



Colorado Scientific Society

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



Oak St. in Telluride, July 27, 1914
Photo courtesy of Denver Public Library

DEBRIS FLOWS IN COLORADO

by Jeff Coe
U.S. Geological Survey
Golden, Colorado

RINCON MOUNTAIN MEGASLIDE: LA CONCHITA, VENTURA COUNTY, CALIFORNIA

by Dr. Larry D. Gurrola
Consulting Geologist
Santa Barbara, Calif.



NOT Thursday!!**



Wednesday, February 17, 2010

**Colorado School of Mines—Department of Geology and Geological Sciences,
Berthoud Hall, Room 241, Golden, CO**

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

February Talk Abstracts

Debris Flows in Colorado

by Jeff Coe

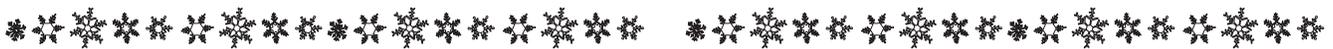
U.S. Geological Survey, Golden, Colorado

Debris flows are fast-moving landslides that are triggered by rapid snowmelt or intense or prolonged rainfall. Debris flows are extremely hazardous to anything in their path because they occur with little warning and often contain large boulders, trees, and other debris. Three primary types of debris flows affect areas of western North America: 1) flows that mobilize from discrete landslides (i.e., “slides” using the Varnes, 1978 classification) and travel over the surface of the hill-slope, often flattening vegetation and leaving a thin veneer of deposits; 2) flows that mobilize from slides that then erode and entrain hillslope and channel materials; and 3) flows that initiate from surface-water runoff that erodes and entrains hillslope and channel materials.

In Colorado, recent debris flows along the Interstate 70 corridor, in the towns of Ouray and Telluride, along Highway 550 between Ouray and Silverton, and in the Cottonwood and Chalk Creek valleys near Buena Vista, indicate that Colorado is most susceptible to debris flows of type 3 (runoff-initiated flows). The runoff type is most common because Colorado has an abundance of steep, sparsely vegetated slopes that are covered by loose debris. The flanks of formerly glaciated valleys and areas burned by wildfire are especially susceptible to runoff-initiated debris flows.

To better understand initiation conditions and processes for runoff-initiated debris flows, the USGS began monitoring four debris-flow basins in central Colorado in 2004. One of these basins, at Chalk Cliffs near Buena Vista, had an average of two debris flows per year between 2004 and 2007. This high rate of occurrence led to an expanded monitoring effort at Chalk Cliffs in 2008 when the University of Colorado and East Carolina University began collaborating with the USGS at the site. Current monitoring instrumentation is designed to capture flow stage, pore-fluid pressure, bed-normal stress, soil moisture, rainfall, and video and still photography during debris-flow events. Terrestrial laser scanning is used to monitor topographic changes caused by debris flows. Monitoring during the summers of 2008 and 2009 captured data from five debris-flow events.

Results from monitoring indicate that flows were initiated by surface-water runoff from colluvium and bedrock that entrained sediment from rills and channels with slopes ranging from about 14° to 45°. The availability of channel material was essentially unlimited because of thick channel fill and refilling following debris flows by rock fall and dry gravel processes. Rainfall exceeding $I=6.61(D)-0.77$, where I is rainfall intensity (mm/hr), and D is duration (hr), was required for the initiation of debris flows in the drainage basin. Soil moisture levels in hillslope and channel sediment were low (< 10 percent volumetric water content) immediately prior to debris-flow initiation. Observed flows consisted of multiple, steep-surge fronts of coarse-grained material without measurable pore-fluid pressure, pushed by more water-rich tails. Surges with the largest pore-fluid pressures, some two times greater than hydrostatic, were the most mobile and triggered mass movement into the channel by undercutting bounding hillslopes. The total depths of mapped debris-flow deposits were generated primarily by progressive vertical accretion of multiple surges, yet resulted in massive, vertically unstratified sedimentological textures.



Rincon Mountain Megaslide: La Conchita, Ventura County, California

by Dr. Larry D. Gurrola

Consulting Geologist, Santa Barbara, Calif.

