



# AGS NEWSLETTER

ARIZONA GEOLOGICAL SOCIETY, INC., TUCSON, ARIZONA

November 2009

## November 3, 2009 DINNER MEETING

### *Water: An Emerging Challenge for US Foreign Security*

Kenneth J. Hollett, U.S. Geological Survey, Retired

Significant increases in water scarcity are projected to occur by the year 2015. While in the past water scarcity has seldom generated armed conflict, we are entering an unprecedented period of water stress on a global scale—a time when the past may not be a good guide to current or emerging issues. Water supplies are becoming scarce and increasingly polluted—posing challenges to a growing num-

ber of countries. These problems create competition for scarce resources that foment tensions and disputes and potentially can lead to violent conflict, but such consequences are not always a foregone conclusion.

Senior policymakers are increasingly aware, however, of the potential for conflict, and their concern has added water to the list of foreign policy topics in recognition that situa-

tions combining dwindling water supplies and deep distrust are likely to be the most volatile flash points.

Senior U.S. military commanders also have expressed concern about the increasing potential for disputes in water-scarce regions—eyeing emerging tensions over water as a fuel to flame internal or transboundary societal issues into regional conflagration.

## 2009/2010 AGS EVENTS CALENDAR

11/13-15/09

### AIPG FIELD TRIP

Saturday—La Herradura Mine (NW Sonora\*)

Sunday—Petroglyphs (Caborca\*)

Overnights in Puerto Peñasco (Rocky Point)

Leader: Dawn Garcia

([dgarcia@srk.com](mailto:dgarcia@srk.com) for more information)

12/01/09

### AGS DINNER MEETING

Lawrence Krauss, ASU, *Topic to be announced*

12/4-6/09

### AGS WINTER 2009 FIELD TRIP

PINACATE VOLCANIC FIELD (NW Sonora, Mexico\*)

Leader: Dan Lynch

01/05/10

### AGS DINNER MEETING

Leslye Obiora, UA Law Professor, formerly Minister of Solid Minerals in Nigeria: *The challenges of mining and mineral exploration in Africa*

02/02/10

### AGS DINNER MEETING

Mike Zientek, *Topic to be announced*

Late March / Early April 2010

### AGS SPRING 2010 FIELD TRIP

MOROCCO (via Frankfurt am Main, Germany)\*

Leader: Doug Shakel

**\*Passport will be required.**

## November Dinner Meeting — Sheraton Four Points, The Ball Room, 1900 E. Speedway

(DINNER SALAD, NO-SALT, AND VEGETARIAN/VEGAN MEALS ARE AVAILABLE UPON REQUEST.)

**RESERVATIONS ARE REQUIRED. PLEASE CALL 520-663-5295 BEFORE OCTOBER 30, 2009, OR MAKE YOUR RESERVATION ON LINE AT THE AGS WEB SITE UNTIL MIDNIGHT, AUGUST 30, 2009.**

Cash Bar @ 6 pm

Dinner @ 7 pm

Talk @ 8 pm

Cost: Members \$24, Guests \$27, Students \$10

# ANNOUNCEMENTS

## Members in the News

Congratulations to AGS VP Marketing Lukas Zürcher on the birth of the birth of his son, Erik, in August.

## 2010 AGS Dues are Due

Remember Y2K? Well, it's 10 years later, if you can believe that, and your current worry is renewing your AGS membership, if you pay on an annual basis. Dues can be paid by check through the mail, or at a dinner meeting. Be sure to complete and send in the form on page 4 of the newsletter to update your personal information. These forms also are available at dinner meetings.

## AZGS Identifies Programs to Cut

from the AZGS web site (posted 10/16/09)

In September 2009, the Governor's Office of Strategic Planning and Budget (OSPB) called for State agencies, including AZGS, to submit a plan reducing State General Fund monies by 15% in FY-2010. The OSPB further instructed agencies to meet the proposed cut by eliminating programs. Because the budget cuts, if implemented, would occur mid-year, they amount to a 30% cut and the elimination of programs sufficient to meet that cut.

