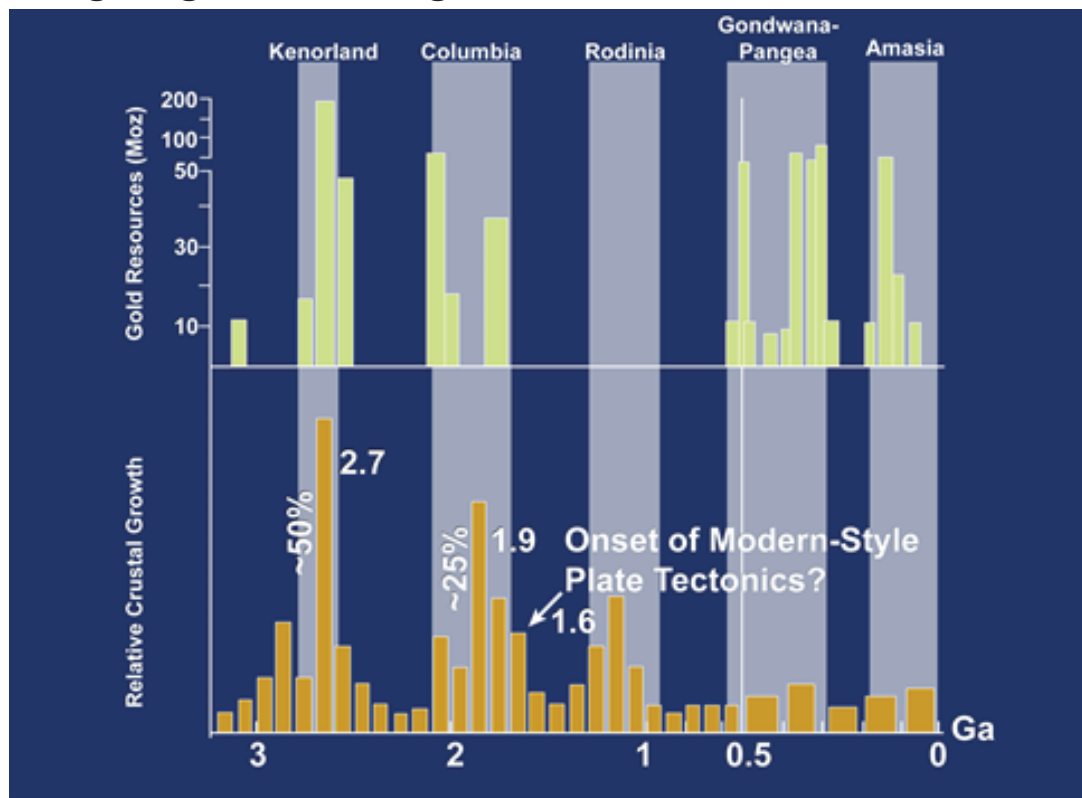


Colorado Scientific Society

The objective of the Society is to promote the knowledge and understanding of Earth science, and its application to human needs

Tectonics and Gold Metallogeny by Dr. Richard Goldfarb, USGS

Orogenic gold vs. crustal growth



and... two Student Research Competition presentations!

Thursday, October 17, 2013

Shepherd of the Hills Presbyterian Church
20th Ave. at Simms St., Lakewood

Social half-hour – 6:30–7 p.m., Meeting time – 7:00 p.m.

Tectonics and Gold Metallogeny

by

Dr. Richard Goldfarb, USGS

The temporal pattern for different types of gold deposits will vary with evolving global tectonic geodynamics, such that a particular deposit type will tend to have a characteristic time-bound nature. Factors bearing on the age distribution of a particular type of gold deposit include uneven preservation, data gaps, and long-term secular changes in the Earth System.

