Geological Society of Nevada

SOUTHERN NEVADA CHAPTER

Newsletter April, 2001

Mesozoic thrusting in the hinterland of the Sevier orogenic belt: The central Nevada thrust belt.

DATE: **Thursday, April 26, 2001**

SPEAKERS: **Joseph Gilbert**
Melissa Hicks
Ilsa Schiefelbein

LOCATION: **Room 102 Lilly Fong Geoscience Building**

TIME: **5:30 p.m. Social hour**
6:30 p.m. Presentation

Structural correlation of Mesozoic (?) contractional structures with the central Nevada thrust belt, Nye County, Nevada.

Joe Gilbert – UNLV, Geoscience, Las Vegas, NV 89154-4010, jjg@nevada.edu

Abstract (GSN- Las Vegas meeting on April 26, 2001)

The Central Nevada Thrust Belt (CNTB) is a N/S trending fold and thrust belt of probable Mesozoic age that is located in the hinterland of the Sevier orogenic belt. Subsequent dissection by Cenozoic normal faults makes delineation of CNTB structures difficult. Some workers suggest the southern portion of the CNTB is an early pulse of Mesozoic contraction related the Sevier orogenic belt. Therefore, understanding the CNTB is important to the regional tectonic evolution of the western Cordillera from late Paleozoic to Eocene time. The purpose of this study is to document contractional structures and Cenozoic normal faults in the central Pancake Range, Nye County, Nevada, and correlate contractional structures to the CNTB.

Map, cross section, and stereonet data suggest a minimum of four sets of Cenozoic normal faults: pre-35.34 Ma, 35.34 Ma to 31.3 Ma, and post- 31.3 Ma sets. Most normal fault sets strike N/S, however, several transverse normal left-lateral oblique-slip faults were mapped that are younger than 35.34 + 0.07 Ma.

Field relations document an E-vergent, N-striking (N23^{o}E/46^{o}W) thrust fault, the Ike Springs thrust. This fault lies structurally above southern CNTB thrust faults mapped in the Grant and Quinn Canyon ranges. The Ike Springs thrust places Devonian strata over Mississippian/Pennsylvanian deposits with a maximum stratigraphic offset of 2037 m. This relationship is consistent with CNTB faults mapped further north. In contrast, previous workers attribute deformation of Paleozoic strata to a Cenozoic low-angle normal fault. The documentation of the Ike Springs thrust together with no observation of a low-angle normal fault provides a better explanation for the deformation of Paleozoic strata exposed within the area.

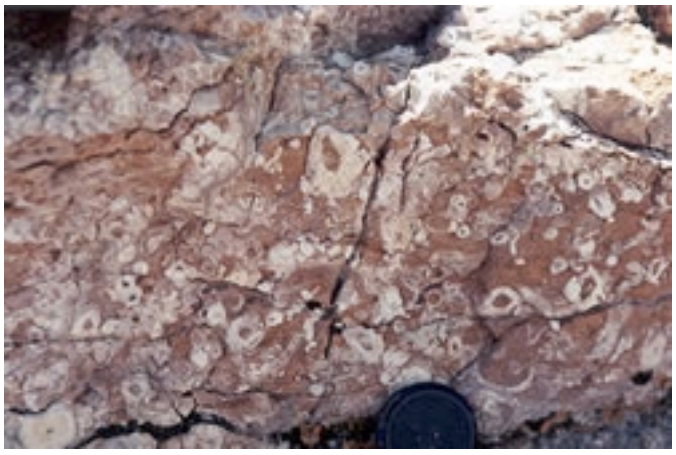
Field mapping and structural analyses document contractional structures that lie structurally above southern CNTB structures exposed to the southeast. The faults show consistent offsets and strikes and are

consistent with CNTB structures mapped to the north. Structures exposed in the Pancake Range therefore link the CNTB through central Nevada.

Joe Gilbert

Joe graduated from a diminutive state school in River Falls, Wisconsin. After completing his B.S., Joe migrated to Denver to discover traffic, mountain highs, and indulge in capricious desires. While in Denver, Joe worked long hours completing such tasks as AVO analysis, spherical divergence tests, semblance and constant velocity picks, statics, pre and post-stack filtering, and commitment to favorable relationships. Successful forbearance at UNLV allowed Joe to further his career in geoscience, baseball, and digital subversions. His post-education career includes travel to distant isles, beguilement with similar peoples, and frolics with new ideas in a vain attempt at solace.

Paleoecology of lower Cambrian archaeocyathan reefs in Esmeralda County, Nevada.



