Colorado Scientific Society

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

May Meeting

Not Just for Scientists Anymore: Societal Relevance of the Connection Between Groundwater and Surface Water

Donald Rosenberry
U.S. Geological Survey, Water Resources Discipline

Thursday, May 16th, 2013

Shepherd of the Hills Presbyterian Church
11500 W. 20th. Ave. (at Simms St.), Lakewood
Social half-hour—6:30 p.m.
Meeting time—7:00 p.m.

Everyone is Welcome!

Everyone is Welcome!

Abstract

The USGS Circular "Ground water and surface water – A single resource" has greatly changed the thinking of water-resource scientists and managers since it was published in 1998. The concept that groundwater and surface water are actually one resource, linked at the sediment-water interface of lakes, wetlands, streams, and estuaries, is now widely accepted. Study of the physical, geochemical, and biological processes that control and are affected by the linkages between groundwater and surface water is not just the esoteric pursuit of scientists, however. These processes and linkages are directly relevant to the public. Examples from across the country will illustrate how the public is affected, sometimes greatly, by the linkage between groundwater and surface water, and how improved understanding of processes and exchanges at this interface has influenced water-management decisions.

Biography

Donald Rosenberry is a research hydrologist with the USGS National Research Program in Denver, Colorado, specializing in processes that affect exchange between groundwater and surface water, and in developing new tools for quantifying fluxes at the sediment-water interface. Don received his training in geography, geology, hydrogeology, and fluvial geomorphology at Bemidji State University, University of Minnesota, and University of Colorado. Concepts and methods related to exchange between groundwater and surface water are tested at three long-term research sites where things are relatively well known. New ideas and understanding usually come from taking the show on the road, however, where results seldom turn out as expected.

CV is available at http://profile.usgs.gov/rosenber/

The Colorado Scientific Society, Summer Field Trip is coming!
Saturday, July 27

The hike: Green Mountain kimberlite pipe, Boulder, Colorado.
The hike leader: Pete Modreski

This will be a short day hike to visit the most accessible and best exposed kimberlite pipe in Colorado. The Green Mountain kimberlite is located within Boulder Open Space and Mountain Parks, between Flagstaff Mountain and Green Mountain. The hike to the site, starting at the "Realization Point" trailhead, is only about one mile each way, mostly via the Ranger and Greenman trails, but it does involve negotiating a fairly steep grass/dirt hillside off-trail to cross a side valley to the kimberlite outcrop. Total elevation climb on the hike is about 500 feet. The pipe forms a good outcrop, about 140 feet in diameter, surrounded by Boulder Creek Granodiorite. This pipe, age about 600Ma (?), is the southernmost kimberlite of the State Line Kimberlite District, and is the only kimberlite of the district in which diamonds have not been confirmed to have been found. The classic kimberlite indicator minerals, pyrope garnet, chrome diopside, and magnesian ilmenite, can be seen in the rock. We will probably meet at about 8 a.m. at a suitable park-and-ride lot in Boulder, to be designated. If interested in coming on the trip, please contact Pete Modreski, pmodreski@usgs.gov, office 303-202-4766, or cell 720-205-2553.

CSS President's Message - by Matt Sares

There is no President's Message this month, but I hope to see you all at the Past Presidents Dinner May 10th! (See page 7 for more details)
Otherwise, have a great summer!

Where is this rock?
By Pete Modreski

April's photo was of "Harmonica Arch", an unusual, large granite arch located on a dome of Pikes Peak Granite on the east side of Goose Creek, within the Lost Creek Wilderness. Believed to be Colorado's largest natural arch, its size does not seem to have been precisely measured; my estimate, a length of 80-100 feet. It can be reached by a hike north from the Goose Creek trailhead, then some uphill

May Where is this Rock: We'll just offer this picture without further comment, other than to say it is in Colorado. Write to newsletter editor Linda Barton if you think you recognize it!

Colorado Scientific Society & 150 Years of Geologic Research in Colorado: Part II- Development of Geological Concepts, and Studies in Colorado Geology, Sponsored by the Rocky Mountain Region's oldest scientific society, founded in 1882

Session Chairs Lisa Fisher and Libby Prueher

Dive into the fascinating world of Colorado geology, its contribution to development of geologic concepts, and the wide range of recent research crossing all topical studies, including volcanology, paleontology, structure, tectonics, regional studies, and more.

