

GSA TODAY

A Special Meeting Issue!

Vol. 12, No. 6

A Publication of the Geological Society of America

June 2002

Science at the Highest Level *Denver 2002*

Annual Meeting & Exposition
October 27–30, 2002

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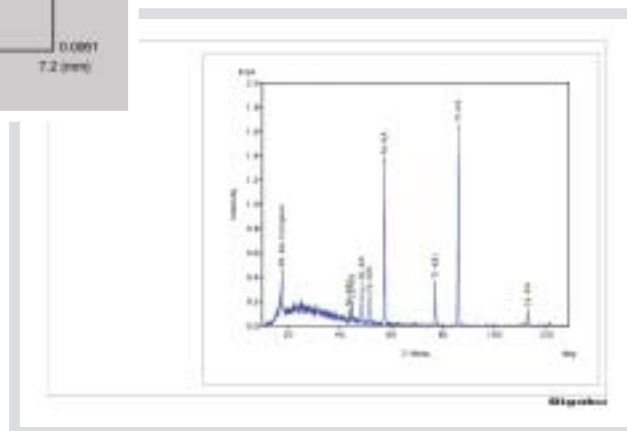
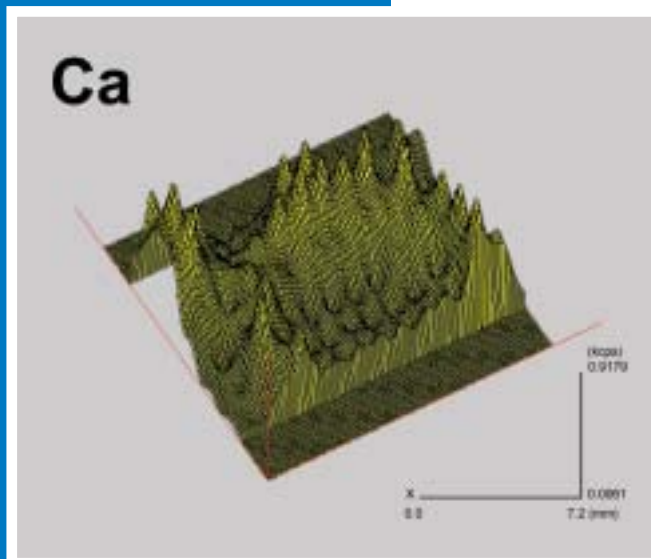
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Cover Photo: Flatirons in Boulder, Colorado. Geologist for scale. Photo by John Karachewski.

Denver skyline at dusk. Photo courtesy of the Denver Metro Convention & Visitors Bureau.

DIALOGUE



Annual Meeting Offers Variety, Depth, and Interdisciplinary Science

John Geissman, Technical Program Chair, GSA 2002 Annual Meeting

Greetings (Again)

With more than 125 topical sessions and seven Pardee Keynote Symposia spanning a broad range of interests and reflecting a healthy emphasis on interdisciplinary geoscience, the 2002 Annual Meeting in Denver promises an excellent forum for communication of quality geoscience.

Three Pardee symposia focus on highly topical, as well as pleasantly contentious, policy-related issues that will keenly affect our society for years to come.

- ◎ “Earth Sciences Challenges in the National Problem of High-Level Radioactive Waste Disposal” (Monday morning) will address major issues bearing on the suitability of a mined repository.
- ◎ “The Role of the Earth Sciences in Fostering Global Equity and Stability” (Monday afternoon) explores the critical issue of the contribution of earth sciences in effecting a globally sustainable planet.
- ◎ “Toward a Better Understanding of the Complicated Earth” (Tuesday afternoon), sponsored by the National Association of Geoscience Teachers, will deal with how to better understand our home through increasing our ability to affect the learning process.

Four Pardee symposia highlight cutting-edge science on Earth’s early evolution,

contemporary geomorphology, and exploration of the solar system.

- ◎ Two surface-processes-oriented symposia will focus on landscape evolution (Sunday morning) and flood hazards on dynamic rivers (Wednesday afternoon).
- ◎ A symposium on the evolution of the early Earth environment as recorded in Precambrian ore deposits (Tuesday morning) will summarize the wealth of new information that bears on how environmental conditions changed on Earth.
- ◎ With growing hope that future, current, and recent graduates in the geosciences may play a keen, active role in the exploration of Mars, the symposium “There and Back Again: Terrestrial Approaches to Extraterrestrial Problems” (Wednesday morning) serves as a stepping-off point for evaluation of anticipated extraterrestrial dilemmas and how to deal with them.

The 127 Topical Sessions provide a great mix of science and attractive representation for most geoscience disciplines.

Several sessions (e.g., T84, “Seafood Through Time,” honoring Richard Bambach) will celebrate the scientific accomplishments of notable individuals in the geosciences. These sessions will present new science as well as overviews of the history of progress in these fields.

