



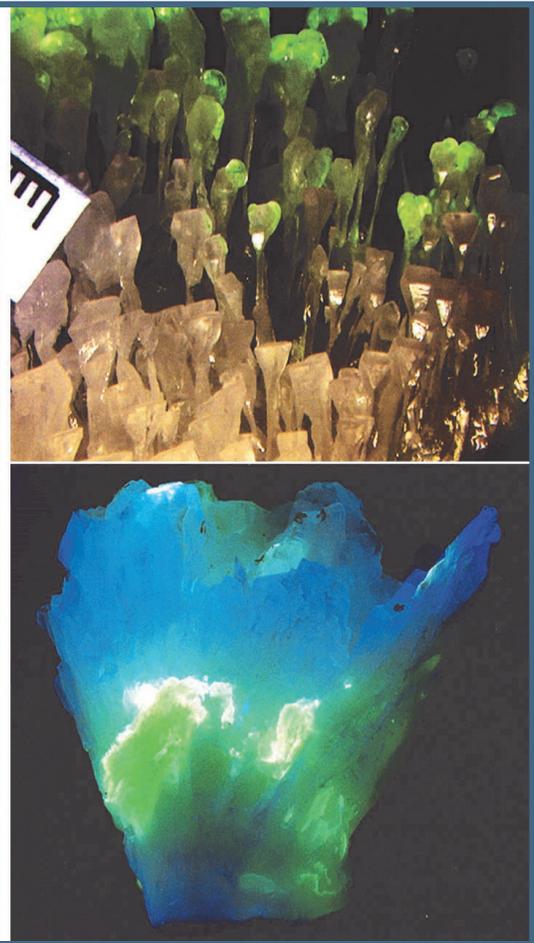
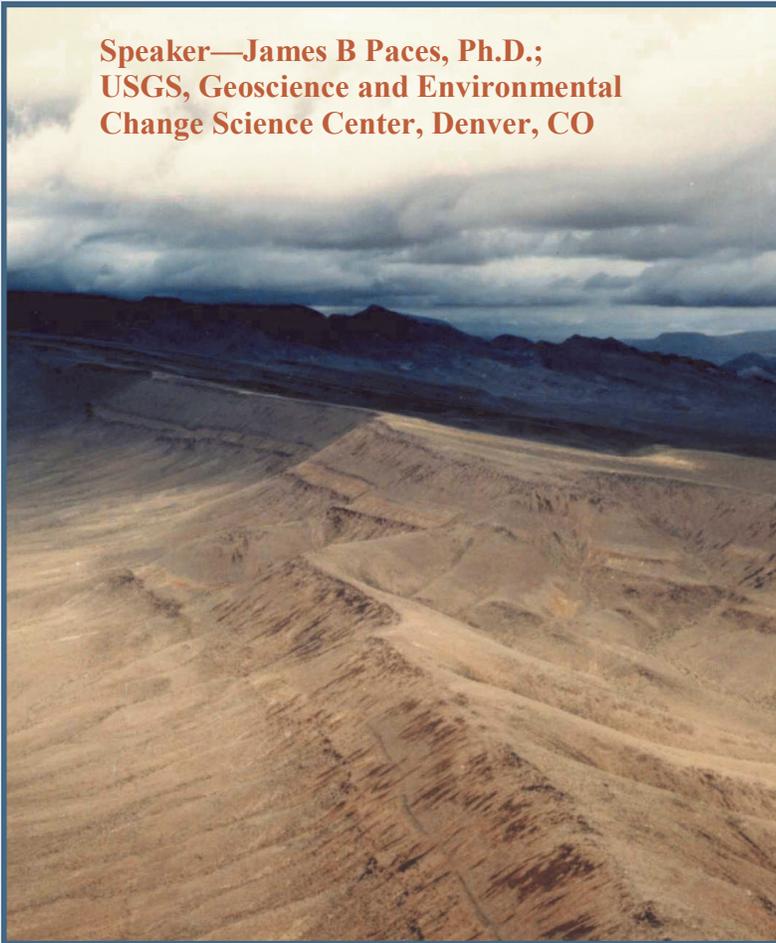
Colorado Scientific Society

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

Thursday, February 20th:

