



## *Colorado Scientific Society*

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



Aerial view of northern La Jencia Basin near Socorro, New Mexico, showing west-dipping beds of Miocene Popotosa Formation with Proterozoic rocks of Ladrone Peak on skyline.

**Tectonic/paleoclimate events in the SW U.S., late Miocene**  
*Charles Chapin, NM Bureau of Geology and Mineral Resources*

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**A Photo Tour of Colorado's Mining History**  
*J. Harrison Daniel, Ph.D., P.E.*

**Thursday, May 15, 2008**

*American Mountaineering Center*

710 10<sup>th</sup> St. (NE corner 10<sup>th</sup> and Washington), Golden  
Social half-hour – 6:30 p.m. Meeting time – 7:00 p.m.

## Abstract

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### **Interplay of tectonic and oceanographic/paleoclimate events during middle to late Miocene sedimentation across the southwestern U.S.**

By Charles E. Chapin, New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology

Continental sedimentation reflects a complex interplay of tectonics and climate. A 2000-km transect from coastal California to the western Great Plains documents a major increase in sedimentation in earliest middle Miocene (ca. 17-15 Ma). Basin and Range-style regional extension following elongation of the Pacific-North American transform boundary at 17.5 Ma provided fault-bounded basins for accumulation of continental deposits. Sedimentation also occurred in transtensional basins along the transform boundary and on unextended erosional surfaces of the Great Plains and Colorado Plateau. Upwelling along the California Coast deposited the hemipelagic Monterey Formation (ca. 16-6 Ma) coeval with continental sedimentation. Three tectonic/oceanographic events that strengthened thermohaline and Pacific gyral circulation were: 1) Opening of Fram Strait (17.5

Ma), 2) growth of the East Antarctic Ice Sheet (14.2-13.8 Ma), and 3) closing of the Indonesian Seaway (12-10 Ma). Upwelling of cold waters along the California Coast, abetted by domination of La Nina phases of ENSO, progressively aridified the Southwest as reflected in both the sedimentary and biologic records. Opening of the Gulf of California (6.4 Ma) intensified the North American monsoon resulting in integration of drainages, incision of uplifts, and exhumation of basin fills. The Miocene ended with the driest climate of the Tertiary accompanied by conversion of savanna to steppe or scrub desert, spread of C4 grasses, and extinction of 35 genera of large mammals. The answer to the long-running controversy over tectonic uplift versus changing climate in continental sedimentation/erosion is not either/or, but the complex interplay of both.

## Abstract

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### **When mining was king of the mountains -- a photo tour of Colorado's mining history"**

By J. Harrison Daniel, Ph.D, PE.

Travel through the historic mining districts in Colorado to view our mining heritage from the turn of the century when "Mining Was King of the Mountains." The impressive and treasured structures and ruins were largely

responsible for the building of our Nation and in establishing the United States as a world leader. Districts include Central City, Leadville, Red Mountain Pass, Summitville, Bonanza and Victor.



# **President's Notes, May 2008**

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By Matt Morgan

The weather is finally turning warmer as summer nears. Time to dust off the old boots and backpack and head out to the field to look at some rocks. After being in the office for the last 6 months I realized how lucky I am to be involved in mapping the geology of our great State. This leads me to the subject of this month's president's message: what is your favorite place to explore the geology of Colorado?

For me, it depends.

Best place to see a geologic mystery: Unaweep Canyon (Uncompahgre Plateau near Grand Junction). Did glaciers or rivers carve it? A truly spectacular place as impressive as the Black Canyon of the Gunnison.

Best place to view geology in motion: Great Sand Dunes National Monument and Preserve (San Luis Valley). Massive sand dunes are moving before your eyes! You could also check out the Slumgullion earthflow between Creede and Lake City that continues to move 20 feet per year.

Best place to see geology that makes a difference: The Denver Basin (Greater Denver area). The rocks here are important sources of ground water, oil, gas, coal, minerals, and aggregate which help drive the Colorado economy and allow us to live in relative comfort.

Best place to see evidence of an extraterrestrial impact:

Trinidad Lake State Park (Trinidad). Here the K/T boundary impact layer is exposed and available for you to touch.

A close second is the High Plains of eastern Colorado where the 4<sup>th</sup> largest concentration of meteorites in the U.S. occurs.

Best place to learn about geology on a rainy day: Denver Museum of Nature and Science (Denver). An incredible display of minerals, fossils, and dioramas await you. Alternatives include the Morrison Natural History Museum and Dinosaur Journey Museum in Fruita.

