



# Arizona Geological Society Newsletter

ARIZONA GEOLOGICAL SOCIETY, INC., TUCSON, AZ

OCTOBER 2010

## October 5, 2010 DINNER MEETING

**Geoff Plumlee, USGS Senior Research Geochemist**, will be our featured speaker. See abstract below.

**Where:** Sheraton Four Points Hotel, Wild Cat Room, 1900 E. Speedway Blvd. in Tucson

**When:** Cash Bar at 6 pm, Dinner at 7 pm, Talk at 8 pm.

**Cost:** With reservation, members \$24, guests \$27, Students \$10.

Without a reservation a \$3 surcharge will be added (if the hotel is able to accommodate you).

**RESERVATIONS: CALL 520.663.5295 by 5 p.m. on October 1, 2010.** Indicate low-salt, vegetarian, or vegan meal preferences. A coffee/salad/roll/dessert option is also available for \$18. Please cancel if unable to attend. The hotel cannot guarantee that meals will be available without a timely reservation.

## ABSTRACT

### Earth Sciences in Environmental Disaster Response and Planning By Geoff Plumlee, U.S. Geological Survey

Disasters pose a variety of direct threats to human safety and health, such as injuries or fatalities caused by building collapse or fire. However, disasters can also release hazardous materials into the environment that may pose both short- and longer-term environmental and health threats. The U.S. Geological Survey (USGS) has helped assess potentially hazardous materials produced by a number of natural and anthropogenic disasters, such as: dusts from the 2001 World Trade Center collapse; flood waters sediments from hurricane Katrina; ash and burned soils from 2007–2009 southern California wildfires; ash from numerous volcanic eruptions; and mud from the ongoing LUSI mud volcano eruption in East Java. These studies have demonstrated that earth scientists can play important roles in helping emergency responders and public health experts assess environmental and environmental-health hazards of disasters.

The USGS has also taken a lead role in the development of multi-disciplinary scenarios to model plausible physical, economic, and other consequences of future natural disasters. Recent examples include the 2008 Great Southern California ShakeOut scenario that modeled a geologically plausible 7.8 magnitude earthquake along the southern San Andreas fault (<http://urbanearth.gps.caltech.edu/scenario08/>) and the ongoing ARkStorm scenario that is modeling the impacts of a meteorologically plausible weeks-long winter storm affecting the western coast of the United States (<http://urbanearth.gps.caltech.edu/winter-storm/>). USGS scientists are working with expert collaborators and stakeholders from diverse disciplines to estimate plausible environmental and environmental-health impacts of the ShakeOut and ARkStorm scenarios. Helping to understand the potential sources, types, environmental behavior, and health implications of hazardous materials predicted to result from these disaster scenarios will enhance planning for, mitigation of, and hence resilience to, environmental and health consequences of future disasters.

---

**Geoff Plumlee** is a senior research geochemist with the U.S. Geological Survey in Denver, Colorado. He received a B.S. degree from the University of New Mexico and a Ph.D. from Harvard. He was the 1994 recipient of the Society of Economic Geologists Waldemar Lindgren Award. Geoff's research has covered a wide range of topics linking geochemistry, the environment, and public health. He has worked extensively on the environmental geology and geochemistry of mineral deposits, and has studied how earth materials (such as asbestos and various lead minerals) interact chemically with the body to cause toxicity. Geoff has helped lead interdisciplinary teams that assess environmental and health implications of materials produced by disasters, such as dusts generated by the collapse of the World Trade Center. Geoff is currently working with hazards risk assessors to help understand plausible environmental and health implications of disaster scenarios, such as a major future earthquake along the southern San Andreas fault.

## October Member Spotlight—David A. Kring

**David A. Kring** was born in Indianapolis, Indiana. After receiving a B.S. in geology and astrophysics from Indiana University, he received a Ph.D. in earth and planetary sciences from Harvard University in 1989. Now at the Center for Lunar Science and Exploration in Houston, Dr. Kring specializes in impact cratering processes produced when asteroids and comets collide with planetary surfaces. He is perhaps best known for his work with the discovery of the Chicxulub impact crater and its link to the K-T boundary mass extinction of dinosaurs and over half of the plants and animals that existed on Earth 65 million years ago. He has also studied the environmental effects of impact cratering and shown how impact processes can affect both the geological *and* biological evolution of a planet.