***EVALUATING THE HISTORY OF VADOSE-WATER FLOW THROUGH YUCCA
MOUNTAIN, NEVADA, USING SECONDARY HYDROGENIC MINERALS —
A CASE FOR SLOW AND STEADY***

Speaker—James B Paces, Ph.D.;
USGS, Geoscience and Environmental
Change Science Center, Denver, CO



*Left side: Aerial photograph of Yucca Mountain looking north towards the Timber Mountain caldera showing thick beds of ash-flow tuff gently dipping towards the east.
Right side: Examples of secondary calcite and opal deposited in vadoso-zone cavities at depths of 200–300 m below land surface. Photos are taken with mixed white
and shortwave ultraviolet light (upper) and shortwave ultraviolet light (lower), which causes uranium-rich opal to glow bright yellowish green. Calcite
appears as white bladed stalks (upper oblique photo), or blue-glowing coarse-crystalline spar (lower cross sectional slab).*

**Location—Shepherd of the Hills Church,
11500 W. 20th. Ave. (at Simms St.),
Lakewood, Colorado
Social time— 6:30 p.m. Lecture—7:00 p.m.**

Everyone is Welcome!

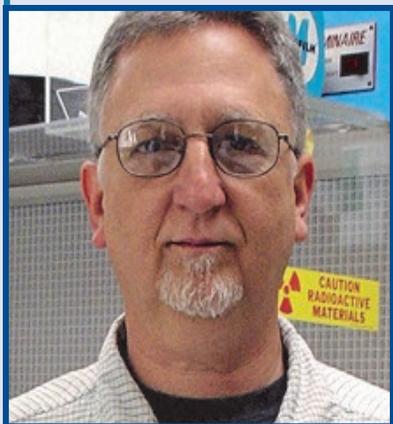
Abstract

Yucca Mountain, the erstwhile repository site for the Nation's high-level radioactive waste, represents one of the most extensively studied patches of real estate on the planet. Although the waste-disposal program was suspended in 2010, a large body of science provided unprecedented insights into the geologic, hydrologic, and climate histories and processes, and how these features contribute to a natural barrier for isolating hazardous wastes over geological time periods. One of the most critical mechanisms affecting repository performance is the flow of water through the 500- to 700-m-thick vadose zone, which has the potential to interact with waste packages and transport radionuclides to the accessible environment. In addition to understanding present-day conditions, reliable performance evaluations require knowledge of hydrologic responses to climate changes expected over a functional life span of more than 100,000 years for a repository.

Secondary hydrogenic minerals formed in this environment, mostly calcite and opal, contain physical, chemical, and isotopic information that can be used to decipher the history of past flow at various time scales. In addition, the mineral deposits allow the investigation of the mechanisms and processes of fracture flow, the source of the solutions, and the physical conditions under which the minerals formed. Information derived from these deposits represents an important means of evaluating hydrologic flow and transport models that are based largely on computer simulations of rock properties rather than direct observations.

The presentation will describe the general nature of the problem of understanding vadose flow through time as well as the evolution of how the mineral record was deciphered by scientists working on the Yucca Mountain Project at the USGS. Isotopic compositions of secondary calcite and opal confirm a meteoric source of infiltration and downward percolation that has remained more-or-less constant despite large variations in surface-water availability caused by fluctuations in Pleistocene climate. Those records reflect a substantial degree of hydrological stability which is likely to be maintained for hundreds of thousands of years or longer.

Biography



Jim Paces is a research geologist at the USGS who specializes in radiogenic isotope and geochronological studies. He received a Ph.D. degree from Michigan Technological University in 1988 that was focused on understanding the petrogenesis of flood basalts associated with the Proterozoic Midcontinent Rift. After completing a USGS-NRC post-doc working on lower crustal nodules from northern Michigan and mafic rocks of the Duluth Complex, he was hired by the Yucca Mountain Project Branch where he contributed to studies of paleoseismology, geomorphology, paleohydrology, and paleoclimate. After the Branch was disbanded in 2010, his focus has broadened to include areas outside of southern Nevada and his current work includes geochemical and isotope studies of speleothems, peat-rich wetland deposits, archeological materials, calcic soils, ground-water discharge deposits, and hydrologic flow systems.

