



AGS Newsletter

www.arizonageologicalsociety.org

AGS evening programs 2023: Live & in-person!

In this edition:

- AGS evening programs 2023
- Lithospheric controls on the formation of porphyry copper deposits: what could possibly go wrong?
- AGS survey
- Arizona Mineral Districts v1.0 Cochise and Santa Cruz Counties
- In Search of AZ's orphaned oil and gas wells
- Critical Minerals in New Mexico

The Arizona Geological Society's 2023 evening program got off to a slow start while the Executive Committee searched for an appropriate and affordable venue. AGS VP-Programs Simone Runyon (Freeport-McMoRan) schedules AGS programs in 2023. We decided on Hexagon Mining's multi-media conference room and they graciously accepted our request. The 2023 Speaker Series kicked off on 7 March with an excellent presentation by Ralph Stegen (Freeport McMoRan, retired) on the Lone Star porphyry copper deposit of the Safford mining district, Arizona. Thirty-five people attended the talk – see figure – and more than 60 people viewed the live stream, courtesy of Hexagon's Media IT team.

Presentations Spring 2023

Ralph J. Stegen and David B. Parker, Exploration Geologists, March 2023, 'Magmatism and Characteristics of Supergene and Hypogene Alteration-Mineralization of the Lone Star Porphyry Copper Deposit, Safford District, Arizona', available online at https://www.youtube.com/watch?v=IEqcOGZYvJ0&list=PLLkn9IzbK_retIpUy1DwoZVojw1AnCxa

Susan Lieb, Ph.D., April 2023, 'Temporal Evolution of the Rattlesnake Creek Terrane and Implication of Jurassic Construction of Crust in the Western United States'. Susan Lieb is the mineral curator at the UArizona's Alfie Norville Gem & Mineral Museum.

(...continued on next page)



AGS Newsletter

www.arizonageologicalsoc.org

AGS evening programs 2023: Live & in-person! (continued)

Hervé Rezeau, Ph.D., May 2023, Lithospheric controls on the formation of porphyry copper deposits: What could possibly go wrong?. Hervé Rezeau is Assistant Professor and Lundin Family endowed Chair in Economic Geology at the Dept. of Geosciences, University of Arizona.

Presentations in summer, fall, and winter 2023 are yet to be scheduled.

On behalf of AGS members, the AGS Executive Committee thanks Hexagon Mining for accommodating our 2023 speaker series.



AGS Speaker Series 2023 – Hexagon Multi-Media Room



Lithospheric controls on the formation of porphyry copper deposits: What could possibly go wrong?

Speaker. Hervé Rezeau, Assistant Professor and Lundin Family endowed Chair in Economic Geology at the Dept. of Geosciences, University of Arizona

Day/Time/Location | 6:30 p.m. on Tuesday, 2 May, at Hexagon Mining, 40 E Congress Street.

ABSTRACT. Porphyry copper deposits (PCDs) formed in the upper continental crust represent rare short-lived events within the protracted evolution of volcanic arc systems. PCDs are the primary world's copper resources and provide a substantial source of gold and molybdenite – all of them considered as critical elements. Despite their economic importance, the trans-crustal geologic processes that carry these elements and culminate in their economic enrichment remain unclear. Based on a global compilation of available Cu concentrations of arc volcanic rocks, I will discuss processes that control the evolution of melt Cu concentrations during magmatic differentiation, and ultimately demonstrate the crucial role of the initial melt water content in arc magmas to form PCDs. While melt Cu concentrations is of secondary importance, I will still argue that it may play an important role to modulate the size of PCDs.

Based on a case study focused on the Meghri-Ordubad pluton in southern Armenia, I will use a comprehensive zircon U-Pb and molybdenite Re-Os geochronological dataset to show that long-lived magmatism is a pre-requisite to build up fertile magmatic-hydrothermal systems. I will combine these data with field observations and mineral chemistry to argue that the presence of appropriate structures focusing ore-bearing fluid flow over time is a key parameter to form large PCDs. Overall, these complementary multi-scale approaches will highlight a series of parameters that influence the journey of copper enrichment from the mantle to the upper continental crust.

Dr. Hervé Rezeau is an assistant professor and the Lundin Family endowed Chair in Economic Geology at the department of Geosciences, University of Arizona. Dr. Rezeau obtained his master and PhD degrees at the University of Geneva, Switzerland. Then, Dr. Rezeau carried on his scientific journey from 2018 to 2021 as a post-doctoral fellow at the Massachusetts Institute of Technology in Cambridge, USA.

(...continued on next page)



AGS Newsletter

www.arizonageologicalsociety.org

AGS Member Survey

What would you like to see in AGS's Evening Programs? To improve our monthly evening presentations, we seek your feedback on presentation logistics and subject matter. To that end, we have launched an online survey tool with Google Forms. The tool was designed by the Executive Committee to gauge members' interest in the content and frequency of the evening presentation program. The survey comprises six close-ended questions and one open-ended question for you to share your comments and ideas.

