



Arizona Geological Society Newsletter

SEPTEMBER 2014

September 2, 2014 DINNER MEETING

Who: Lewis Land will speak about “Evaluation of Groundwater Residence Time in a Karstic Aquifer System: Insights Gained from Use of Multiple Environmental Tracers”.

Where: Sheraton Tucson Hotel and Suites, 5151 East Grant Road, (at the intersection of Grant and Rosemont on the North side of Grant in the *PIMA BALLROOM* (enter at northwest corner of the building) and go upstairs to the meeting room.

When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.

Cost: Members \$27, Guests \$30, Students Members free with online reservation (\$10 without).

RESERVATIONS ARE REQUIRED: CALL (520) 663-5295 or reserve on the AGS website (www.arizonageologicalsoc.org) by 11 a.m. by Friday, August 29th. Please indicate regular (Beef Tri-Tip with au jus & A1 sauce), vegetarian, or Cobb salad meal preference. Please cancel by Friday, August 29th at 11 a.m. if you are unable to attend—no shows and late cancellations will be invoiced.

The September dinner meeting is sponsored by JDS Energy and Mining U.S.A. LLC



AGS is grateful for JDS Energy and Mining’s sponsorship, which helps us to offset dinner meeting costs

Abstract

Evaluation of Groundwater Residence Time in a Karstic Aquifer System: Insights Gained from Use of Multiple Environmental Tracers

by Lewis Land

We use several environmental tracers to evaluate groundwater residence time within karstic and semi-karstic aquifers in southeastern New Mexico, including tritium, tritium-helium, carbon 14, and chlorofluorocarbons (CFCs). Natural groundwater discharge occurs in the lower Pecos Valley east of Roswell from a region of karst springs, wetlands and sinkhole lakes on the northeast margin of the Roswell Artesian Basin. The springs

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and sinkholes are formed in gypsum bedrock that serves as a leaky confining unit for an artesian aquifer in the underlying San Andres limestone. Estimates of the time required for groundwater to travel through the artesian aquifer from recharge areas on the Pecos Slope vary widely because of uncertainties regarding karst conduit flow. Results of our tracer studies suggest that the artesian aquifer contains a significant component of water recharged within the last 10 to 50 years, combined with pre-modern groundwater originating from the underlying Yeso and Glorieta Formations, some of which may be sourced from the Sacramento Mountains to the west.

Additional tracer surveys in the southern Sacramento Mountains indicate that groundwater in the semi-karstic Yeso Formation ranges in age from less than one year to greater than 50 years, although the calculated age varies significantly depending on which tracer is used. A distinctive feature of our results is discordance among the methods used to date groundwater in the study area. We attribute this apparent ambiguity to the heterogeneous character and semi-karstic nature of the aquifer system, which may yield water from either matrix porosity, solution-enlarged fractures, conduits, or a combination of the three. The data also indicate mixing of groundwater from two or more sources, including pre-modern groundwater upwelling along fault zones. This study highlights the importance of using multiple tracers when conducting large-scale investigations of a heterogeneous aquifer system.

About the September Dinner Speaker

Lewis Land is a hydrogeologist with the New Mexico Bureau of Geology and Mineral Resources, and has been working in Carlsbad with the National Cave and Karst Research Institute since 2002. Most of his work involves regional investigations of karstic aquifers in New Mexico, but he also occasionally finds his way into caves and sinkholes. In spite of his official title as NCKRI's karst hydrologist, all of his degrees are in geology, from the University of Oklahoma and the University of North Carolina at Chapel Hill, where his doctoral research included going for rides in a nuclear submarine while studying submarine sinkholes in the Florida Straits. For the past couple of years Lewis has been dabbling with the Institute's new electrical resistivity equipment. He has been known to occasionally describe himself as a karst geophysicist, as long as there are no real geophysicists in the room to ask him hard questions about his work.

How Long Have You been a Member of the Arizona Geological Society?

The AGS is looking to recognize members in good standing, who have maintained continuous membership in the Society for 50 years or more.

If you think you may meet this membership milestone, please notify David Briggs at geomineinfo@aol.com.

