



FOUR CORNERS GEOLOGICAL SOCIETY NEWSLETTER

April 2007

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Next Meeting and Presentation

April FCGS Meeting and Presentation in Durango – p. 2
Speaker abstracts – p. 4 - 6

The Prez Sez – p. 3

General Announcements

Advertising & News – p. 6 – 10

Membership Renewal Form 2007 p. 11 – 12

Four Corners Geological Society

April Meeting and Presentation

DATE:

Friday, April 27, 2007

SPEAKERS: FLC Seniors- Clinton Casey, Cassady Harraden, Emilee Skyles & Daniel Wade

TOPIC: Senior Thesis

PLACE: Fort Lewis College, 1000 Rim Drive, Durango, Colorado (970) 247-7010

AGENDA:

5:30 – Social Hour, “Extreme Room”, downstairs in the College Union Building

6:30 PM Dinner

7:30 PM Presentation

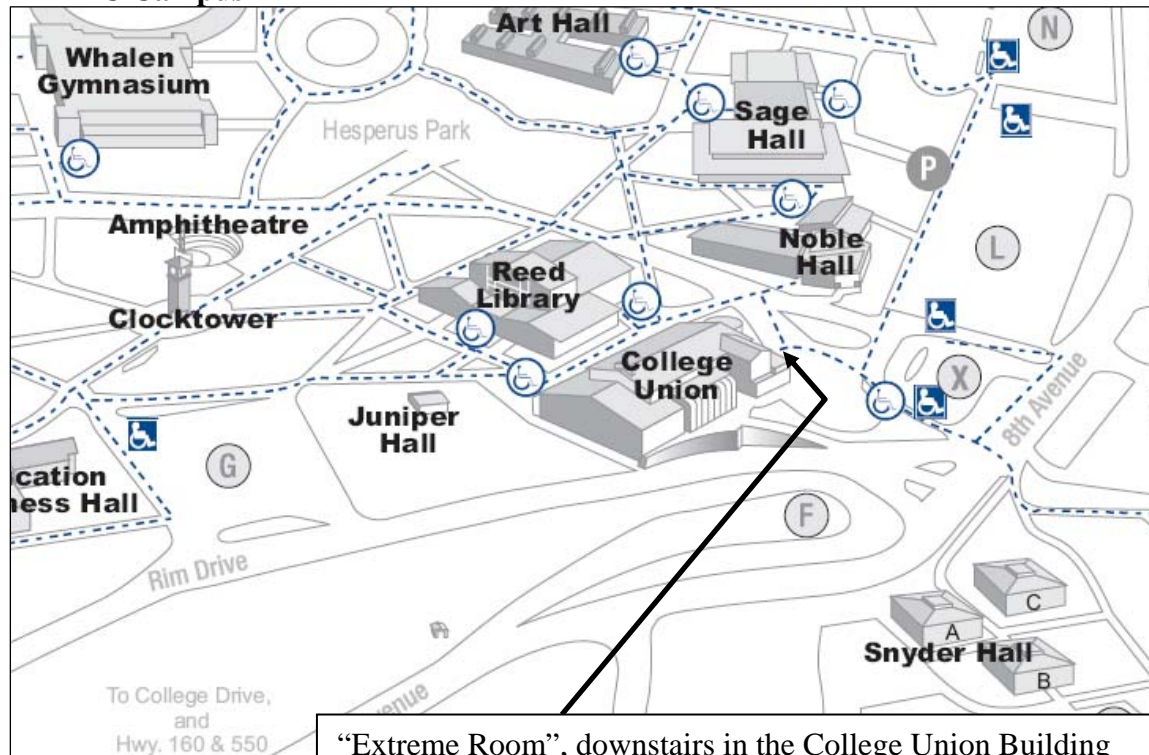
COSTS: \$20.00 per person (dinner and talk), \$2.00 per person (talk only), student’s free (talk only)

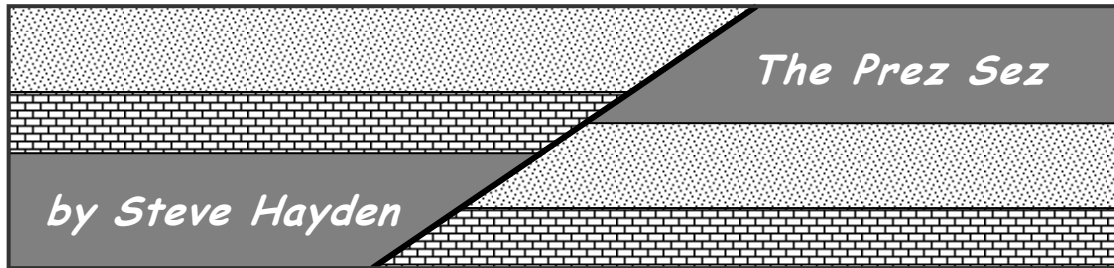
Reservations for this months meeting and presentation should be made by Wednesday, Apr. 25.