The distribution of gold-rich porphyry and epithermal deposits is skewed towards the late Cenozoic. The ores are associated with subvolcanic plutonic complexes and shallower parts of oceanic and continental arcs in the convergent margins of the circum-Pacific and Tethyan of southern Europe. Most deposits that formed in the upper few km of crust before ca. 20–30 Ma, were uplifted and eroded, and thus lost from the geologic record, although significant exceptions date back through all Phanerozoic orogens, and even to the Archean. Carlin-type deposits are only widely recognized in Nevada (Tertiary) and perhaps along the SW edge of the Yangtze craton (Jurassic), so knowledge about these remains are too limited to confidently relate the ores to major global tectonic patterns.

Orogenic gold deposit formed in medium-grade metamorphic belts tens of millions of years subsequent to host rock deposition. The deposits in both eastern China and Sonora are hosted in high-grade rocks and provide global anomalies where deposits post-date host rock metamorphism by billions of years, leading to revisions in the ore genesis model. Preserved orogenic gold deposits correlate in time with addition of new oceanic lithosphere to craton margins during supercontinent growth at ca. 2.8–2.55 Ga, 2.1–1.75 Ga, and 650–35 Ma. Major lithospheric instabilities controlling ore formation include thickening by terrane accretion, subduction of a spreading ridge, rollback or delamination of subducted oceanic lithosphere, or Precambrian plume events. The ca. 3.0 Ga timing of stabilization of subcontinental lithospheric mantle (SCLM) below the Kaapvaal craton indicates that the Witwatersrand gold ores cannot be Late Archean orogenic deposits.

The IOCG deposits represent the one group of gold ores in intracratonic settings, typically 100–200 km inland from the craton margins, where extension and anorogenic magmatism occur between areas of Archean and Proterozoic SCLM. The partial melting of metasomatized SCML, either by mantle underplating or plume episodes, leads to IOCG development in buoyant and refractory Precambrian cratons, such that even shallowly formed deposits have been preserved.

Richard J. Goldfarb is a senior research geologist with the Minerals Program of the U.S. Geological Survey, where he has been employed for more than 33 years. Rich's major expertise has been on the geochemistry and geology of ore deposits with emphasis on Phanerozoic lode gold. Much of his earlier career work concentrated on the Tertiary gold deposits of southern Alaska. Results from this work were used to develop ore genesis models for giant gold deposits elsewhere in Alaska and in other parts of the North American Cordilleran. In recent years, Rich has conducted detailed studies on the understanding of the distribution of gold deposits through space and time, compiling the most comprehensive global description of their distribution and evaluating the controlling tectonic/geologic features. He has senior-authored and co-authored more than 200 refereed publications in economic geology. Rich has served as President of the Society of Economic Geologists, is a past Silver Medalist and Thayer Lindsley lecturer of the society, has served as chief editor of *Mineralium Deposita*, is presently on the editorial boards of *Economic Geology* and *Gondwana Research*, and was one of the co-editors of the *Economic Geology One Hundredth Anniversary Volume*. He received his BS in geology from Bucknell University, MS in hydrology from MacKay School of Mines, and Ph.D in geology from the University of Colorado in 1988.

President's Message, by Matt Sares



About three weeks have passed since the northern Front Range of Colorado saw record rainfall and historic flooding. The floodwaters inundated towns, farms, and major infrastructure in the South Platte River basin in Colorado and continued into Nebraska. Geoscientists are involved in helping county, state, and federal government agencies assess the damage from streams that carved new pathways through several mountain towns, and saturated plains cities. Geoscientists will also be involved in recovery efforts, helping to plan where, and how to rebuild infrastructure to withstand future flood events. Planning for extreme natural events like these floods is often unpopular because it takes forethought, planning, and work that cost money (e.g. taxes) and can crimp near-term economic development of communities. But time and again, the work and foresight of mapping floodplains, outlining potential debris-flow paths, building dams in the right locations, and communicating important geohazard concepts to land-use planners have proved their worth in limiting the loss of life and infrastructure. If you are one of the geoscientists involved in these efforts – Thank You.

CSS has many members in and near the flood areas. If you have been affected and there is any way that your fellow members can help you in recovery, please contact me. (303-866-3581 x8290, matt.sares@state.co.us) We will communicate your needs to the membership to facilitate members helping each other.

