



# Arizona Geological Society Newsletter

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OCTOBER 2019

## November 5th, 2019 DINNER MEETING

**Who:** **Tony Hammond** is the featured speaker. See abstract below.

**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 **SABINO 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 \$30, Guests \$33, Students Members free with online reservation (\$10 without).

**RESERVATIONS ARE REQUIRED:** Reserve on the AGS website (<http://www.arizonageologicalsoc.org/events>) by 11 am on Friday, November 1st. Please indicate Regular (Roasted Turkey Breast with Cranberry-Orange Sauce), Vegetarian (Vegetable Napoleon), or Salad (Greek Salad) meal preference. Please cancel by **Friday, November 1st at 11 am** if you are unable to attend - no shows and late cancellations will be invoiced.

**The November dinner meeting is sponsored by:**

We are still accepting sponsors for the November 2019 dinner meeting.

If you are interested in sponsoring current or future AGS dinner meetings, please contact:

[info@arizonageologicalsoc.org](mailto:info@arizonageologicalsoc.org)

**Arizona Geological Survey presents:**

## **Vanadium Deposits in Arizona**

**by Tony Hammond  
Mining and GIS Consultant  
Hammond Swayne LLC**

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## ABSTRACT

The occurrence of vanadium in Arizona has been documented since the early 1900s (Bulletin 115, AZ Bureau of Mines, U of AZ, September 1, 1921). Vanadate deposits occur throughout the State and the main vanadium mineral is vanadinite, a chloro-vanadate of lead, commonly associated with the oxidation of lead sulfides in sedimentary rocks. The historic Tiger Mine (Au-V-Pb-Zn-Mo-Cu-Ag) located in the Mammoth mining district in Pinal County produced vanadium pentoxide during the war years. Uranium and vanadium was mined in the 1950s in the Salt Wash Member of the Upper Jurassic Morrison Formation along the perimeter of the Carrizo Mountains in Apache County (Zona No.1 Mine, Chenoweth, 1990). Although Arizona has not been an important producer of vanadium in the past, it has the potential to become a producer should the demand for this metal increases in the coming years. While the use of vanadium as an alloy in the steel industry is the largest application for this metal, growth in demand is expected to come from the renewable energy industry in the form of vanadium flow batteries used for energy storage. This presentation describes the vanadium occurrences in the Zn- Pb-Mo-V deposits in the Miami-Globe, Dripping Springs and Mammoth districts of Arizona.

## ABOUT THE SPEAKER

Tony Hammond is a mining engineer with over 30-year experience in mining operations in North and Latin America. A native of Lima, Peru, Mr. Hammond's experience covers mining operations, project and construction management, resource modeling and evaluation of mineral properties, preparation of due diligence reports. Tony has dedicated the last 8 years to study the occurrence of vanadium in various types of mineral deposits. During the last 3 years he was consultant for companies engaged in vanadium mineral exploration. In 2017, he was project manager at the Bisoni-Mc Kay vanadium project in Nevada and coordinated the metallurgical study to extract vanadium from organic shales. Tony Hammond is a Qualified Person under the NI 43-101 norm and Professional Engineer registered in Peru. His consulting firm, Hammond Swayne LLC, offers mining consulting and GIS services to clients in North America from its two locations in Tucson, Arizona and Lima, Peru.



## **Barbara H. Murphy Honored with AGI's Ian Campbell Medal for Service to Geosciences**



Our colleague, friend, and fellow AGS member, Barbara (Barb) Murphy, was awarded the Ian Campbell Medal for Service to Geosciences by the American Geosciences Institute. Please join the AGS Executive Committee in congratulating Barb for this well-deserved recognition and award!

Read about the award here:

<https://www.americangeosciences.org/news/barbara-h-murphy-honored-agis-ian-campbell-medal-service-geosciences>

## **Society Announcements:**

The Arizona Geological Society is seeking volunteers for next year's AGS Executive Committee. We are looking for:

- 2x Councilors (2-year term, 2020-2022)
  - Vice Treasurer
  - Treasurer
  - Vice President of Programs
  - Vice President of Marketing

For more information, please contact us at:

[info@arizonageologicalsoc.org](mailto:info@arizonageologicalsoc.org)



## GRABOIDS ARE THE LEAST OF OUR CONCERNS

**Earth Fissures of Apache Junction and Chandler Heights Field Trip**  
**Saturday, November 9, 2019**



South-central Arizona is lacerated with hundreds of kilometers of earth fissures that have formed in the past 80 years. Voluminous groundwater withdrawal drives heterogeneous basin subsidence, which produces tension cracks that manifest as earth fissures along the basin perimeter or along bedrock highs. Southeastern Apache Junction, Maricopa County, and the Chandler Heights area, along the Maricopa – Pinal County line have been particularly hard hit; up to 5.7 m of subsidence has been documented in metropolitan Phoenix and Eloy (Pinal County). Fissures result from groundwater harvesting – up to 150 m decline in some areas.

