

Colorado Scientific Society

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

Complex Uplift History of the Front Range deduced from the Synorogenic sediments in the Denver, Cheyenne, North-Middle and South Park Basins, Colorado

by

Marieke Dechesne (Denver Museum of Nature and Science (DMNS)
and USGS), Jim Cole (USGS), and Bob Raynolds (DMNS)



NEW
LOCATION!!

Thursday, March 15, 2012

→ Shepherd of the Hills Presbyterian Church ←

20th Ave. at Simms St., Lakewood

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

NEW
LOCATION!!

March Talk(s)

Abstract

Complex Uplift History of the Front Range deduced from the Synorogenic sediments in the Denver, Cheyenne, North-Middle and South Park Basins, Colorado

by Marieke Dechesne (Denver Museum of Nature and Science (DMNS and USGS), Jim Cole (USGS), and Bob Reynolds (DMNS)

The basins surrounding the Front Range reveal information about the timing and location of uplift of this basement block. Each basin tells part of the story and combining clues from all basins allows interpretation of the regional paleogeographic evolution for this region. This study combines data collected by the Denver Museum of Nature & Science, USGS, Colorado Geological Survey and University of Washington. This talk will be given in three parts:

Bob will discuss the basin-fill succession and characteristics of the Denver Basin. The stratigraphy of the Denver Basin serves as a temporal and spatial framework for comparison with the other basins. The Western Interior Seaway covered this region completely before the Front Range showed any signs of uplift. The character of the seaway sediments follows the linear pattern of its coastlines. The first hint of uplift in the hinterland is recorded by sparse pebbles in the regressive shorelines of the Fox Hills Sandstone. Several hundred feet higher in the section, the Arapahoe Conglomerate marks the onset of hinterland uplift. Not much later, the Front Range basement started to emerge and fan systems developed off its flanks in distributary patterns that thin eastward and northward. These depositional patterns are an important factor in understanding aquifer distribution in the basin.

Jim will describe the North and Middle Park Basins on the west side of the Front Range. The basin-fill sequence here reveals a complex history of broad uplift, widespread erosion and subtle deformation before sediment started to accumulate. Fossil leaf margin analysis shows that at about 58 Ma this area was elevated significantly higher than the nearby Denver Basin. Within the synorogenic strata of the basin, angular unconformities are present and (combined with the other observations) indicate multiple phases of deformation and fault activity. Depositional facies indicate that coarse, proximal, fluvial-alluvial deposits are only present in a few locations at the base of the synorogenic strata. Fine-grained basal deposits elsewhere around the basin margins indicate the uplift source areas were more distant. The synclinal basin observed today is a smaller, folded relic of the original depositional basin.

Marieke will highlight the thick package of latest Cretaceous sediments in the Cheyenne Basin and the sediment sequence in South Park. Evidence from all discussed basins will be integrated together in a series of maps showing the paleogeographic evolution of the region between 70–55 Ma.



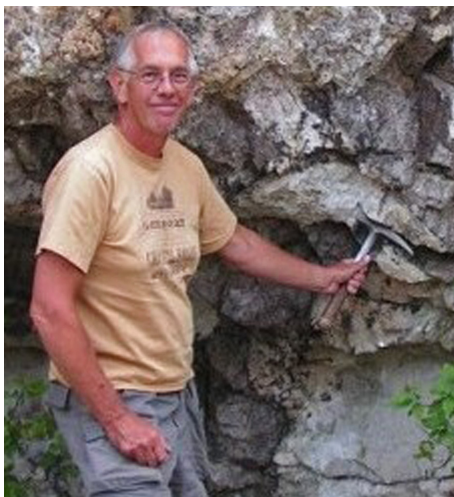
Marieke Dechesne has been working with Bob Reynolds on the Laramide synorogenic sediments of the Denver Basin since 2002, and more recently also with the CGS. Expanding this work to the north into the Cheyenne Basin with the DMNS and the University of Washington sparked her curiosity to find out what was happening on the other side of the mountains. Since 2010 she is also working with Jim Cole on the North Park - Medicine Bow Mountains project to learn more about the history of the Front Range. She has a degree from the University of Utrecht in the Netherlands, been a researcher at the Colorado School of Mines, and taught at CSM and CU.

