



AGS NEWSLETTER

ARIZONA GEOLOGICAL SOCIETY, INC. OCTOBER 2009

DINNER MEETING SPEAKER OCTOBER 6, 2009

FLEETWOOD R. KOUTZ, ARIZONA MINERALS, INC.

Geology and Mineralization of the Hardshell Silver, Base-Metal, Manganese Oxide Deposits, Harshaw Mining District, Patagonia Mountains, Santa Cruz, Co., Arizona

ABSTRACT: In the Patagonia Mountains Laramide-age plutons intrude and mineralize Paleozoic sedimentary and Mesozoic volcanoclastic rocks. Zoned porphyry copper and satellite deposits, including Red Mountain and Sunnyside, make up the core of the range. The Hardshell deposit is developed at the end of a major SE-striking fault zone extending 6 miles through the range and the locus of major mines.

Hardshell mineralization is primarily confined to manto zones in silicified (jasperoid) Mesozoic volcanoclastic strata overlying Permian carbonates (Concha, Scherrer and Epitaph Fms). The Main Manto Zone is about 2000 feet N-S, 200-1000 feet E-W and 200 to 300 feet thick, but follows structural and stratigraphic zones into the carbonate section below and to the NW. Mineralization consists of variable replacement and open-space filling of original host rocks by intergrown, coliform encrustations and crystalline veinlets of quartz and Mn oxides in fine-grained, volcanic sediments and jasperoid. Stratigraphy and both low- and high-angle structures strongly control primary mineralization, enrichment and oxidation.

The mineralization consists of manganese oxides, including cryptomelane and lesser chalcophanite, which contain significant quantities of silver, zinc, lead, and copper within the manganese oxide crystal structure. Pb content is usually higher in the upper part of the manto with Zn-rich mineralization often later, peripheral and deeper. Ag is widely variable and unsystematic in Mn oxides and the deposit, but is often lower in deeper and peripheral mineralization with fewer multiple stages. Historically Pb-Ag carbonate, Mn-rich siliceous/ferrometallurgical and bonanza Ag-halide ores were important in peripheral zones.

(continued on page 3)

Dinner Meeting Schedule:

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

Cash Bar @ 6 pm Dinner @ 7 pm Talk @ 8 pm

Cost: With reservation: Members \$24, Guest \$27, Students \$10 Without reservation \$3 additional. Please call **(520) 663-5295** by 5 pm before **October 2nd**. Indicate if a low-salt, vegetarian, or vegan meal is required.

A coffee/salad/roll/desert option is also available for \$18.

Please cancel if you are unable to attend.

CALENDAR OF EVENTS:

- Nov. 3, AGS Dinner Meeting, Kenneth Hollett, USGS retired, *Water: An Emerging Challenge for US Foreign Security*
- Dec. 1 AGS Dinner Meeting, Lawrence Krauss, ASU
- Dec. 4-6, AGS Winter 2009 Field Trip, Pinacate Volcanic Field, Dan Lynch
- Jan. 5 AGS Dinner Meeting, Leslye Obiora, *The Challenges of Mining & Mineral Exploration in Africa*



Other Geology Trips:

Spots are still available on the AIPG field trip scheduled for Nov. 13-15. The group will visit NW Sonora to see the **La Herradura Mine** and petroglyphs near Caborca with an overnight stay in Rocky Point. Please see www.arizongeologicalsoc.org Field Trips page for more details. You can reserve your spot by contacting Erick Weiland at eweiland@pirmie.com or Dawn Garcia at dgarci@srk.com.

AGS FALL FIELD TRIP, SATURDAY OCTOBER 10, 2009

Geology & Mineralization of Red Mountain Porphyry Cu-Mo and Hardshell Ag, Base Metals, Mn Oxide Deposits—Alteration, Structure, Mineralization

WHAT WE'LL SEE: This day-long trip in early October will allow us to look at the alteration and surficial mineralization at the Red Mountain porphyry copper-molybdenum deposit near Patagonia in Santa Cruz County. We will also review the structural setting, alteration, and Mn-Cu-Pb-Zn-Ag mineralization at the Hardshell manto deposit (see October talk abstract for additional information).

TRIP LEADERS: Fleetwood R. Koutz, Richard Ahern, and Russell M. Corn

MEETING TIME: Assembly time 9:20-9:30 am

MEETING LOCATION: In SONOITA in the parking area just east of the "Stakeout Restaurant and Saloon" at the SE corner of intersection of AZ 82 & AZ 83 (3243 State Highway 83, Sonoita, Arizona). This meeting location was selected as 21st Annual Patagonia Fall Festival is in swing during this weekend and parking spaces in Patagonia will be tight.

TRANSPORTATION: Road conditions on Red Mountain will require 4 x 4 vehicles with high clearance. We plan on using private vehicles and carpooling to reduce the number of vehicles. If insufficient personal vehicles are available, AGS will rent 4 x 4 sedans at an extra field trip cost to the participants. A carpool location will be arranged in Tucson once we have the list of participants and we'll consolidate vehicles in Sonoita.