Earth fissures range from nascent ground cracks to wide-open fractures, tens of meters deep, meters wide, and hundreds of meters to kilometers in length. The transition from nascent ground crack to fissure gully is driven by rainfall events; fissure transverse to drainages capture runoff that erodes and widens the fissure.

The Arizona Section of the American Institute of Professional Geologists and the Arizona Geological Society will be holding a joint field trip to examine some long-lived (decades) and recently reactivated fissures near Houston and Meridian Road, Apache Junction, and at the intersection of the Thompson and Hunt Highway adjacent to the Santan Mountains. The Houston Rd fissure provides an opportunity to examine a recent mitigation project (spring - summer 2018) that failed in the face of its first monsoon storm in Aug. 2018.

**Date:** Saturday, November 9, 2019

**Tucson Meeting Point:** Meet at SRK Consulting office parking lot (west side of building), located at 3275 W Ina Road (east of intersection of Ina and N Camino De La Tierra Rd.) for carpooling at **7am** to travel to the Phoenix Meeting Point.

**Phoenix Meeting Point:** Carpool to W. Guadalupe Rd and S. Ironwood Rd in Apache Junction. Park on Guadalupe Rd. just west of Ironwood Rd. by **9:15 am**. The Phoenix Meeting Point is the field trip start and end locations.

**RSVP:** [bmurphy@geo-logic.com](mailto:bmurphy@geo-logic.com)

**Cost:** \$20/person. Cost includes lunch, water and soda. Lunch will include a variety of sandwiches, chips and cookies.

**Send your check of \$20 payable to AIPG Arizona Section by November 2 to:**

Barb Murphy  
 Clear Creek Associates  
 6155 E. Indian School Road, Suite 200  
 Scottsdale, Arizona 85251

### WHAT TO BRING:

- Sunscreen, hat and hiking sticks (if desired).
- Wear comfortable shoes.
- Please print and send in the attached waiver with your check or bring it with you. We will need signed waivers from all participants prior to leaving.



## GRABOIDS ARE THE LEAST OF OUR CONCERNS

AIPG + AGS FIELD TRIP ON SATURDAY, NOVEMBER 9, 2019

### Field Trip Registration

Name(s): \_\_\_\_\_

*Note: Each person should fill out a waiver.*

Email address(es): \_\_\_\_\_

Cell phone number(s): \_\_\_\_\_

HAVE YOU INCLUDED YOUR PAYMENT AND WAIVER FORM? Make checks payable to *AIPG Arizona Section*. Mail your registration form, payment and waiver to:

Barb Murphy  
Clear Creek Associates  
6155 E. Indian School Road, Suite 200  
Scottsdale, Arizona 85251

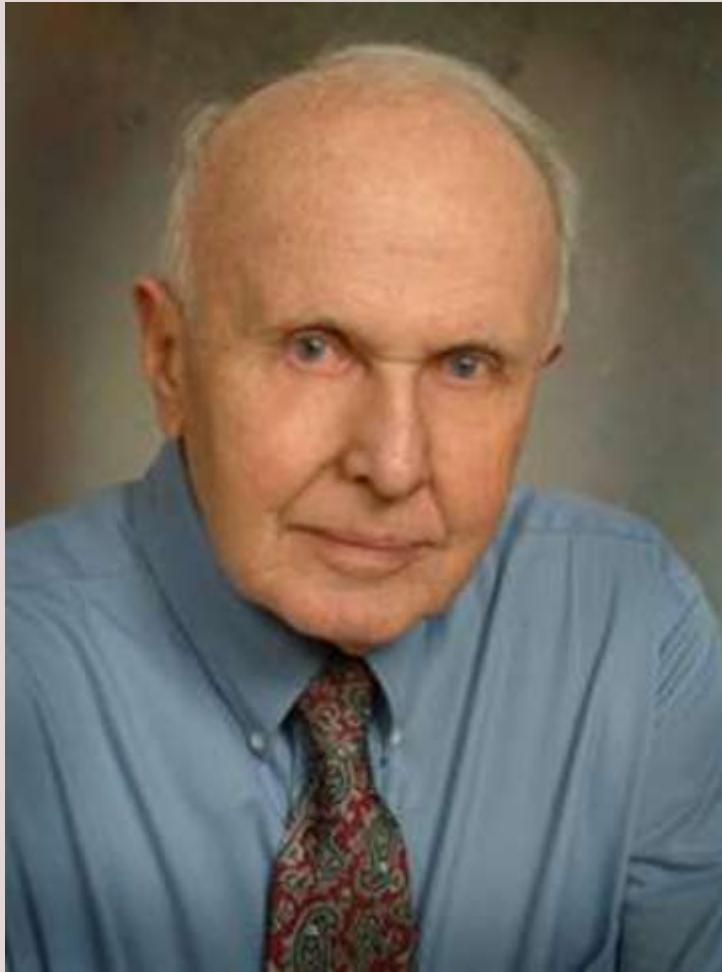


### MEET OUR FIELD TRIP LEADER MIKE CONWAY, ARIZONA GEOLOGICAL SURVEY

Mike Conway joined the Arizona Geological Survey in 2007. He earned his Ph.D. in 1993 from Michigan Technological University. His early career involved volcanological studies in Guatemala, Nicaragua, Colombia, Kamchatka – eastern Russia, and the southwestern U.S. He is the Arizona Earthquake Program Manager – yeah, he’s the guy who schedules earthquakes.



