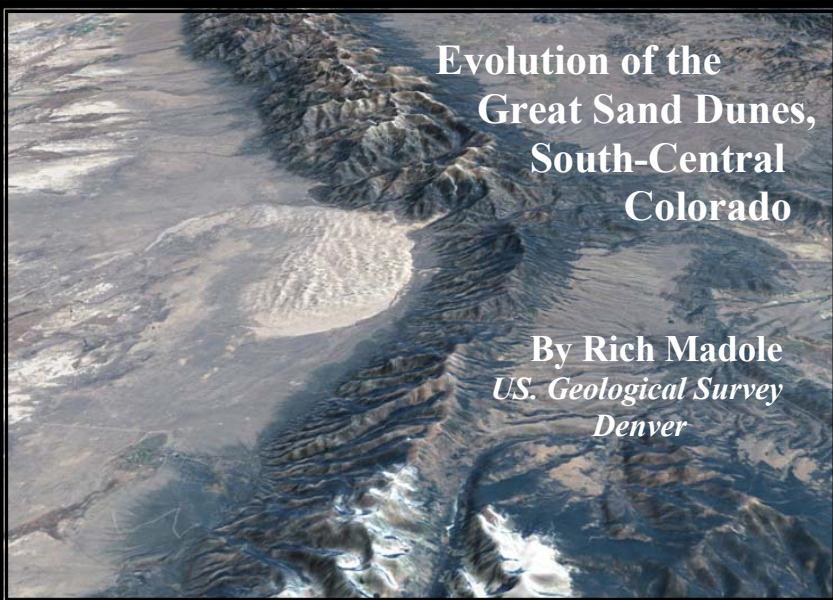




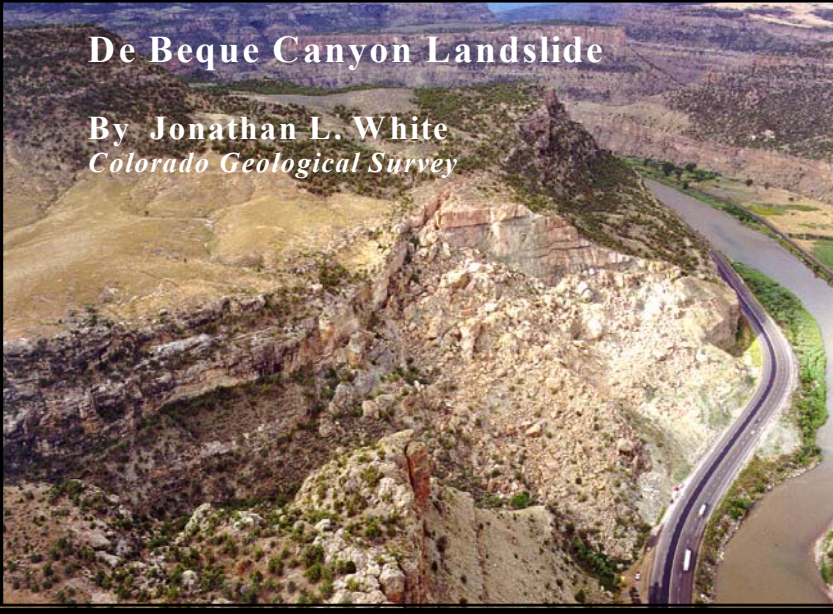
Colorado Scientific Society

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



**Evolution of the
Great Sand Dunes,
South-Central
Colorado**

By Rich Madole
*US. Geological Survey
Denver*



De Beque Canyon Landslide

By Jonathan L. White
Colorado Geological Survey

Thursday, February 19, 2004

American Mountaineering Center

710 10th St. (NE corner of 10th and Washington), Golden

Social half-hour – 7:00 pm. Meeting time – 7:30 pm.

Abstract

Evolution of the Great Sand Dunes, south-central Colorado

By **Rich Madole**, U.S. Geological Survey, Denver

Geomorphic and stratigraphic evidence obtained in recent field studies indicate that the sand in the Great Sand Dunes came primarily from a lacustrine source rather than from flood-plain deposits of the Rio Grande, as previously supposed. The source of the sand in the Great Sand Dunes has been pondered for more than a century, but since the 1960s, the idea that the flood plain of the Rio Grande was the source has been widely accepted. Closely linked to the issue of source are questions about when and under what conditions the sand was transported. Although most recent publications do not assign dates to the time of dune formation, a few infer that the process began about 12,000 years ago and link it to increased discharge and sedimentation during deglaciation of the San Juan Mountains.