Best place to collect fossils with your kids: Douglas Pass (near Rangely). While I have not taken my kids here yet, I can't wait. Beautifully preserved plant and insect fossils are preserved in the Green River Formation. At nearly 8300 feet above sea level, the panoramic view from the summit (which can be easily driven to by car) makes the trip even better.

There is more incredible geology in Colorado than a person can explore in a single lifetime. But don't let that wonder end with you; pass your knowledge of these hidden gems along to your children, friends, and colleagues so that they too can visit the places that still inspire you.

## **Rescheduled—Family Day, June 7th**

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### **Amazonite-bearing pegmatites in the Pikes Peak batholith, near Harris Park, Park County, Colorado**

Due to snowy conditions, the USFS is postponing the opening of the access road to the mineral claim. Family Day will be rescheduled for

June 7<sup>th</sup>, when roads will be drier and weather warmer. Please keep updated by the website. Also, an announcement will be emailed in May.

## 2008 CSS Grant Awards

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By Bill Nesse

Recipient	School	Title	Fund	Amount
Bradley Johnson	University of North Carolina	The effect of Holocene climate change on alpine landscapes in the southeastern San Juan Mountains, Colorado	Pierce	\$1200
Christina Carr	Montana State University	Fault segmentation control on alluvial fan development along the Lemhi Range, east-central Idaho	Pierce	\$1000
Byron Straw	University of Northern Colorado	Glacial and Periglacial Record of Post-Pinedale Climatic Events, Lake of the Clouds Cirque, Never Summer Mountains, Colorado.	Pierce	\$1400
Zachary Wessel	Colorado State University	The nature of the Idaho Springs-Ralston Shear Zone: Implications for Proterozoic Tectonics and Laramide Magmatism	Snyder	\$1400
Wesley Clary	Colorado State University	The Kinematic History of the Southern Picuris-Pecos Fault System, New Mexico: A critical Test of Rocky Mountain Tectonic Models	Tweto	\$1200
Ryan Thompson	Colorado State University	Possible coupling of intra-basin fracturing with basin-bounding deformation, Central Wyoming	Tweto	\$1200
Brady Foreman	University of Wyoming	Fluvial response to abrupt climate change at the Paleocene-Eocene boundary: Bighorn and Piceance Creek Basins, USA	Tweto	\$1200
Jesse Thompson	University of Kansas	Sequence Stratigraphy of the Cretaceous Rollins Sandstone Member (Illes/Mount Garfield Formation) and Cameo-Wheeler Coal Zone, Piceance Basin, Colorado	Oriel	\$1200
Douglas Portis	Northern Arizona University	Proterozoic deformation and metamorphism, southern Hualapai Mountains, Northwest Arizona: Refining the western boundary between the Mohave-Yavapai crustal Provinces	Oriel	\$1200

## Spring Field Trip to South Park

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By Karl Kellogg

### **New insights into the geologic and geomorphic evolution of South Park basin.**

This is the second announcement for the Society's Spring field trip May 17 to South Park. Highlights of the trip include (1) probable Quaternary normal faulting and structural

relationships near Kenosha Pass, (2) the Elkhorn thrust and associated high-frequency footwall folding and syn-tectonic conglomerates, (3) new geophysical and hydrological data that constrain

the configuration and extent of the Elkhorn thrust, (4) Eocene to Miocene volcanic and sedimentary rocks in southwestern South Park and the structural deformations that affect them, (5) regional and local evaporate dissolution and collapse, (6) new information on Late Paleozoic to Paleocene stratigraphy, and (7) (time permitting) Pleistocene paleovalley abandoned at the end of the Pleistocene or early Holocene. Field trip leaders include Cal Ruleman, Bob Bohannon, and Bob Kirkham.

