Geological Society of Nevada

SOUTHERN NEVADA CHAPTER

GSN Newsletter **April, 2002**

UNLV Graduate Student Presentations

DATE: **Thursday, April 25, 2002**

SPEAKERS: **Amy L. Brock**
Robyn Howley
Joseph Kula

LOCATION: **Room 105**
Lilly Fong Geoscience building

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

Announcements: **Visit the website for up to date info!**

http://www.unlv.edu/Colleges/Sciences/Geoscience/GSN/gsnsc.htm

Genesis and morphology of soil pendants in Quaternary landforms of Pahranagat Valley, Nevada

Amy L. Brock –
Advisor: Dr. Brenda Buck

Abstract (GSN- Las Vegas meeting on April 25, 2002)

Five geomorphic surfaces present in the northern Pahranagat Valley of Lincoln County, Nevada range in age from Early Pleistocene to recent (Q1-Q5) and vary in lithology from dolomite to volcanic tephras. Two chronosequences and 5 lithosequences were compared to evaluate micro and macromorphic characteristics and development of soil pendants. This study presents a new interpretation for soil pendant development. Key features observed in the Pahranagat Valley pendants provide evidence for precipitation at the clast-pendant contact suggesting that newer deposits are not found at the pendant terminus as other studies have assumed. These features include a void at the clast-pendant contact where precipitates such as calcium carbonate, silica and/or fibrous silicate clays may precipitate. Other features present in these pendants include significant amounts of parent clast grains that are incorporated into the pendant, detrital grain and parent material displacement and/or dissolution and presence of the fibrous clay sepiolite.

Amy L. Brock
UNLV Graduate Student

Amy Brock graduated with a Bachelor of Science degree in Geology from Oklahoma State University in 1999. She is currently a student in the UNLV Department of Geoscience where she is working on her master's degree with a focus on Quaternary geomorphology and arid soils. Amy's research includes calcium carbonate development in soils of the northern Pahranagat Valley in Lincoln County, Nevada specifically soil pendant genesis and morphology.

Analysis of cyclic shallow-water carbonates: Cambrian Highland Peak Formation, eastern Nevada.

Robyn Howley –
Advisor: Dr. Margaret N. (Peg) Rees

Abstract (GSN- Las Vegas meeting on April 25, 2002)

Numerous methods of analysis were used to test the robustness of sea level signals recorded in Middle to early Late Cambrian shallow-water carbonate rocks in the western United States and to refine stratigraphic correlation of this interval. Embedded Markov chain and cycle architectural analysis define the high-frequency accommodation signal, whereas cycle grouping pattern and facies proportions analysis reveals the low-frequency sequence stratigraphic accommodation changes. Gamma analysis and Fischer plots were unsuccessful in deciphering the signature of high or low frequency signals.

Six low-frequency accommodation events are present in the Middle to early Late Cambrian Highland Peak Formation. Each sequence is defined by its minimum accommodation zones that are correlative across the shallow-water carbonate platform and thus record platform-wide relative sea level change. Two of these minimum accommodation zones record eustasy.

Robyn Howley
UNLV Graduate Student

Robyn recieved her Bachelor of Science in Geology from Salem State College in 1999. She is currently a student in the Department of Geoscience working on a Master's of Science degree. Robyn's research interests include evaluating the validity of cyclic carbonates as indicators of global sea level events and gamma radiation analysis of cyclic Cambrian carbonates.

Thermochronology and geobarometry of the Granite Mountains, Southeast California; exhumation of a plutonic complex during collapse of the Sevier Orogen.

Joseph Kula –
Advisor: Dr. Terry Spell

Abstract (GSN- Las Vegas meeting on April 25, 2002)

Mid-Tertiary tectonic overprinting in the eastern Mojave Desert region adds complication to describing and interpreting results of earlier Mesozoic tectonics. Thermochronologic data indicate the preservation of original Mesozoic isotopic signatures in the Granite Mountains, southeast California. These data include ages and cooling histories for Cretaceous plutons determined by U/Pb, $^{40}Ar/^{39}Ar$, and U-Th/He systematics. U/Pb zircon and $^{40}Ar/^{39}Ar$ hornblende ages are indistinguishable at 2σ errors suggesting Late Cretaceous intrusion and instantaneous cooling through ~500 °C for Granite Mountain plutons. Intrusion depths of ~11-17 km determined using the aluminum-in-hornblende barometer agree with extremely rapid (instant) thermal equilibration between magma and country rock, assuming a geothermal gradient of 30-40 °C/km. Thermal modeling of $^{40}Ar/^{39}Ar$ K-feldspar age spectra indicates continued rapid cooling down to ~150 °C. Rapid cooling for plutons during this temperature interval (300-150 °C) requires tectonic activity. These data support increasing evidence for Late Cretaceous extension due to the gravitational collapse of the overthickened Sevier Orogen. U-Th/He apatite ages range from ~40 to ~20 Ma and correlate with elevation. These data may be interpreted as resulting from very slow cooling or an extended period of residence in the He partial retention zone, however, they may

also be indicative of Mid-Tertiary Basin and Range tectonics playing a later role in the exhumation of this plutonic complex.