Melissa Hicks – UNLV, Geoscience, NV 89154-4010, hicksm@nevada.edu

Abstract (GSN- Las Vegas meeting on March 22, 2001)

The Lower Cambrian marks the emergence of metazoan-built reefs. Archaeocyathans (calcareous sponges) and calcimicrobes (e.g., *Renalcis*) constructed these early reefs on shallow carbonate platforms. As part of my thesis, I correlated four localities of upper Lower Cambrian archaeocyathan-calcimicrobe reefs in the upper Harkless Formation in Esmeralda County, Nevada. These reefs are lens-shaped patch reefs ranging in size from 1 m long and 0.5 meters high to 15 meters long and 1 m high. In some reefs, archaeocyaths compose an estimated 25 percent of the reefs, creating a rigid framework conducive for extensive lateral and vertical growth. *Renalcis* is found pervasively within the reefs acting as a binding entity that adds strength and stability to the archaeocyathan framework. Reef dwellers and peri-reefal

organisms such as ostracodes, trilobites, salterella, hyoliths, chancelloria, echinoderms, and (in one locality) coralomorphs are present.

All reefs formed on a shallow, carbonate platform, are surrounded by packstone, and are capped by fine sandstone. It appears that a regional sea level fall might be the culprit that brought about the end of these particular reefs. However, at the end of the Early Cambrian, archaeocyathan-built reefs disappeared globally. Events that led to this global collapse of the archaeocyathan reef ecosystem are poorly understood. The Esmeralda County reefs are some of the youngest archaeocyathan-built reefs in the world; and therefore, could provide clues to the processes that cause reef communities, ancient and recent, to decline.

Melissa Hicks

Melissa obtained a BS in geology at Juniata College (Native American word, not Spanish) in the very heart of the Appalachian Mountains. Her senior thesis at Juniata involved an 8-week sentence in Kentucky looking at the paleoecology of the Devils Hollow member (Middle Ordovician) of the Lexington Limestone Formation. After graduation, Melissa went west to the University of Nevada, Las Vegas, in order to procure a master's degree in paleontology. Her research involves describing the paleoecology of Early Cambrian archaeocyathan reefs and looking into reasons for their decline at the end of the Early Cambrian. In the near future, Melissa will begin her Ph.D. research at UNLV looking in more detail at climatic effects on both archaeocyathan reefs and modern sponges.

Fault segmentation and linkage along the Sevier Fault, southwestern Utah.

Ilsa Schiefelbein – UNLV, Geoscience, NV 89154-4010, ilsa@nevada.edu

Abstract (GSN- Las Vegas meeting on March 22, 2001)

Fault segmentation and linkage theories are applied to different long (70 km) faults around the world. The theories imply that faults initiate as separate faults, propagate, and ultimately link to form a long fault.

Fault linkage models include situations in which separate faults originally overlap or underlap. In addition, separate faults may link along new breakthrough faults or by one fault capturing another. Fault capture occurs between overlapping faults where one fault propagates more quickly and links to a second fault near its center. Segment boundaries may occur at linkage zones and include geometric, structural, and earthquake types. The purpose of this study is to document and determine how two sections of the Sevier fault (SF) linked, what type of segment boundary formed, and asses the earthquake and slope failure hazards for the region.

The SF is a steeply, down to the west, segmented long (~250 km) normal fault located in the High Plateaus subprovince of the Colorado Plateau. A 17 km section from Orderville to north of Glendale, UT was studied. Data analyses suggest the SF linked by fault capture and formed a geometric bend. At the geometric bend and 8 km north, two relay ramps were documented further suggesting linkage occurred in this zone. Although no Holocene ruptures were documented along the SF, offset Quaternary basalt indicates Quaternary movement. Earthquakes located near the trace of the SF suggest it may be active. Landslides and rockfalls are common along the 73.2 m to 182.9 m high fault escarpment.

We suggest that the SF is a segmented, long normal fault that initiated as more than one isolated fault and then linked to form the fault we see today. Linkage in the study area occurred by fault capture with the formation of two relay ramps and a geometric bend. Because the SF may be active, seismic risk is posed to the communities and roadways in the region.

Ilsa Schiefelbein

Ilsa got her B.S. in geology and geophysics from the University of Wisconsin-Milwaukee in 1999 where she studied structural and engineering geology. She is currently finishing a M.S. in structural geology under the direction of Dr. Wanda J. Taylor at UNLV. After earning a M.S. she will pursue a Ph.D. in tectonics and sedimentation. Her goals after earning a Ph.D. are working for the USGS or doing research for an oil company.

Announcements

Look! Its a *NEW* GSN web site!
http://www.gsnv.org

If you know of anyone that would like to become a member of if you need to renew your membership in the Geological Society of Nevada, a membership application is attached.