## **Member Announcements:**



AGS regrets to announce the passing of former AGS President and Life Member, Dr. Spencer R. (Spence) Titley, Professor Emeritus, The University of Arizona, in Tucson on August 18.

See Spence's Life Story at:

<https://angelvalleyfuneralhome.com/tribute/details/22786/Spencer-Titley/obituary.html#tribute-start>

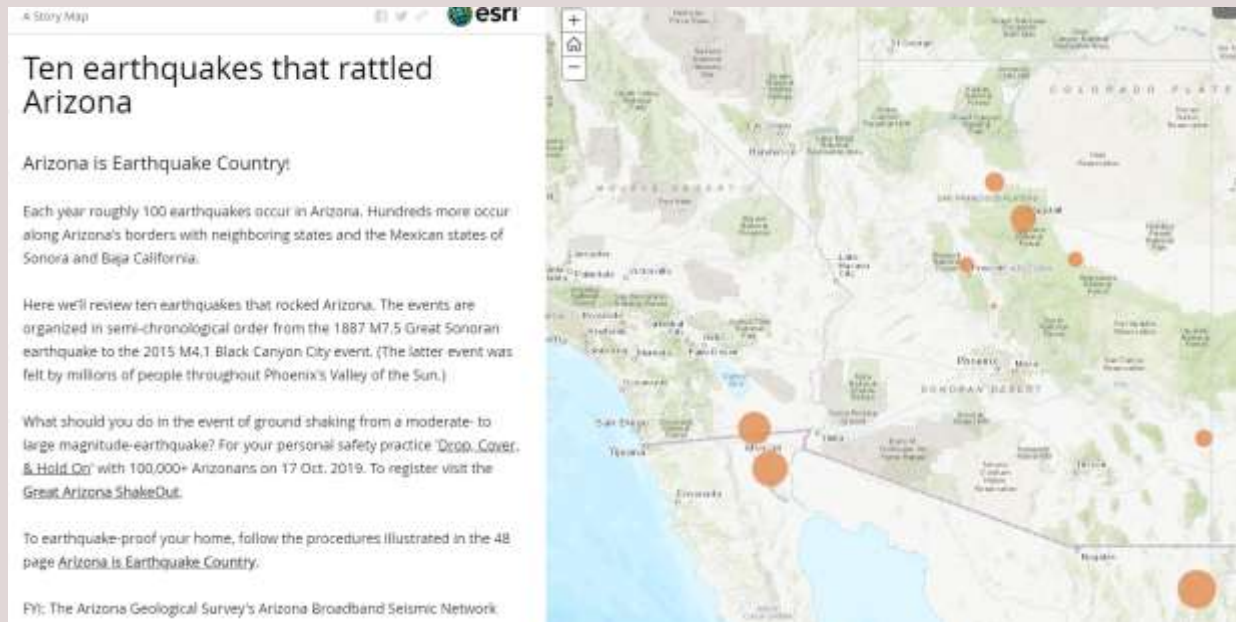
# Photos from AGS October 8th Meet and Greet at Ten55 Brewery





# 10 Earthquakes that Rattled Arizona

by Arizona Geology e-Magazine, Arizona Geological Survey



Arizona Geological Survey's new Story Map, 'Ten earthquakes that rattled Arizona', illustrates that Arizona has earthquakes and the potential for damaging, even life-threatening, earthquakes. Moreover, Arizona is subject to seismic activity in the neighboring states of California, Nevada, Utah and New Mexico, and Baja California and Sonora, Mexico. To protect yourself from the ground shaking that accompanies moderate to large magnitude earthquakes, practice 'Drop, Cover and Hold On'. Follow the guidelines in [Arizona is Earthquake Country](#) to earthquake-proof your property or business. Preparing for earthquakes could save you from injury and your home from damage in the event of a moderate to large magnitude earthquake.

See the new Story Map here:

<https://uagis.maps.arcgis.com/apps/MapJournal/index.html?appid=adef1615f5c949ccaa03f4dd0d9c2b52>

Read Arizona is Earthquake Country here:

[http://repository.azgs.az.gov/uri\\_gin/azgs/dlio/1459](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1459)

**Arizona Geological Society is grateful to Freeport-McMoRan, Inc. for their generous support of our student members!**

**Freeport-McMoRan has sponsored student dinners for the 2018-2019 AGS monthly meetings.**



**AGS MEMBERSHIP APPLICATION OR RENEWAL FORM**

YOU CAN RENEW OR SIGN UP as a new member and pay online. Please go to our website, [arizonageologicalsoc.org](http://arizonageologicalsoc.org). Or use the form below if you are more comfortable with the old school approach.

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

Dues (check box)  1 year: \$35;  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 or the  M. Lee Allison Scholarship Funds.