In Case You Did Not Catch It On The News...

Groundhog Day 2014: Phil Sees His Shadow, Signifying 6 More Weeks of Winter

PUNXSUTAWNEY, PA. — Will we have an early spring, or will winter stretch on until mid-March? According to Groundhog Phil, the world's most famous furry forecaster, there are six more weeks of winter ahead this year. Phil saw his shadow at around 7:25 a.m. the morning of February 2nd, 2014 in the small town of Punxsutawney, Pa., Sunday, amidst mostly overcast skies and temperatures in the [mid-30s](#). Thousands of revelers showed up for the folksy celebration.

Published: Feb 2, 2014, 9:53 AM EST weather.com





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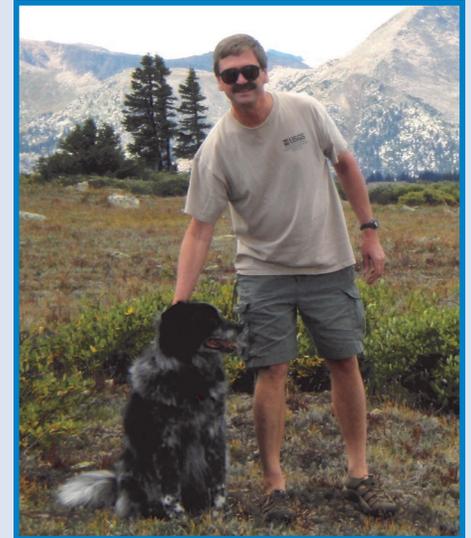


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CSS President's Message by Scott Lundstrom

Our Emmons Lecture last month by Tad Pfeffer on the Greenland Ice Sheet was engaging, well done, and a real success, based on the questions, discussion, and comments from the audience. We will continue the tradition of high quality presentations when we resume our regular meeting in February with a talk by Jim Paces on the geologic history of vadose-water flow through Yucca Mountain, Nevada. Jim will discuss a remarkable suite of state-of-the-science collaborative approaches that were applied to evaluating geologic and geochemical records of past vadose-water flow through the volcanic stratigraphy at and near the subsurface depths of the proposed repository. It is an important part of a legacy of high-quality earth science that will remain no matter how present and future nuclear waste issues are addressed.

Shifting gears, I am also going to (occasionally?) use the duty of writing monthly messages as an opportunity to mention items such as science books I have recently read that might be of interest to any CSS members. The title I will pass along here is *Oasis in Space* by Preston Cloud (1988). Dr. Cloud, with a remarkable career as faculty member of various universities (but longest and last at University of California, Santa Barbara) and a major stint with the USGS, gave our first Emmons Lecture in 1962. *Oasis in Space* could be categorized as historical geology, but it is remarkable in discussing the co-evolution of Earth and life from their respective, but still entwined beginnings, with due consideration to the majority of earth history that preceded the Paleozoic. Thus, of 17 chapters, only the last 5 focus on the Phanerozoic. Throughout, the author blends discussion of many key episodes and aspects of earth history with historical development of geology in sync with technological opportunity. Undoubtedly some of you were able to read this book before I was able to get into and through it during the past year (some 25 years after publication) – if so, I would be interested in your assessments of this book.