Newsletter Update

Do you know someone who has moved and not told us? A few newsletters are returned because of incorrect addresses following each mailing. If you are aware of someone who hasn't received a newsletter, please have them call or email Paul Bowen at (702)247-7765 or p_jbowen@ix.netcom.com. You may also contant Laura Rudd at GSN headquarters to update this information. Thanks!

GEOLOGICAL SOCIETY OF NEVADA
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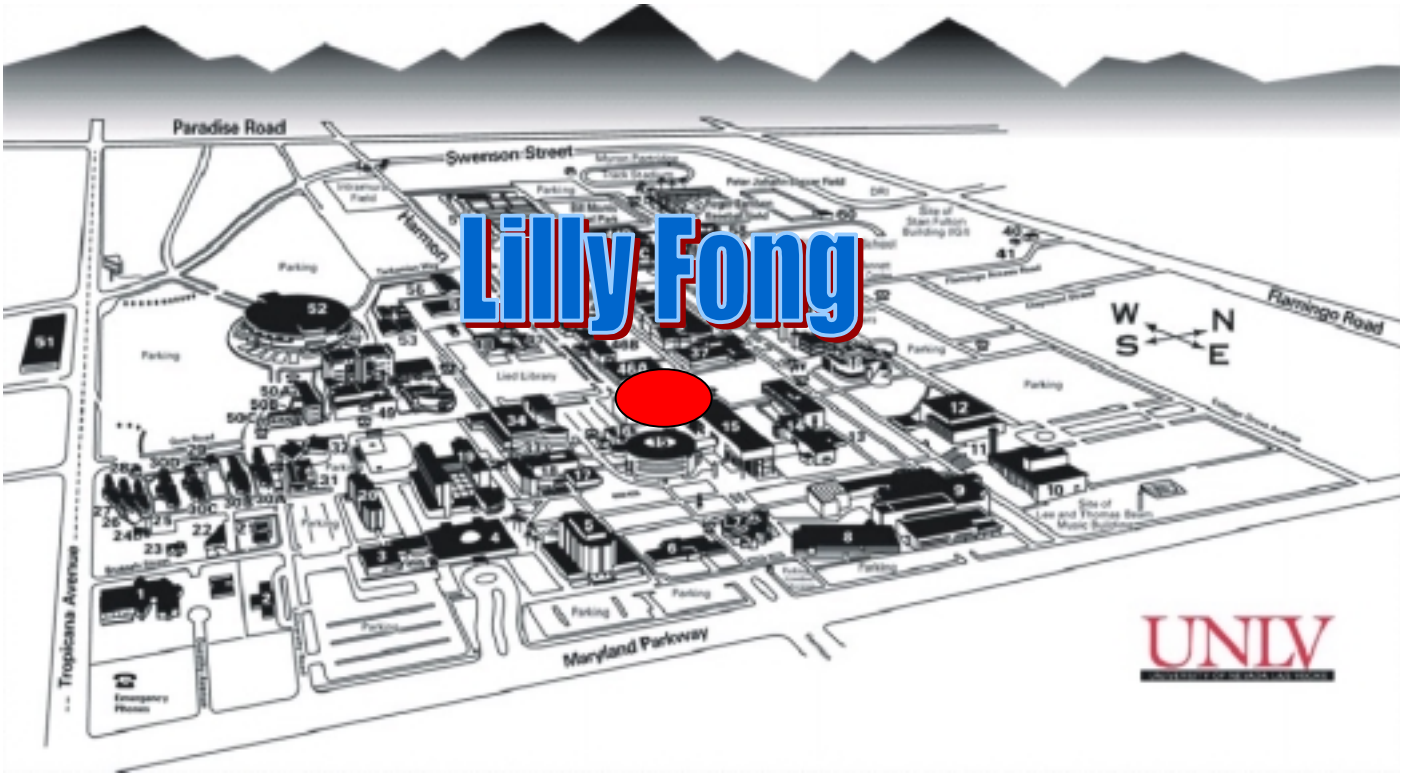
Return with payment to: Geological Society of Nevada, P.O. Box 12021, Reno, NV 89510-2021
Fax to 775/323-3599, e-mail gsn@mines.unr.edu

PROPOSED DATES FOR TALKS

30 November 2000 Jim O'Donnell
25 January 2001 Dr. Andrew Hanson
22 February 2001 Dr. Stephen Rowland
22 March 2001 Dr. Wanda Taylor
26 April 2001 Student Presentations
24 May 2001

As you can see we need to fill in the gaps. Also if anyone would like to volunteer to give a talk or host a discussion in December we would be open for suggestions. Some of us aren't going anywhere.



Publication and mailing of this newsletter has been contributed by The UNLV Department of Geoscience.

Come visit us online at **http://www.unlv.edu/Colleges/Sciences/Geoscience/1st_page.html**

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