2015 Slate of Nominees—AGS Officers and Councilors

Don't miss the September 2nd dinner meeting, when we will vote on the following slate of officers for 2015. If you are unable to attend the meeting you may vote online. All AGS members with a known email address will be sent an email with a link to the online ballot and a link to the 2014 Motions of Significance that the Executive Committee is asking the membership to approve.

If you wish to vote online, you must do so before 5 pm on August 29. If you vote online, you will not be permitted to vote again at the meeting. One vote per member.

President: Michael Conway, Arizona Geological Survey

VP Programs: Robert J. Kamilli, Retired U. S. Geological Survey

VP Field Trips: Ralph J. Stegen, Freeport-McMoRan Exploration Corp.

VP Marketing: Ann D. Pattison, Independent

Treasurer: Alison H. Jones, Clear Creek Associates

Vice Treasurer: Rachel C. Feuerbach, University of Arizona Student

Secretary: David F. Briggs, Independent

Vice Secretary: Trevor Cole, Haley & Aldrich

Past President: Kim Wilson, Silver Bell Mining LLC

Councilor 1 (15-17): Carl Bowser, Emeritus Professor, University of Wisconsin

Councilor 1 (15-17): Marisa Lerew, Silver Bell Mining LLC

Councilor 2 (14-16): Bruce M. Walker, Retired Chevron Questa

Councilor 2 (14-16): Stan Evans, Retired Mineralogist

Councilor 3 (13-15): Richard Jones, Retired

Councilor 3 (13-15): Coleen Brown, Retired American Red Cross

November 2014 Dinner Meeting

The Arizona Geological Society invites everyone to its November 4, 2014 dinner meeting, where Isabel Fay, of the University of Arizona, will present "Ores in synorogenic veins in the Central African Copperbelt: Remobilization or addition?" This event will be held at the Sheraton Phoenix Airport Hotel, located at 1600 South 52nd Street in Tempe, Arizona.

Since we will not have a meeting in Tucson in November, we are currently working to organize car pools to make it more convenient for our Tucson members to attend this event. Anyone who might be interested in driving to Phoenix for this meeting, contact David Briggs at secretary@arizona Geological Soc.org.

Why is there a “Reserved” table at the AGS dinner meetings?

Many of you have noticed that the table nearest the podium at the AGS dinner meetings has a “Reserved” sign on it. We do not call it the “Head Table”; we call it the “Speaker’s Table”. It exists for purely practical reasons:

1. We ask the wait staff to serve that table first because the speaker needs to eat and finish his/her meal early to prepare to give the talk.
2. The Society President and the Program Vice-President need to be near the podium to make announcements and introduce the speaker. The Program Vice-President needs to be near the laptop and projector to make any needed adjustments or fix glitches.
3. Speakers commonly bring a guest or two, which is the one perquisite they get, besides the usual souvenir rock. The Society does not give honoraria.
4. We always ask the speaker if there is anyone special; a thesis advisor, old friend, research colleague, etc.; whom they would like at the Speaker’s Table.

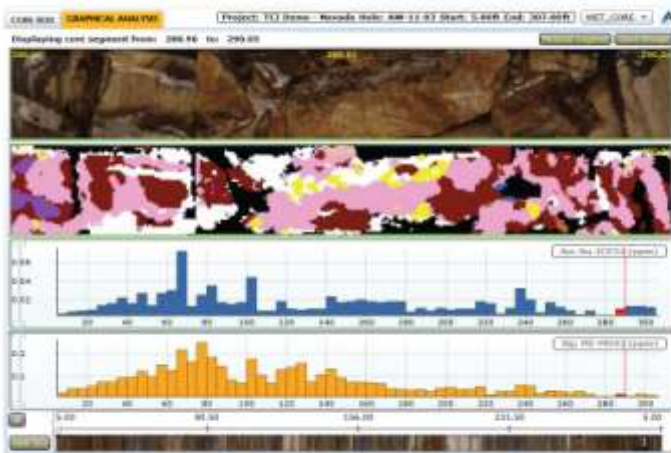
This combination of people usually fills the eight-person capacity of the reserved table each month. Either the President or Program Vice President makes up the seating list, sometimes at the last minute.