The Middle East—a relatively poorly known part of the world, geologically

speaking—has been the subject of intense interest of late. The session “Tectonic Evolution of the Middle East and Adjacent Regions” will focus on links between the Alpine and Himalayan orogenic systems.

Exploring a topic that has long been of keen interest, several sessions on Rocky Mountain evolution have been organized into a sequence that could informally be referred to as “Building and Tearing Down the Rocky Mountains!” These sessions will involve numerous approaches to solving this fundamental issue in western Cordilleran geology.

Several sessions promise interesting interdisciplinary fare. Paleontological Society-sponsored sessions include T76, “Three Billion Years of Reef Systems,” and T81, “Paleobiogeography: Integrating Plate Tectonics and Evolution.”

Following on themes from last year’s groundbreaking GSA–Geological Society of London meeting in Edinburgh, sessions T71, “Feedback in Earth Systems: Determining System Response to Perturbation Through Observations and Modeling,” and T73, “Global Biogeochemical Change During PETM Events,” will concentrate on many facets and offer discussion of earth system processes.

Please plan to join us—and many of your colleagues—and contribute to Denver 2002—Science at the Highest Level, the 114th Annual Meeting and Exposition of the Geological Society of America. Please note that the abstract deadline is July 16!

SPECIAL EVENTS

Special Events

GSA PRESIDENTIAL ADDRESS AND AWARDS CEREMONY

Sun., Oct. 27, 4–6 p.m., Ballroom 2-3, Colorado Convention Center

Join us Sunday when President Tony Naldrett will be speaking and distributing the 2002 Annual Meeting Awards. Stay tuned for more information about Tony's topic of discussion. Awardees of the Penrose Medal, the Arthur L. Day Medal, the Young Scientist Award (Donath Medal), the GSA Public Service Award, and the GSA Distinguished Service Award, as well as the newly elected Honorary Fellows, will be announced in the July issue of *GSA Today*.

Come and honor your fellow geoscientists—the awardees and Honorary Fellows—at the Presidential Address and Awards Ceremony. Also, be sure to stick around for great networking opportunities at the Welcome Party in the Exhibit Hall from 6 to 8 p.m.

EXHIBITS OPENING AND WELCOME PARTY

Sun., Oct. 27, 6–8 p.m., Exhibit Halls A and B, Colorado Convention Center

Come and kick off the Grand Opening of the 2002 GSA Annual Meeting and Exposition in the Exhibit Hall right after the Presidential Address. The Welcome Party proves to be a great networking time with colleagues and friends and a good opportunity to view the exhibits and enjoy your favorite beverage.

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Attention Students!

PRESIDENT'S STUDENT BREAKFAST RECEPTION

Sun., Oct. 27, 7–8:30 a.m.

Sponsored by ExxonMobil Corporation; hosted by GSA.

ExxonMobil
Exploration



GSA President Tony Naldrett invites all students registered for the meeting to attend a free breakfast buffet sponsored by ExxonMobil Corporation. Tony and members of GSA's leadership, as well as ExxonMobil staff members, will be on hand to answer questions and address student issues. Each student registered for the meeting will receive a complimentary ticket for the breakfast buffet. This is one of the most popular events at the meeting for students, and with good reason. Take this opportunity to network with fellow students and meet the officers of GSA!

AWARD LUNCHEONS AND OTHER TICKETED GROUP FUNCTIONS [301–312]

Associated Societies and GSA Divisions invite their members and other interested guests to join them for their annual meal functions, special addresses, and awards ceremonies. Only a few tickets will be available on-site, so please register early for ticketed functions using the preregistration form (p. 23). Location and time of events will appear on your ticket and in the 2002 Annual Meeting Program. **Please note: Some luncheon dates have changed from previous years because of the new meeting schedule. Please double-check the registration form when you sign up.**

DINNER AND COLORADO SYMPHONY [201]

Sat., Oct. 26, 5:30 p.m.

An exceptional evening with the Colorado Symphony Orchestra! Program features Pinchas Zukerman, conducting Mozart, Beethoven, and R. Strauss. Zukerman on the violin and Max Levinson on the piano. Dinner will precede the concert at the Boettcher Bistro in the Boettcher Hall within the Denver Performing Arts Center Complex, downtown Denver. Contact: Nancy Adams. Cost: \$85 per person, and sorry, no refunds. Limit 50 people.

GROUP ALUMNI PARTY

Mon., Oct. 28, 7–9:30 p.m., Marriott City Center Hotel.

Come join your former classmates and colleagues at this year's Group Alumni Party at the Denver Marriott. To include your school in the Group Alumni Party, go to www.geosociety.org and complete the Space Request Form, or contact Melissa Cummiskey at mcummiskey@geosociety.org, (303) 357-1058, for details.

PRIVATE ALUMNI RECEPTIONS

Mon., Oct. 28, 7–10 p.m. Locations will be listed in the Annual Meeting Program.

