th, 2013**

Time: **6:00 PM Social Hour**
7:00 PM Dinner
8:00 PM Lecture

Place: **American Legion**
2020 H St. Bakersfield, CA 93301

PSAAPG Members & Mesozoic's
$25 w/reservation
$30 without reservation

Non PSAAPG Members
$30 w/reservation

Full-time Students with ID:
Free, Courtesy of Chevron & Occidental

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By: Friday June 7th, 2013

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An Outcrop Example of a Seismic-Scale Mass-Transport Deposit, Taranaki Basin, New Zealand: Spatial Variability in Stratigraphy, Structural Architecture, and Kinematics

Glenn Sharman[1]
[1]Stanford University

This study characterizes a seismic-scale mass-transport deposit (MTD) that evolved along a tectonically active and rapidly prograding late Miocene slope margin in the Taranaki Basin, New Zealand. The informally-named "North Awakino MTD" is at least 70 meters thick and outcrops for approximately twelve kilometers in cliffs up to eighty meters high and in wave-cut platforms along the present-day northern Taranaki coast. The scale and quality of these exposures offer a unique opportunity to study the stratigraphy, structural architecture, deformational character, and kinematics of a large MTD in a spatial context. In addition, this MTD or its stratigraphic equivalents are imaged in a grid of 2D seismic-reflection lines just kilometers offshore the study area. This dataset allows integration of outcrop- and seismic-scales of observations and provides insights into the nature, extent, and magnitude of deep-water slope mass-wasting in a highly dynamic tectono-sedimentary setting.

Considerable lithologic and structural heterogeneity have been identified within the North Awakino MTD. In the northern four kilometers of the studied outcrop, thick- to medium-bedded volcaniclastic sandstone and mudstone are prevalent, and the deformational style is relatively ordered, being dominated by spectacular folding with amplitudes reaching the scale of the outcrop (10's of meters height). These folds are open to isoclinal, have reclined to recumbent axial surfaces, and often exhibit "detachment" of their cores along thin, fine-grained intervals. The southern portion of the outcrop study area is characterized by thin-bedded volcaniclastic sandstone and mudstone. These facies are typically accompanied by less ordered, disharmonic folding at the decimeter- to meter-scale. Pre-lithification faults (normal and reverse) are found pervasively within the North Awakino MTD with typical displacements of centimeters to several meters. Preliminary kinematic analysis suggests that the MTD transport direction is not consistent along the outcrop extent but locally varies by up to ninety degrees. These findings have important implications for the application of traditional paleoslope analyses that do not account for spatial variability within the transport direction of MTDs. Future work will focus on continued kinematic analysis and integration of outcrop and seismic-reflection datasets.

Glenn Sharman –BIO

I grew up in Delaware and did my undergraduate studies at Wheaton College (outside of Chicago, Illinois) where I received a B.S. in geology. I worked for a little over a year as a field geologist with ENVIRON International Corporation, an environmental consulting firm based in Chicago. I then started graduate school at Stanford, and I am currently in my 4th year working on a PhD. My research interests include using provenance relationships to understand regional paleogeography and paleotectonism in central California. I also am studying an outcrop exposure of a large mass-transport deposit exposed in coastal cliffs in New Zealand.