To participate, please follow this link - <https://forms.gle/9YpzWKtcycZpFSSh6> - to AGS' SurveyMonkey.com assessment tool. The tool will be available through Wednesday, 31 May.

The Executive Committee will compile, analyze, and circulate the results along with a short report summarizing the responses.

Arizona Mineral Districts v1.0: Cochise and Santa Cruz Counties

A new text, 'Arizona Mineral Districts v1.0 Cochise and Santa Cruz Counties', by Jan Rasmussen and Stan Keith revisits the distribution of mineral resources previously reported in Arizona Geological Survey Bulletins:

- "Index of Mining properties in Cochise County, Arizona (Keith, 1973)
<https://library.azgs.arizona.edu/item/AGSB-1552426592487-584>
- "Index of Mining properties in Santa Cruz County, Arizona (Keith, 1975)
<https://library.azgs.arizona.edu/item/AGSB-1552428751157-764>
- "Metallic Mineral Districts and Production in Arizona (Keith and others, 1983)

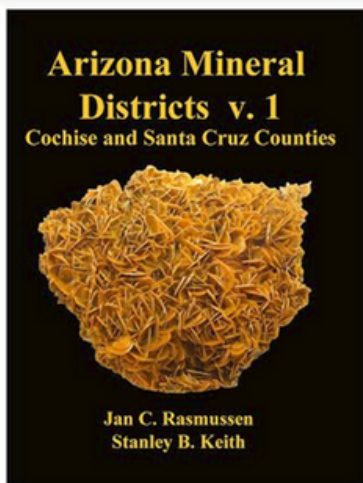
From their promotional flyer, "Arizona Mineral Districts v. 1 Cochise and Santa Cruz Counties is a detailed reference work describing the geology, mineralogy, age dates, locations, and past production of Arizona mineral districts within those counties. The book is profusely illustrated with portions of 1:62,500-scale old topographic maps, scenery, old mine maps and facilities, and photographs of minerals from those localities. This is the first of a series of scientific references describing the mineral districts in all of Arizona's 15 counties." You can order the hardcover or paperback from Amazon here:

https://www.amazon.com/Arizona-Mineral-Districts-Cochise-Counties/dp/B0BZB5P8TL/ref=tmm_pap_swatch_0?_encoding=UTF8&qid=&sr=



AGS Newsletter

www.arizonageologicalsoc.org



**Jan Rasmussen
Stanley Keith**

300 p.
8.5"x11"
photos or
mineral district maps
on every page



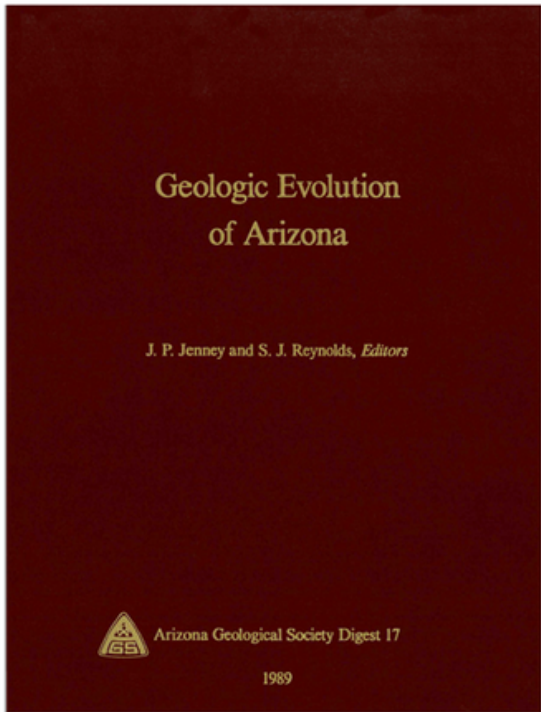
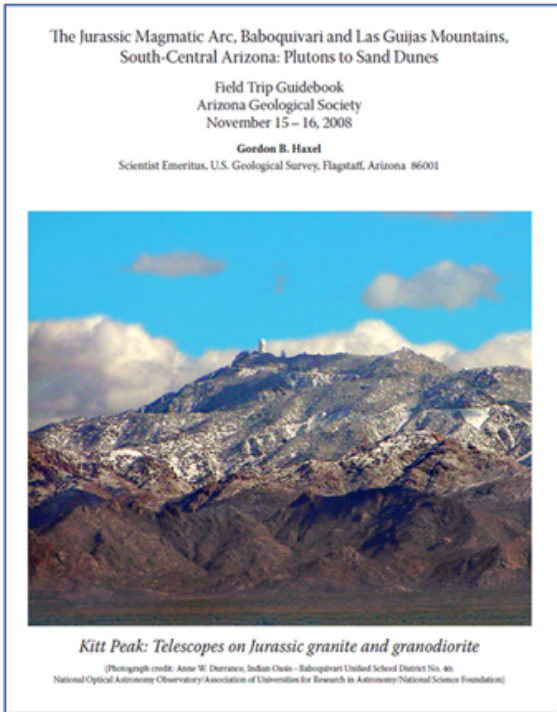
Cover and flyer promoting Arizona Mineral Districts v. 1.