To meet OSPB's conditions, we propose to eliminate 11 programs outright, reduce funding of seven programs by 5 to 50%, and retain four core programs at current funding levels. The programs were prioritized by an external review panel of AZGS stakeholders (data and service users) that used public input to help guide their recommendations.

Continued on p. 3

## THE ARIZONA GEOLOGICAL SOCIETY 2009

### J. Harold Courtright Scholarship Application

The Arizona Geological Society is now taking applications for the J. Harold Courtright Scholarship Fund

Harold Courtright had a life-long interest and career in mining and geology. He honed his field mapping skills and porphyry copper exploration techniques in the Northern and Southern Cordillera and was instrumental in discovering some of the better-known porphyry copper deposits in Arizona and Peru, including Silver Bell and Toquepala.

The scholarship fund, set up by the Arizona Geological Society after his death in 1986 and largely funded by AGS member contributions, is designed to promote graduate research in all geology fields with special emphasis on field geology, economic geology, and the study of ore deposits.

Graduate students working towards a degree in the geological sciences at Arizona State University, Northern Arizona University, and University of Arizona are eligible to apply. Students should be working on a field-related project in the North or South American Cordillera. Preference will be given to proposals for field studies related to economic geology and the study of ore deposits, but proposals related to structural geology, petrology, geochemistry, geochronology, tectonics, and geophysics will be fully considered.

In evaluating proposals, the AGS Scholarship Committee will consider the scientific significance of the proposed research, the applicability of the research methodology to the problem at hand, and the likelihood that research goals can be achieved. United States citizenship is not a requirement.

Awards are intended to help with thesis-related field costs, associated costs related to rock-sample collection, transport, and laboratory analysis, and thesis preparation following field work. Application deadline has been extended to Friday, October 30, 2009. Maximum individual award is \$2000.

For more information and application instructions, see: <http://www.arizonageologicalsoc.org/208/courtright-scholarship-2>

**SME Arizona Conference**  
**December 6-7, 2009**  
**Hilton El Conquistadore Golf and Tennis Resort**  
**Tucson, Arizona**

**2010 SME Annual Meeting**  
**February 28 - March 3, 2010, Phoenix, AZ**  
Submit abstracts at [sme2010.abstractcentral.com/index.jsp](http://sme2010.abstractcentral.com/index.jsp)

**Geological Society of Nevada**  
**2010 Symposium**  
***Great Basin Evolution and Metallogeny***  
May 14-22, 2010  
John Ascuaga's Nugget, Reno, Nevada

**\* 3 days of Technical Sessions \***  
**\* 9 Field Trips \***  
**\* 6 Short Courses \***  
**\* SEG GOLD WORKSHOP—2 Days \***  
**\* Poster Presentations/Core Shack \***  
**\* Publication Volumes \***  
**\* Exhibit Hall \***

**Contact Us:**  
(775) 846-9766 [secretary@gsnv.org](mailto:secretary@gsnv.org) [www.gsnv.org/symposium](http://www.gsnv.org/symposium)

GEOLOGICAL SOCIETY OF NEVADA  
GREAT BASIN  
Evolution & Metallogeny  
2010 SYMPOSIUM  
May 14 - 22

**Co-Hosts:**



On 16 October, OSBP accepted the AZGS proposal. We await further instructions from OSBP and the State Legislature before moving forward to implement the cuts.

**Core programs** we will attempt to preserve at current funding levels include:

- Geologic Hazards
- Geologic Mapping
- Mineral Resources
- Basin Analysis (entirely contract and grant funded)

Of the four core programs, one is entirely funded by external funds, whereas the other three receive matching funds from external sources, e.g., the StateMap program receives a 100% match of State funds from the U.S. Geological Survey.