The basic proposed plan is to open the submissions to all topics in Colorado's geology, beginning with how the richness of Colorado geology and the efforts of CSS members have influenced the development of geological concepts. We intend to solicit papers for Colorado's volcanology, paleontology, economic geology, structural geology, tectonics, petrology, regional studies, and other topics of current research from CSS members. Submissions from non-members will also be welcomed.

There will be a pre-session field trip, "Colorado Geology Then and Now, 1901 to 2013: Following the route of the Societies' 1901 trip through central Colorado – Evolution of geological thought and discovery," which will follow the historic route of the 1901 CSS-GSA-AAAS joint field trip exploring Colorado, led by the geological giants of that time, including Samuel Emmons and Arthur Lakes. The historical aspects will be integrated with current geologic knowledge and research of the areas visited.

The CSS is the oldest scientific organization in the Rocky Mountain Region, established in 1882. The Society's history has been interwoven with great events in Colorado's geology, and with major advances in the geological sciences. In our last session (2010), we examined the Great Surveys of Colorado and the West, the 1859 Gold Rush and subsequent mining in Colorado, the great dinosaur finds of Arthur Lakes, the discovery of the Florissant fossil beds, along with other significant events, that all laid the foundation for the establishment of the Society.

Early members of CSS include such distinguished names as S.F. Emmons, Arthur Lakes, G. K. Gilbert, R. A. F. Penrose, and D.W. Brunton – all important contributors to geology, both to Colorado research and to geologic research in general. Work of Society members continued through the years, resulting in considerable contributions to the earth sciences. Current CSS members continue the tradition of ground-breaking geologic research, crossing all topical studies, including volcanology, paleontology, structure, tectonics, and regional studies. The associated pre-session field trip follows this same concept of integrating past and present studies by CCS members. We invite the audience to explore the past, present, and future of Colorado's geology with the members of the Colorado Scientific Society**.**

GSA Associated Societies Meeting, April 27, 2013

As many of you know, CSS is a member of the GSA Associated Societies. This year's meeting covered multiple topics, notably the plans and projects for the upcoming 125th Anniversary Meeting, and the finalization of GSA's Strategic Plan and implementation of that plan. Education and outreach issues were given high priority, and new ideas and projects designed for both Earth Science students and the general public were discussed. Efforts are being made to increase diversity in the Earth Sciences and to include the Private Sector in membership and meetings.

The Associated Societies are important to GSA by bringing their missions and efforts to the local level. We can contribute by volunteering with implementation of educational and outreach programs and by becoming more involved in the GSA Sectional Meetings.

For more information, please contact Lisa Fisher- lisa.fisher@escalantemines.com

Science News

Research Aims to Settle Debate over Origin of Yellowstone Volcano

Apr. 15, 2013 — A debate among scientists about the geologic formation of the supervolcano encompassing the region around Yellowstone National Park has taken a major step forward, thanks to new evidence provided by a team of international researchers led by University of Rhode Island Professor Christopher Kincaid. In a publication appearing in last week's edition of Nature Geoscience, the URI team demonstrated that both sides of the debate may be right.

Using a state-of-the-art plate tectonic laboratory model, they showed that volcanism in the Yellowstone area was caused by severely deformed and defunct pieces of a former mantle plume. They further concluded that the plume was affected by circulation currents driven by the movement of tectonic plates at the Cascades subduction zone.

Mantle plumes are hot buoyant upwellings of magma inside Earth. Subduction zones are regions where dense oceanic tectonic plates dive beneath buoyant continental plates. The origins of the Yellowstone supervolcano have been argued for years, with sides disagreeing about the role of mantle plumes.

According to Kincaid, the simple view of mantle plumes is that they have a head and a tail, where the head rises to the surface, producing immense magma structures and the trailing tail interacts with the drifting surface plates to create a chain of smaller volcanoes of progressively younger age. But Yellowstone doesn't fit this typical mold. Among its oddities, its eastward trail of smaller volcanoes called the Snake River Plain has a mirror-image volcanic chain, the High Lava Plain, that extends to the west. As a result, detractors say the two opposite trails of volcanoes and the curious north-south offset prove the plume model simply cannot work for this area, and that a plates-only model must be at work.