AGS Member-Only Publication Access

Did you know that as an AGS member you have access to a trove of out-of-print (bold) and in-print (italicized) Digests (11 | 11) and Guidebooks (74 | 13) published by the Society? Well, you do. You can access the guides and digests at:

<https://www.arizonageologicalsoc.org/PublicationsArchive>.

To gain access to in-print materials, you need to login to your AGS account at <https://www.arizonageologicalsoc.org>.



Cover shots of AGS publications available to members through the AGS website.



AGS Newsletter

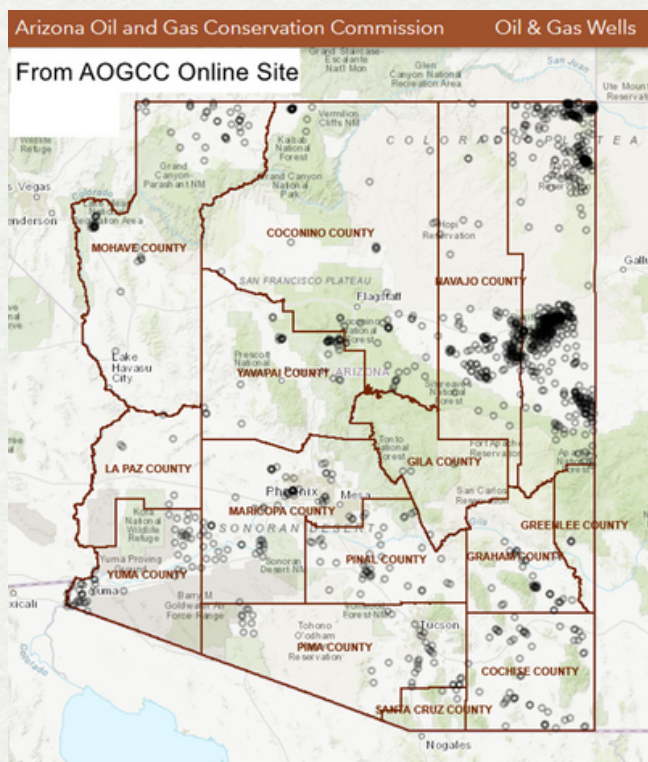
www.arizonageologicalsoc.org

In Search of Arizona's Orphaned Oil and Gas Wells

The hunt is on for orphaned oil and gas wells in Arizona. As part of the Biden Administration's Infrastructure Law, the Arizona Oil and Gas Conservation Commission (AOGCC) - housed at the Arizona Dept. of Environmental Quality - received a \$25 million grant to identify, assess, and plug orphaned oil and gas wells. At this stage, the Commission recognizes 246 orphaned wells that require assessment and potential treatment. There may be other orphaned wells in Arizona, so the AOGCC launched an online site for the public or civil authorities to report possible orphaned wells. To view the site and/or report orphaned wells:

<https://survey123.arcgis.com/share/865475107fdc48caa8b16e0994253b3b?portalUrl=https://ADEQ.maps.arcgis.com>

Over the past 100 years, more than 1,100 oil and gas exploration wells have been drilled in Arizona. The locations and well logs - physical and electrical - of wells drilled since the 1920s are online at the interactive [Arizona Oil and Gas Well Viewer](#). According to the Environmental Information Administration, "the largest producing oil field in Arizona—Dineh-bi-Keyah, The People's Field—is on the Navajo reservation. Although production is now modest, the field has produced almost 19 million barrels of crude oil since its discovery in the mid-1960s.



Distribution of known oil and gas wells in Arizona. AOGCC well viewer resides at [Cover shots of AGS publications available to members through the AGS website.](#)



AGS Newsletter

www.arizonageologicalsoc.org

Critical Minerals in New Mexico

Economic geologists Ginger McLemore and Alexander Gysi just released a fresh article on critical minerals in "New Mexico Earth Matters", newsletter of the New Mexico Bureau of Geology & Mineral Resources. The US Dept of Defense, Dept of the Interior, and Dept of Energy assign 53 minerals to critical. The article can be viewed or downloaded at tinyurl.com/4bjhca9s.

From the introduction, "Although the definition of a critical mineral varies from country to country depending on strategic conditions and supply and demand, in the United States critical minerals are commonly defined as a nonfuel mineral commodity essential to U.S. economic and national security and provided by a supply chain vulnerable to global and national disruption. Disruptions in supply chains can be caused by natural disasters, labor strife, trade disputes, resource nationalism, conflict, and other conditions."

Citation: McLemore, V.T. and Gysi, A., 2023, Critical Minerals in New Mexico. New Mexico Earth Matters, Winter 2023, New Mexico Bureau of Geology and Mineral Resources

Map of mining districts in New Mexico with critical minerals (McLemore and Gysi, 2023).