Farmington Contact: Steve Hayden – email: steven.hayden@state.nm.us, phone: (505) 334-6178

Durango Contact: Kim Hannula – email: hannula_k@fortlewis.edu, phone: (970) 247-7463

FLC Campus





I hope to see many members at the meeting on April 27th. This will be one of the highlights of the year, as the program will be presentations of senior thesis research topics by four students.

We have had some success getting new candidates for society officers for the coming year. Kim Hannula will be running for President. Chip Head is a candidate for president-elect (formerly the vice president position). Jim Hornbeck is running for treasurer and Stephanie Johnson for secretary. I am campaigning for the Past President position. If anyone else is interested in running for office for the coming year, please contact Kim Hannula or me. The Ballots will go out with the May newsletter, so please let us know soon if you wish to run for office.

Steve



***AN ASSESSMENT AND COMPARISON OF THE GEOCHEMICAL SIGNATURES
OF THERMAL SPRINGS IN THE ANIMAS RIVER VALLEY, CO***

Casey, C., and Gonzales, D.,

ABSTRACT

A study of the chemical signatures (Na, K, Mg, Ca, Fe, Cu, As, Li, Al) of the thermal springs in the Animas River valley over a one-year period provides further evidence that these springs developed as near-surface circulation of meteoric water along regional fracture systems. Water that issues from these springs is characterized by pH = 6.5, temperatures of 30-45 degrees Celsius, and high concentrations of dissolved salts. A comparison of geochemical trends between Trimble and Pinkerton thermal springs indicates that element trends over time are similar but concentrations are higher at the Pinkerton system, this is most likely due to a lower discharge. A tritium analysis returned concentrations of 4.8 (TU), which indicates that the waters have either been at the surface since 1952; or have mixed with younger waters near the surface. Sulfur isotope data obtained in this study suggests that water in these thermal springs interacted with sulfate and carbonate minerals in Pennsylvanian (Hermosa) and Permian (Cutler) rocks exposed in the area.

Collectively, the data from my research is consistent with a shallow geothermal system recharged by meteoric fluids that circulated along fractures, were heated at depth, and then discharged along the edges of the Animas River valley. Using the Geothermal gradient alone, the waters would need to reach depths of 0.75 to 1.5 kilometers to attain the temperatures observed at the surface. My model contrasts with some regional studies that suggest a deep, perhaps mantle source for fluids in thermal springs in Colorado, Arizona, and New Mexico.

***The Depositional History of the Telluride Conglomerate and Implications
for Mid-Tertiary Tectonism in the western San Juan Mountains, Colorado***

Harraden, C., Gonzales, D. and Gianniny, G.

ABSTRACT

Detailed analysis of selected stratigraphic sections in the Telluride Conglomerate supports the hypothesis that this unit originated as debris flows transported from a highlands adjacent to the Needle Mountains (southeast to northwest) at the onset of Tertiary volcanism. No evidence was found to support the idea of Cross and Purington (1899) that the distal part of this system was dominated by lacustrine deposits.

The Telluride Conglomerate shows a distinct lateral change in grain size, sedimentary structure, and style of deposition from proximal to distal deposits. Proximal deposits are dominated by clast-supported boulder and cobble conglomerate with subordinate amounts of finer-grained material present. Distal deposits have approximately equal proportions of fine-grained and coarse-grained facies, and sections examined contain three distinct fining-upward sequences ranging from 20 to 50 meters in thickness. Individual distal sections of these fining-upward sequences display abundant scoured channels, planar and trough cross-beds, and dewatering structures in poorly sorted sandstones.

Vertical sections in the Telluride Conglomerate display a younger to older sequence of clast types (from bottom to top) reflecting regional unroofing of the uplifted Needle Mountains. Erosion was synchronous with high-energy fluvial events, with the trends and transitions of deposits in the Telluride Conglomerate indicating that eroded sediments were transported to the northwest. The occurrence of intermediate to felsic volcanic clasts in this unit suggests that eruptions had occurred before or during alluvial deposition. This suggests that either the volcanic record in the San Juan Mountains is older than previously reported, or that the Telluride Conglomerate is younger than currently documented.