**Programs facing 5-to-50% cuts** due to transfer of agency-generated funds are:

- Finance/Administration
- Energy Resources
- Map and Book Store (closed for walk-in sales; mail/phone orders only)
- Inquiries, Outreach, and Tech Transfer
- GIS Map Production and Database Development
- Information Technology Support
- Technical Support for the AZ Oil & Gas Conservation Commission

**Programs facing elimination** include the following state-funded programs:

- Phoenix Branch Office
- Energy Resources
- Core and Sample Repository
- Inquiries
- Education, Outreach, and Tech Transfer
- Enterprise Geodatabase
- Library
- Earth Fissures
- Publications
- Information Technology Support
- Website Updates

Most of the eliminated programs have only limited state general fund support to begin with; typically a part of one or two people's time. So while we are prepared to eliminate all State funded support to the 11 programs, we hope to maintain the programs, at least in part, by searching out external funds and by reallocating remaining indirect monies from external contracts and grants.

**Cost-Cutting Procedures.** We are implementing additional cost-cutting moves now, including reducing the number of vehicles and office phones, renegotiating service contracts, and transferring staff to new contracts and grant funded projects.

## Hardshell Field Trip Report

By Cori Hoag

AGS members and friends enjoyed superb weather, interesting outcrops, and great discussions on the Fall field trip held on October 10th to Red Mountain and Hardshell deposit near Patagonia. Field trip leaders Fleet Koutz, Russell Corn, and Dick Ahern led us up steep mountainous roads to get superb views of the region and to examine the surface mineralization and alteration overlying the deeply buried Red Mountain porphyry copper deposit. At the Hardshell deposit near the historic community of Harshaw, we hiked up the canyon to see the outcrops and historic workings in this Ag, base-metal, manganese district. We ended the day looking at Hardshell drill core at Arizona Minerals' logging facility.



Fleetwood Koutz and Russ Corn looking at sphalerite-galena mineralization in Hardshell drill core.



Doug Shakel holds field trip illustrations for Russ Corn at Red Mountain.

**Please make your AGS dinner-meeting reservation BEFORE Friday, October 30, 2009.**  
Call 520-663-5295 today or go online to [www.arizonageologicalsociety.org/](http://www.arizonageologicalsociety.org/)



# AGS Early December Field Trip

## 3-days, 2 nights

### Camping in Mexico's Pinacate Volcanic Field

***SPEND THE NIGHTS SLEEPING ON A VOLCANO!***

***SEE "MAAR" CRATERS!***

***WALK ON LAVA FLOWS THAT LOOK LIKE THEY ERUPTED YESTERDAY!***

***SEE "AA" AND "PAHOEHOE" CLOSE-UP AND PERSONAL!***

In the late 1700s European scientists were engaged in a raging controversy over the origins of basalt.

Perhaps the most famous European geologist of the time, Abraham Gottlob Werner of the University of Freiberg, in Saxony, taught that basalt formed as an original chemical precipitate in the primordial sea. But a Scottish professor, James Hutton of Edinburgh University, beholden to field experiences, argued that basalt was actually of volcanic origins that could and had been erupted at many different times during earth's past.

Ironically, nearly a century before two of Werner's students convincingly demonstrated that geologically young features in the Auvergne region in the south of France proved their former mentor wrong, Father Eusebio Kino made note of his Italian lieutenant's observations in anticipation of the modern interpretation on the other side of the world, in the Pinacates of Pimeria Alta—now northwestern Sonora!

On 5, 6, and 7 December, Dr. Dan Lynch will lead an AGS field trip into the Pinacates where he spent several years in the 1970s working on various features that culminated in his University of Arizona Ph.D. dissertation.

Costs are not yet set, and four-wheel drive vehicles are not requisite. Campers would be fine.

AGS will provide van travel for those who need it, but that will increase the trip cost to participants. Some substantial subsidy will however be afforded to bona fide students who want to go on this trip.

Participants will need to provide breakfast and lunch makings for themselves, but Dan offers to cook both evening meals for all who attend.