The 1995 and 2005 landslides in the 200-m high sea cliff above the community of La Conchita, California, are known to be part of a reactivated Holocene prehistoric landslide. We propose that the prehistoric Holocene slide is part of a much larger, several hundred million cubic meter late Pleistocene slide complex composed of upper slumps and lower flows, informally termed as the Rincon Mountain megaslide. An approximate age of 30 ka for the Rincon Mountain landslide is derived, based on a 25-m high fault scarp formed in earthflow deposits that overlie the megaslide deposits and a known rate of faulting (~0.8 m/ky). Geomorphic evidence for the megaslide includes a prominent 100-m-high amphitheater-shaped head scarp, back-tilted landslide benches, hummocky topography, and numerous smaller landslides and earthflow deposits. Geologic evidence includes deposits composed of slide breccia with fragments of the late Pleistocene (45 ka) emergent marine platform and terrace deposits displaced several tens of meters.

Isolated parts of the Rincon Mountain landslide are active in the La Conchita area, but no evidence exists that the entire slide mass is moving as a unit. Landslides from the 200-m high slope behind La Conchita will reoccur and future development on the proposed Rincon Mountain slide should be very carefully evaluated to avoid reducing slope stability and reactivation of the megaslide.

President's Message from Scott Minor



Dear Society Members,

For those of you who could not make it to the Emmons Lecture last month, you missed a very interesting and well presented talk in which speaker Jim Kennett made a compelling case for an extraterrestrial impact over North America nearly 13,000 years ago. Although the "YDB impact hypothesis" is still controversial, I got a sense that many folks in the near-capacity audience walked away after the talk with at least a more open mind regarding the idea. For all who could attend, thanks for helping make this a successful event!

Clearly, our planet's geologic history has been punctuated from time to time by "catastrophic" natural events such as the proposed YDB cosmic impact. Although not as severe as a large cosmic impact, the devastating January earthquake in Haiti certainly qualifies as catastrophic in terms of the tragically huge human death toll that resulted from it. Largely based on the results of neotectonic studies, a large ($M > 7.0$) earthquake had been predicted for the same fault segment that caused the January Haitian temblor. Even though this 2008 prediction had been published in the scientific literature, apparently it did not result in any preventative measures being taken to reduce damage or loss of life. Of course, even if governmental authorities, engineers, etc. had been made aware of the earthquake prediction, probably little could have been done to prepare for the event due to the extremely poor structural quality of most buildings and dwellings and the dire economic state of Haiti. However, I use this example of the Haiti earthquake to make the point that all the great science that many of us do and most of us care about generally has little benefit to society unless we educate the lay public on the societal value (e.g., implications, applications, etc.) of our findings.

Whereas members of the Colorado Scientific Society usually do not have something as dramatic as an earthquake prediction to share with the public, the Society is well poised to play an educational role in the local community. This could be realized through public attendance at scientific talks at our monthly meetings, outreach and educational efforts at public events and at K-12 schools and community colleges, participation at conferences and symposiums, and even occasional scientific contributions to main-stream newspapers and other arms of the media. Some of these educational efforts are already being done by members of the Society (thank you!), but there is much more that could be done. Please let me or other CSS officers and councilors know if you have any ideas or strategies on how we, as an organization, can improve communication of our science to the greater public.

I look forward to seeing everyone at our February meeting, which I am informally calling "Landslide Night." This name derives from the fact that our two speakers, Jeff Coe (USGS) and Larry Gurrola (Ph.D-UCSB), will be talking about debris flows and "megaslides." Please join us as we go down that slippery slope on Wednesday, February 17th!

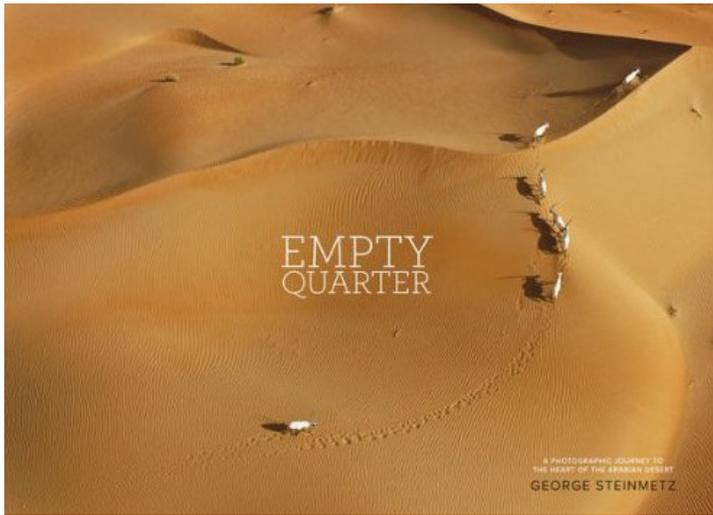


2010 Past President's dinner and Emmons Lecture by Jim Kennett...good beer, good friends, good talk.



Photographs by Lisa Rukstales.





