



Arizona Geological Society Newsletter

ARIZONA GEOLOGICAL SOCIETY, INC., TUCSON, AZ

JUNE 2010

June 1, 2010 DINNER MEETING

Alex Iriondo will be our featured speaker. Please see the title and abstract below.

Sheraton Four Points, Wild Cat Room: 1900 E. Speedway Blvd. in Tucson (Speedway Blvd. at Campbell Ave.).

Cash Bar at 6 pm, Dinner at 7 pm, Talk at 8 pm.

Cost: With reservation, members \$24, guests \$27, Students \$10. Without reservation, \$3 additional.

RESERVATIONS: CALL 520.663.5295 by 5 p.m. on May 28, 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. We cannot guarantee that meals will be available without a timely reservation.

ABSTRACT

New Ideas on the Distribution of Paleoproterozoic Provinces in Northwestern Mexico: Possible Basement Influence on Subsequent Geological Events in Southwestern North America

In the past few years, a number of colleagues working in Sonora and I have accumulated information about Precambrian geology to propose a new distribution of Paleoproterozoic crustal blocks and to find a more robust correlation with pre-existing basement provinces in SW USA (Mojave, Yavapai, and Mazatzal). The original concept of the Caborca (1.7-1.8 Ga) and North America (1.6-1.7 Ga) blocks, established over 30 years ago, is now seen as too simplistic based on new geological studies.

The North America block, present in eastern Sonora, is made up of rocks that easily correlate with rocks from the Mazatzal province of SE Arizona. Some examples are present in the Pinacate-Cabeza Prieta region (Eastern Complex), Quitovac region, and perhaps in the El Crestón area in northcentral Sonora. In contrast, the westerly Caborca block appears to be an inhomogeneous piece of crust with a southwestern part made up of rocks with similarities to the Mojave province (Tortuga, Bámuri, Tecolote, Santa Rosa, and Sierrita Prieta). However, the most intriguing geology is the one present between the Mojave and Mazatzal provinces in NW Sonora (still part of the Caborca block). We suggest that these Precambrian rocks represent a thin, NW-SE trend, group of Yavapai-type rocks that acted as a zone of crustal weakness. Some examples of this Mexican Yavapai crust include rocks in the Andrade Quarry, Pinacate-Cabeza Prieta region (Western Complex), Quitobaquito, Quitovac, Aibo area, El Rajón, Sierrita Prieta (?), and El Crestón areas.

We proposed that this thin NW-SE zone of crustal weakness (Mexican Yavapai) influenced different geological events in NW Mexico since the Precambrian. For example: 1) alignment of ~1.1 Ga granites and anorthosites, 2) orientation of continental rifting during break-up of Rodinia, 3) locus for emplacement of Mesozoic magmatism and sedimentary basins, 4) zone of decollement for Laramide thrusts, 5) channel ways for metamorphic fluids that formed a belt of Laramide orogenic Au deposits, 6) locus for Tertiary volcanism, 7) orientation of extension to form metamorphic core complexes and Basin and Range normal faults that control current topography, 8) opening of the Gulf of California, 9) and perhaps Quaternary mafic magmatism.

This proposed NW-SE orientation of the orogen in NW Sonora contrasts sharply with the overall NE-SW geological trend observed for the Paleoproterozoic provinces in SW USA. This fact is used to hypothesize about the existence of a sharp oroclinal bend in SW Laurentia, what we call the "Caborca oroclinal bend", that could have resulted from the actual collision, perhaps slightly oblique, of the Yavapai and Mazatzal volcanic island arcs against the preexisting Mojave crust.

Testing this and/or future hypotheses about the distribution of basement provinces in the region should help obtaining a better understanding of the SW margin of Laurentia to be used in current efforts to reconstruct the Rodinia supercontinent.