If you would like to sit at the Speaker’s Table, just ask the Program Vice President (currently Bob Kamilli) or the President (currently Kim Wilson), and we will do our best to accommodate you. However, PLEASE honor the reserved sign and do not just sit at the Speaker’s Table without consulting one of the two people mentioned above, as the seats may already be assigned.

Thanks for your cooperation.



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2015 Grand Canyon Geology Raft Trip



Alison Jones and Fred Beck are organizing another geology raft trip through 188 miles of the Grand Canyon July 6-12, 2015. As in the past, our outfitter is Hatch River Expeditions, and we will be using 2 motorized 34-foot inflatable rafts. After launching at Lee's Ferry, we will go "down section" from the late Permian into the Precambrian, and making numerous geologic and fun stops along the way. Hatch provides all camping gear and food, and three licensed experienced guides who run the boats, do the cooking, and assure that everyone will have the experience of a lifetime. On the last day, we be lifted out by helicopter to Bar 10 Ranch on the North rim, and from there we will fly back to Marble Canyon (or Las Vegas if you prefer). This trip is very popular, and it will probably fill up by October or November. A deposit of \$500 per person is required to hold a spot. The balance of \$2,450 is due in March. In case of cancellation, the deposit will be returned if we can fill the spot. For more detailed information, contact Alison Jones at ajones@clearcreekassociates.com.

2014 AGS Member Directory Coming in Late September

Directory compilation is in progress so submit your company ads to Directory Coordinator, Cori Hoag, choag@srk.com through Sept. 5th. [See our website for advertising size/cost details](#) – payment accepted by check in advance, or secure credit card online. We are also looking for photos of our members on recent AGS field trips.

Members – please ensure we have your up-to-date contact info including a correct mailing address. E-mail this updated info to David Briggs at geomineinfo@aol.com. The directory will be sent by bulk mail and will not be forwarded. Thanks to all our Advertising Sponsors for their on-going support of the Arizona Geological Society!

Geological Society of Nevada 2015 Symposium

Call for Papers

The Geological Society of Nevada has announced a [call for papers](#) to be presented at its 2015 Symposium, which will be held at John Ascuaga's Nugget in Reno/Sparks, Nevada on May 14-24, 2015. Co-hosts for this event include the Society of Economic Geologists, Nevada Bureau of Mines and Geology and the U. S. Geological Survey. Its theme is New Concepts and Discoveries. Anyone wishing to present a paper at this meeting needs to submit a draft abstract no later than October 1, 2014. [For more information on this event visit this link.](#)



Join the American Institute of Professional Geologists (AIPG) and the Arizona Hydrological Society (AHS) for the *2014 Water and Rocks, the Foundations of Life National Conference* in Prescott, Arizona.

The **2014 AIPG/AHS National Conference** will be held from **September 13-16, 2014**, at the **Prescott Resort & Conference Center (PRCC)** in **Prescott, Arizona**. The American Institute of Professional Geologists will be holding their Executive Board Meeting and their Advisory Board Meeting on Saturday, September 13, 2014. Field trips, workshops, exhibitor setup, poster setup, the AHS Foundation Meeting, and the icebreaker/reception will take place Sunday, September 14, 2014. Technical sessions, workshops, and more field trips will take place Monday and Tuesday, September 15 and 16. For more information about this event please visit their [conference web site](#).



Join the AIPG and the Colorado Section of the AIPG for the 2014 Social Licensing-Achieving Public Support Conference, hosted by the American Institute of Professional Geologists (AIPG) in Denver, Colorado on November 10, 2014. This conference will be a forum to bring together geoscientists as well as specialists in communication to discuss the challenges of obtaining the SLO for contentious geological issues from the wider public.

The term “Social License to Operate” (SLO) was originally adopted for use by the Canadian mining industry in the late 1990s, and referred to the concept that social permission was needed for a mining company to conduct its operations, for example from local communities or indigenous people. Since then, the premise of the SLO has been expanded to other geological challenges faced by society, such as fracking for oil and gas development, radioactive waste disposal, carbon capture and storage, geologic hazards, and deep-well injection of wastewater.