The Empty Quarter (Rub' al Khali) is one of the largest sand deserts in the world, encompassing most of the southern third of the Arabian Peninsula, including southern Saudi Arabia, and areas of Oman, the United Arab Emirates, and Yemen. A story with several beautiful desert photographs appeared in the January/February 2010 print edition and website of Saudi Aramco World.

www.saudiaramcoworld.com/issue/201001/empty.quarter.htm

Author, George Steinmetz, took the photos from a motorized paraglider. The article is an excerpt from his new book on the Empty Quarter. His website has additional photos of the area. Other books on exploration of the Empty Quarter are also available at: <http://www.georgesteinmetz.com>

Steinmetz, George. 2009. *Empty Quarter: A photographic journey to the heart of the Arabian Desert*. Abrams. (this article submitted by CSS member, Bruce Wahle. Thanks Bruce!)

Colorado Scientific Society Memorial Funds report for 2009

Don Sweetkind, CSS Treasurer

The Colorado Scientific Society Memorial and Endowment Funds generated interest revenue of \$14,500 in 2008, of which \$900 was generated by the Endowment Fund (and used as general operating revenue) and \$13,600 was generated by the combined Memorial Funds and was dispersed as student grant awards through our Memorial Funds grants program. In addition, about \$400 from the Pillmore Fund was used to offset field trip costs, facilitating student participation in these trips. The interest generated by the Memorial Funds in 2008 represents a rate of return of 8.2%; rate of return in 2009 was 5.3%.

Details of financial activity related to the Colorado Scientific Society investment portfolio are listed below.

Memorial Funds

| | |
|-------------------------------|------------------|
| Balance at beginning of 2009 | \$176,681 |
| Withdrawal of 2008 interest | -\$14,500 |
| 2009 investment income | +\$9,373 |
| Change in asset value | +\$17,680 |
| <i>Balance at end of 2009</i> | <i>\$189,236</i> |

Endowment Fund

| | |
|-------------------------------|-----------------|
| Balance at beginning of 2009 | \$16,434 |
| 2009 investment income | +\$266 |
| Change in asset value | +\$2,140 |
| <i>Balance at end of 2009</i> | <i>\$18,840</i> |



We'll settle for, "old blood" too!



Membership Chairperson STILL Needed!!

Do you have creative ideas for recruiting new and/or young members?
Can you help infuse young blood into our aging organization?

If yes, please consider volunteering as the CSS Membership chairperson. Contact Scott Minor if interested. (sminor@usgs.gov; 303-236-0303)

Dear Friends and colleagues of Doug Nichols:

I would like to let you know that you are all welcome to attend an evening in memory of Doug Nichols at the Denver Museum of Nature and Science on February 19 from 6:00 to 9:00 P.M. There will be an opportunity to say some words about Doug if you are so moved. Please let me know if you think this might be something that you are interested in doing. I am working with Doug's friend Jon Youngblut, a professional photographer, who is preparing a PowerPoint show of Doug images that will be shown in the west atrium of the museum. Please send me JPEGs of "Doug images" that you think might be suitable for this or that you think that Doug's family would like. I have a list of nearby hotels if you are in need of lodging for that evening. A nice obituary of Doug appeared in the February 4 Denver Post as well as separate ones in both of the Berthoud newspapers. <http://www.berthoudrecorder.com/2010/01/douglas-nichols-ph-d-1942-2010/>

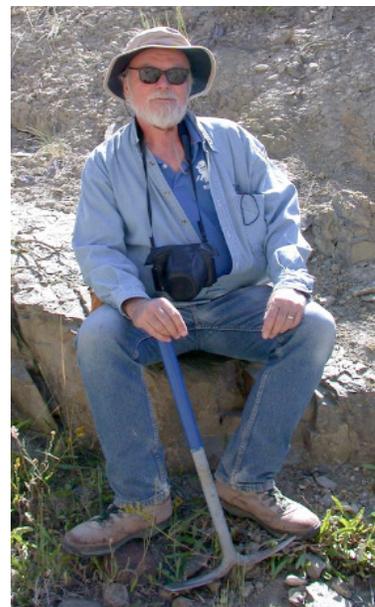
Please let me know if you have any questions.