Kring has suggested that an intense period of impact bombardment may have affected the origin and early evolution of life on Earth by creating vast subsurface hydrothermal systems that were crucibles for pre-biotic chemistry and provided habitats for the early evolution of life. He calls this concept the “Impact-Origin of Life Hypothesis”. The bombardment of the Earth-Moon system remains



the highest science priority for our nation’s return to the Moon.

Dr. Kring has also led a joint academic-industry-NASA design team for a robotic lunar lander and rover system that can be deployed anywhere on the lunar surface. His team generated three point-designs for missions to the floor of a shadowed lunar crater, the sunlit rim of Shackleton Crater, and an impacting probe. The photo at left shows Kring (right) with the Lunar Electric Rover on a training exercise near the SP Cinder Cone in Arizona.



Photo credit: NASA Desert RATS

**How did you first become interested in geology?** I was captivated by the work of the Apollo astronauts on the lunar surface. I also liked the idea of being an explorer and solving mysteries. I soon learned that those interests could be fused together as a geologist. Geology has given me an opportunity to explore most continents, several ancient sea

floors, and the surfaces of several other worlds.

**What was your first job?** I was a newspaper carrier for the Indianapolis News in the late 1970’s. The most memorable day involved a record-setting blizzard that produced white-out conditions and dropped temperatures to more than 40 degrees below zero. The newspaper told me that I was one of only two carriers in the city who managed to deliver papers during the storm.

**What was your first job as a geologist?** A few days after finishing my thesis at Harvard, I moved to the University of Arizona where I held a series of appointments, beginning as a Research Associate and ending nearly 17 years later as an Associate Professor of Planetary Sciences, with a joint appointment in Geosciences, while serving as Director of the NASA/UA Space Imagery Center. Like most geologists, I found it easy to work in an environment surrounded by the Arizona landscape. Five generations of my family had also lived in the state, so Arizona was truly home.

**What is your most memorable field experience?** Well, there was the time I was kidnapped in Mexico and the time when I had to flee a gorilla army group in Colombia (that later kidnapped and executed another geologist in the same area), but the most memorable experience was in Haiti. A teacher and his class hiked several hours from their school to a K-T boundary outcrop that our team was sampling. He had heard about our work and thought a visit a good educational opportunity. When I tried to explain we were studying the extinction of dinosaurs, I learned that the teacher had never heard of them or other types of fossil life. Moments like those are humbling and force one to appreciate the opportunities available to us in our country.

Continued Page 3

## Member Spotlight—David A. Kring (continued)

**What do you consider your greatest professional achievement?** Discovering shocked quartz and impact melt in the Yucatán-6 exploration borehole. That provided the evidence needed for our team to define the buried Chicxulub impact crater and prove its link to the K-T boundary mass extinction. The impact-mass extinction hypothesis generated a dramatic shift in the tenets of geology. We are now exploring an impact-origin of life hypothesis (an interesting flip of the extinction-radiation coin) and the potential consequences of impacts on the evolution of life at other times in Earth history.

**Your greatest achievement EVER?** This cannot be defined by any particular event. Rather, it is striving over the course of a lifetime to maximize my contribution to society and pass along the lessons I have learned to the generations that follow. I am currently the director of the NASA-funded Center for Lunar Science and Exploration. In that capacity I have the good fortune to be working with young NASA scientists, engineers, and astronauts as the nation strives to reach beyond low-Earth orbit, return to the lunar surface, and re-establish our human exploration of the solar system.

**What are your hobbies?** I like to hike, study the wildlife around me, and fly fish. I enjoy reading and collecting landscape paintings too.

**Water, Whiskey or Wine?** I spent most of my life in the desert and learned long ago that there is nothing as satisfying as water.