The Great Sand Dunes are a small part (<10%) of an area of windblown sand that blankets the east side of the San Luis Valley for a distance of about 100 km. Stratigraphic evidence and numerical ages show that this area of windblown sand is the product of multiple episodes of eolian transport that occurred intermittently over a time span that probably includes much, if not all, of the Pleistocene.

Accumulation of eolian sand was controlled primarily by climatically driven fluctuations of water-table level. During megadroughts, water table fell and exposed areas of sandy sediment in playas to wind erosion. These areas became

primary sources of new generations of dune and sheet sand. At the same time, drought reduced vegetation on deposits of older eolian sand allowing wind to remobilize parts of them. During wetter times, water table rose and shallow lakes formed, and the sand supply on the basin floor was replenished by inflow from streams that originated in the surrounding mountains and on piedmont slopes.

The distribution of the eolian sand of which the Great Sand Dunes are a part suggests a relationship with the closed basin part of the San Luis Valley rather than with the Rio Grande. This body of eolian sand is nearly coincident with the length of the closed basin, and the parabolic dunes north of the Great Sand Dunes indicate a sand source and transport direction unrelated to the Rio Grande. Also, leeside dune belts, which typically flank riverine sand sources, are conspicuously absent along the leeside of the Rio Grande. Finally, the timing suggested in previous publications for the onset of sand transport and dune formation seems improbable. Archeological, paleontological, and stratigraphic data indicate that at the end of the Pleistocene, lakes, marshes, and vegetation occupied much more of the area between the Rio Grande and the Great Sand Dunes than at present. These conditions would have been unfavorable for widespread eolian erosion and transport of sand.

Abstract

DeBeque Canyon landslide

By **Jonathan L. White**, Colorado Geological Survey

An active landslide has historically impinged upon the Colorado River and transportation corridors on the floor of DeBeque Canyon, located in Mesa County, 21 miles east

of Grand Junction, Colorado. Interstate 70 passes through the toe of the landslide on the south wall of the canyon.

DeBeque Canyon was formed by the

incision of the Colorado River into gently dipping, Cretaceous Mesa Verde Group strata on the west flank of the Piceance Basin. Exposed on the canyon walls are cliffs of sandstone interbedded with shales and siltstone. The complex landslide extends from the river's bank to the canyon rim where large and impressive fissures occur.

The large fissures, structural offsets, and tilted blocks indicate landslide morphology characterized by low-angle extensional movements of sandstone strata at the canyon rim and deep-seated deformations within a thick shale stratum below. Below the cliffs of these upper blocks, the main landslide morphology changes to translational down-slope movements of landslide rubble, and at the lower slope to deep-seated rotational failures that periodically

impact the highway.

Major reactivation of the slide occurred in April 1998 when the toe of the rotational landslide heaved upward 14 feet and almost closed Interstate 70. An earlier event occurred in February 1958 when the toe heaved 24 feet. Around 1900 much larger movements of the landslide caused the slide toe to enter the Colorado River and alter the river's course. Portions of the railroad alignment and the work camp of Tunnel on the opposite riverbank were subsequently washed out. This presentation will discuss the results of an investigation of the landslide that was done after the 1998 emergency, specifically the geology, geomorphology, the on-going monitoring work, and the water diversion mitigation project by Colorado Department of Transportation.

Colorado Scientific Society President's Note—February 2004

By Emmett Evanoff

The Denver area is a wonderful place to be a geologist. Not only are a wide variety of geologic features readily available for study, but here are also a wide variety of people who are willing to share their geological knowledge. Organizations such as the U.S. Geological Survey, the Colorado State Survey, various universities and colleges, and industry all employ a variety of professional geologists. They are the main source of the Colorado Scientific Society membership and provide a deep well of experience in and knowledge about the geology of Colorado and the western United States. However, my classes at the Denver Museum of Nature and Science have introduced me to an even wider audience of potential CSS members: very interested amateur scientists who are fascinated by geology. These amateurs share with the professional geologists a deep appreciation of the world and its history. Both groups seek activities that will increase their knowledge of the geologic features and events in our region.