To examine these competing hypotheses, Kincaid, former graduate student Kelsey Druken, and colleagues at the Australian National University built a laboratory model of Earth's interior using corn syrup to simulate fluid-like motion of Earth's mantle. The corn syrup has properties that allow researchers to examine complex time changing, three-dimensional motions caused by the collisions of tectonic plates at subduction zones and their effect on unsuspecting buoyant plumes.

By using the model to simulate a mantle plume in the Yellowstone region, the researchers found that it reproduced the characteristically odd patterns in volcanism that are recorded in the rocks of the Pacific Northwest. "Our model shows that a simple view of mantle plumes is not appropriate when they rise near subduction zones, and that these features get ripped apart in a way that seems to match the patterns in magma output in the northwestern U.S. over the past 20 million years," said Kincaid, a professor of geological oceanography at the URI Graduate School of Oceanography. "The sinking plate produces a flow field that dominates the interaction with the plume, making the plume passive in many ways and trapping much of the magma producing energy well below the surface. What you see at the surface doesn't look like what you'd expect from the simple models."

The next step in Kincaid's research is to conduct a similar analysis of the geologic formations in the region around the Tonga subduction zone and the Samoan Islands in the South Pacific, another area where some scientists dispute the role of mantle plumes. According to Kincaid, "A goal of geological oceanography is to understand the relationship between Earth's convecting interior and our oceans over the entire spectrum of geologic time. This feeds directly into the very pressing need for understanding where Earth's ocean-climate system is headed, which clearly hinges on our understanding of how it has worked in past."

Journal Reference:
C. Kincaid, K. A. Druken, R. W. Griffiths & D. R. Stegman. Bifurcation of the Yellowstone plume driven by subduction-induced mantle flow. Nature Geoscience, 07 April 2013 DOI: 10.1038/ngeo1774

Calendar of Events- April

Colorado Scientific Society's regular meetings are held the 3rd Thursday of the month at the Shepherd of the Hills Presbyterian Church, 11500 West 20th Ave., Lakewood, CO. Unless otherwise advertised- Social time begins at 6:30 p.m. and talks start at 7:00 p.m. For more information, contact Matt Sares, tel. 303-717-3983, matt.sares@state.co.us

Upcoming CSS Presentations :

May 16- Don Rosenberry (USGS) - "Ground-Water/Surface-Water Exchange in Hyporheic Settings."

Other Upcoming Geological Presentations:

USGS Rocky Mountain Area Seminar Series is held once every two weeks, 10:30-11:30 a.m., alternate Tuesday mornings, Building 25 Lecture Hall, Denver Federal Center, Lakewood, CO. Public is welcome. Park in the lot east of Bldg. 25 and use entrance E-14. For more information, contact Pete Modreski, tel. 303-202-4766, pmodreski@usgs.gov.
May 7
Time: 12:00 pm MDT
Location: First Floor Conference Room "Madison Room"- NOROCK, 2327 University Way, Suite 2
Speaker: AJ Reyes
May 14- TBA
May 21- Becca Manners
May 28- TBA

RMAG- Luncheon, Denver City Center Marriott, 11:30 a.m.; Lunch: 12:00 p.m.; Talk: 12:20 p.m. Lunch $30/ Walk-in without lunch $10.
June 5- KC Oren," "Honing the Zone" or "Just Let Me Drill It": Trade-Offs in Drilling the Perfect Horizontal Well."
Please note: ONLINE REGISTRATION FOR THIS EVENT WILL CLOSE ON THURSDAY, May 30, 2013 AT 4:00PM

Denver Mining Club
Every Monday, except when noted, 11:30 a.m.- 1:00 p.m. Golden Corral Buffet & Grill, 3677 South Santa Fe Drive, Sheridan, (Southwest side at Santa Fe Dr. & Hampden Ave.) Purchase of buffet lunch required. VISITORS ALWAYS WELCOME!
May 13.- Guy Johnson, Colorado Mining Exhibit Foundation. "Update on Public Education (Including the Capitol Dome)."
May 20.- John L. Lufkin, Dept. of Earth & Atmospheric Sciences, Metropolitan State University Denver. "Tucson Gem and Mineral Show."
May 27.- No meeting. Memorial Day Holiday.