Where is this Rock? By Pete Modreski

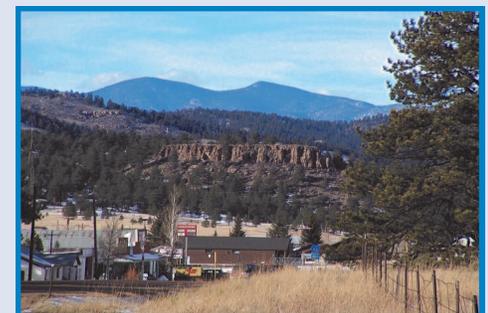


The January photo: This is a site we visited on Day 2 of our October GSA-CSS Central Colorado field trip: columnar jointing in the black, basal vitrophyre (glassy lava-like ignimbrite) of the 36 Ma (Eocene) Wall Mountain Tuff, compressed and re-welded into an obsidian-like rock; near Hecla Junction, along the Arkansas River between Salida and Buena Vista. Linda, our editor, recognized this photo (not surprising, as she was standing not far off to the side when this picture was taken), and I'm sure others who were on the trip did also. We had one new comment on **December's picture**, the granitic rock at "the tunnels" north of Buena Vista near Elephant Rock. I wrote that this was "probably 1.7 Ga granodiorite", but Rick Moscati of the USGS wrote back to me, noting that he had obtained a 1436 +/- 8 Ma U-Pb zircon age on granite from near Elephant Rock, collected by Karl Kellogg. This makes it a "Silver Plume age" granite, of which the geologic map of the Buena Vista East quadrangle (CGS OF04-04, 2004) shows several bodies, intrusive into the larger terrane of 1.7 Ga granodiorite.



February— Where is this Rock?

All I'll say about this picture is that this landscape contains both Tertiary and Proterozoic rocks.



Calendar of Events- February

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 Scott Lundstrom, 303-917-2849, pslundstrom@msn.com.

Upcoming CSS Meeting presentations:

Thurs., Feb. 20th., 6:30 p.m. Social half-hour; 7:00 p.m. Lecture- "Evaluating the History of Vadose-Water Flow Through Yucca Mountain, Nevada, Using Secondary Hydrogenic Minerals -A Case For Slow and Steady." Speaker—James B Paces, Ph.D.; USGS, Geoscience and Environmental Change Science Center, Denver, CO. Shepherd of the Hills Church, 11500 W. 20th Ave. (corner of 20th and Simms), Lakewood. Free admission. Public welcome!

USGS Rocky Mountain Science Seminars

Tues., Feb. 18, 10:30 a.m., - "How to Date Sedimentary Rocks." Speaker—John Aleinikoff, USGS, Denver.

All interested persons are welcome to come to these lectures held in the Building 25 auditorium, Denver Federal Center, Lakewood. Enter the Federal Center via the main gate (Gate 1) on Kipling St., and go north to the large parking lot (with overhead solar photovoltaic panels) east of Building 25; enter Bldg. 25 via the Security station at entrance E-14, near the center of the building.

Please email: pmodreski@usgs.gov for a complete list of all our seminars scheduled through May 28.

Friends of Mineralogy (Colorado Chapter) Monthly Meeting

Thurs, March 13th, 7:30 p.m., at the Denver Museum of Nature and Science located on the west side, at 2001 Colorado Blvd, in City Park, Denver, Colorado. Enter the museum via the staff/security entrance, to the left of the main entrance doors on the north side of the museum. Security staff will direct you to the Meeting Room. There will be a Board meeting 6:30-7:30 PM.

Colorado School of Mines Van Tuyl Lecture Series

Thursdays at 4:00 p.m., at the Colorado School of Mines, Berthoud Hall Room, Golden, CO. Refreshments included.

Schedule posted at: http://geology.mines.edu/calendar/Van_Tuyl.html , or call [303-273-3800](tel:303-273-3800).

February 6th—Brigette Martini, Corescan Pty. Ltd.: "Back to Basics: Automated, Accurate and Precise Mineralogical and Textural Logging for the Resource Industry."

February 13th—Elizabeth Holley, CSM: "Geology & Geological Engineering Student Research Fair."

February 20th—Ken Ridgeway, Purdue: "Cenozoic Flat-Slab Subduction Processes and the Tectonic Development of Southern Alaska."

February 27th—John Warne, CSM: "Tripping over Catastrophes: Outcrop Serendipity."

March 6th—Alberto Malinverno, Lamont-Doherty Earth Observatory of Columbia University: "Gas Hydrates, Methanogenesis, and Carbon Cycling at Continental Margins."