I am encouraging CSS to strengthen its links to both professional and amateur geologists by sponsoring one-day symposia on a topic of regional geologic interest, followed by a one-day field trip to examine the features discussed in the previous day. The first such symposium will focus on the geologic history of the Front Range. This topic is not only one of immediate interest for people in the Denver Metro area but it was also the primary interest of the late William A. Braddock, to whom the symposium is dedicated. The symposium will be free and open to the public, and it will be held at the Benson Earth Sciences Building at the University of Colorado at Boulder. The symposium will be followed on April 4 by a one-day field trip to see geologic features in the nearby Front Range. Other potential topics for future symposia include the geology and groundwater resources of the Denver Basin, and the effects of mining on groundwater. What other topics would like to chew on during future symposia? Let me know.

Colorado Scientific Society Symposium on the Geology of the Front Range in honor of William A. Braddock Call for Speakers

By **Emmett Evanoff**, CSS President

When	Saturday, April 3, 2004
Where	Benson Earth Sciences Building, CU-Boulder
Topics	All aspects of Front Range geology—Precambrian, Ancestral Rockies, Laramide, and post-Laramide history
Field trip	Sunday, April 4
Deadlines	Friday, February 20—deadline for submitting a title for a talk Friday, March 12—deadline for submitting abstract
Submit abstracts to	Emmett Evanoff emmettevanoff@earthlink.net 399 UCB, University of Colorado, Boulder, CO 80309-0399

On April 3, 2004, the Colorado Scientific Society will sponsor a one-day symposium on the geology of the Colorado Front Range. The symposium is dedicated to the memory of William A. Braddock, a CU geologist who dedicated most of his studies to the geology of the Front Range. About 30 minutes will be allowed for each speaker. If you are interested in presenting a talk, contact Emmett Evanoff (address above) and provide your name, address, phone number, e-mail address, and a title for your presentation. The title of your talk must be received no later than **February 20**. If you are interested in helping to plan the field trip route, please let me know that by February 20 also.

Guidelines for abstracts: The deadline for abstracts will be **Friday, March 12**. The abstract can range from a short abstract (typical GSA style abstract) to an extended abstract with figures and references. Extended abstracts,

including title, text (double spaced, 12 point Times Roman type) and references must be no more than two pages long. You may submit no more than two figures, with captions, along with your abstract.

Submit the abstract electronically by email or disk (zip, CD-ROM, floppy). Graphics must fit inside a 6.5" H 9" rectangle. Abstracts must be in DOS/Windows word processing format (MS Word preferred) or as unformatted text. Please send your graphics as separate files, preferably as TIF or JPEG files.

Reservations: No reservations are required for the symposium talks. Just show up. Notify Emmett Evanoff if you want to participate in the field trip, so the proper number of vans (3 or 4, holding 36 to 48 people total) can be arranged. Departure is slated for Cold Springs Park 'n Ride, just southeast of the intersection at Sixth Avenue and Union Street.

New USGS project focuses on Front Range mapping and mineral assessment

By **Karl Kellogg**, U.S. Geological Survey, Denver

Earth scientists from both the Central Mineral Resources Team and the Earth Surface

Processes Team of the USGS are cooperating to assess and update information regarding mineral

resources, abandoned mine lands, geological hazards, and basic geological information in a large region that includes most of the Colorado Front Range. Terry Klein (Central Mineral Resources) and Karl Kellogg (Earth Surface Processes) are leading the project, which is officially named the Central Colorado Assessment Project. Ongoing mapping will fill in holes and resolve conflicts in the existing mapping and will result in new digital geologic maps of several 1:100,000 topographic quadrangles that initially include the Bailey, Denver West, Estes Park, and Fort Collins sheets. A digital 1:250,000 geologic map of the area that includes the Pike and San Isabel

National Forests will also be compiled from published geologic maps with some revisions. More than half of the project area is covered by National Forest. In fact, a request by the U.S. Forest Service for additional geologic information on the public lands (particularly regarding abandoned mine lands, mineral resource issues, and the need for revised surficial mapping) was a major catalyst in moving the project to reality. In addition to completing new geologic maps, geochemical, geophysical, isotopic, mineral deposit, and remote sensing studies will be undertaken in the project area.