We will leave from the Cold Springs Park-n-Ride at 7:30 a.m., Saturday, May 17. We will

return to Cold Springs Park-n-Ride about 5:30 p.m. Cost, including transportation (vans) and lunch will be \$45.00/person. Student grants from the Pillmore Fund are available to cover expenses. Contact Karl Kellogg ([kkellogg@usgs.gov](mailto:kkellogg@usgs.gov); (303) 236-1305) for questions or additional information. **Send the sign-up form below with remittance (checks written to Colorado Scientific Society) to: Karl Kellogg, Colorado Scientific Society, P.O. Box 150495, Lakewood, CO 80215-0495. Deadline is May 9 (but sooner is very much appreciated).**

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**South Park Basin sign-up form  
May 17, 2008**

**Name(s)** \_\_\_\_\_ **Address:** \_\_\_\_\_

\_\_\_\_\_ **Phone:** \_\_\_\_\_ **E-Mail**

\_\_\_\_\_ **Food preferences?** \_\_\_\_\_

**Number of registrants** \_\_\_\_ x \$45 = \_\_\_\_\_ (enclosed)

**Write checks to: Colorado Scientific Society**

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*North end of South Park from the Colorado Trail*

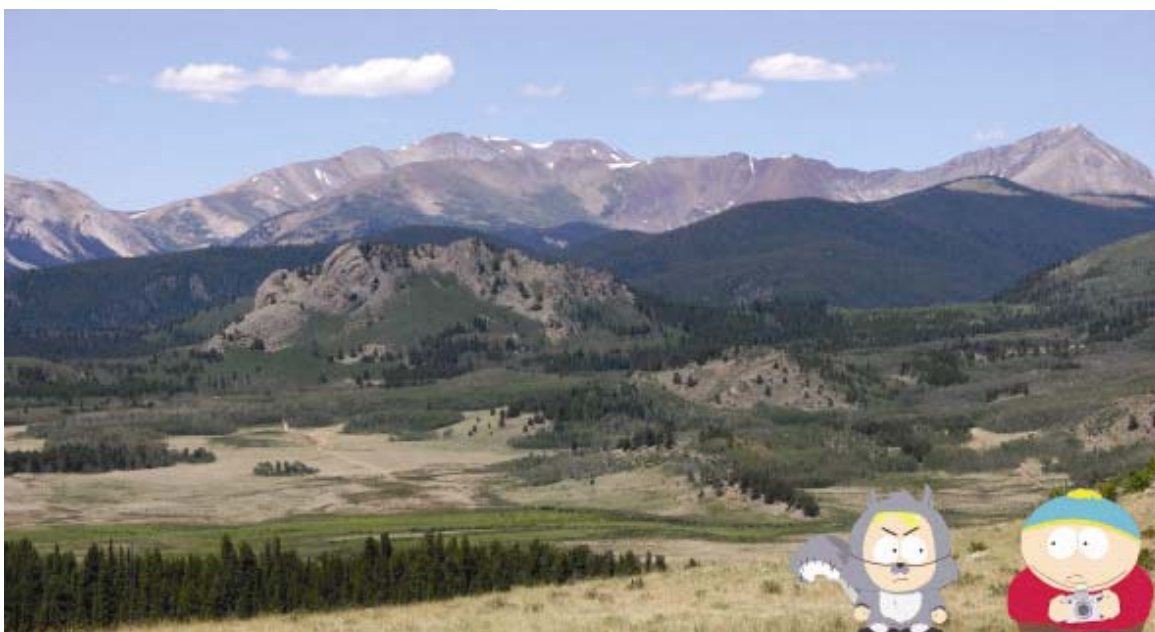


photo by Bob Bohannon and Lisa Rukstales

## Fall Field Trip!

By Karl Kellogg

### **The search for Braddock's Caldera: Field trip to the northern Never Summer Range volcanic field, September 6-7.**

Set your calendar for Saturday and Sunday, September 6 and 7 for a visit to the 29-27 Ma volcanic field of the northern Never Summer Range. Early basaltic to dacitic flows were followed by two major ignimbrite eruptions that originated from near Mt. Richthofen, now underlain by a granodiorite stock. These relationships led the late William Braddock to

suggest that Mount Richthofen is the root of a deeply eroded caldera. This trip may include hikes of as much as about 3 miles. We'll stay overnight in Walden. As a sidelight, we'll also visit glacial features of the upper Poudre River Valley. Trip leaders are Ed Larson, Mike O'Neill, Jim Cole, Karl Kellogg, and perhaps others.

## CSS at the Jeffco Gem and Mineral Show



Display board by Sue Hirshfeld and display case by Beth Simmons.

## *Newsletter Help!*

CSS is seeking a person to assume newsletter responsibilities. This is a fun job! Be among the first to learn of upcoming talks and fact-filled field trips. Attend council meetings and enjoy free pizza! Most importantly, you would have satisfaction in knowing

you are contributing to a valuable and enduring organization. If interested, please contact Celia Greenman at 303-291-7327, [celia.greenman@state.co.us](mailto:celia.greenman@state.co.us).