Denver Gem and Mineral Guild Show, Fri.-Sun., Feb. 21-23, at the Jefferson County Fair Grounds, Lakewood. Free admission and parking; 10-6 Fri. & Sat., 10-5 Sun. For more information see <http://denvergem.org/Shows.html>

The Rocky Mountain Association of Geologists & The Denver Geophysical Society

Tues., Feb. 14th. Registration, Sponsorship and Vendor Booths now available for 20th Anniversary 3D Seismic Symposium: Sheraton Hotel in Downtown Denver, 1550 Court Place, Denver, CO.. The 3D Seismic Symposium provides case histories for geophysicists, geologists, landmen and engineers who seek to stay abreast of new 3D technology as applied to petroleum exploration and development. Pre-Paid Check In: 7:15a.m.. Kickoff Presentation Begins at 8:00a.m. Onsite registration is dependent on availability. Rooms will be held at the Sheraton Hotel for a special rate for 3D Symposium attendees subject to availability. For more information visit: <http://www.rmag.org/i4a/pages/index.cfm?pageid=3455>

Feb. 1-15, Arizona Mineral & Fossil Show (Hotel Tucson City Center, formerly Inn Suites)

Feb. 13-16, Tucson Gem and Mineral Show (Tucson Convention Center) *The* event for mineral collectors!



Science News



What Lies Beneath – Scientists Discover Giant Trench Under Antarctic Ice

Published on: 14th January 2014

A massive ancient subglacial trough – deeper than the Grand Canyon - has been discovered by a team of UK experts.

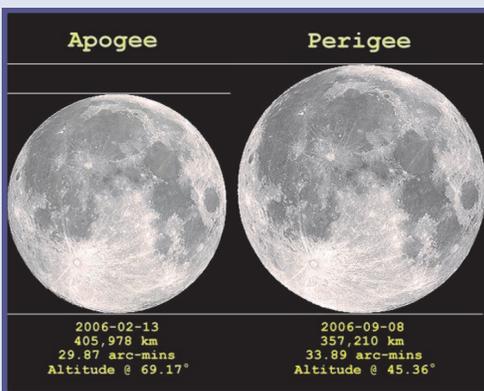
The research involved scientists from Newcastle University, the University of Bristol’s Glaciology Centre, the British Antarctic Survey and the universities of Edinburgh, Exeter, and York. They charted the Ellsworth Subglacial Highlands – an ancient mountain range buried beneath several kilometers of Antarctic ice - by combining data from satellites and ice-penetrating radars towed behind skidoos and on-board small aircraft.

The researchers spent three seasons investigating and mapping the region in West Antarctica, uncovering a massive subglacial valley up to 3 kilometers deep, more than 300 kilometers long and up to 25 kilometers across. In places, the floor of this valley is more than 2000 meters below sea level. The mountain range and deep valley were carved millions of years ago by a small icefield similar to those of the present-day Antarctic Peninsula, or those of Arctic Canada and Alaska.

The team’s analysis has provided an unprecedented insight into the extent, thickness and behavior of this ancient icefield, and the configuration and behavior of the early West Antarctic Ice Sheet. The subglacial landscape shows where and how the West Antarctic Ice Sheet originated and grew. It also provides important clues about the size and shape of the ice sheet in West Antarctica in a warmer global climate.

The findings are published in the latest edition of the Geological Society of America Bulletin. The paper’s lead author Dr. Neil Ross from Newcastle University said: “The discovery of this huge trough, and the characterization of the surrounding mountainous landscape, was incredibly serendipitous. The lecturer in Physical Geography added: "We had acquired ice penetrating radar data from both ends of this huge hidden valley, but we had no information to tell us what was in between. Satellite data was used to fill the gap, because despite being covered beneath several kilometers of ice, the valley is so vast that it can be seen from space. “To me, this just goes to demonstrate how little we still know about the surface of our own planet. The discovery and exploration of hidden, previously-unknown landscapes is still possible and incredibly exciting, even now.”

Citation: The Ellsworth Subglacial Highlands: Inception and retreat of the West Antarctic Ice Sheet



What Is A Supermoon?

Facts:

We have just had one of these – Supermoon! It is when the full moon appears to be bigger than average. It can be about 14% bigger (in diameter) and about 30% brighter than an average full moon! These occur approximately once every 14 full moons. The next one is on 10th August 2014.

The term ‘Supermoon’ was coined by astrologer Richard Nolle in 1979, arbitrarily defined as: “...a new or full moon which occurs with the Moon at or near (within 90% of) its closest approach to Earth in a given orbit (perigee). In short, Earth, Moon and Sun are all in a line, with Moon in its nearest approach to Earth..”



Pleas and Thank You's

It's Time to Pay Dues for 2014...

