



AGS Newsletter

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AGS Speaker Series

March 5, 2024

Jason Ricketts, Ph.D.

Asst. Professor University of Texas El Paso

For additional information & registration:

<https://www.arizonageologicalsociety.org/event-5621085>

**Title: The Origin and Tectonic Significance of the
Basin and Range - Rio Grande Rift Boundary in
Southern New Mexico**

ABSTRACT: Cenozoic extension in the western United States occurred within two iconic domains: the Basin and Range and Rio Grande rift. These provinces merge in southern New Mexico to form an interconnected zone of extension, although the existence, location, and nature of the boundary between the two provinces are uncertain. In southern New Mexico, existing thermochronologic, geologic, and geophysical data sets, combined with thermal modeling of zircon (U-Th)/He (ZHe) data, define a subvertical, 30–40-km wide boundary that extends through the lithosphere to depths of at least 100 km. Thermal modeling indicates Proterozoic basement in the upper crust of the southeastern Basin and Range exceeded 225 °C during Oligocene magmatism, resetting ZHe dates and creating a thermal boundary that coincides with independent geologic and geophysical data sets. Although many aspects of this boundary are transient, others may become permanent features to define a lithospheric-scale boundary prone to reactivation during future tectonism. This assessment of the boundary supports models in which the southern Rio Grande rift is a separate structural entity from the adjacent Basin and Range, and this region provides an exceptional case study for understanding how extensional lithospheric scale boundaries evolve to become stable features of continents.

Highlight Reel:

- AGS March Speaker: Jason Ricketts
- New geologic maps from AZGS
- Upcoming Presentations
- Volunteer needed! web page assistant
- AGS Video Page Showcase
- Facebook posts from AZGS



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Jason Ricketts BIO: My main research focuses on structural geology, tectonics, low-temperature thermochronology, and fluid-fault interactions. Much of my research centers on brittle tectonics in Earth's upper crust. I combine field methods and observations with various analytical techniques and modeling efforts to investigate various processes which control deformation. My expertise centers on the development of the Rio Grande rift of Colorado, New Mexico, western Texas, and northern Mexico, where I routinely conduct field work with students and colleagues. To learn more about my current research and publications, please visit my personal website: Jason Ricketts | geology (jwricketts8.wixsite.com/geology)





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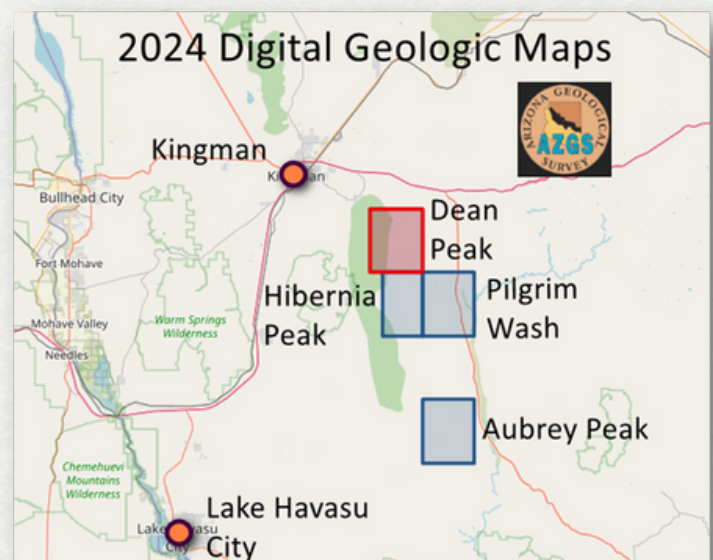
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New Geologic Maps from the Arizona Geological Survey

The Arizona Geological Survey (AZGS) just released four (4) 1:24,000 scale digital geologic maps in the Big Sandy Valley southeast of Kingman in western Arizona's Mohave County. These maps represent a concerted years-long effort to understand the geology and mineral resources of Big Sandy. Currently, the geologic maps (see figure below) are provided in PDF format and accompanied by descriptive pamphlets; the GIS databases will be available later this year or early 2025.

From the introduction to the Pilgrim Wash 7.5' geologic quadrangle. "The Big Sandy Valley is located in Mohave County, northwestern Arizona, and lies between the Hualapai Mountains to the west and the Aquarius Mountains to the east. In Fall 2020, the Arizona Geological Survey began a multi-year geologic mapping campaign starting with the Gunsight Canyon, Aubrey Peak, Tule Wash, Wikieup, and northern half of the Greenwood Peak 7.5' quadrangles. Mapping continued in 2021-2022 with the Pilgrim Wash, Bottleneck Wash, and Dean Peak quadrangles, the southern half of the Tom Brown Canyon quadrangle, and the eastern half of the Hibernia Peak quadrangle. The Aquarius and Hualapai Mountains are underlain by Paleoproterozoic gneiss intruded by Paleoproterozoic and Mesoproterozoic plutonic rocks. In the Hualapai Mountains, these rocks have been intruded locally by late Cretaceous plutons and several spatially extensive dike swarms."