Plan to join your fellow alumni for an evening of memories and renewed connections. Please see the 2002 Annual Meeting Program for a listing of schools holding individual alumni receptions and locations. If you would like to hold an alumni reception, check with your department head, who may have already arranged this with GSA, or e-mail mcummiskey@geosociety.org.

THINGS TO DO IN DENVER

Please see the Meetings and Excursions section at www.geosociety.org for information on things to do while in Denver.

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Title Sponsor of the 2002 GSA Annual Meeting.

EXHIBITS

Exhibits

Join a community of dedicated exhibitors who will be meeting 6,500 geoscientists in Denver! For an Exhibitor Prospectus, please call Brenda Martinez, GSA Exhibit Sales, (303) 357-1038 or view it online at www.geosociety.org/meetings/2002.



Photo courtesy of the Denver Metro Convention & Visitors Bureau.

EXHIBIT HALL HOURS

Sun., Oct. 27

Exhibits & Welcome Party: 6 p.m.–8 p.m.

Mon., Oct. 28 9 a.m.–5:30 p.m.

Tues., Oct. 29 9 a.m.–5:30 p.m.

Wed., Oct. 30 9 a.m.–5:30 p.m.

2002 Exhibitors (as of 5/1/02)

Computer Software

ESRI (Environmental Systems Research Institute, Inc.)
Golden Software, Inc.
RockWare, Inc.
Tasa Graphic Arts, Inc.

Philips Analytical
Rigaku/USA, Inc.
SPEX CertiPrep, Inc.
Terraplus USA Inc.
Thermo ARL
Thermo Finnigan

Gems and Mineral Dealers, Jewelry, and Gifts

Donald K. Olson Minerals
Gems and Crystals Unlimited
Geographics
Howard Minerals
IKON Mining & Cal Graeber
Komodo Dragon
Nature's Own

Other—Commercial

Geoprobe Systems
Estwing Manufacturing Company
Lowrance Electronics, Inc.
Subaru of America, Inc.

Other—Educational

DOSECC, Inc.
Joint Oceanographic Institutions

Geologic Supplies and Related Equipment

ASC Scientific
Forestry Suppliers, Inc.
Great Atlantic Stream Flow Meters
Rite in the Rain
Thermo Elemental
Trimble Navigation, Ltd.
Zodi Hot Showers (Zodi Outback Gear)

Professional Societies and Associations

AAPG Bookstore
American Association of Stratigraphic Palynologists
American Geological Institute
American Institute of Hydrology
American Institute of Professional Geologists
Association of American State Geologists
Association of Earth Science Editors
Association of Engineering Geologists
Association for Women Geoscientists
ASTM International
Council on Undergraduate Research Geoscience Division
Cushman Foundation
Geoscience Information Society
Geochemical Society

Geological Society of America, Headquarters

Bookstore
Coming Attractions
Education and Outreach
Foundation
Membership

Government Agencies (Federal, State, Local, International)

Colorado Geological Survey
Geoscience Laboratories
NASA/GSFC Living With a Star Program
National Park Service
National Research Council—Canada Research Press
National Science Foundation
NOAA—National Geophysical Data Center
Oklahoma Geological Survey
U.S. Bureau of Land Management
U.S. Geological Survey
USDA Forest Service

Instrumentation, Cameras, Scopes

Advanced Geosciences, Inc.
Bruker AXS, Inc.
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Meiji Techno America
Micromass, Inc.
New Wave Research

GSA Apparel
GSA Geology & Public Policy
GSA K–16 Education Share-a-Thon
GSA Planetary Geology Division
History of Earth Sciences Society
Micropaleontology Press
Mineralogical Association of Canada
Mineralogical Society of America

National Association for Black Geologists and Geophysicists
NAGT (National Association of Geoscience Teachers)
National Earth Science Teachers Association
Paleontological Research Institution
Paleontological Society
Rocky Mountain Association of Geologists
SEPM (Society for Sedimentary Geology)
Sigma Gamma Epsilon
Society of Economic Geologists

Publications, Maps, Films, and Teaching Aids

American Journal of Science
Blackwell Publishing
Brooks/Cole Thomson Publishing
Cambridge University Press
Columbia University Press
Elsevier Science/GEOBASE Abstracts
Houghton Mifflin Co.
iGage Mapping Corporation
John Wiley & Sons, Inc.
Kendall/Hunt Publishing Company
Kluwer Academic Publishers
McGraw-Hill Higher Education
Mountain Press Publishing Co.
Oxford University Press
Prentice Hall
Springer-Verlag New York, Inc.
University of Chicago Press
W.H. Freeman & Company
W.H. Norton and Company
Wards Natural Science Establishment, Inc.
Yale University Press

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Beta Analytic, Inc.
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Geochron Labs/Krueger Enterprises, Inc.
XRAL Laboratories

State Surveys

Wyoming State Geological Survey

Universities and Schools

Baylor University
Colorado School of Mines
Desert Research Institute (DRI)
National Research Council
Ohio State University
University of Nevada, Las Vegas
University of Nevada, Reno
University of Wyoming

Graduate School Information Forum

Mon.–Wed., Oct. 28–30, 9 a.m.–5:30 p.m.,
Colorado Convention Center, Exhibit Hall.