Symposium in honor of Tom Steven

By **Karl Kellogg**, U.S. Geological Survey, Denver

Mark your calendar for the upcoming symposium to honor the long and productive career of Thomas A. Steven: “Cenozoic silicic volcanism, associated mineralization, and landscape evolution in the central Rocky Mountains.” It will be held Friday, March 5, from 1:00 to 4:30 p.m. in Powell Auditorium, Building 810, Denver Federal Center. Presenters and tentative titles are as follows:
1) Peter W. Lipman (USGS), “Development of concepts about silicic volcanism:

studies in the San Juan Mountains, 1890–2004 ”
2) Philip M. Bethke, Paul B. Barton, and Robert O. Rye (USGS), “Creede-type ore deposits”
3) Charles G. (Skip) Cunningham (USGS), “Silicic volcanism and ore deposits of the Marysvale volcanic field, Utah”
4) Emmett Evanoff (University of Colorado Museum), “The ups and downs of Cenozoic landscape evolution in the central Rocky Mountains”

CSS past presidents win prestigious book award

By **Scott Minor**, U.S. Geological Survey, Denver

Congratulations Dave Love, Jack Reed, and Ken Pierce!! Past presidents Reed and Pierce, and Love (recently deceased), have won the 2004 Mountains & Plains Booksellers Association Regional Book Award for their recently revised edition of *Creation of the Teton Landscape*, published by the Grand Teton Natural History Association. The authors will

be presented the award at the MPBA Regional Book Awards Banquet at the Marriott Denver Tech Center (4900 South Syracuse, Denver 303-779-1100) on Saturday, March 20, 2004 at 7:30pm. The Banquet, which is a fundraiser for the MPBA Literary Grant Program, is open to the public. Please come to the banquet and cheer on the authors for a job well done.

Yule Marble—New Colorado state rock

By **Clare Marshall**, science advisor to the Girl Scout troop described below

In January 2004 the Colorado House State, Veterans and Military Affairs committee unanimously passed the initiative to make Yule Marble the official Colorado state rock. The Girl Scouts (and the adult witnesses) did a superb job convincing the committee members that having

a state rock will be good for Colorado.

Vince Matthews, Colorado Geological Survey, was a witness in favor of this bill. He fielded questions from all sides about why a state rock? and why not granite or sandstone? and how long will the Yule Marble quarry last?

March Skies

By **Terry Hiester**

This is the first of a several articles on naked-eye astronomy.

March is going to be a great month to see the classic planets. All five innermost planets will be visible at the end of the month. Mercury, Venus, Mars, Saturn, and Jupiter will all be visible in the southern sky along the ecliptic, the great circle across the sky in which the planets move around the sun.

On March 22, Mercury will be visible to the lower right of the new lunar crescent in the west-southwest sky. On March 29, both Mercury and Venus will be at their apparent furthest (greatest elongation) from the Sun. Look low in the western sky for Mercury if you are away from the mountain front. Venus is the very bright planet in the low southwest sky and has been very spectacular for the last couple of months. On June 8 of this year Venus will cross the Sun's disk, a trip that is called a transit. (I'm excited already!) We'll have to travel east to observe the event. More on this event later in the spring.

Mars and its robot geologists are west of the star Aldebaran, the reddish star in the southwest sky above and to the east of Venus. Mars is not as bright as it was last summer, and it is interesting to compare the "butterscotch" color of Mars with the red of Aldebaran. Look for the orange planet just to the west of the star; the planet has less twinkle than the reddish star. Saturn is the bright planet high in the south-southwest sky. The orientation of Saturn and its rings are very photogenic at the present time, but you will need a telescope to see the rings. Last but not least is Jupiter. It is low in the southeastern sky at sunset. Jupiter is second only to Venus in brightness.

Once you identify these five planets, the line that connects them defines the planetary ecliptic. The planets will travel along this line, which prompted the ancient Greeks into calling them the *planetos* or the "wanderers." It will be quite a sky show in March, so try to get out to look at the sky if you can.

A note from the editors

By **Mary-Margaret Coates**

Now we know that people read the CSS newsletter! Some folks loved the January 2004 View through the Brown Cloud—others emphatically didn't. We like having a fresh

opinion on the world around us. Brown Cloud "views" may occasionally provide a humorous take on controversial topics, but please note that the "views" are not necessarily those of the CSS. Enjoy!