FrackingSENSE free public lecture series continues weekly every Tuesday at 6:30 p.m., Hale 270, CU Boulder Campus. Kirby Wynn, "Garfield County's Lessons Learned about Oil and Gas Development: Building Relationships with Industry and the Community to Effectively Address Citizen Concerns." See http://centerwest.org/ for information and lecture topics for the whole series **through May 21.**

Denver Museum of Nature and Science- "Mammoths & Mastodons: Titans of the Ice Age." **February 15– May 27th**.
Life-size models, fossil tusks and skulls, touchable teeth, spear points, cave paintings, interactive displays, and monumental video installations bring the Ice Age back to life.

May 11- **Dinosaur Discovery Day and Boy Scout Day at Dinosaur Ridge**
10 a.m.-2:30 p.m. Dinosaur Discovery Days (free public tour days) continue on the first Saturday of each month through October. Morrison, CO. Read more.

May 11- **Friends of Mineralogy Colorado Chapter, Silent Auction**
12 p.m.-3 p.m., Clements Community Center, 1580 Yarrow St., Lakewood CO

May 19- **Florissant Scientific Society Monthly Meeting**
A field trip to visit sites near Cañon City including the Indian Springs trace fossil site, the dinosaur quarries and oil spring site near Garden Park, and if time permits, a drive up Skyline Drive. Info: contact Beth Simmons, cloverknoll@comcast.net

Pleas and Thank Yous

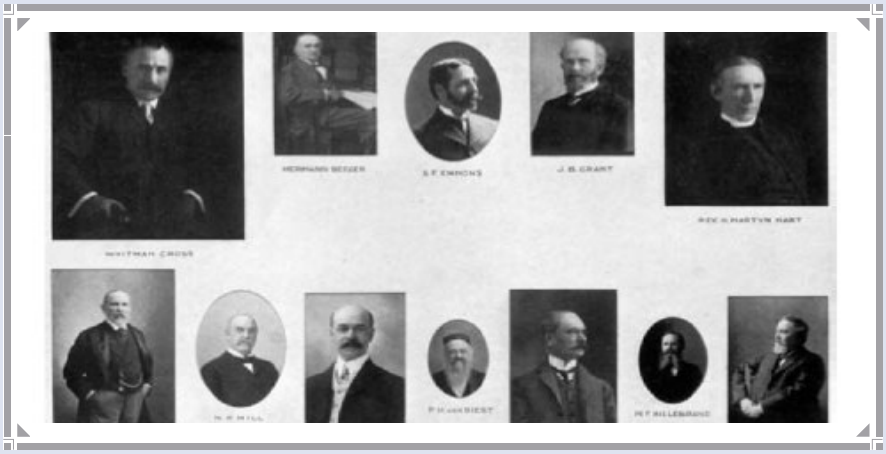
CSS Topical Session for the October GSA Meeting: Call for Abstracts!

Please help us to make this session a success. We need you to submit abstracts to CSS's Topical Session for the fall GSA meeting! We are soliciting talks about any and all aspects of Colorado Geology, and those that highlight how past and/or current studies of science in our state have fostered the advancement of geology. Please encourage your colleagues to consider presenting their Colorado research; speakers need not be a CSS member. If you know of a talk that should be included, let us know!

For more information please contact session chairs Lisa Fisher (lisa.fisher@escalantemines.com) or Libby Prueher (lprueher@umich.edu) for further information. The submittal deadline is August 6, 2013. Please contact the session chairs with your intended topic Thank you!

Annual Past President's Dinner

The annual "Past-President's Dinner" will be held this Friday evening at Pinehurst Country Club, beginning at 4:00 pm. The Society truly appreciates our Past President's dedication and service, as well as all our volunteers, past and present. Thank You!



A Note from the Editor: by Linda Barton

Spring has sprung and summer is just around the corner. What that signifies to the CSS newsletter editor is vacation time. My fiancé (Jim Cronoble) and I will be heading to those nearly inaccessible reaches of mountain and desert wilderness to recharge our biotic batteries, perform a bit of oil exploration, visit loved ones, and hunt for hidden mineral treasures, so the May edition will be the last newsletter I will submit until September. Please be aware that email bulletins will be sent to inform members of pertinent events and/or news throughout the summer months.

In the meantime, have safe and great adventures this summer, and thank you all for your support!