COST: \$20 per person including guidebook and snacks; \$10 for spouse or others not requiring guidebook. Fee for Students \$10. We will collect fees at the assembly area while we get the release forms signed.

WHAT TO BRING: Rugged outdoor shoes will do (but wear your boots if you can still get into them), hat, and sunscreen. Bring your own lunch and water. AGS will have snacks, soft drinks, and water available.

WHAT TO EXPECT: At the Red Mountain site there will be some short hikes, mostly along road segments with approximately 200 feet in elevation gain. This will be in relatively open country, with no serious brush. At the Hardshell property, expect an approximately 1 mile round-trip "walk" on a road up a canyon with some scrambling over stream cobbles and boulders near the end in the arroyo bottom. The trip is anticipated to last until late afternoon, but there are several stops and opportunities to leave the trip early if needed.

RESERVATIONS: To make a reservation, please call (520) 663-5295, sign up online at www.arizona GeologicalSoc.org, or email VP Field Trips Doug Shakel directly at dshakel@dakotacom.net. Please indicate whether you are willing to drive and can take 1 or more passengers in your vehicle.



Photo by D.P. Young of drilling rig at Hardshell deposit with Red Mtn and Mt. Wrightson in background.

MEMBER AND OTHER NEWS

Welcome to new members **T. Scott Bryan**, Emeritus, retired, Victor Valley College, and to **Ashley Applebee** and **Traci Skinner**, students at the University of Arizona.

We regret to inform our members that long-time member **Mike Fitzgerald** passed away on August 11 in Tucson. He had a long career with Phelps Dodge Morenci, Kerr-McGee, and his own company Min-Ex Services and Metal Ex-Management in Arizona, Nevada, Colorado, and Vancouver, B.C. A memorial service is planned in Tucson on October 24th—please contact Cori Hoag at choag@srk.com if you are interested in attending as details have not yet been finalized.

FLEETWOOD KOUTZ'S ABSTRACT, CONT. FROM PAGE 1

Recent deep core drilling has confirmed that galena, sphalerite, chalcopyrite, pyrite, sulfosalts, alabandite, and rhodochrosite are among the hypogene progenitors of the Mn oxides in the Hardshell deposit, as in the nearby Trench Camp veins. Deeper carbonate-hosted mineralization to the NW of the main manto is often dominated by calc-silicates: wollastonite and rhodonite, rather than jasperoid. The carbonate section around mineralized zones is bleached of carbonaceous materials and is finely recrystallized and marbled. Locally oxidation extends to 2,400 feet depth – often 2,000+ feet below the present water table.

Hardshell volcanic host-rocks have been K/Ar dated between 83 and 71 Ma. Adularia with mineralization dates at 59 Ma – compatible with other district mineralization. K-rich cryptomelane dates at 19 Ma and may be related 20-26 Ma volcanic, tectonic and thermal events in the district.

Fluid inclusion temperatures in quartz intergrown with Mn oxides mainly range from 210-340 °C. Evidence of boiling is noted, especially in the Red Clay halo at the sharp upper contact of the jasperoid caprock to the manto. Fluid inclusion temperatures decrease from the Sunnyside intrusive center 8000 feet SE through the Trench and Hardshell-Hermosa systems.

Wildcat Silver is advancing the extent, grades, metallurgy and feasibility of mining Hardshell.

Fleetwood Koutz is a Consulting Economic Geologist with Arizona Minerals, Inc., a subsidiary of Wildcat Silver Corporation.

THANKS MEMBERSHIP DIRECTORY SPONSORS!

By now you should have your **2009 AGS Member Directory**, which was mailed out in early September. Kudos to those who contributed excellent photos from the field trips and your adventures out in the field and who compiled the updated membership information. A list of acknowledgements is found in the back of the directory.

A big thanks goes to our loyal advertising sponsors who completely subsidized the printing costs. These companies provide funds year after year to support local professional societies including AGS, Arizona Hydrological Society, American Institute of Professional Geologists, Society of Economic Geologists, Society of Mining, Metallurgy, and Exploration, and many others. Please let them know that you saw their ad and appreciate their support.

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Also: Arizona Geological Survey, Arizona Dept. of Mines & Mineral Resources, U.S. Geological Survey



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For info on ordering AGS
publications, upcoming events,
and the dinner meeting schedule
visit
www.arizona Geological Soc.org.

AGS books & maps are sold at the
dinner meetings and by the
Arizona Geological Survey.

Enjoy your Fall field work and geology adventures. As always, please keep us up-to-date as you move, or change jobs and email addresses.

2010 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

Please mail check with membership form to: Arizona Geological Society, P.O. Box 40952, Tucson, 85717

Dues (check box) 1 year: \$20; 2 years: \$35; 3 years: \$50; full-time student (membership is free)

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