Jim Cole earned a Ph.D. in Geology from the University of Colorado-Boulder, and has been a mapping geologist with the USGS for over 35 years. His career work has covered Precambrian basement rocks in Colorado, island-arc terranes in Saudi Arabia, Paleozoic stratigraphy and Mesozoic thrusting in southern Nevada, Tertiary stratigraphy and groundwater resources in New Mexico, and Pliocene drainage integration of the Rio Grande. For the last 7 years, he's returned to the northern Front Range to take another look at the Laramide history, and late Tertiary uplift and drainage evolution.



Bob Reynolds is a Research Associate at the Denver Museum of Nature & Science. His dissertation research focused on sedimentary rocks that accumulated at the foot of the Himalayas. This experience led him to study rocks in the Denver Basin that record the uplift of the Front Range. Bob has taught at the Center for Excellence in Geology at Peshawar University in Pakistan, at Dartmouth College, and at the Colorado School of Mines where he is an adjunct faculty member. His recent lectures focus on the impact of climate change on Colorado's ecology and water resources.

President's Message, by Pete Modreski



Hi, Sci-Soc members. Let me just briefly hit some highlights regarding the Society and our coming events:

Our meetings at Shepherd of the Hills Church in Lakewood seem to be working out quite well—the meeting room is very good, and we have enjoyed being able to have refreshments here. We are still planning to experiment with holding occasional meetings elsewhere in the metro/front range area, possibly one in the fall, at CU in Boulder; perhaps this may be our Student Night, in October.

I heard one version of this month's program, given by Marieke Dechesne at the USGS back in January. It's going to be a very interesting and stimulating, three-party presentation, and I encourage you not to miss it!

Please note that our April meeting will be on a **WEDNESDAY**, April 18, due to a scheduling conflict at Shepherd of the Hills.

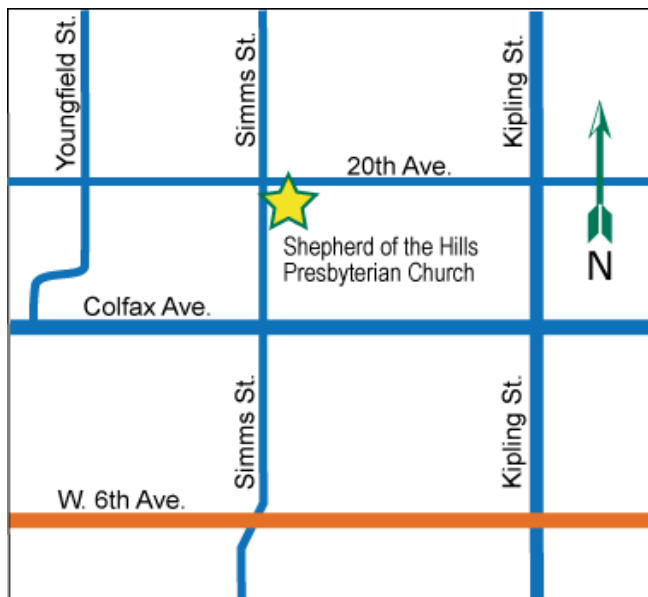
As you'll read elsewhere in this newsletter, we have the opportunity to take part in a geology field trip via train on the Cumbres & Toltec on June 24 (with a block of seats reserved for Sci-Soc members through Mar. 15), and a Family Night at Chamberlin Observatory, April 28. We will also be planning a "regular" weekend geology field trip sometime in the fall (stay tuned!) and, a "fun, family" field trip to "dig for pegmatite minerals" some Saturday, probably in July.

We don't have any info. about it yet, but our annual Emmons Lecture will probably take place in September. Again, please stay tuned!