**Thanks, David!**

*Portions of the text are excerpted from biographical information from the Lunar and Planetary Institute. For more information on Dr. Kring and his work, go to <http://www.lpi.usra.edu/science/kring/>*

## WELCOME NEW MEMBERS

James Callegary, Hydrologist, USGS  
Ching-Chih Chang, UA Graduate Student  
Miles Hearn, UA Graduate Student  
Andrew Kowler, UA Graduate Student  
Andrew Laskowski, UA Graduate Student  
Sergio Salgado Souto, UA Graduate Student  
Sarah Truebe, UA Graduate Student

Dominique Giesler, UA Undergraduate Student  
William Lytle, UA Undergraduate Student  
James McNabb, UA Undergraduate Student  
Leah Wills, UA Undergraduate Student  
Randy Richardson, UA Geosciences Professor

## Membership Recruitment

AGS thrives on the input of new members as well as the continuing contributions of its long-time members. We encourage all members to invite prospective AGS members—including students, active/retired professional geologists, and others who have an interest in geology, to attend a dinner meeting or field trip. Recent recruitment efforts in late August were focused on a University of Arizona Department of Geosciences welcome party. AGS reps (L to R) Doug Shakel (VP Field trips), Cori Hoag (VP Marketing), Ann Pattison (Councilor), and Kevin Horstman (Past President) spoke with many returning students, professors, and alumni and recruited 13 new members. The membership application can be found on the AGS website or on the back page of this newsletter.



## AGS 2011 Officers & Councilors

The following slate of AGS Officers and Councilors was unanimously approved by the membership at the September meeting:

President	Greta J. Orris, U.S. Geological Survey
VP Programs	Robert J. Kamilli, U.S. Geological Survey
VP Field Trips	Doug Shakel, Retired
VP Marketing	Ann D. Pattison, Independent
Treasurer	Coleen Brown, Retired
Vice Treasurer	Michael Conway, Arizona Geological Survey
Secretary	Alison H. Jones, Clear Creek Associates
Vice Secretary	David F. Briggs, Independent
Past President	Mark D. Cocker, U.S. Geological Survey
Councilor 1 (11-13)	Anthony B. Williams, Diligent Investor
Councilor 1 (11-13)	Robert E. Powell, U.S. Geological Survey
Councilor 2 (10-12)	Jeffrey Cornoyer, Rosemont Copper
Councilor 2 (10-12)	Claudia Stone, SRK Consulting
Councilor 3 (09-11)	M. Lee Allison, Arizona Geological Survey
Councilor 3 (09-11)	Diana C. Kamilli, Retired

## J. Harold Courtright Scholarship Announcement

Harold Courtright, former chief geologist with ASARCO, was a pre-eminent exploration geologist instrumental in the early development of well-known porphyry copper deposits such as Silver Bell, Arizona and Toquepala, Peru. The Courtright Scholarship was initiated upon his death in 1986 to encourage geologic field work in the North and South American Cordillera, which is where Courtright himself worked

**Who is eligible to apply?** Graduate students working towards a degree in the geological sciences at Arizona State University, Northern Arizona University, or 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 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. Most important are the scientific significance of the proposed research, the tractability of the problem addressed, and the applicability of the research methodology to the problem at hand. United States citizenship is not a requirement

**What will the scholarship cover?** This scholarship grant is intended to assist students with thesis-related expenses, including travel, field equipment, mapping and sample collection supplies, shipping, field-sample costs for petrographic-mineralogical slides and laboratory analyses, and other relevant expenses such as data reduction and thesis preparation. A maximum of \$2,000 per applicant will be awarded based on project merit and financial requirements.

**How do I apply?** Applications are available on the web at <http://www.arizonageologicalsoc.org/courtright-scholarship-2>. Submit the completed application form, a one-page description of your field project including a budget proposal, and a letter of support from your research advisor to the Arizona Geological Society by **Friday, October 22, 2010**. Scholarships will be awarded at the December dinner meeting, to be held December 7, 2010 in Tucson.