The Geological Society of America's 125th Annual meeting is taking place at the end of this month. Please take time to attend the CSS-sponsored session, "Development of Geological Concepts and Studies in Colorado Geology" on Wednesday, October 30th starting at 1:00 PM. Also, there will be a late-breaking session on the Colorado Flood Event on Tuesday, Oct. 29 at 8:00 AM. Please don't forget to volunteer for some time in the CSS Booth in the Exhibits Hall. Enjoy the conference!

UPCOMING CSS Meetings!!

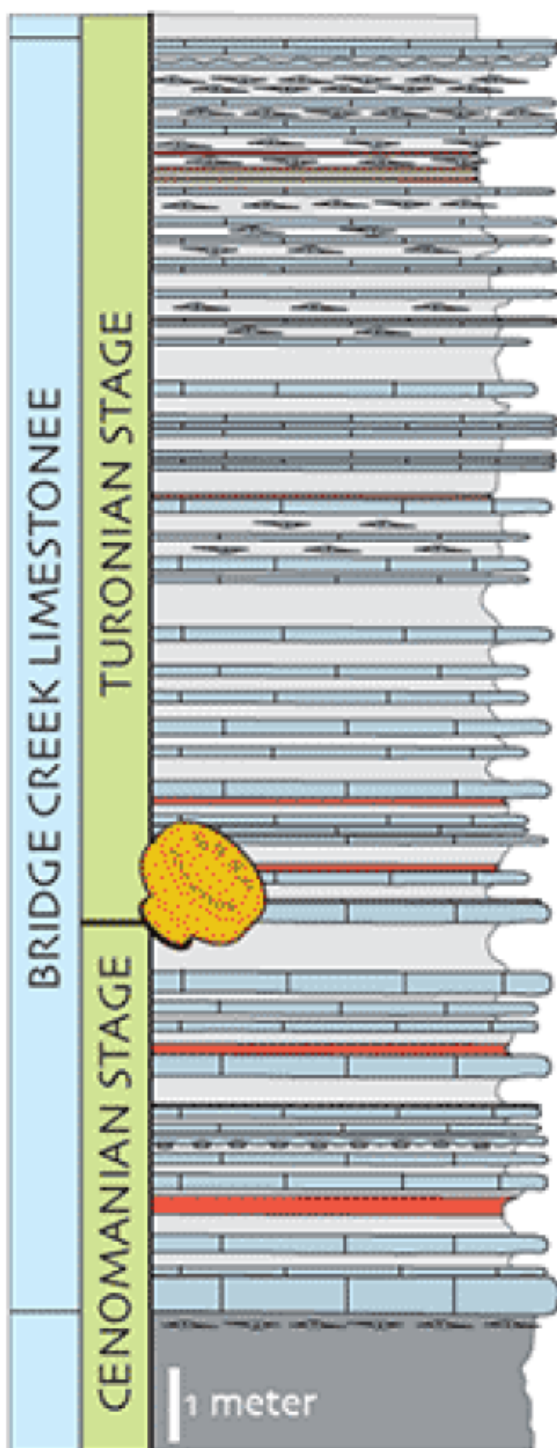
November: Peter Barkmann - "The Joys of Mapping Northwest Colorado Geology: Subtleties, Slides, and Snakes," *with* two Student Research Competition presentations and awards.

December: CSS Business Meeting and President's Address, Matthew Sares – "Exploring Areas of Natural Acid Rock Drainage in Colorado."

Hi folks! Due to a newsletter snafu, this is it for this month!

See you next month.... watch out for those Trick or Treaters!





Cenomanian-Turonian Boundary

Global Stratotype Section and Point

38.2822° N Latitude

104.7275° W Longitude



DEDICATION CEREMONY

*for signage marking
the GSSP*

October 25, 2013

Lake Pueblo State Park
Pueblo, CO

In collaboration with the
Geological Society of America



Information on logistics for the event
(maps, schedule, etc.) coming soon.

URL for this page: <http://www.earth.northwestern.edu/PuebloGSSP/>