Draw the best students to your institution through GSA's Graduate School Information Forum! Reserve space now for the Colorado Convention Center.

The Graduate School Information Forum is an effective way to attract graduate students to your program. GSA student members are enthusiastic and serious about geology. That's why 1,600 of them attended our 2001 Annual Meeting and we expect even more in Denver. No wonder more than 50 universities in the United States send representatives to the forum year after year. The three-day forum will be conveniently located in the Exhibit

Hall adjacent to the exhibits and posters. Take advantage of this excellent visibility for your institution, and reserve space for one, two, or all three days.

When you reserve space in the forum, your school and program will also be promoted in three places with no additional charge:

- ☉ October issue of *GSA Today*
- ☉ GSA's Web site
- ☉ 2002 Annual Meeting Program

WOULD YOU LIKE TO PARTICIPATE?

Contact Brenda Martinez, GSA Exhibit Sales, (303) 357-1038 or 1-800-472-1988, ext. 1038, bmartinez@geosociety.org.

EMPLOYMENT

GSA Employment Services

INTERVIEW SERVICE

Sat., Oct. 26, noon–5 p.m.

Sun.–Tues., Oct. 27–29, 8 a.m.–5 p.m.

Do you need qualified scientists to fill staff needs? Or are you looking for employment in the earth sciences? If so, you are invited to participate in the GSA Employment Interview Service. All organizations seeking qualified earth scientists are urged to submit notices of their vacancies and their requests for lists of applicants in advance of the meeting. Interview booths may be reserved at the meeting in half-day increments for a nominal fee. GSA staff will handle all interview scheduling with Employment Service applicants.

Many job seekers have found the Employment Interview Service critical to their successful search for positions. The registration fee for applicants is \$35 for GSA members and associates, and \$65 for nonmembers, and it includes year-round service as well as interviewing at the Annual Meeting. Students completing degrees during 2002 are particularly encouraged to join the Employment Matching Service and to check the job offerings at the meeting. Applicants who sign up with the Employment Matching Service by September 15, 2002, will have their information included in the materials that employers receive prior to the meeting, so submit your application form and résumé early to receive maximum exposure. Be sure to indicate on the form that you will be attending the meeting. Both applicants and employers may also register onsite.

For additional information or forms, contact Nancy Williams in Member Services at member@geosociety.org or (303) 357-1017. Forms are also available in the Employment Opportunities section of GSA's Web site at www.geosociety.org.

EMPLOYMENT OPPORTUNITIES IN THE GEOLOGICAL SCIENCES—ROUNDTABLE DISCUSSIONS

Sat., Oct. 26, 1–3 p.m.

This annual forum on employment opportunities in the geosciences allows valuable one-on-one interaction between panel members and individuals or small groups. Experts in each of the

areas listed below will conduct his or her own "mini-roundtable" discussion designed to provide a better opportunity to field both general and specific questions on a more personal, individualized basis. These roundtable discussions will be in the Employment Service area during the interview registration time; however, *you do not have to be signed up for either the Annual Meeting or the Employment Matching Service to participate in these discussions.* Everyone—professionals and students—is encouraged to attend. Join as many of the discussions as you like. Roundtable discussion leaders from the following areas will be featured this year: academic and education; mining; federal government; state and local government; consulting; petroleum; and résumé review.

For additional information, contact Nancy Williams, Member Services, GSA headquarters, at member@geosociety.org or (303) 357-1017.

Student Volunteer Program

Free registration!

Free abstracts volume!

These are a couple of the benefits to working as a student volunteer at the GSA Annual Meeting. To learn more about the Student Volunteer Program and other student opportunities visit our Web site:

www.geosociety.org/meetings/2002/students.htm.

If you have additional questions in regard to the Student Volunteer Program, contact Kevin Ricker, kicker@geosociety.org,

1-800-472-1988, ext. 1090.

We extend a warm welcome to all guests at the 2002 GSA Annual Meeting & Exposition in Denver, Colorado!

To register as a guest, please complete the Preregistration Form and send it to GSA either by mail to 2002 GSA Annual Meeting, P.O. Box 9140, Boulder, CO 80301-9140 or by fax at 303-357-1071. You may also register online at www.geosociety.org.