Sincerely
Kirk

Kirk R. Johnson
Vice President & Chief Curator
Research and Collections
Denver Museum of Nature & Science
P: 303-370-6448
Kirk.Johnson@dmns.org



Doug Nichols, Ph.D., a well-known palynologist, passed away on January 21, 2010, following complications from surgery. Doug was a well-loved and highly-respected figure in the geological and paleontological communities both locally and internationally. He received his Ph.D. from Pennsylvania State University before working as a college professor (Arizona State and SUNY Geneseo) and as an oil company geologist (Chevron) before joining the U.S. Geological Survey in 1978. Doug had broad interests and had conducted research in North America, China, Russia, Mongolia, Japan, and Egypt. He studied the palynology of the Cretaceous and Paleogene and was famous for his work on the Cretaceous-Tertiary boundary. He was an internationally-recognized leading authority on the palynology and palynostratigraphy of the Rocky Mountains and Great Plains region, the Cordilleran thrust belt, and Mesozoic-Cenozoic nonmarine strata of the Western Interior of the United States. Just prior to his retirement from the USGS in 2006, Doug received the Department of Interior Meritorious Service Award, a crowning achievement for a career marked by outstanding contributions in the fields of palynology and biostratigraphy. After retirement, Doug continued his active research program as a USGS scientist emeritus, as research associate at the Denver Museum of Nature & Science, and as senior editor of the international journal, "Cretaceous Research." In 2008, he published a book with Cambridge University Press entitled, "Plants and the K-T Boundary." Doug was a Fellow of the Geological Society of America, past-president of the American Association of Stratigraphic Palynologists, a popular speaker at Western Interior Paleontological Society, and a member of the Friends of Dinosaur Ridge. His gentleness, patience and wry humor will be much missed by all those who knew him. He is survived by his wife Jan, son Ken (Spiny), daughters Joyce and Amber, and granddaughter Samantha. Donations in Doug's memory can be made to the Palynology Program at the Denver Museum of Nature & Science.



Photographs by Ken Takahashi, USGS.



To pay your membership dues or donate to the Memorial Fund and Endowment Fund, go to:

<http://www.coloscisoc.org/membership/dues.html>

You can use “snail-mail” or PayPal. Thanks!!

Fri., Mar. 12, **USGS Free GPS, Map, & Compass Class**; held in Building 810 on the Denver Federal Center, Lakewood; Map & Compass sessions are in the morning, 9:00–11:30 a.m., and “Using GPS with Topo Maps” in the afternoon, 12:30–5:00 p.m.; you may sign up for either or both classes. Free to everyone, but reservations are required and space is limited; call 303-202-4689 or write to gpsworkshops@usgs.gov. Classes will not always be held every month this year; to check on future dates and for more info., please see <http://www.cr.usgs.gov/gpsworkshops/>



CSM GEOLOGY MUSEUM BOOK SALE

Mon.-Fri., Feb. 15–19

The Colorado School of Mines (CSM) Geology Museum will host a used book sale February 15–19 from 9–4 daily. These are the same days and hours as the CSM library book sale. Similarly, most prices will decrease about 50% each day. The Museum book sale will be in the Museum building, in the room across the hall from the Museum entrance.

Their will be over 40 boxes of books, several hundred maps, and several hundred USGS Folios for sale. There’s a wide range of interesting publications for rock hobbyists, as well as explorationists. The Museum address is 1310 Maple Street, Golden; phone number is 303-273-3815. **and at the same time...**

CSM ARTHUR LAKES LIBRARY ANNUAL BOOK SALE, 9–4 daily.

A Silent Auction for more expensive, rare, and collectible books will be held on Monday, Feb. 15, from 10 am to noon. Advance e-mail and postal mail bids will be accepted for Silent Auction items. The 2010 Silent Auction Bid List is now available. They expect to have 5,000-6,000 items at the main book sale, in which selling prices are reduced each day during the 5 days of the sale. Contact Heather Whitehead, 303-273-3540, with questions about the book sale or about donating materials to the Library. For more information, see: http://library.mines.edu/About_the_Library/LBNews_Booksale

Fri-Sat-Sun, February 26–28
Gem and Mineral Show,
Jefferson County Fair Grounds,
sponsored by the Denver Gem and
Mineral Guild. Free admission!
10–6 Friday and Saturday, 11–5
Sunday. 15200 W. 6th Ave. (frontage road south
of 6th Ave., west of Indiana St.).



CSS Newsletter going “Digital Only”!!

There are quite a few members in the current CSS database who have working e-mail addresses but continue to receive a paper copy of the newsletter. Postage to mail the newsletter costs about \$650 a year. There are additional postage costs every time we contact you. We are going to streamline our mailing operation, allowing us to contact you more easily and frequently by switching to your electronic e-mail address. With an e-mail address, we can contact you quickly regarding meeting announcements, field trip information and more. You will now receive the newsletter by email if you have a functioning e-mail address.