Palsas in the Khangay Mountains, central Mongolia

Skyles, E., and Kenny, R.

ABSTRACT

The valleys of the Chuluut Gol (47.29°N, 100.07°E, 2283 m) and Tsarang Sairin Gol (47.23°N, 100.02°E, 2446 m) contain palsas and other periglacial landforms. The palsa mounds contain an interior lens of segregated ice beneath a 60- to 85-cm thick peat-rich active layer, measure between 15 and 20 m in diameter and up to 2 m high, and are clustered in fields; the palsa fields of this study are in different stages of decay. The Chuluut Gol palsa field has four active palsas on a 6% slope and is located in an open valley covered with grass and sedge peat, and adjacent to patterned ground. The Tsarang Sairin Gol field has one active palsa with segregated ice and numerous inactive palsas without subsurface ice; this field lies on the floor of a narrow glacial valley with dwarf willows and sedge peat. Radiocarbon dating of samples taken at 25 cm depth from an active palsa in each field reveal an age of 312 ± 35 in the Chuluut Gol palsa field and 79 ± 63 in the Tsarang Sairin Gol palsa field. Field data collected from both palsa fields were used to determine what factors and/or processes contributed to the stage of palsa degradation. These factors include: (1) type and extent of vegetative cover, (2) thickness and density of the peat-rich active layer, (3) topography, (4) growth rate of the segregated ice, and (5) exposure of the subsurface ice due to growth (expansion) cracks. Field data suggests that frost cracks and the insulating properties of the active layer are important factors affecting the thermal stability of palsas in the study area. However, topography and moisture availability are the most influential to morphological differences between the two palsa fields.

***A Model for the Emplacement of the Sugarloaf Volcanic Complex,
Flagstaff, Arizona***

Daniel Wade



General Announcements/News from other Geo-Societies

**FCGS Members Transform Mineralogy and Petrology at Fort Lewis College
by Minna Swanson-Theisen, Meghan Marsters and Kim Hannula**

This article is adapted from one that will be published in the FLC Geoscience Department's alumni newsletter. If you are interested in receiving the annual newsletter, send an e-mail to Darren Cookus (cookus_d@fortlewis.edu) or to Kim Hannula (hannula_k@fortlewis.edu, (970) 247-7463) - friends of the department, as well as alums, are welcome!

Generous donations from FCGS members Bill and Mickie Thurston and Bob Owen made it possible for the FLC Geoscience Department to purchase ten new polarizing microscopes this winter. The highly advanced Leica DM EP binocular microscopes have several advantages and new features that the old, outdated microscopes did not have. These include: gypsum plates and Bertrand lens modules in the scope apparatus, binocular as opposed to monocular viewing, and digital capacity, which means that the images can be projected onto computers to aid in analysis and teaching. Without a doubt, the optical quality is phenomenal compared to the old microscopes.

The students in this year's Optical Mineralogy class have already begun reaping the benefits of these wonderful instruments. Students from previous years emphasize that this was a much needed addition to the department. They have said repeatedly, "this year's students don't know how lucky they are." Dr. David Gonzales, who teaches the Optical Mineralogy class, feels that this updated technology was greatly needed as well. This will enhance his ability to communicate and teach the difficult but important subject matter. Cassidy Harraden and Justin Gilbert, both of whom learned optical mineralogy on the old scopes and are using the new scopes for senior research, have stated "this will really save the eyes, backs, and necks of future Optical Mineralogy students."

Next year, these microscopes will be used by senior thesis students to study microfossils in the Hermosa Group, dead oil in Paradox Basin bioherms, metamorphic mineral assemblages in the Vallecito Conglomerate and the Twilight Gneiss, and igneous mineral assemblages in Precambrian dikes and Tertiary intrusions, as well as by students in classes such as Optical Mineralogy, Igneous and Metamorphic Petrology, and Advanced Structural Geology. All of the students are grateful that they will have access to microscopes with fantastic optics. FCGS members can look forward to seeing some of the digital photomicrographs at future April meetings.

We are very fortunate at Fort Lewis College to be able to have access and training on the latest, top-of-the-line equipment. This will give students an advantage, not only

educationally, but in future careers as well. We are very thankful to all the generous donors who have made these much needed advancements possible.