The guest or spouse registration fee of \$80 per person is for nongelologist spouses or friends of professional and/or student registrants. The guest registration fee is required for those attending all guest activities, seminars, entrance to the Exhibit Hall, and refreshments in the Guest Hospitality Suite. Formal tours are at an additional cost and are listed below. Formal tour costs include professional tour guides, round-trip transportation, admission fees, and gratuities. Lunch is only included in the Colorado Springs and Dinosaur Ridge Tours. The guest registration fee will not provide technical session access. However, if any guest would like to sit in on a specific presentation, please sign up with the hostess in the Guest Hospitality Suite.

Tours

All GSA Annual Meeting registered guests are welcome to register for the following tours offered as part of the Guest Program. Reservations for all tours will be accepted on a first-come, first-serve basis. The tour operator requires a final guarantee weeks in advance, and most tours have attendance minimums and maximums. Please register early to guarantee your spot. Tours may be canceled if minimum attendance is not met. Plan to arrive at the departure location (to be listed in the October issue of *GSA Today* and Annual Meeting Program) 15 minutes before the scheduled departure time to make sure you don't miss the bus.

The Denver area has a great deal to offer and the formal tours can only cover a small portion of what is available to see and do. You may enjoy visiting other area attractions with fellow guest attendees or go it alone on a self-guided tour. The Guest Hospitality Suite hostess can provide you with more information and activity suggestions.

Nature Hike and Bird Watching—Barr Lake State Park [101]

Sat., Oct. 26, 7:30 a.m.–noon

A beautiful day in October is the perfect time to hike and observe the diverse wildlife habitat offered at Barr Lake State Park, home to the Wildlife Refuge. Bird watchers can spot over 300 species of birds at the park's Colorado Bird Observatory. At this time of year, the migratory bird banding station will also be of interest. Guests should bring their binoculars because there is the potential to catch glimpses of bald eagles, which have nested in the park since 1989. Cost: \$29. Min.: 20 people.

Vail Adventures [102]

Sun., Oct. 27, 8 a.m.–4 p.m.

Come and visit one of the most popular and prestigious ski resorts in America. Vail Resort is the region's largest ski area offering exceptional challenges and entertainment opportunities for everyone. Famous as a dynamic winter destination, it is also a fabulous summer and fall experience for people of all ages. This beautiful Swiss-style village is surrounded by majestic mountains poised against the bluest of skies, creating a perfect backdrop for any activity. Enjoy a shopping extravaganza at shops carrying everything from T-shirts to furs! A wide variety of excellent restaurants and cafes lets you select your own culinary experience. Vail certainly has its share of things to do: gondola rides up the mountain, jeep rides, hiking, mountain biking, horseback riding, and more. Cost: \$34. Min.: 35 people.

The Collection: Antique and Design Market and the Tattered Cover Book Store [103]

Sun., Oct. 27, noon–5 p.m.

Imagine more than 100 beautifully designed custom vignettes featuring antiques, art, and accessories, all in one convenient location. The Collection: Antique and Design Market is a 14,000-square-foot spectacular showroom with wares from home and office, everything from fine furniture and antiques to international lighting and fine art. Whether you are looking for chandeliers from Argentina, ceramics from Italy, or furnishings from Provence, the abundant selection is sure to delight. Best of all, each beautiful item is for purchase. The next stop will be the world-famous Tattered Cover Book Store, located in the heart of Cherry Creek. With small beginnings, owner Joyce Meskis has grown this renowned bookstore from one location to a multi-store establishment. The store features three stories of books, a coffee shop, and a restaurant. With comfortable couches, soft carpeting and plenty of cozy nooks assembled for the reader's enjoyment, visitors are encouraged to sit, read, and relax. A real must-see, the store is a highlight on the Denver visitor's list. Wrap up this tour with a stop across the street at the Cherry Creek shopping mall. Cost: \$30. Min.: 20 people.

Rocky Mountain National Park—Estes Park [104]

Mon., Oct. 28, 8 a.m.–4 p.m.

Begin your visit to the Rocky Mountains with a trip through the city of Boulder, home of GSA headquarters and the University of Colorado, then continue on past the impressive Flatirons rock formations. Your first stop is the charming resort village of Estes Park where you will have time for souvenir shopping in the many shops and boutiques. Estes Park is the site of the famous Stanley Hotel, the imposing property on which Stephen King based his novel *The Shining*. After visiting Estes Park, the tour continues into the expanses of the Rocky Mountain National Park with its towering peaks, picturesque canyons, and lush valleys. Cameras are a must as you may encounter elk, deer, or bighorn sheep. Cost: \$42. Min.: 35 people.

Foothills Mountain Tour—Coors Brewery [105]

Mon., Oct. 28, 9 a.m.–2 p.m.

Get a taste of the Colorado Rocky Mountains by beginning your foothills adventure with a stop at the Red Rocks Park and Amphitheater, a natural concert arena with 400-foot red sandstone walls that create a spectacular setting. Continue west into Clear Creek Canyon to Lookout Mountain and enjoy the spectacular view of Denver sprawling in the sunlight and the eastern plains stretching to the horizon. From there, it's a scenic downhill jaunt to the Coors Brewery in Golden. You'll tour the largest brewing facility in the United States and taste the beer. The Coors Company uses 13,640-gallon kettles and natural spring water to brew its beers to perfection. Cost: \$30. Min.: 20 people.