Membership dues for the coming year (2014) are now being accepted. You will find a dues payment form in this newsletter or on the CSS Web site: www.coloscisoc.org/membership/dues.html

Dues payments are \$20 for regular members; \$10 for corresponding members (outside the Colorado Front Range area), and \$5 for students. You may pay your dues by mailing a check to the CSS, or pay with a credit card using PayPal on the CSS website.

CSS Treasurer Don Sweetkind will send out an email to all members with information on their dues paid status. If you are uncertain if you owe dues or of your member status, or if you have not received a receipt for a past contribution, contact CSS Treasurer Don Sweetkind by phone at 303-236-1828 or by e-mail at dsweetkind@usgs.gov.



MORE EVENTS

Tues., Feb. 11, 6:30p.m., Hale #270, CU campus, Boulder, Barbara Green Attorney, Sullivan Green Seavy, LLC, representing mountain counties on water and natural gas issues in the lecture/discussion series, **FrackingSENSE 2.0: What We Know, What We Don't Know, and What We Hope to Learn about Oil & Gas Development**. "The Center of the American West, in conjunction with the AirWaterGas Sustainability Network and Boulder County are proud to introduce the Spring edition of FrackingSENSE 2.0. We have encouraged our speakers to offer evidence-based findings that might lead to recommendations and prescriptions for the future. All our upcoming speakers will demonstrate how they weigh evidence, evaluate conflicting studies, and appraise contradictory claims. FrackingSense series is available as both podcasts and videos at www.centerwest.org & AirWaterGas.org See <http://centerwest.org/> for information on the other speakers in the series, through April 15.

Sat., Feb. 22, 10:00a.m. to 1:00p.m., **History and Science Writing Workshop**, "for teachers and learners of all ages", with Steven Veatch, at the Western Museum of Mining and Industry, Colorado Springs. Writing about nature, history and science offers exciting opportunities to learn, teach and be published. Open to students as young as 13 years. This informative workshop will include topics like basic research, writing techniques and tips, using illustrations, science photography and publication issues. Course fee is \$20 for adults and \$10 for students (21 and under). WMMI members receive \$5 off adult admission and \$2 off student admission. Advance registration is required. Call (719) 488-0880 or email- rsvp@wmmi.org for more information.

Sat., Feb. 22, 10:00a.m. to 3:30p.m. "Stories in Stone Symposium" at the Colorado Springs Pioneers Museum, 215 S. Tejon St., Colorado Springs. Five featured lecture presentations on Ordovician fossils, dinosaurs and their tracks, Baculite Mesa, Lake Florissant, and more activities. Free admission; for more info call 719-385-5990 or see www.cspm.org .

Schedule of speakers:

10:00 a.m., Tom Nolan, **Ordovician fossils and observations in deep time**

11:00 a.m., Lou Taylor, **The Morrison Formation and its dinosaurs**

1:00 p.m., Amber Cain, **Dinosaur tracks of the Dakota Sandstone**

2:00 p.m., Malcolm Bedell, Jr., **Life in the Pierre Shale of Baculite Mesa**

3:00 p.m., Conni O'Connor, **Reconstructing Lake Florissant**

Feb. 17-21, 9:00a.m. to 4:00p.m. daily. **Annual Book Sale, Colorado School of Mines Library**, 1400 Illinois St., Golden, CO.

Thurs., Feb. 13, 6:00 p.m., Western Museum of Mining and Industry, "Social Life in Western Mining Camps: Exhibit Opening and Heritage Lecture." Exhibit opens at 6:00 p.m. and lecture begins at 7:00 p.m. The settlement of this region involved more than just the lone prospector and his donkey or the silver magnet and his opera houses. Women, children and all sorts of people made their homes here and built the state and greater region as we know it today. See the personal possessions early pioneers brought west: toys, quilts, household appliances and supplies and more, as you learn about the living and working conditions of life in the 19th century West. The opening lecture will be given by Fawn Amber Montoya and focuses on her work on the lives of children in the company towns of coal giant, Colorado Fuel and Iron. The heritage lecture and museum admission that evening will be free, however reservations are needed. See- <http://www.wmmi.org/> or call [719-488-0880](tel:719-488-0880) for more information.