- 7.5 minute quadrangles, authors, and link to map products.
- Aubrey Peak by Richardson, Garcia & Thompson
<https://library.azgs.arizona.edu/item/ADGM-1707495507780-15>
- Pilgrim Wash by Gootee & 4 others
<https://library.azgs.arizona.edu/item/ADGM-1707498544587-187>
- Eastern half of Hibernia Peak by Garcia & Thompson
<https://library.azgs.arizona.edu/item/ADGM-1707498862803-416>
- Dean Peak by Garcia & 4 others
<https://library.azgs.arizona.edu/item/ADGM-1707499630122-741>





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Arizona Geological Society (AGS) Presentation Series – Spring 2024

The spring presentation series is hosted at the Hexagon Mining venue at 40 E Congress St. On behalf of AGS members, the AGS Executive Committee thanks Hexagon for the use of this magnificent venue. For additional information on the presentations – time and registration – visit <https://www.arizonageologicalsoc.org/>

AGS Tuesday Evening Presentations on Youtube. We began recording AGS presentations in May 2020. Links to 16 presentations recorded between May 2020 and February 2024 are located at the AGS Video Presentation page at <https://www.arizonageologicalsoc.org/page-1855800> . AGS thanks the Arizona Geological Survey for hosting our videos at their Youtube channel (<https://www.youtube.com/user/azgsweb>).

Dr. John Douglass' Feb. 6, 2024 AGS presentation, "The Bidahochi Formation: Implications for Grand Canyon Arizona" is now online at <https://www.youtube.com/watch?v=RwBPWjrRnhM> .



Festoon X-bedded sands with locally

From John Douglass' presentation on the formation of Grand Canyon (6 Feb. 2024).

5 March 2024 Dr. Jason Ricketts (UTEP) The Origin and Tectonic Significance of the Basin and Range - Rio Grande Rift Boundary in Southern New Mexico

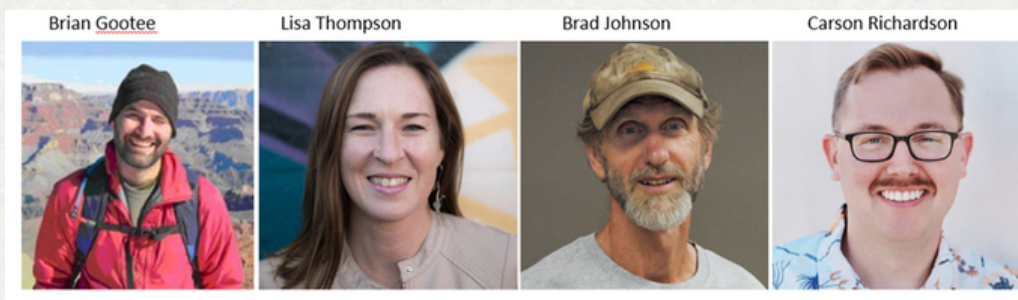


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Arizona Geological Society (AGS) Presentation Series – Spring 2024

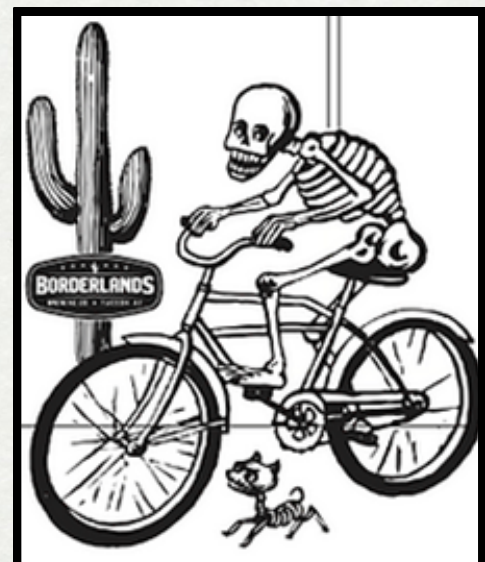
Tues, 2 Apr. Dr. Carson Richardson, Brian Gootee, Lisa Thompson “Introduction to the Geology and Economic Geology of the Big Sandy Valley of western Arizona” (actual title pending). This presentation presages the AGS field trip to the Big Sandy Valley scheduled for the weekend of 27 April 2024. Carson, Brian, Lisa, and Brad Johnson will lead the trip. members in early March. For a brief description of the field trip goals and objectives, please see AGS Jan. 2024 newsletter at <https://www.arizonageologicalsoc.org/>.



Weds., 1 May Eytan Bos Orent (UA Ph.D. candidate) “Characterization of contrasting ore-related fluid systems in the Paradox Basin”. Note, because of a scheduling conflict, Eytan’s presentation is scheduled for the 1st Weds in May and not the 1st Tuesday.

Presentations at Hexagon Mining will resume in September and carry through to December 2024. Phil Pearthree, AGS Vice President of Programs, is working on the fall-2024 schedule.

SUMMER SOCIAL MIXERS. In June, July, and August 2024, we’ll call for a brief hiatus in presentations in exchange for once-a-month Thursday evening social mixers at Borderlands Pub on Toole St. in downtown Tucson. More on this as summer approaches.