Best regards to all, Pete Modreski

Map to the CSS March meeting on Thursday, March 15

Shepherd of the Hills Presbyterian Church
11500 West 20th Avenue
Lakewood, Colorado 80215



Colorado Geological Survey unveils new website and Facebook page

—Announcement from Vince Matthews, Colorado State Geologist



Please visit the new CGS website! It is loaded with data and free goodies. For instance, 227 out-of-print publications can be downloaded for free in PDF format. A newly-designed map server allows you to view several statewide maps of interest. The online Niobrara tool allows the determination of depth to Niobrara and thickness of the Pierre shale at any point in the Denver Basin underlying the Denver basin aquifers. A high-resolution image gallery (not quite complete) contains downloadable files of geologic interest around the state. Free stuff for teachers and kids. All of past RockTalks are posted online.

The website is a work in progress, so check back often. One of the things in progress is the posting of all 1:24,000 geologic maps in Colorado on the website for free download. AND, be sure and check out our Facebook page. You don't have to be a Facebook member to visit. Simply click on one of the Facebook icons on the home page to see what's happening today at CGS. We post news notes, historical notes, and "did you knows" daily. Let your children and teachers also know about this great resource. We would appreciate any feedback or suggestions.

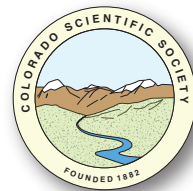
Website: <http://geosurvey.state.co.us/Pages/CGSHome.aspx>.

Facebook page: <http://www.facebook.com/pages/Colorado-Geological-Survey/362778650407517>

NOTE DATE CHANGE FOR THE APRIL COLORADO SCIENTIFIC SOCIETY MEETING:

WEDNESDAY, APRIL 18. (not Thursday)

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



Upcoming CSS Family Event on April 28.....A night out at the Chamberlin Observatory Open House hosted by the Denver Astronomical Society (DAS). Guests can view the heavens through the observatory's famous 20-inch aperture Alvan Clark-Saegmuller refractor for a \$1 per-person fee. An added bonus on Open House nights is that DAS members set up their telescopes on the observatory grounds (Observatory Park) to share with anyone and everyone interested in the wonders of the universe—stars, planets, galaxies, nebulae, star clusters and more! Details for the event will be posted in the April CSS Newsletter so stay tuned. For more information about the observatory, go to: <http://www.denverastro.org/openhouses.html>



Annual Meeting Invitation

Join the Friends of Dinosaur Ridge (FODR) for our Annual Meeting: a buffet dinner, a short lecture by Joe Roller (about our roadrunner), Board Elections and Volunteer Appreciation.

Wednesday, March 21, 2012, 6:00 PM at the Solterra Retreat House

15250 West Evans Avenue, Lakewood 80228

(just south of Alameda Parkway, east of C-470, less than a mile from the Dinosaur Ridge Visitor Center)

RSVP amber_cain@dinoridge.org

FODR president, Sam Bartlett reports that FODR recently received the good news that the Jefferson County Commissioners will allow FODR to complete the tracksite cover structure AND received approval to proceed with the design and construction of a new visitors center on the 19 acres that the County recently purchased, including the site of “Grandma Rooney’s house” west of the present Visitor Center. As part of this process FODR must vacate the present Visitor Center when the current lease expires in six years. Although excited and appreciative of the County Commissioners’ decisions, NOW comes the hard work of making both structures a reality. It’s estimated that FODR will need to raise more than \$10 million over the next six years to complete the two projects. FODR will need the support, talents and efforts of every member to make this dream a reality. Please help support FODR so the tracksite and visitors center will be here for generations to come.



It’s Time to Pay Dues for 2012...

Membership dues for the coming year (2012) are now due. You can download the membership form from the CSS website:

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.** If you are uncertain if you owe dues or of your member status, contact CSS Treasurer Don Sweetkind by phone at 303–236–1828 or by e-mail at dsweetkind@usgs.gov.

As you pay your dues, please consider making an additional contribution to one of our Memorial Funds, which support our student research grants program, or the Endowment Fund, which we use to defray operating costs. Any contributions made in calendar year 2012 (checks dated before 1 January 2013), will be credited toward the 2012 tax year.

Please remember that your entire contribution goes towards generating interest for the grants and that your contribution is 100% tax deductible because the Society is a non-profit Section 501 (c)(3) organization. Through interest income generated by our Memorial Funds, we have awarded over \$125,000 in research grant funding to more than 165 students. This year we also supported the participation of about a dozen students on our field trips through the Pillmore Fund.