Alexander Iriondo was born in Spain. He obtained his B.S. at the Basque Country University in Bilbao in Tectonics and Mineral Deposits. Iriondo then enrolled at the University of Colorado at Boulder where he got his M.S. and Ph.D. degrees under the supervision of Prof. Bill Atkinson. For those degrees, Iriondo worked towards solving regional and tectonic problems including Precambrian basement distribution, time of juxtaposition of basement blocks, and the occurrence of Laramide orogenic gold deposits in NW Sonora. Later, Iriondo conducted a 2-year Postdoctoral study at the U.S.G.S. in Denver to further expand the knowledge of Precambrian geology in NW Mexico. Iriondo teaches at the Geosciences Center at the Universidad Nacional Autónoma de México (UNAM) in Querétaro, where he is a Full Researcher/Professor. Iriondo has been introduced as a geochronologist but he prefers to be seen as a geologist with some valuable knowledge in geochronology.

June Member Spotlight—Robert A. Metz

Robert A. (Bob) Metz was born in Cleveland, Ohio in 1932. He received a degree in Geological Engineering (Mining) in 1955 from the Colorado School of Mines. He is a father of four—Jim (Aguanga, CA), Tom (Oceanside, CA), Lori (Tucson) and David (Tucson). He lives in Tucson with his friend, Bruno, a 3-year old Red Queensland Heeler cross, adopted from the Humane Society of Southern Arizona in 2008 .

When did you first become interested in geology? I'd always had an interest in nature and the great outdoors, not too easily satisfied growing up in a suburb of the fifth largest city (at that time). Fortunately the Cleveland city fathers had acquired a ring of parklands around the city, one of which bordered my town (Lakewood). The Cleveland Museum of Natural History had a Trailside Museum there, which was open during the summer. It had all sorts of nature exhibits and some small animals (raccoons, skunks, snakes, a sparrow hawk and barn owl) rescued from the wild, and also educational groups for youngsters. At age thirteen, with the liberating power of a bicycle, I could handle the 7-mile ride three times a week. We learned about bugs, plants, trees, birds and animals of the area. One day we had a geology field trip and, though there was a smattering of Devonian fish scales found that day, I found the marcasite crystal concretions fascinating and was hooked for life. Another fellow in the group had similar interests which we pursued to the limits of our abilities. Our interests were wonderfully fostered by the museum staff, and we were enlisted as volunteers to identify minerals donated to the main museum and stored in the dusty basement of an old Brownstone mansion



next to the main museum. Armed with streak plates, hydrochloric acid, some mineral identification tables, etc., we spent most of our Saturdays there for the next couple of years. I actually believe we got most of them right! Needing transportation for longer field trips, I worked on getting my dad interested in collecting fossils and minerals. Camping out in an active limestone quarry on a shut-down day and roaming the benches at will would have given the MSHA folk fits, but the worst we suffered was sunburn. Eventually, we learned about the Kirtland Geology Club, part of the prestigious Kirtland Scientific Society in Cleveland. My friend and I were the first non-adults allowed to join.

What was your first job? At fifteen I got my first summer job at a small company (Air Controls, Inc.) just east of Lakewood in Cleveland, first carrying heavy stuff around, then assembling blowers and fans of various sizes, for 35 cents an hour. Working with a group of older guys was interesting in a lot of ways, like being threatened with bodily harm for working too fast. Anyhow by the end of the summer, it was 60 cents an hour. I believe that was the last time I punched a clock on a job.

What was your first job as a geologist? In the early 1950s Kennecott Copper Corporation set up Bear Creek Mining Company as its domestic exploration subsidiary. As porphyry coppers were high on the list of prospects sought, and Kennecott owned four of the best mines, it was felt that those were good laboratories in which to learn as much as possible about these deposits. Thus the Operating Properties Division of Bear Creek was established with a senior and junior geologist at each of the mines, independent of the local management, to do geologic research on the deposit. I was extremely fortunate to be hired for the junior position at Chino Mines Division. Our initial task was to map in detail 16 square miles surrounding the mine at 100 ft per inch. I could not have designed a better place to start right out of school in 1955; it was a great combination of complex and varied geology, excellent mentors and mine operations.

What is your most memorable field experience? There have been so many, it's hard to choose. High on the list would be helicoptering in to post notices to patent on claims the company held eight miles north of Mt. St. Helens four months after the eruption. I can still see that glowing lava in the crater. The lack of damage to vegetation, fireweed blooming everywhere and abundant elk tracks were equally impressive.