American Association of Petroleum Geologists

The 2007 Rocky Mountain Section Meeting of the AAPG will be held **October 6-9** at Snowbird, Utah. The meeting will be hosted by the Utah Geological Association. The technical program co-chairs are David Lambert, GL1253@msn.com / (801) 953-3373 and Rich Newhart, richardnewhart@questar.com / (801) 324-2090.

Arizona Geological Society

The AGS is running a spring fieldtrip to Rosemont Ranch on Saturday, April 28th, 2007. The one-day trip will be led by Augusta Resource personnel. Contact Rich Brown at rbrown@clearcreekassociates.com for more information.

The AGS is (still) planning their AGS Ores & Orogenesis Symposium for **September 24-30th, 2007**. They now have descriptions of two short courses which will accompany the symposium on Monday, September 24th; “Mineral Resource Estimation” by Steve Ristorcelli and Michael Gustin Monday and “NI 43-101 Reporting Process” by Allan Moran, Greg Gossan and others. In addition there are three more short courses listed for which descriptions are not yet available. These are; Tuesday, Sept. 25, “Uranium Deposit Models” by Karen Wenrich, Michel Cuney and Phil Goodell, Tuesday September 25th, “Ore Fluids” by Robert Bodnar and Sunday, September 30- Monday, October 1, “Whole Lava Love” by Charles Ferguson. Go to www.agssymposium.org for more information.

Colorado Geological Survey

The CGS has just published Volume 10, No. 1 of “Rock Talk”. This issues covers the centennial anniversary of the CGS, news from the director, Vince Matthews, national meetings hosted by CGS, new staff, new publications, presentations and outreach and updates on projects of interest. This issue and back issues can be obtained for FREE by contacting the CGS by mail (CGS / 1313 Sherman Street, Room 715 / Denver / Colorado 80203), fax (303-866-2461), phone (303-866-4762) or email (pubscgs@state.co.us) or downloading them from the website (<http://geosurvey.state.co.us>) .

Colorado Oil and Gas Association

COGA is holding the “Rocky Mountain Strategy Conference and Investment Forum” on August 13-15th, 2007 at the Colorado Convention Center in Denver. For more information visit www.coga.org .

Geological Society of America

The GSA Annual Meeting will be held **October 28-31, 2007** at the Colorado Convention Center in Denver, Colorado. For more information visit www.geosociety.org.

Geothermal Resources Council

The GRC is holding their annual meeting on **September 30 – October 3, 2007**. The theme of the meeting is, “Renewable Baseload Energy: Geothermal Heat Pumps to

Engineered Reservoirs”. For more information visit <https://www.geothermal.org/meet.html> . Or write to GRC / P.O. Box 1350 / Davis / California 95617, or call (530) 758-2360 or email grc@geothermal.org .

Montana Geological Society

The MGS is holding two field trips this summer. The first will focus on “Marine Cretaceous Reservoirs in Central and Northern Montana” from **June 15-17th**. The trip will depart Billings on Friday, stopping to examine Upper Cretaceous outcrops near Winnett and Lewiston, and end in Chinook just east of Havre. On Saturday they will drive to the Sweet Grass Hills to look at the Lower Cretaceous Bow Island / Viking outcrops and return to Chinook that evening. Sunday will include stops in the Bear Paw and Little Rocky mountains on the way back to Billings. The trip will be led by Karen Porter, Montana Bureau of Mines and Geology and Jennie Ridgley, USGS (retired). The trip costs \$275 for MGS members, single occupancy, \$225 for MGS members, double – occupancy, \$325 for non-MGS, single occupancy and \$275 for non-MGS, double occupancy. This cost includes transportation, two night’s lodging, three box lunches, daily refreshments and guide materials. No breakfasts or dinners are included.

The second fieldtrip will visit the Pennsylvanian Tensleep Sandstone in the northern Bighorn Basin over **July 9-10th**. The trip will be led by David Lopez of the Montana Bureau of Mines and Geology and Steve Van Delinder of Ballard Petroleum. There will be a two-hour presentation on the evening of July 9th at the Crowne Plaza Hotel in Billings followed by a one-day trip on July 10th that will depart and return to Billings. Because the trip is underwritten by a grant from the DOE, there is no charge, but participants must pre-register. More information and a registration form will be available on the MGS website in May. Any questions can be sent to the MGS via the email link at the website: www.montanags.org .