Colorado Springs Tour—U.S. Air Force Academy, Garden of the Gods, U.S. Olympic Training Center [106]

Tues., Oct. 29, 8 a.m.–5 p.m.

A visit to Denver would not be complete without a tour to Colorado Springs and its famous sights. The U.S. Air Force Academy, situated along the Rampart Range of the Rocky Mountains, covers 18,000 acres and is home to approximately 4,000 cadets. You'll gain insight into the life, education, and military service of cadets at the academy as you visit the Cadet Fieldhouse, the multid denominational chapel, with its outstanding architecture and the spectacular spires, Falcon Football Stadium, and Thunderbird Outlook. Enjoy a sliced roasted strip loin of beef for lunch at the Air Force Academy Officer's Club. After touring the USAFA and lunch, you'll tour the United States Olympic Training Center, home of the U.S. Olympic Committee. A short video presentation introduces you to the history and future of the center, followed by a guided walking tour of the facilities, including the Sports Center, the Olympic Shooting Center, and the U.S. Swimming International Center for Aquatic Research. Next, you'll travel southwest into the majestic Garden of the Gods. Magnificent red sandstone formations, thousand-year-old juniper trees, and twisting needles of rock sculpted by wind all combine to make this Colorado Springs city park truly a garden fit for the gods. Make sure you bring your camera! Cost: \$57. Min.: 20 people.

Denver Botanic Gardens & Denver Zoo [107]

Tues., Oct. 29, 9 a.m.–2 p.m.

Denver Botanic Gardens, one of the nation's premier indoor-outdoor gardens, is a perfect destination for plant enthusiasts of all

types. When you walk into its enormous glass honeycomb conservatory, it's as if you have entered a lush tropical and subtropical forest of carob, cocoa, banana, and many other trees and shrubs. Strolling through the rich vegetation in the park, you'll encounter a Japanese Garden with an authentic teahouse, mountain flora paths, and the world-renowned Alpine Garden with its own chalet, each offering wonderful contours, textures, and scents. Beautiful fountains and sculptures accent the surrounding greenery. We'll also take you to the Denver Zoo located in City Park and home to over 1,300 exotic life forms—nearly 400 animal species and over 300 species of colorful birds. There are several natural-terrain habitats including the North Shores, featuring arctic creatures, Tropical Discovery with its rainforest inhabitants, and the Primate Panorama, where 29 distinct primate species thrive. There is much more in this state-of-the-art, world-class facility to entice and intrigue you! Cost: \$36. Min.: 35 people.

Dinosaur Ridge Tour [108]

Tues., Oct. 29, 10 a.m.–2:30 p.m. (Sponsored by *Friends of Dinosaur Ridge*.)

The Dinosaur Ridge hogback exposes Jurassic and Cretaceous rocks containing dinosaur bones, and dinosaur and crocodile footprints and trackways. You might just spot a well-known geologist or two on hand to point out the highlights. We'll also have the opportunity to visit the Visitor Center. Bring the kids, too! Cost: \$27 (includes transportation, tour guide, and lunch). Guidebooks can be purchased on the trip for \$2.50 each. Min.: 33 people.

Seminars

Payment of the guest registration fee entitles you to also attend the Guest Seminars offered. Please refer to the October issue of *GSA Today* and the Annual Meeting Program (distributed onsite at the meeting) for a complete list of seminars, dates, times, and locations, or visit the Guest Hospitality Suite for more information.

Guest Hospitality Suite


Hours: Sun.–Wed., Oct. 27–30, 8 a.m.–5:30 p.m.

Beginning Sunday, October 27, guests are invited to visit the Guest Hospitality Suite. The location will be announced in the October *GSA Today* issue and listed in the Annual Meeting Program. The hostess will provide a resource center with abundant information on Denver and the surrounding areas. Light refreshments will be served throughout the day. Please remember to wear your GSA badge; it will be required for admission to the Hospitality Suite and the Exhibit Hall.