What do you consider your greatest professional achievement? Taking over the senior geologist position of Bear Creek's Operating Properties Division at Ray Mines shortly after a significant discovery and increase in re-

Robert A. Metz—continued

serves. My boss felt the mapping program (only nine square miles there) wasn't going well and needed improvement. With good help and support from above, and ample time to do the work, our group was able to convince management that more exploration was justified, not an easy task at that time. At the end of the project I left feeling satisfied that the kids of people I worked with could have jobs there; I suspect that's been extended by a generation or two.

What do you consider your greatest achievement EVER? I think that, overall, I've had good relations with people wherever I've worked and felt welcome whenever I visited. But, probably best of all, with separations from work and unfortunate family situations, my once estranged kids and I have great relationships. Maybe I've got them and Bruno fooled as well.

What are your hobbies? Tennis, bicycling (3 silver medals in El Tour de Tucson and dreams of doing it again), hunting, fishing and camping (now with more creature comforts).

Water, whiskey, or wine? Right now, after answering all these questions??? Whiskey!

Thanks, Bob!

Do you know someone who would be an interesting subject for a "Member Spotlight" column? Email his/her name and contact information to ajones@clearcreekassociates.com.

USGS NOONTIME LECTURE SERIES

Alex Iriondo (see his bio on Page 1) will speak on June 1, 2010 at the USGS at noon in Room 353. The USGS is located on the U of A campus at 520 North Park Ave. Parking is available in the parking garage to the east of the building.

ABSTRACT

Newly Discovered Permian Magmatism in Northwestern Sonora, Mexico:

Implications for the Establishment of the Active Continental Margin of Southwestern North America

The closing of the Rheic Ocean along an ENE-WSW, south-dipping, subduction zone during the Late Paleozoic allowed the final collision of southern Laurentia and Gondwana along the Ouachita-Marathon-Sonora orogenic belt (suture) to achieve the final assembly of Pangea. This south-dipping subduction zone formed the latest Mississippian-Early Permian Las Delicias volcanic arc that went extinct just prior to the final continent-continent collision.

In Permian time, during the last stages of collision, the western part of Pangea experienced approximately east-west convergence that generated a nascent NW-SE, east-dipping, subduction zone that started consuming the proto-Pacific oceanic plate (Mezcalera plate?) allowing the establishment of the East Mexico continental magmatic arc (~300-250 Ma). We hypothesize that the magmatism started initially in southern Mexico, where we find the oldest igneous rocks, and advanced towards the north passing through NW Sonora and going all the way to California and Nevada in the USA. This is a large continental arc event in SW North America that differs in time, and is basically oblique to the older Las Delicias arc found in NE Mexico.

The Permian (~275-258 Ma) granitic rocks, found in NW Sonora, intrude Paleoproterozoic (~1.7 Ga) basement rocks of SW Laurentia (Yavapai crust) and represent a change from a passive continental margin, established soon after the rifting of Rodinia, to an active margin in Permian time. These granitic rocks in NW Sonora represent a previously unrecognized local source of Permian zircons that should allow the reinterpretation of U-Pb detrital zircon data for Mesozoic and Cenozoic sedimentary basins allowing for more robust paleogeographic reconstructions of NW Mexico.

Announcements

WELCOME NEW AGS MEMBERS:

Katie Alexander, graduate student, Arizona State University
Marie Ruiz, staffing manager, Geotemps, Inc.

AGS Dues for 2010—If your friends mention that they are not receiving their AGS newsletter anymore, it is likely that they forgot to renew their dues! No worries! Just ask them to sign up again. The form is on the back of this newsletter.

Upcoming AGS Dinner Meeting Speakers

July 6, 2010: Stan Keith

Topic: "The Origin of Kerogen" or "Throw Hot Water on a Peridotite and Make an Oilfield"

August 3, 2010: Ray Grant

Topic: "Geology and Mineralogy of the Grandview Copper Mine, Grand Canyon, AZ"

September 7, 2010: Marcia McNutt, U.S.G.S Director. Topic TBA

U of A #1

U.S. News & World Report recently ranked the University of Arizona's graduate geology program NUMBER 1 in the U.S, tied with University of Michigan-Ann Arbor. The remaining top 10 graduate schools for geology were Pennsylvania State University, University of Texas-Austin, Stanford University, California Institute of Technology, Massachusetts Institute of Technology, University of Wisconsin-Madison, University of California-Berkeley, and Harvard.