PLEASE support our future scientists by generously supporting the *Colorado Scientific Society*.

Thank you!!



Student Research Grants Available!! The Colorado Scientific Society invites students enrolled at an accredited college or university to apply for research grants to be awarded in late April 2012. Grants are generally awarded to students in a Masters or Ph.D. program, however applications from undergraduates conducting senior-level research will also be considered and are encouraged.

General grant categories:

- Field-oriented research on geology, geochemistry, and geophysics of the Rocky Mountain region,
- Engineering geology research (with no restriction on geographic area of interest),
- Studies on the Heart Mountain fault in NW Wyoming or a Quaternary study with no geographic restriction.

The grant amounts actually awarded may vary depending on the number of applicants, however typical amounts from past years have ranged from \$600 to \$1200. Students can obtain application forms and grant policy and procedure information directly from the Society website at <http://www.coloscisoc.org/grants/grants.html>

Completed applications must be emailed or post-marked by March 30, 2012.



Sign up for the Cumbres & Toltec Scenic Railroad offers Geology Train Excursion!!

On Sunday, June 24, the Cumbres & Toltec Scenic Railroad will operate a special train from Antonito, Colorado, to Chama, New Mexico, specifically for geologists. This train will stop at many outcrops and cuts along the right of way to allow geologists to mingle, take photographs, and collect rock samples.

Ticket price for adults is \$150 and for students is \$100. For online ticket reservations and information go to:

<http://www.cumbrestoltec.com/geologytrainexcursion>

For Reservations by Phone: 1-888-286-2737

Monday–Friday 8AM–4PM MST.

Please call 1-888-286-2737

E-Mail: geologytrain@cumbrestoltec.com



Vanpool and lodging logistics and costs will be ascertained AFTER we know how many members have signed up, so PLEASE contact Cal Ruleman after your ticket purchase.

Cal's email: cruleman@usgs.gov; phone: 303-236-7804.

Note: The train company is holding 40 slots for CSS members until March 15. After that, the tickets will be available to the general public. They can accomodate only 150 people. CSS is NOT purchasing the tickets for you; you must do this on your own, and then contact Cal Ruleman to let him know you have signed up.



Mar. 23–25, Fort Collins Rockhounds Club Gem and Mineral Show at the Thomas M. McKee 4-H building, Larimer County Fairgrounds, 5280 Arena Circle, at The Ranch/Budweiser Events Center, I-25 Exit 259. Hours 4–8 p.m. Fri., 9–6 Sat., 10–5 Sun. For more info see <http://www.fortcollinsrockhounds.org/gemAndMineralShow.shtml>

Mar. 24, 10 a.m.–2 p.m., Silent Auction and Bake Sale, sponsored by the Colorado Springs Mineralogical Society, at the Western Museum of Mining and Industry, Colorado Springs. "All are welcome"... standard WMMI Admissions apply. CSMS members and other WMMI supporting clubs admitted free." For more info see: <http://www.csms.us> or <http://www.wmmi.org>



Apr. 12, 7:00 p.m., Flatirons Mineral Club Annual Silent Auction; West Boulder Senior Center, 909 Arapahoe Ave. (Just west of the Boulder Main Public Library, suggested overflow parking is to use the library parking lot)

Apr. 13, Gem, Jewelry, Mineral Silent Auction, North Jeffco Gem and Mineral Club, APEX Community Rec. Center, 6842 Wadsworth Blvd., Arvada. Sale begins at 6:45 pm, checkout starts about 9:15 pm. No early checkout. All are welcome; free admission & parking, and free refreshments will be served. For more info., call Merlene Solis 720 212-5550 or email linumas@gmail.com



Earth Science Meetings and Talks

Newsletter items must be received by the 25th of each month.