The lay public is frequently uninformed or misinformed about the complex scientific and technical challenges that accompany these issues. This problem is typically coupled with a general lack of knowledge about subsurface geology. The SLO seeks to alleviate this problem through a variety of public participation strategies to engage with citizens, communities and stakeholder groups. Through this process, geoscientists can develop an understanding of public knowledge and concerns.



[Arizona Mining Review](#) e-Video Magazine – 27 August 2014

- The latest in Arizona mining with Nyal Niemuth
- Aggregate Mapping in Phoenix and Environs with Phil Pearthree, Chief of AZGS's Environmental Geology section.
- New Directions for the National Minerals Information Center with Director Steven Fortier (US Geological Survey)

Arizona Mining Review - The August episode will be broadcast at 10:00 am MST on 27 August on Live Stream (<http://new.livestream.com/accounts/2496466/azminingreview>). Immediately thereafter it will be available on our [AZGS YouTube Channel](#), along with episodes from January 2013 through July 2014.

New Publications from the Arizona Geological Survey

Niemuth, Nyal, 2014, [Arizona Mining Claim Forms](#), Arizona Geological Survey Open File Report, OFR-14-05, 11 p.

Love, D. S., Gootee, B. F., Cook, J. P., Mahan, M. K., and Spencer, J. E., 2014, [An Investigation of Thermal Springs throughout Arizona: Geochemical, Isotopic, and Geological Characterization, Arizona Basin and Range Province](#), Arizona Geological Survey Open-File Report - 14-06, 129 p.

Ferguson, C. A., and Johnson, B. J., 2014, [Geologic map of the western half of the Columbia 7.5' Quadrangle and the eastern half of the Copperopolis 7.5' Quadrangle, Yavapai County, Arizona](#), Arizona Geological Survey Digital Geological Map DGM-109, scale: 1:24000.

Pearthree, P. A. and Spencer, J. E., 2014, Geologic Map of the Black Peak and Bobs Well 7.5' Quadrangles, La Paz County, Arizona. Arizona Geological Survey Digital Geologic Maps DGM-108 v1, scale 1:24,000. (Pending release on Monday, August 25, 2014).

Arizona Geological Society Publications Update

Work continues to scan all AGS guidebooks and make them available for your download and personal use. The most recent additions from 2005 and 2006 are in the "Members Only" area of the [Publications Archive](#). Please use the email address you use to receive your AGS newsletter and password to log in to the AGS website. If you've forgotten your password, click on "Forgot Password" in the upper right corner.

New Stegen, R.J., Wright, Ernest, and Bryant, D.G., 2005, The Warren (Bisbee) mining district, Cochise County, Arizona: Arizona Geological Society Spring Field Trip, April 30, 2005, 33 p.

New Stegen, R.J., Seibert, W.W., III, Gerwe, J.E., Thoman, M.W., North, R.M., and Worthington, W.T., 2006, Tyrone porphyry copper deposit, Grant County, New Mexico [part 1] and Santa Rita porphyry copper deposit, Grant County, New Mexico: A summary [part 2]: Arizona Geological Society Fall Field Trip, November 4-5, 2006, 82 p.

ANNOUNCEMENTS

Welcome New AGS Members

Fred Johnson

David Maher

Jonathan Zaloumis

Arizona Geological Society is grateful to Freeport-McMoRan Copper and Gold for their generous support of our student members!



Freeport-McMoRan is sponsoring student dinners for the 2014 AGS monthly meetings.

2014 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

Please mail check with membership form to: Arizona Geological Society, PO Box 40952, Tucson, AZ 85717

Dues (check box) 1 year: \$20; 2 years, \$35; 3 years: \$50; full-time student (membership is free)

NEW MEMBER or RENEWAL? (circle one) Date of submittal _____

Name: _____ Position: _____

Company: _____

Mailing Address: _____

Street: _____ City: _____ State: _____ Zip Code: _____

Work Phone: _____ Home Phone: _____

Fax Number: _____ Cellular Phone: _____

E-mail: _____ Check this box if you do not have an email address

All newsletters will be sent by email. If you do not have an email address, we will mail a hard copy to you, but we cannot guarantee timeliness.

If registered geologist/engineer, indicate registration number and State: _____

Enclosed is a _____ tax-deductible contribution to the J. Harold Courtright Scholarship Fund.