Earth Science Meetings and Talks



Newsletter items must be received by the 4th 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 7:00 p.m. and talks start at 7:30 p.m. For more information, contact Jim Cappa at (303) 866-3393, jim.cappa@state.co.us

Denver Mining Club meets every Monday (except when noted) at Country Buffet near Bowles and Wadsworth (at 8100 W. Crestline Ave.) 11:30 a.m.-1:00 p.m. **The Trouble with Gold - A Promising Treasure from Cripple Creek**, February 9—Jim Davis, Consulting geologist. **No meeting**, February 16. **Recent Exploration of the Large Altered and Brecciated Area at Webster Pass, Colorado**, February 23—Charles Robinson, President, Mineral Systems, Inc.

Denver International Petroleum Society meets the second Friday of each month at the Wynkoop Brewing Co., 18th and Wynkoop Streets. Reception begins at 11:30 a.m., luncheon at 12 p.m., program at 12:30 p.m. Make reservations (required) by leaving message at (303) 623-5396. Reservations accepted after 8 a.m. on Friday until 10:30 a.m. on Wednesday prior to the meeting. Cancellations accepted until 11:00 am Wednesday prior to the meeting. Cost: \$15 for lunches; talk only is available for \$2 (make checks payable to "D.I.P.S."). Contact Keith Murray at (303) 986-8554 for information.

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. **I Never Met a Rhyolite I Didn't Like - Some of the Geology in Economic Geology**, February 2, Jonathan G. Price. 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. **TBA**, February 16. Call Elice Wickham at 303-573-2781 for reservations. Web page: <http://dwls.spwla.org>.

Rocky Mountain Association of Geologists (RMAG) Reception at 11:30 a.m., lunch at 12:00 p.m., talk at 12:30 p.m. Reservations are taken by recording at 303-623-5396 until 10:30 a.m., Wed. before the luncheon. Cancellations are taken until 11:00 a.m. on Wed. at 303-573-8621. Luncheon cost is \$20 payable to RMAG at the door. Reservations are not required for talk only—cost is \$3. Meeting location: Denver Petroleum Club, Anaconda Tower, 555-17th St, 37th floor. **TBA**, February 20—Andre Brown, W.L. Gore & Associates. **Laser Drilling: Effects of Beam Application Methods on Improving Rock Removal**, March 5—Richard Parker, Parker Geoscience Consulting. Web page: <http://www.rmag.org>.

University of Colorado at Boulder, Geological Sciences Colloquium Wednesdays, 4:00-5:30 p.m., Rm. 180. Refreshments at 3:30 p.m. on the 3rd floor. **TBA**, January 14—Don Helmberger, California Institute of Technology. **Even in Boulder: The Boulder Oil Field, 1901–Today**, February 11—Matt Silverman, Consultant. **Continental isotopic records of global change in the Cretaceous greenhouse world**, February 18—Greg Ludvigson, Iowa Geological Survey and U. of Iowa. **A snowball's Chance in Death Valley**, February 25—Frank Corsetti, U. of California-Santa Barbara. For more information, call 303-492-8141. Web page: <http://www.colorado.edu/GeolSci>.

Friends of Dinosaur Ridge; 7:00 pm at Red Rocks Elementary School in Morrison, Colorado. Join now. Web page: <http://www.dinoridge.org>.

Colorado School of Mines, Van Tuyl Lectures Fridays from 3:00PM to 4:00PM in Berthoud Hall room 108. **Cenozoic altitudes and paleobotany of Western Interior United States**, February 6—Warren Hamilton, CSM. **Carving Crazy Horse: Art and Engineering of Blasting Massive Rock Monuments**, February 13—Charles Dowding, Northwestern U. **TBA**, February 20 and 27. **Recent advances in characterizing ground water flow and chemical transport in fractured rock from cores to kilometers**, March 5—Allen Shapiro, USGS. For further information, check <http://www.mines.edu/academic/geology/calendar/vantuyl.html>

USGS Geologic Division Colloquium. Thursdays, 1:30 p.m., Foord Room, Building 20, Denver Federal Center. 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

For a constantly updated, online geo-calendar, visit the Colorado Geological Survey at
<http://geosurvey.state.co.us>

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