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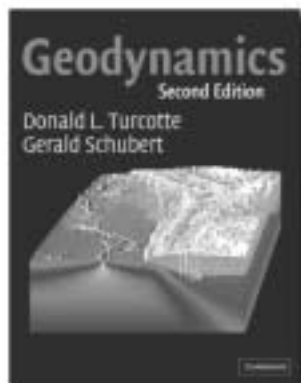


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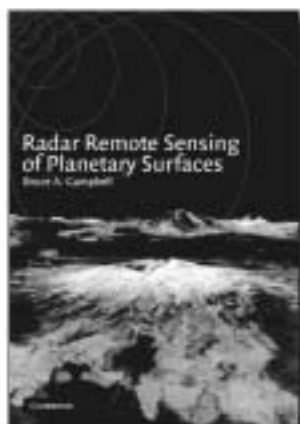
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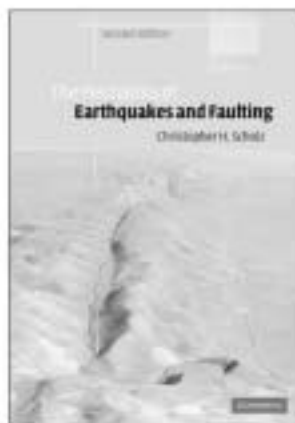
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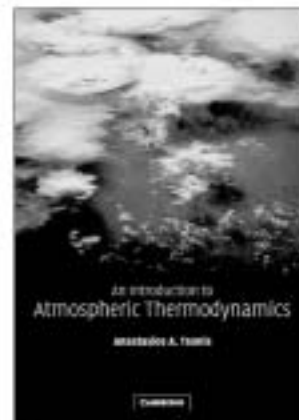
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FIELD TRIPS

Field Trips

Students, spouses, and interested guests are cordially encouraged to attend field trips. Trips are technical in nature and some can be physically rigorous. Participants should be prepared for cold weather. Trips last one to four days and are led by active field researchers. The minimum number of registrations for field trips is 12 unless otherwise stated.

If you register for *only* a field trip, you must pay a \$40 nonregistrant fee in addition to the field trip fee. This fee may be applied toward meeting registration if you decide to attend the meeting. Trip fees include transportation during the trip and a guidebook. Other services such as meals and lodging are noted by the following symbols: B—breakfast, L—lunch, R—refreshments, D—dinner, ON—overnight lodging.

All trips begin and end in Denver at the Colorado Convention Center, *unless otherwise indicated*. Some returning postmeeting trips can stop at the Denver International Airport to discharge participants who have evening flights or who would prefer to spend the night in a hotel closer to the airport. Participants are cautioned against scheduling any tight travel connections with field trip return

times because those times are estimates, and delays in the field can occur. For a list of hotels near the airport and their phone numbers, contact Edna Collis, Program Officer, GSA Headquarters, (303) 357-1034, ecollis@geosociety.org.

CANCELLATION DEADLINE: SEPTEMBER 27

No refunds will be given after this date. If GSA must cancel a field trip because of logistics or if minimum registration requirements are not met, a full refund will be issued to you after the meeting. Be aware of flight-change penalties imposed by the airlines. Plan alternatives in advance should the trip you are registered for be cancelled.

FOR MORE INFORMATION

Contact the trip leader or the 2002 field trip co-chairs: Eric Erslev, (970) 491-6375, erslev@cnr.colostate.edu, and Jerry Magloughlin, (970) 491-1812, jerry@cnr.colostate.edu, both of the Department of Earth Resources, Colorado State University, Fort Collins, CO 80523-1482, fax 970-491-6307.

Premeeting

1. Paleontology and Geology of the Green River Formation, Utah and Wyoming [401]

Tues.–Fri., Oct. 22–25. Cosponsored by *GSA Sedimentary Geology Division*. Arvid K. Aase, Fossil Butte National Monument, P.O. Box 592, Kemmerer, WY 83101, (307) 877-4455, fax 307-877-4457, arvid_aase@nps.gov; Alan Carroll; H. Paul Buchheim; Meredith Rhodes. Max.: 42; min.: 12. Cost: \$315. (3L, 1D, R, 3ON, vans). *Begins and ends in Salt Lake City, Utah.*

This trip will explore two of the Eocene Green River lakes, Fossil Lake, and Lake Gosiute. Sites illustrating various aspects of depositional environments, paleolimnology, and paleontology will be visited in Fossil Lake of western Wyoming. Lake Gosiute sites will highlight recent advancements in stratigraphy, geochronology, Sr isotope geochemistry, and paleontology near Rock Springs, Wyoming.

2. Middle and Late Jurassic Dinosaur Fossil-Bearing Horizons: Depositional Settings and Implications for Dinosaur Paleocology, Northeastern Bighorn Basin, Wyoming [402]

Wed.–Sat., Oct. 23–26. Erik P. Kvale, Dept. of Geological Sciences–Indiana Geological Survey, Indiana University, 611 N. Walnut Grove, Bloomington, IN 47405, (812) 855-1324, fax 812-855-7899, kvalee@indiana.edu; Debra Mickelson; Steve T. Hasiotis; Gary D. Johnson. Max.: 22; min.: 12. Cost: \$495 (4L, 1D, R, 3ON, vans).