The Denver Museum of Nature and Science is Looking for New Homes for USGS Topographic Maps

Over the decades our Museum has acquired a large collection of topographic maps and map cabinets, but with the imminent move to our new collections facility, we are seeking to downsize our collections. We began downsizing these collections in January 2014.

Our maps are catalogued and inventoried. The maps span the 50 U.S. states, and include 7.5' (1:24,000), 15' (1:62,500), 30' (1:125,000), 30'x60' (1:100,000) and 1⁰x2⁰ (1:250,000) maps. We also have a limited number of national park, Canadian and Antarctica maps. Many of the 15' and 30' maps are antiques in of themselves, dating back to pre-1920. We have detailed listings of U.S. maps (by map name, latitude/longitude and publication years). If you or one of your colleagues is interested in these maps, please let me know which states you may have interest in and an index can be provided. The Museum will prioritize giving maps to its own personnel, then to other libraries and museums and then to civic organizations or their members.

Thank you for your consideration.

Dan Winester
Department of Earth Sciences
Denver Museum of Nature and Science
dwinester@dmns.org



JUDGES ARE SOUGHT FOR:

Colorado Regional Science Fair (Boulder area), University of Colorado on Thursday, Feb. 27, 7:45 to 3 p.m. Contact Grace Ellen DeBacker, Judge Coordinator, Corden Pharma Colorado Regional Science Fair; ellen.debacker@bvsd.org ; [720-561-6813](tel:720-561-6813).

Denver Metro Regional Science & Engineering Fair, Wednesday, March 5, Denver Museum of Nature and Science; see <http://ahec.ucdenver.edu/sciencefair/> .

Colorado State Science & Engineering Fair, at CSU, Fort Collins, Thursday, April 10; see <http://www.csef.colostate.edu/> . Click on Judges Information.

Just a quick reminder—



Applications for the Rocky Mountain Section Undergraduate Geology Research Grants are due 1 March 2014, 5 PM.

Funds are available from the Rocky Mountain Section of the Geological Society of America for undergraduate Geology students in support of research.

Eligibility:

- The award is open to undergraduate Earth Science students who are currently enrolled in a B.S. or B.A. degree program.
- The project should involve the Rocky Mountain region.
- The undergraduate student must be a member in good standing of the Rocky Mountain Section of GSA.

Funds available:

- Up to \$500 may be requested.

2014 CSS Elected Positions

President:.....Scott Lundstrom, 303-917-2849, pslundstrom@msn.com
President Elect:.....Paul Morgan, 303-866-2611, paul.morgan@state.co.us
Treasurer:.....Don Sweetkind , 303-236-1828, dsweetkind@usgs.gov,
Secretary:.....Lisa Fisher, 303-215-0480, lisa.fisher@escalantemines.com
Past President.....Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us

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

- ◆ **Outreach Chair**
- ◆ **Publicity Chair**
- ◆ **Hospitality Chair**
- ◆ **Program 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
2014–2016: Celia Greenman, celia.greenman@earthlink.net
2014–2016: Peter Barkmann,
2012–2014: Rebecca Flowers, 303-492-5135, rebecca.flowers@colorado.edu

COMMITTEE CHAIRPERSONS

Best Paper Award: Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us
Database Manager: Paul Morgan, 303-866-2611, paul.morgan@state.co.us
Field Trips: Cal Ruleman, 303-236-7804, cruleman@usgs.gov
History: Beth Simmons, cloverknoll@comcast.net
Hospitality: Open
Membership/Mentor: Liz Pesce, epesce@mines.edu
Memorial Funds: Matt Sares, 303-866-3581 x8290, matt.sares@state.co.us
Newsletter Editor: Linda Barton Cronoble, 720-338-6201, lbarton1611@gmail.com
Outreach: Open
Program: Open
Publicity: Open
State Science Fair: Chuck Weisenberg, 303-238-8806, cweisnrg@msn.com
Webmaster: Barb Warden, 303-278-2701, bwarden@tablemtn.com

Colorado Scientific Society
P.O. Box 150495
Lakewood, CO 80215-0495
<http://www.coloscisoc.org>



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: <i>Colorado Scientific Society</i> 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
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