If you **MUST** continue to receive your newsletter by regular mail, please contact Emily Taylor, CSS database manager at emtaylor@usgs.gov or 303-236-8253.





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 Colorado School of Mines 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 Scott Minor, at 303-236-0303, sminor@usgs.gov

Café Scientifique Wynkoop Brewery, evening science talks at 6:30. Free, except for beer. <http://www.cafescolorado.org>

Colorado School of Mines, Van Tuyl Lectures—**Feb. 11**, *Michael Gurnis, California Institute of Technology*, “Linking the dynamics of the earth’s interior with regional stratigraphic sequences and global sea level since the Mesozoic.”
Feb. 18 No Lecture. Feb. 25 *Morgan Sullivan – Chevron Energy Technology Company, Houston*, “Sequence Stratigraphy in Tectonically Active Basins—is it Possible? An Example from The Ridge Basin, Southern California.” **March 4** *Dr. Paul Spry – Dept. of Geological and Atmospheric Sciences, Iowa State University*, “Sulfide melting of the giant Broken Pb-Zn-Ag deposit, New South Wales, Australia: Did it happen and what are the implications for the exploration of Broken Hill-type deposits?” Berthoud Hall room 241. <http://www.mines.edu/academic/geology>

DIPS (Denver Intl. Petroleum Society)—**Feb. 19**, *Renaud Bouroullec, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO*, “The Channel Stacking Matrix: A Method to Relate Deep-water Channel Stacking Pattern to Reservoir Parameters.” Wynkoop Brewing Company, 1634 18th Street, Denver. Gather at 11:30 am; Lunch served at Noon; Lunch price: \$15.00 for members and \$18 for non-members. \$3 talk only. Please e-mail Bob Zilinski, at rezilin@aol.com or call him at 303-885-0615 to make reservations before Wednesday, Noon, Feb. 17.

Denver Mining Club—**Feb. 22**, *Charley Khoury and Allan J. Breitenbach, Vector Engineering Inc.*, “Pipe Drainage Under Heap Piles.” The DMC meets every Monday 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. <http://www.denverminingclub.org>

Denver Museum of Nature and Science—**Feb. 18**, 6:30–9:30 p.m., “The Science Lounge,” Entertainment, Science, and Cocktails...”Life Out There,” by Astrobiologist David Grinspoon, Ph.D, and space scientist Ka Chun Yu, Ph.D. \$8 member, \$10 non-member. <http://www.dmns.org/sciencelounge>

Denver Region Exploration Geologists’ Society (DREGS) meets in the Mutual Consolidated Water Building, 12700 West 27th Avenue, Lakewood. Social 6:00-7:00 p.m. Presentation at 7:00 p.m. Meetings are normally scheduled for the first Monday of each month. 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. Call Sarah Voight at 720-946-1374 by prior Thursday for reservations. Web page: <http://dwls.spwla.org>

Rocky Mountain SEPM—**Feb. 23**, *Donna S. Anderson, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO, and EOG Resources, Inc., Denver, CO* “Stratigraphy and Depositional Controls on the Juana Lopez Member of the Mancos Shale, southeastern Uinta basin, Utah.” Reception at 11:30, lunch at noon, speaker at 12:30. Reservations: luncheons@rmssepm.org, or call Steve Stancel 720-929-6536, before noon of preceding Friday. \$20.00 lunch, \$3 talk only. Wynkoop Brewing Company, 1634 18th St., Denver. <http://www.rmssepm.org/luncheons.shtml>

Univ. of Colorado, Boulder, Geol. Sciences Colloquium—**Feb. 17** *Dave Budd, University of Colorado-Boulder*, “Motivations and Learning Strategies Students Bring to Introductory Geology & How Instructors and Learning Environment Affect Those Motivations and Attitudes.” **Feb. 22** (This is a Monday Colloquium) *Ramon Arrowsmith, Arizona State University, Earthscope*, “High spatial resolution tectonic geomorphology and earthquake geology along active fault zones of western North America.” **March 3** *Vince Matthews, Colorado Geologic Survey*, “The Global Scramble for Natural Resources and its Impact on Colorado.” 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/>

Western Interior Paleontological Society—**Mar. 1**, *Dennis J. Wilson, Pangaea Designs*, “Paleontological Reconstructions from the demented mind and world of Dennis J. Wilson.” 7 p.m. (doors locked at 7:30 p.m. for security reasons), Ricketson Auditorium, Denver Museum of Nature & Science (all welcome, no admission charge). www.wipsppc.com

Colorado Scientific Society
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| | | |
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| Webmaster: | Table Mountain Web Design, 303-278-2701, bwarden@tablemntn.com |



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