In Memoriam- Tom Fails

Tom Fails' memorial service will be held at 10:00 AM, May 11th at Augustana Lutheran Church, 5000 E. Alameda Ave., Denver (303-388-4678) with a reception to follow. Tom passed away on April 14th, 2013. Tom's tireless work for the AIPG both nationally and for the Colorado Section will be long remembered and much appreciated. He served in numerous positions and was President of both the Section and National AIPG. The memorial service will be jointly for Tom and his wife, Ivy, who preceded Tom in death by 20 days (March 25). All are welcome to attend.

2013 CSS Elected Positions

President:……Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us
President Elect:….. …… .Scott Lundstrom, *303-917-2849,* pslundstrom@msn.com
Treasurer:……Don Sweetkind , 303-236-1828, dsweetkind@usgs.gov,
Secretary:…….....Lisa Fisher, 303-215-0480, lisa.fisher@escalantemines.com
Past President…….. …….Pete Modreski, 720-205-2553, pmodreski@aol.com.

We are still seeking volunteers or nominations to fill several vacant posts. They are:

- **Outreach Chair**
- **Publicity Chair**

We will also gladly accept volunteers to serve on any and all of our standing committees. If you have any questions regarding the duties of these positions, please call your favorite officer, councilor, or chair.

Please consider volunteering—many hands make lighter work and we would love to have a larger pool of ideas and contacts!

COUNCILORS

2013–2015: Marieke Dechesne, mdechesne@usgs.gov
2013–2015: Liz Pesce, pesce.e@gmail.com
2011–2013: Celia Greenman, celia.greenman@earthlink.net
2011–2013: Ben Harrison, 303–417–9633, benjh@earthlink.net
2012–2014: Paul Morgan, 303–866–2611, paul.morgan@state.co.us
2012–2014: Rebecca Flowers, 303–492–5135, rebecca.flowers@colorado.edu

COMMITTEE CHAIRPERSONS

Best Paper Award: Pete Modreski, 720-205-2553, pmodreski@aol.com
Database Manager: Emily Taylor, 303–236–8253, emtaylor@usgs.gov
Field Trips: Cal Ruleman, 303–236–7804, cruleman@usgs.gov
History: Beth Simmons, cloverknoll@comcast.net
Hospitality: Ben Harrison, 303-417-9633, benjh@earthlink.net
Membership/Mentor: Liz Pesce, epesce@mines.edu
Memorial Funds: Pete Modreski, 720-205-2553, pmodreski@aol.com
Newsletter Editor: Linda Barton, 720-338-6201, lbarton1611@gmail.com
Outreach: Open
Pillmore Fund: Lee Shropshire, leeshrop@comcast.net
Program: Open
Publicity: Open
State Science Fair: Chuck Weisenberg, 303–238–8806, cweisnbrg@msn.com

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Colorado Scientific Society

Application and Membership Update Date_____
Dues and Funds Contributions

New Member _____ Renewing Member _____

_____
(email address) (Telephone)

_____
(Last Name) (First Name) (Initial)

_____
(Address)

The success of most Society activities depends on volunteer help. Please circle any activities for which you can provide assistance. We will pass your name on to the appropriate Committee Chairperson.		
Field Trips	History	Outreach
Fund Raising	Newsletter	Program/Talks

Annual Dues (January – December)

Regular Members $20 _____
Corresponding Members $10 _____
Student Members $5 _____

Memorial Funds: These funds support research grants to graduate students in the Earth Sciences throughout the nation. *Please note if contribution is made in the memory of an individual.*

Ogden Tweto Memorial Fund _____
Steven Oriel Memorial Fund _____
Edwin Eckel Memorial Fund _____
Bill Pierce-Heart Mountain Fund _____
George Snyder Memorial Fund _____
Chuck Pillmore Memorial Fund _____

Endowment Fund:

This fund is used to support the Society's monthly meetings and newsletter, field trips, family night, annual Emmons Lecture, invited speaker honorarium, and special activities. _____

TOTAL CONTRIBUTIONS (DUES AND FUNDS): _____

Please make your checks payable to the: *Colorado Scientific Society* Send this form & your check to: **Colorado Scientific Society** **P.O. Box 150495** **Lakewood, CO 80215-0495**	Or register and pay on-line using PayPal at: http://www.coloscisoc.org/membership/duespaypal.htm