We will visit Elegante and Cerro Colorado craters, and explore the unique features of the Tecolote cinder cone. We'll also visit the brand new visitor center for the "Reserva de La Biosfera de El *Pinacate* y Gran Desierto de Altar "...on the south side of the volcanic field, built on the young "Ives lava flow" that Dan Lynch named in honor of the long-time NAU professor.

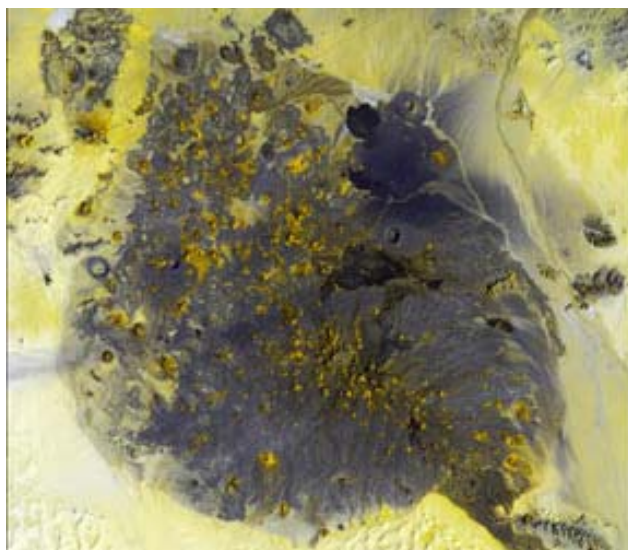
Short winter daylight and potential border-crossing delays dictate that we should leave on Friday afternoon, 4 December, and head back to the USA not long after noon on Sunday, 6 December.

**YOU MUST BRING A VALID PASSPORT OR BORDER CROSSING CARD** to participate on this trip. You have just barely enough time to get one if you act immediately!

There will be some short hikes, but no great elevation changes will be required. There are NO "comfort" facilities at our car-camping campsite either night. So be sure to bring a dependable trowel!

Otherwise we do not anticipate any serious obstacles to enjoying this unique geologic landscape of the Sonoran Desert. And as an added interdisciplinary attraction you might even get to see the Andromeda Nebula as a naked-eye astronomical site!

Pinacate Volcanic Field (Satellite Image from USGS web site)



The pockmarked terrain of Pinacate National Park in Mexico's Sonora Province is evidence of a violent past. Among hundreds of volcanic vents and cinder cones are rare maar craters, formed when rising magma met underground water to create pockets of steam that blew nearly circular holes in the overlying crust.

# Arizona Earthquake

Text and map from the AZGS web site

On August 3, 2009, at 10:59 a.m. MST, a magnitude 6.9 earthquake, originating in the Gulf of California (GCA) about 100 miles south of US-Mexico frontier, shook Baja and Sonora Mexico, southern California, and southern and central Arizona.

## Seismic/Geologic Summary

- Focus (location of earthquake) - Central Gulf of California (29.372° N., 112.814° W.)
- Depth -- 10 km (6 miles)
- Magnitude - M6.9 (major aftershock - M5.9; M5.8)
- Rupture occurred on right-lateral strike-slip fault on North America-Pacific Plate Boundary
- Travel-time of seismic waves to Phoenix (500 miles NE) - 1 minute, 2.9 seconds
- Duration of anticipated smaller aftershocks - months
- Electronic Data Capture in AZ - \*AISN and AEIC Seismic Networks.

\*AISN - Arizona Integrated Seismic Network operated by the Arizona Geological Survey with support from ASU, NAU and UA geoscientists. AEIC - Arizona Earthquake Information Center at NAU in Flagstaff, AZ.

## Arizona Shaking

From Yuma north to Prescott there were reports of ground shaking and related phenomena. The reports are heavily concentrated along the Central Arizona corridor: Nogales, Tucson, Casa Grande, Phoenix Metro, and Prescott. In the Phoenix metro area there were more than 180 reports of a felt event; in Tucson there were 85 such reports.