# Earth Science Meetings and Talks



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

Items may include special events, open houses, etc...thanks!

**Colorado Scientific Society's** regular meetings are held the 3rd Thursday of the month at the American Mountaineering Center in Golden (unless otherwise advertised). Social time begins at 6:30 p.m. and talks start at 7:00 p.m. For more information, contact Matt Morgan, at 303-866-2066, [matt.morgan@state.co.us](mailto:matt.morgan@state.co.us)

**Denver Mining Club** meets every Monday at Country Buffet near Bowles and Wadsworth (at 8100 W. Crestline Ave., in the shopping center) 11:30-1:00. May 19, Irv Parrish, "Heimaey Island, Iceland and the Atlantic Rift". <http://china-resources.net>.

**Denver Region Exploration Geologists' Society (DREGS)** meets in the Mutual Consolidated Water Building, 12700 West 27th Avenue, Lakewood. Social hour 6:00-7:00 p.m. Technical presentation at 7:00 p.m. Meetings are normally scheduled for the first Monday of each month. May 5, Keith Laskowski, Bayswater Uranium, "Uranium deposits of the Powder River Basin". For information contact Jim Piper, (303) 932-0137, or the website <http://www.dregs.org>.

**Denver Well Logging Society (DWLS)** meets on the third Tuesday of each month, Sept. through May. Lunch and a technical talk at the Wynkoop Brewery begins at 11:30 a.m., 18th and Wynkoop Sts. in Denver. Subject matter usually deals with the application of well logs to oil and gas exploration. Call Eleice Wickham at 303-573-2781 for reservations. Web page: <http://dwls.spwla.org>.

**Rocky Mountain Association of Geologists (RMAG)** Reception at 11:30, lunch at noon, talk at 12:30. Reservations by recording at 303-623-5396 until 10:30 a.m., Wed. before the luncheon. Cancellations until 11:00 a.m. on Wed. at 303-573-8621. Luncheon is \$20 payable to RMAG at the door. Talk only (no res)—cost is \$3. Location: Denver Marriott, 17<sup>th</sup> & California. Web page: <http://www.rmag.org>.

**Rocky Mountain SEPM** Reception at 11:30, lunch at noon, speaker at 12:30. Reservations: [steve.stancel@anadarko.com](mailto:steve.stancel@anadarko.com), 720-929-6536, before noon of preceding Friday. \$15.00 lunch, \$3 talk only. Wynkoop Brewing Company, 1634 18<sup>th</sup> St., Denver. Web page: [www.rmssepm.org](http://www.rmssepm.org).

**CO-AIPG** May 20, Lon Abbott, UC, "A grand puzzle: the enigmatic evolution of the Grand Canyon." Social at 11:30, lunch at noon, speaker at 12:30. Reservations: [dimageol@msn.com](mailto:dimageol@msn.com), 303-394-0321, before noon May 16. \$25 prepaid, \$28 @ door. University Club, 1773 Sherman St.

**University of Colorado at Boulder, Geological Sciences Colloquium** Wednesdays, 4:00-5:30, Rm. 380. Refreshments at 3:30 on the 3rd floor. 303-492-8141. Web page: <http://www.colorado.edu/GeolSci>.

**Colorado State University, Dept of Geosciences**, Rm 320 Warner College of Natural Resources Bldg, Fridays, 4:10 pm. 970-491-5661. <http://welcome.warnercnr.colostate.edu/geo-training/index.php>

**Friends of Dinosaur Ridge.** Web page: <http://www.dinoridge.org>. Admission is free, but donations are welcome. Visitor's center, 16831 W. Alameda Parkway. Talks at 7:00 p.m. May 28, Neffra Matthews and Brent Beithaupt, "Photogrammetry in tracking." For more information contact the FODR Visitor Center at (303) 697-3466 or [cloverknoll@comcast.net](mailto:cloverknoll@comcast.net).

**Denver Museum Nature and Science.** Ricketson auditorium, 7:00 p.m., May 14, Kirk Johnson, chief curator, "Crocodiles in Greenland and hippos in London: a fossil-fueled tour of past and future climates. May 20, Bruce Geller, CSM, A history of Colorado gold production, Phipps IMAX Theater, 7:00 p.m. \$12 member, \$15 non-member. [www.dmns.org](http://www.dmns.org).