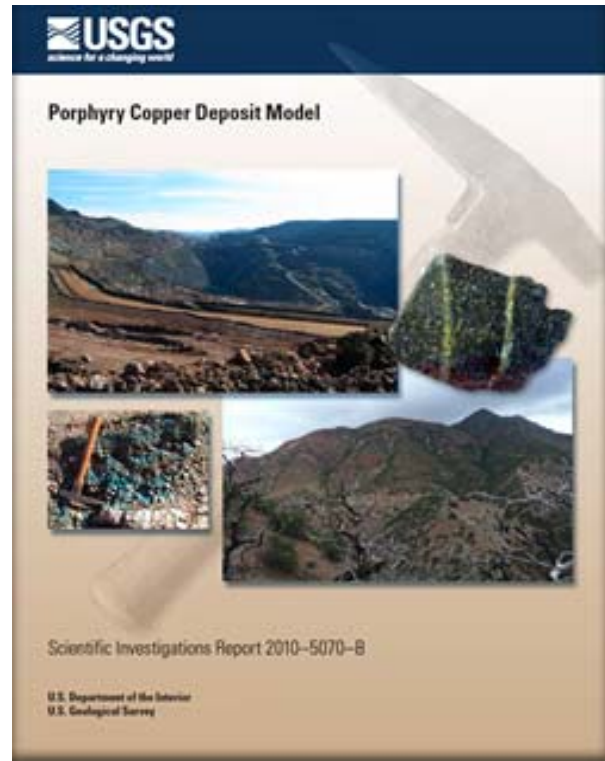
**Please submit your completed application no later than October 22, 2010 to:**

Chairperson, Courtright Scholarship Committee  
 Arizona Geological Society  
 P.O. Box 40952  
 Tucson, AZ 85717

The USGS has published Scientific Investigations Report 2010-5070-b, titled *Porphyry Copper Deposit Model*, by David A. John, editor, with contributions by Robert A. Ayuso, Mark D. Barton, Richard J. Blakely, Robert J. Bodnar, John H. Dilles, Floyd Gray, Fred T. Graybeal, John C. Mars, Darcy K. McPhee, Robert R. Seal, Ryan D. Taylor, and Peter G. Vikre.

According to the USGS website, "This report contains a revised descriptive model of porphyry copper deposits (PCDs), the world's largest source (about 60 percent) and resource (about 65 percent) of copper and a major source of molybdenum, gold and silver. Despite relatively low grades (average 0.44 percent copper in 2008), PCDs have significant economic and societal impacts due to their large size (commonly hundreds of millions to billions of metric tons), long mine lives (decades), and high production rates (billions of kilograms of copper per year). The revised model describes the geotectonic setting of PCDs, and provides extensive regional- to deposit-scale descriptions and illustrations of geological, geochemical, geophysical, and geoenvironmental characteristics. Current genetic theories are reviewed and evaluated, knowledge gaps are identified, and a variety of exploration and assessment guides are presented. A summary is included for users seeking overviews of specific topics."

Download a copy FREE at <http://pubs.usgs.gov/sir/2010/5070/b/>



## FIELD TRIPS!!!

Please check the AGS website for two field trips in October: A trip to a cement plant near Marana (Friday, October 1) and to the New Cornelia open pit copper mine in Ajo (Saturday, October 16). You can sign up for the trips on the website.

The 2.5-hr tour of the cement plant will begin with an orientation at 9 AM. There will be no fee, but group size is **limited to 20** (no one under 12 years). Directions and signup information are provided on the AGS website. You can also RSVP to Cori Hoag, at (520) 400-4135 or [choag@srk.com](mailto:choag@srk.com). This will be a joint trip with interested members of the Mining Foundation of the Southwest.

For the Ajo trip, AGS will provide van transportation from Tucson. Vans will leave from the parking lot east of the DeConcini Building (USGS/NWS building) on the U of A campus at 6:30 am, Saturday morning, the 16th of October. Or meet us in Ajo at 9 a.m. at a to-be-designated location. Participation is **limited to 30 people**. Bring your own personal protective equipment (PPE)—steel-toe boots, hard hat, and safety glasses. *PPE is absolutely required*, and no one will be allowed on the trip without it. The \$40 fee is payable on the day of the trip. A sack lunch will be provided.

If you wish to drive out on Friday, October 15, be advised that motel rooms in Ajo may be in short supply. So reserve early or plan to stay in Gila Bend.