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Seeking Volunteer(s)! AGS Website Assistant

AGS Executive Committee is seeking a volunteer(s) to assist with adding new content to our website (<https://www.arizonageologicalsoc.org/>). The job as described in the Jan. 2024 newsletter. No previous webpage management experience required.

From current AGS Web Master David Briggs: "I currently spend about two to four hours per month updating the AGS web site. I can train a new AGS web site administrator, assist him/her as they become familiar with the Wild Apricot web site software, and continue helping out from time to time if needed."

Monthly/Bimonthly Duties

- Update Events Page (i.e. monthly meetings, spring and fall field trips)
- Post AGS Newsletter – Post monthly AGS newsletter.
(monthly/quarterly) on website with links to access newsletters.
- Update AGS Video Presentations Page
- E-mail Blasts – Send e-mail blasts to membership (newsletter and other announcements)

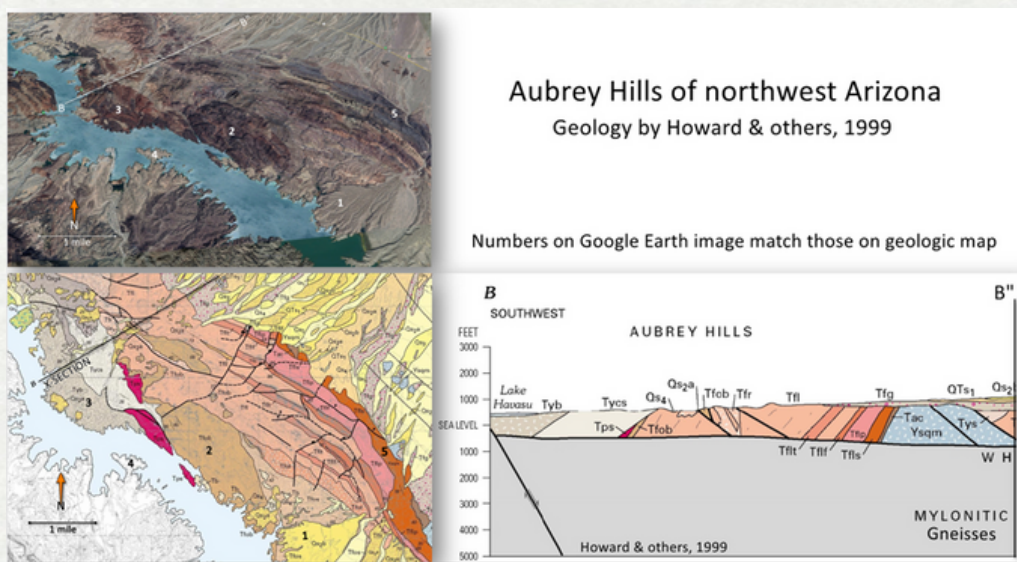
Quarterly/Annual Duties

- Post Field Trip Page – Add photos (submitted by participants) from AGS Field Trips
- Annual Update to Executive Committee Page
- Annual Update to Officers and Councilors Page – Adding names of new officers and councilors to list of former officers and councilors from previous years.
- Annual Update to Scholarship Info and alert student member via e-mail list serve.
 - oAnnual Update to J. Harold Courtright Scholarship Page – Posting Photo and Bio provided by recipient.
 - oAnnual Update to M. Lee Allison Scholarship Page – Posting Photo and Bio provided by recipient.
 - oAnnual Update to Scholarship Recipients Page – Adding new recipients to the list of AGS scholarship awardees.



<https://www.facebook.com/AZ.Geological.Survey>

The northwest-trending Aubrey Hills parallel the Colorado River immediately south of Lake Havasu, Arizona. FYI, the numbers in the Google Earth image correspond to the numbers in the geologic map. From Howard & others (1999), "The area lies within a terrane characterized by major low-angle normal faults", such as the Whipple Mountain detachment fault shown in the cross section. Rocks exposed in the Aubrey Hills are a complex of Neogene (mostly Pliocene?) volcanics (basalt through rhyolite), fanglomerates, conglomerates and sandstones overlying Proterozoic metamorphic rocks. The Neogene rocks are tilted and faulted as part of Miocene Basin and Range deformation. The low-angle Whipple Mountain detachment predates the deformation of the Neogene volcanics and sedimentary rocks.



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Recent posts from AZGS' Facebook page

<https://www.facebook.com/AZ.Geological.Survey>

The North Rim of Grand Canyon hosts the Pleistocene Uinkaret volcanic field, with hundreds of cinder cones and associated lava flows. Hat Knoll is one such cinder cone (Qhp) on the NE side of the volcanic field. The cone is surrounded by Pleistocene basalt lava flows (Qhb). The cone-lava flow complex extends about 2 miles north to south. Cinder cones are the most common terrestrial volcanoes and most erupt for less than one year.



Citation: Billingsley, G.H., and Workman, J.B., 2000, Geologic map of the Littlefield 30' X 60' quadrangle, Mohave County, northwestern Arizona. USGS Map I-2628, map scale, 1:100,000. https://ngmdb.usgs.gov/Prodesc/proddesc_30333.htm