Photo of a mafic dike in the northeast Granite Mountains, East Mojave Desert, CA

Joseph Kula

UNLV Graduate Student

Joseph received his B.S. in Geoscience in 2000 from Montclair State University in New Jersey. Just about the time he was about to quit college altogether due to a lack of interest, Joe enrolled in an intro geology course. The excitement of the class coupled with his desire to not make pizzas for the rest of his life landed him in the Earth and Environmental Studies Department office declaring a major. Joseph became increasingly interested in hardrock geology and as a senior worked on the geochemistry of middle Proterozoic amphibolites. After slashing and burning his way through the dense foliage in order to view actual rock outcrops for potential samples, Joe decided that maybe he should go *where the rocks are* to work on his next degree.

Now in his second year of a Masters program at UNLV, Joseph has become infatuated with geochronology, especially $^{40}Ar/^{39}Ar$ and U-Th/He systematics. Joe's current research involves the application of thermochronology to determine timing of exhumation for intrusive bodies and ultimately widespread tectonic events.

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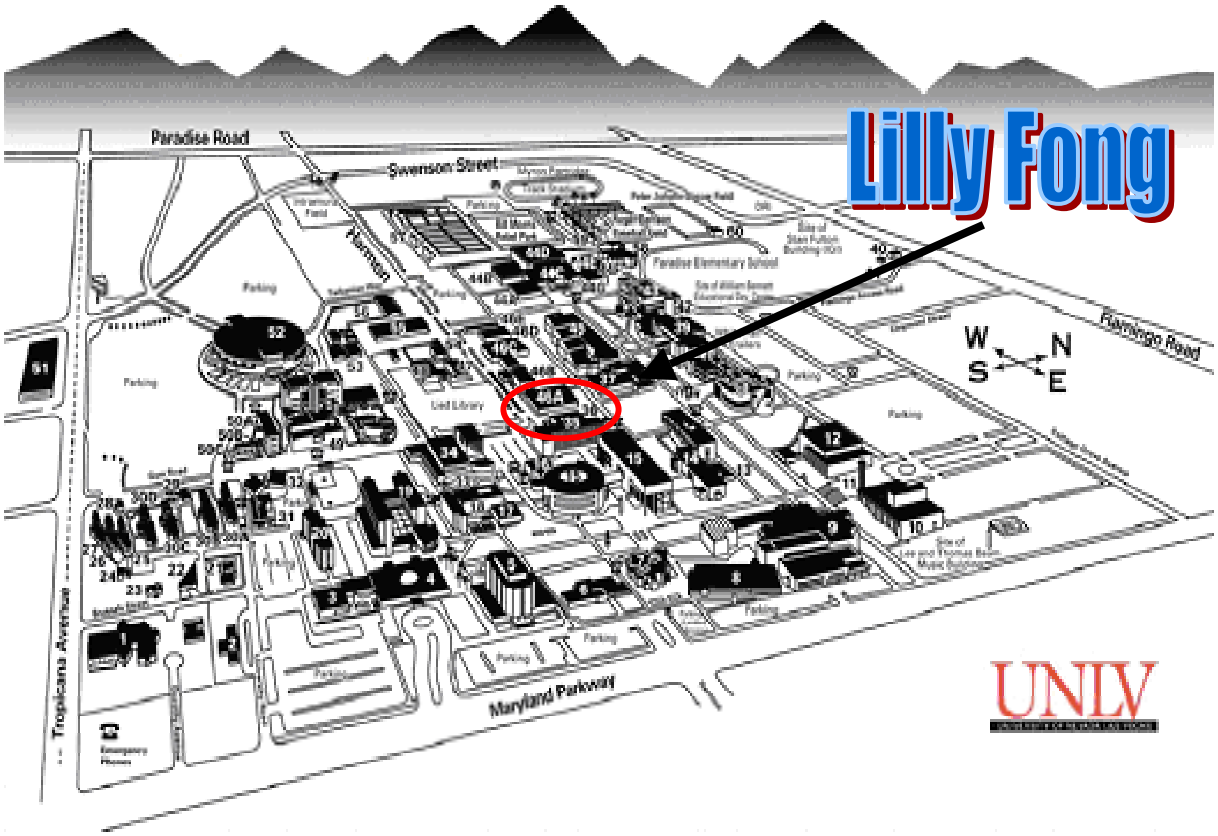
Spring Speakers:

May 23: Maxwell Blanchard

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 or can be accessed online.



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

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GSN – Southern Nevada Chapter
Geoscience Department, UNLV
4505 Maryland Pkwy, Box 454010
Las Vegas, NV 89154-4010