Late Spring Field Trip— RESOLUTION COPPER DEPOSIT

Reservations are being accepted for a late spring field trip to the RESOLUTION COPPER DEPOSIT in Superior, Arizona on June 5, 2010. The plan is for participants to get themselves to Superior by their own devices by 9:30 a.m. The "official" trip will likely end by 2 p.m but "unofficial" stops may be added along the travel route in the afternoon. The AGS website has more information <http://www.arizonageologicalsoc.org/>. **To sign up, contact AGS V.P. for Field Trips Doug Shakel** at dshakel@dakotacom.net or call him at (520) 241-5261. The trip will be limited to 40 participants.



Russ Corn at the April AGS Dinner Meeting.

FROM THE EDITOR:

We received some very sad news just before press time....

RUSSELL M. "Russ" CORN passed away suddenly on May 19, 2010. Russ was an accomplished and highly respected geologist, colleague, father and grandfather, and he was very active in AGS. He is best known professionally for exploration work at Kerr McGee that led to the discovery of the Red Mountain Porphyry Cu-Mo deposit at Patagonia, AZ. Russ was a gentleman, soft-spoken, modest and fiercely principled. I was fortunate to have had the opportunity to interview him for the May "Member Spotlight" column for this newsletter. True to form, he seemed a little embarrassed being in the spotlight, but he was a good sport and a very interesting subject. His AGS friends (of whom there were many) will miss him.

A memorial service will be held at 3 p.m. on Saturday, May 29 at the New Life Church at 8900 E. Golf Links Rd. Russ's family requests that donations be made to the Diabetes Association or another charity in lieu of flowers.

GRAND CANYON ONE WEEK GEOLOGICAL RAFT TRIP in 2011

I am looking for interested individuals for a one week motorized raft trip through Grand Canyon during July or August of 2011. This will be a joint trip for Arizona and Maine (my former home) geologists. Who knows? This might be the start of a fun exchange program!

Here's the deal:

- Cost = \$2750±\$100 per person. We will firm up the price in the coming weeks.
- The outfitter will be Hatch River Expeditions. We will be using the large inflatable rafts. Although we will be going during a warm time of the year, the frequent splashing and shadows from the canyon walls will keep you quite comfortable.
- We will launch at Lee's Ferry (Mile 0) and take out at Mile 188 just downstream from Lava Falls.
- Price includes a night at Cliffdwellers Lodge the night before launching, fabulous food all week long, all the camping gear you will need, guidebooks, a helicopter flight out at the end of the week, and a plane flight back to the starting point. You just bring a small bag of clothes, personal effects and a camera. That's it.
- A qualified geologist will guide the trip. Last time Dr. Stan Beus (NAU emeritus) went with us. Or we may get Dr. John Warme from the Colorado School of Mines, who has led 50 trips and is a renowned stratigrapher and sedimentologist to come along.
- The trip will have a geologic theme, of course, but we will also be looking at the many historical and anthropological aspects of Grand Canyon. **YOU DO NOT NEED TO BE A GEOLOGIST TO ENJOY THIS TRIP.**
- The cost does not include tips for boatmen at the end of the week. I suggest allowing another \$75 to \$100 for tips.
- It helps to be physically fit, but it is not mandatory. Camping skills not required. If you have questions about your ability to do this trip, let me know.

If preliminary interest is sufficient, I will set the dates and collect \$500 deposits. The deposits are refundable if (1) the trip does not happen for lack of interest or (2) you have to back out and we are able to find a replacement. If you back out and we cannot find a replacement, we will keep the deposit. In past years, we have always had a waiting list.

Send me an email if you are interested:
ajones@clearcreekassociates.com or call me at 520-622-3222.



Havasu Creek