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Platts

Platts is sponsoring the “Rockies Gas & Oil, E&P, Infrastructure, Markets, Flows and Price” conference April 26-27, 2007 at the J.W. Marriott in Denver at Cherry Creek. To register call toll-free 866-355-2930 or online at www.events.platts.com . The registration fee is \$1,395 (\$995 government).

Southwest Hydrology and Arizona Hydrological Society

Call for abstracts for the 2007 Regional Water Symposium to be held **August 29-Sept 1, 2007** at the Westin LaPaloma Resort & Spa in Tucson, Arizona. The theme of the symposium is, “Sustainable Water, Unlimited Growth, Quality of Life, Can We Have it All?”. The deadline to submit abstracts is February 2, 2007. Visit their website, www.watersymposium.org, to submit an abstract or propose a session.

Rocky Mountain Association of Geologists

The Coalbed Methane Symposium will be held **June 4th, 2007** at the Marriott City Center Hotel in Denver, Colorado. The symposium is sponsored by the RMAG and the Denver Geophysical Society. For more information contact Bruce Kelso, bsk@bry.com, 303-825-3344 or Bob Lamarre, lamarregeo@quest.net, 720-488-1396. This is NOT the same meeting as the Strategic Research Institute’s 8th Annual Coal Bed Methane Conference below on March 29-30.

The RMAG is notifying their members of the RMS-SEPM fieldtrip to be held **June 21-24, 2007**. The topic is Sequence Stratigraphy and Reservoir Characterization of the Middle Mesaverde Group: Genetic Linkage from Rock Springs Uplift (Wy) to Sand Wash Basin (Co) to Middle Park Basin (Co). Leaders will be Ron Steel, UT Austin and Jeff Crabaugh, Exxon Mobil.

David V. Grey Geologist/Geophysicist	
UPSTREAM ENERGY CONSULTANTS, LLC Geology, Geophysics, Reservoir & Economic Analysis 970-731-2908	
60 JJ Junction Pagosa Springs, CO 81147	Cell: 970-946-5787 dgrey1129centurytel.net

Wyoming Geological Association

The theme of the 2007 WGA Field Conference, to be held **August 2-5, 2007**, will be, “The Powder River Basin: From the Margins Looking In”. Technical sessions will be held on Thursday, August 2nd at the Parkway Plaza in Casper. A field trip on August 3-5 will circle the basin with excursions to the interior. Stops will include, but are not limited to, uranium solution mining, coal extraction, the Hot Springs Mammoth Site, outcrops on the west flank of the Black Hills, the Newcastle “Oil Mine”, coalbed methane surface facilities, Salt Creek and the Teapot Dome. A guidebook will include papers both specific to the conference and relevant to understanding Wyoming geology. The WGA is soliciting 20 minute presentations for the technical sessions, deadline June 29th, 2007. Abstracts should be mailed to laurie.fletcher@jhu.edu (307-259-5721). The deadline for guidebook papers has already passed but for more information email jlawlor@gga-inc.com (307-265-9199). The Conference Chairman is Mark Milliken.

The **Fort Lewis College Geology Department has been publishing a newsletter every summer and those who are not already receiving it are encouraged to contact Darren Cookus at cookus_d@fortlewis.edu



Four Corners Geological Society

MEMBERSHIP RENEWAL or APPLICATION for 2007

PAGE 1

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MEMBERSHIP RENEWAL or APPLICATION for 2007 PAGE 2

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The dues year begins on January 1.
For dues paid after March 1, add a \$5 late fee (does not apply to new members).

Please print, complete and return **both pages** of this form with your check for dues made payable to:

**Four Corners Geological Society
P.O. Box 1501,
Durango, CO 81302**

Advertising rates for the Four Corners Geological Society newsletter:

Full Page Ad (7½" x 9½") \$100/mo. or \$1000/yr. Half Page Ad (7½" x 4½") \$50/mo. or \$500/yr.
¼ Page Ad (3½" x 4½") \$25/mo. or \$250/yr. Business Card (3½" x 2") \$10/mo. or 100/yr.

Odd sizes are \$3.50 per column inch per month, minimum \$10.00

For more information, please contact the FCGS Treasurer, (vacant). Proceeds will go toward the further development of the Society (i.e., offset meeting costs, publications, etc.).

Four Corners Geological Society

P.O. Box 1501, Durango, CO 81302

<http://www.canyonwinds.com/FCGS/index.html>

2006-07 Officers

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