Reports from the Phoenix metro area on the effects of ground shaking ranged broadly from: gently swaying window blinds; vigorous shaking and running for cover; to suffering from vertigo and motion sickness. One building in downtown Phoenix was temporarily evacuated (Source: Channel 12 and the [Arizona Republic](#), 2009).

On the Modified Mercalli scale of intensity – a measure of impact on human society – reports from Arizona ranged from I to IV, with most reports in the II to III range: felt by a few persons in taller buildings; to felt by a larger number of people and accompanied by rattling of windows, doors, or dishware.

The graph on the left shows the timing of earthquakes in the Gulf of California on 3 Aug. On 5 August at 02:13 MST, a M5.6 aftershock occurred.

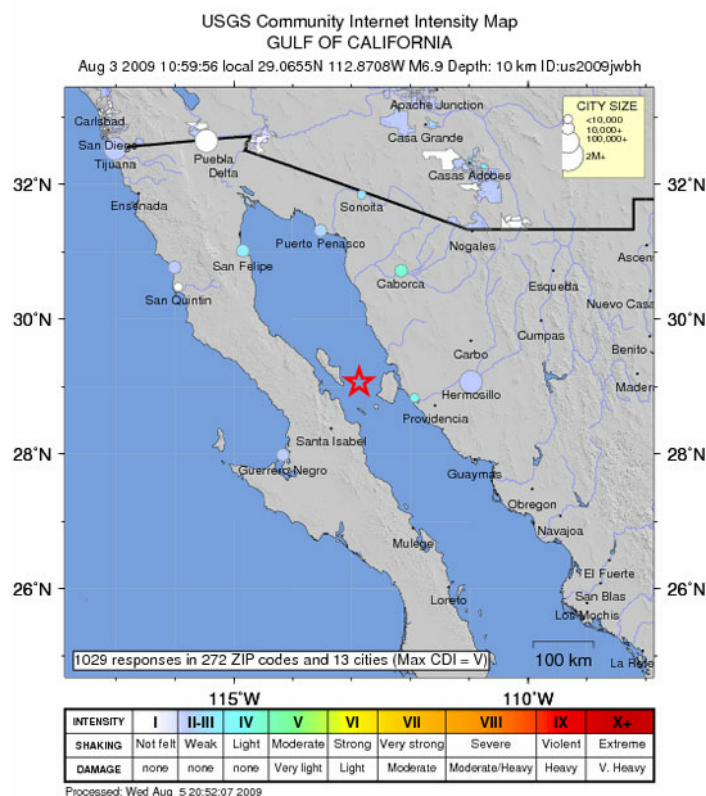


Photo from Lufkin and others, 2009

## GUIDEBOOK TO GEOLOGY OF THE BLACK HILLS, SOUTH DAKOTA

By John Lufkin, Jack Redden, Alvis Lisenbee, and Tom Loomis; published by Golden Publishers.

The book is 96 pages in length, with 90 colored illustrations and photographs. Special features include a detailed road log to 38 locations of the best metamorphic rock exposures and major structures, descriptions of the gold deposits, seven pegmatite and mineral collecting localities, and all the major tourist attractions (Mt. Rushmore, Crazy Horse, Devils Tower, Jewel Cave, Badlands, etc). It sells for \$27 and can be purchased from Golden Publishers. Contact John Lufkin for information: [lufk3@comcast.net](mailto:lufk3@comcast.net) or 303-997-7365.





## ARIZONA GEOLOGICAL SOCIETY

P.O. Box 40952  
Tucson, AZ 85717-0952  
Phone: 520-663-5295  
[www.arizonageologicalsoc.org](http://www.arizonageologicalsoc.org)

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### 2010 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

Please mail check with membership form to: Arizona Geological Society, P.O. Box 40952, Tucson, AZ 85717. Dues (circle one): 1 year: \$20; 2 years: \$35; 3 years: \$50. (Full-time students receive free membership. The newsletter is by e-mail only, and a membership application form must be returned to AGS annually to remain on the membership list.)

Name: \_\_\_\_\_

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