**Colorado School of Mines, Van Tuyl Lectures** Thursdays from 4-5 p.m. in Berthoud Hall room 108.

<http://www.mines.edu/academic/geology.html>

**USGS Geologic Division Colloquium.** Thursdays, 1:30, Foord Room, Building 20, Denver Federal Center. My 1, Todor Todorov, "Effect of trace metals in prostate cancer". For more information contact: Peter J. Modreski, U.S. Geological Survey, Denver, Colorado tel. 303-202-4766, fax 303-202-4767 email [pmodreski@usgs.gov](mailto:pmodreski@usgs.gov).

**Café Scientifique**, Wynkoop Brewery, 6:30-8:00, May 20, Charles Musiba, UC Denver, "Who made the Laetoli footprints 3.6 million years ago?" Free, except for beer. <http://www.cafescicolorado.org>

**Colorado School of Mines.** Short course, "Ore microscopy and ore petrology", Jul 28-Aug 1, taught by Dr. John Lufkin. Contact [lufk3@comcast.net](mailto:lufk3@comcast.net) 303-284-2646

**For a constantly updated, online geo-calendar, visit the Colorado Geological Survey at**

<http://geosurvey.state.co.us>

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

<http://www.coloscisoc.org>



## OFFICERS

President: Matt Morgan, CGS, 303-866-2066 [matt.morgan@state.co.us](mailto:matt.morgan@state.co.us)  
President-Elect: Don Sweetkind, USGS, 303-236-1828, [dsweetkind@usgs.gov](mailto:dsweetkind@usgs.gov)  
Treasurer: Jeremy McCreary 303-744-0907 [jeremy@cliffshade.com](mailto:jeremy@cliffshade.com)  
Secretary: Lisa Fisher, CSM, 303-478-9427 (c), [lfisher@mines.edu](mailto:lfisher@mines.edu),  
Past President: Bill Nesse, UNC, 970-330-7183, [nesse@ctos.com](mailto:nesse@ctos.com)

## COUNCILORS

2007-2010: Jeremy McCreary 303-744-0907 [jeremy@cliffshade.com](mailto:jeremy@cliffshade.com)  
2007-2010: Tim McIntyre  
2006-2009: Scott Minor, USGS, 303-236-0303, [sminor@usgs.gov](mailto:sminor@usgs.gov)  
2008-2011: Cal Ruleman, USGS, [cruleman@usgs.gov](mailto:cruleman@usgs.gov)  
2008-2011: Lee Shropshire, UNC, 970-352-8778, [leeshrop@att.net](mailto:leeshrop@att.net)

## COMMITTEE CHAIRPERSONS

Best Paper Award: Matt Morgan, CGS, 303-866-2066, [matt.morgan@state.co.us](mailto:matt.morgan@state.co.us)  
Database Manager, membership changes: Erik Oerter, CGS, [erik.oerter@state.co.us](mailto:erik.oerter@state.co.us)  
Field Trips: Karl Kellogg, [kkellogg@usgs.gov](mailto:kkellogg@usgs.gov)  
Graphics: Karen Morgan, CGS, 303-866-3529, [karen.morgan@state.co.us](mailto:karen.morgan@state.co.us)  
History: Beth Simmons, [cloverknoll@comcast.net](mailto:cloverknoll@comcast.net)  
Membership: Thom Fisher, Libby Prueher, TC Wait, Eric Nelson, Beth Simmons  
Memorial Funds: Bill Nesse, 970-330-7183, [nesse@ctos.com](mailto:nesse@ctos.com)  
Newsletter Editor: Celia Greenman, CDOW, 303- 291-7327, [celia.greenman@state.co.us](mailto:celia.greenman@state.co.us)  
Outreach: Sue Hirschfeld, 720-565-9302, [eqdoc@ix.netcom.com](mailto:eqdoc@ix.netcom.com)  
Program: Emmett Evanoff, 303-444-2644, [emmettevanoff@earthlink.net](mailto:emmettevanoff@earthlink.net), Libby Prueher, Christine Turner  
Publicity: Lisa Rukstales, [lrukstales@usgs.gov](mailto:lrukstales@usgs.gov)  
Science Fair: Chuck Weisenberg, 303-238-8806, [cweisnbg@aol.com](mailto:cweisnbg@aol.com)  
Webmaster: John M. Ghist, 303-875-9671 [jmghistcss@msn.com](mailto:jmghistcss@msn.com)

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