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 Pete Modreski, at 303-202-4766, pmodreski@aol.com

Café Scientifique Tues., Mar. 13, *Frank Eparvier, Ph.D., Laboratory for Atmospheric and Space Physics, University of Colorado Boulder*; "Solar variability and its physical and economic impact on Earth!" Meets at the Wynkoop in LoDo, 1634 18th St., Denver, evening science talks at 6:30. Free, except for beer. <http://www.cafescolorado.org>

Colorado School of Mines, Van Tuyl Lectures Thursdays from 4–5 p.m. in Berthoud Hall room 241. **Mar. 22,** *Dr. Jirka Simunek, University of California, Riverside, Dept. of Environmental Sciences*, "TBA." http://geology.mines.edu/calendar/Van_Tuyl.html

Colorado State University, Dept of Geosciences, Rm 320 Warner College of Natural Resources Bldg., Mondays, 4:00 pm. 970-491-5661. **Mar. 26** *Vera Schulte-Pelkum, University of Colorado*, "TBA." **Apr. 2** *Jason Kean, USGS*, "TBA." <http://warnercnr.colostate.edu/geo-training/>

Denver Mining Club Mar. 12 *David M. Abbott, Jr., Consulting Geologist*, "Shortcomings of the CRIRSCO Family of Reporting Codes." **Mar. 19** *William D. Collins, Consulting Geological Engineer*, "Buick (Limon, Colo.) Lignite and Heavy Minerals Project." **Mar. 26** *Fred Henderson III, Chief Scientist, Mt. Princeton Geothermal LLC*, "Geothermal Energy in Colorado: Mining Exploration's Cousin?" The DMC meets on Mondays at the Littleton Country Buffet near Bowles and Wadsworth (8100 W. Crestline Ave., in the shopping center) 11:30–1:00. Purchase of lunch required. Visitors always welcome! <http://www.denverminingclub.org>

Denver Region Exploration Geologists' Society (DREGS) meets in the Colo. School of Mines, Berthoud Hall Room 241, Golden, CO. Social 6:00–7:00 p.m. Presentation at 7:00 p.m. **Mar. 12** *W. William Boberg*, "The Wyoming Uranium Province: A case study on the origin of sandstone uranium deposits." For information contact Jim Piper, (303) 932-0137, or the website <http://www.dregs.org>

Rocky Mountain SEPM Mar. 27 *S.B. Gaswirth and D.K. Higley, USGS*, "Reservoir Characterization of the Hunton Group in the West Edmond Field, Oklahoma." Reception at 11:30 p.m., lunch at 11:45 p.m., speaker at 12:15 p.m. Reservations: luncheons@rmssepm.org, before noon of preceding Friday or call Peter Bucknam, 303-895-4698. \$20.00 lunch, \$5 talk only. Wynkoop Brewing Company, 1634 18th St., Denver. <http://www.rmssepm.org/luncheons.shtml>

SME Colorado Section Mar. 15 *Bill Crawl, Gustavson Associates*, "Mineral tenders in Central Asia, especially Afghanistan." Lunch at Denver Marriott West, 1717 Denver West Blvd., Golden, CO, meet at 11:30 a.m., Lunch at Noon, cost \$35/person, Students \$15/person with reservation. RSVP and payments now made through the SME Community Event page: <http://community.smenet.org/SMENET/Events/EventDescription/?CalendarEventKey=4451ffa6-ea4f-4b48-831c-d0d408610837> Through the event page, you may pay by credit card, or submit your RSVP using the option to pay at the event by cash or check. If you pay by credit card online, you will be assessed a small processing charge (\$1.35 for this event). Once you have selected to Register Now on the event page, if you are not already logged in, you will be taken to the login page. Use your SME national login credentials, or create an account as a non-member.

USGS Rocky Mountain Area Seminar Series Mar. 13 *Dr. Clark Johnson, Univ. of Wisconsin*, "Application of 'non-traditional' stable isotopes to tracing biogeochemical cycling over Earth history." **Mar. 27** *Jonathan Caine & coauthors, USGS*, "Hydrogeology of the Schwartzwalder mine and dissolved uranium in surrounding ground and surface waters of Jefferson County, Colorado." Tuesdays at 10:30 a.m., Bldg. 25 Lecture Hall, Denver Fed. Center, Kipling St. & 6th Ave., Lakewood. Visitors are welcome. Use the main gate to enter Fed. Ctr. Building entrance and parking lot is on the east side of Bldg. 25. Contact: Peter J. Modreski, USGS, 303-202-4766, pmodreski@usgs.gov

Univ. of Colorado, Boulder, Geol. Sciences Colloquium Mar. 14 *Jason Briner, SUNY-Buffalo*, "The response of the world's fastest glacier to abrupt climate change: Ice margin reconstructions of Jakobshavn Isbrae, West Greenland." **Mar. 21** *Jane Selverstone, Univ. of New Mexico*, "Diamonds from the Alps: constraints on physical and chemical conditions during oceanic subduction." **Apr. 4** *Alison Duvall, CU-Boulder, CIRES*, "The tectonic evolution of the Tibetan Plateau: insights from the deformation and erosion history of northern Tibet and the surrounding region." Weds., 4:00 p.m., Benson Earth Sci. Auditorium, Rm. 180. Refreshments at 3:30 p.m. on the 3rd floor. <http://www.colorado.edu/geolsci/colloquium.htm>

Western Mining Conference & Exhibition March 19–22, Westin Tabor Center, Denver, CO, www.coloradomining.org.

Colorado Scientific Society
P.O. Box 150495
Lakewood, CO 80215-0495

<http://www.coloscisoc.org>

WANTED: New Members



OFFICERS

President: Pete Modreski, USGS, 303-202-4766, pmodreski@aol.com
President-Elect: Jim Burnell, CGS, 303-866-2611, jim.burnell@state.co.us
Treasurer: Don Sweetkind, USGS, 303-236-1828, dsweetkind@usgs.gov
Secretary: Libby Prueher, 720-260-0350, lprueher@umich.edu
Past President: Lisa Fisher, Escalante Mines, Inc., 303-215-0480, lisa.fisher@escalantemines.com

COUNCILORS

2010-2012: Lee Shropshire, UNC, 970-352-8778, leeshrop@comcast.net
2010-2012: Liz Pesce, pesce.e@gmail.com
2011-2013: Matt Sares, CGS, 303-866-2611, matt.sares@state.co.us
2011-2013: Ben Harrison, 303-417-9633, benjh@earthlink.net
2012-2014: Paul Morgan, CGS, 303-866-2611, paul.morgan@state.co.us
2012-2014: Rebecca Flowers, CU Boulder, 303-492-5135, rebecca.flowers@colorado.edu

COMMITTEE CHAIRPERSONS

Best Paper Award: Lisa Fisher, Escalante Mines, Inc., 303-215-0480, lisa.fisher@escalantemines.com
Database Manager: Emily Taylor, 303-236-8253, emtaylor@usgs.gov
Field Trips: Cal Ruleman, USGS, 303-236-7804, cruleman@usgs.gov
Graphics: Lisa Rukstales, USGS, 303-236-5547, lrukstales@usgs.gov
History: Beth Simmons, cloverknoll@comcast.net
Hospitality: Ben Harrison, 303-417-9633, benjh@earthlink.net
Membership/Mentor: Mitchell Reese, 575-317-4864, mreese83@gmail.com; Liz Pesce, epesce@mines.edu
Memorial Funds: Lisa Fisher, Escalante Mines, Inc., 303-215-0480, lisa.fisher@escalantemines.com
Newsletter Editor: Lisa Rukstales, USGS, 303-236-5547, lrukstales@usgs.gov
Outreach: Sue Hirschfeld, 720-565-9302, eqdoc@ix.netcom.com
Pillmore Fund: Lee Shropshire, UNC, 970-352-8778, leeshrop@comcast.net
Program: VOLUNTEERS NEEDED! CONTACT PETE MODRESKI FOR MORE INFO!
Publicity:
Science Fair: Chuck Weisenberg, 303-238-8806, cweisenbrg@msn.com
Webmaster: Table Mountain Web Design, 303-278-2701, bwarden@tablemtn.com



**** STOP! Do NOT recycle this until after the talk! Please help us with publicity by posting at least the front page of this Newsletter on a bulletin board. Thank you!**