This field trip will examine examples of recently discovered, rare Middle Jurassic, as well as Late Jurassic dinosaur tracks and trackways found within a variety of depositional facies within the Middle Jurassic Gypsum Spring and Sundance Formations as well as the Upper Jurassic Morrison Formation in the northeastern part of the Bighorn Basin. Invertebrate and vertebrate trace fossil diversity and controls on trace fossil development and preservation will be examined. Outcrops will be discussed in the context of depositional environments with the broader implications of paleoclimate, paleoecology, and paleogeography.

3. Cleanup at Summitville—The Superfund Mine Site That Changed Colorado [403]

Thurs.–Sat., Oct. 24–26. Cosponsored by *GSA Hydrogeology Division*. D. Kirk Nordstrom, U.S. Geological Survey, 3215 Marine St., Suite E-127, Boulder, CO 80303-1066, (303) 541-3037, fax 303-447-2505, dkn@usgs.gov; Geoff Plumlee; Harry Posey. Max.: 22; min.: 12. Cost: \$280 (3L, R, 2ON, vans).

Open-pit gold mining and cyanide leaching at about 11,000 feet altitude produced gold from the Summitville mine between 1985 and 1992. The environmental consequences have been so severe that it became a Superfund site when the company went bankrupt. After 10 years and well over \$100 million of cleanup, it is still undergoing remediation. The volcanic history and mineralization of the deposit will be examined, the mining history will be discussed, and the hydrology and environmental geochemistry will be addressed. This field trip will tour the reclamation of the cyanide leach pad, the filling in and reclamation of the open pit, the chemical neutralization facilities for the acid mine drainage, and the effects of natural acidic drainage from unmined, mineralized areas.

4. High Plains to Rio Grande Rift: Late Cenozoic Evolution of Central Colorado [404]

Thurs.–Sat., Oct. 24–26. Cosponsored by *GSA Sedimentary Geology Division*. Eric Leonard, Dept. of Geology, Colorado College, Colorado Springs, CO 80903, (719) 389-6513, fax 719-389-6910, eleonard@coloradocollege.edu; Mary Hubbard; Emmett Evanoff; Shari Kelley; Christine Siddoway. Max.: 30; min.: 10. Cost: \$225 (3L, R, 2ON, vans).

The central Colorado landscape strongly reflects Neogene tectonics, climate, and drainage changes. The trip will begin with a transect from the Colorado piedmont across the southern Front Range to the Arkansas River graben section of the Rio Grande rift, examining structural, sedimentological, geomorphic, fission-track, and modeling evidence of the late Cenozoic regional history. After examining structures and sediments relating to rifting and the Poncha Pass transfer zone, we will end with a return transect via the Arkansas River canyons.

5. Key Rocks and Seminal Thinkers: Classic Rocky Mountain Localities That Influenced Tectonic Thought [405]

Thurs.–Sat., Oct. 24–26. Cosponsored by *GSA History of Geology Division*. A.M. Celâl Şengör, İTÜ Maden Fakültesi, Jeoloji Bölümü, Ayazaga, Istanbul 80626, Turkey, sengor@itu.edu.tr; Tim Lawton. Max.: 44; min.: 12. Cost: \$220 (3L, R, 2ON, bus). *Begins in Salt Lake City, Utah, and ends in Denver.*

The Intermountain West has provided inspiration to numerous geologists who contributed fundamental concepts in the late 19th and early 20th centuries, including Stephen Long, John Charles Fremont, John Strong Newberry, G.K. Gilbert, J.W. Powell, Clarence Edward Dutton, Clarence King, and F.V. Hayden. This field trip will be a traverse from Salt Lake City to Denver, during which we will visit classic localities that engendered classic thinking and talk about the scenery that inspired the concepts of tectonic geomorphology. Participants should arrive in Salt Lake City on Wednesday, October 23, the day before the trip leaves, so we can get an early start on Thursday morning.

6. Active Incision-Driven Evaporite Tectonism, Glenwood Springs, Colorado [406]

Fri. and Sat., Oct. 25–26. Bob Kirkham, Colorado Geological Survey, 5253 County Road, 1 South, Alamosa, CO 81101, (719) 587-0139, fax 719-587-2187, rmk@amigo.net; Mark Hudson; Bruce Bryant. Max.: 22; min.: 12. Cost: \$160 (1L, R, 1ON, vans).

River incision during the late Cenozoic has triggered evaporite tectonism in western Colorado and caused over 1 km of vertical collapse. Much of the incision and collapse occurred during the past 3 million years. Paleomagnetism, dating, and geochemical correlation of late Cenozoic basaltic flows provide constraints on the

Attention Students

The **GSA Coal Geology Division** offers a \$50 scholarship to the first division-affiliated student member who registers for a division-sponsored field trip. You must pay the full field trip fee when registering, but will be reimbursed \$50 after the meeting by the Coal Geology Division.

The **GSA Hydrogeology Division** will subsidize the first student registrant who is a valid division member. You must pay the full field trip fee when registering, but will be reimbursed \$50 after the meeting by the Hydrogeology Division.

The **GSA Sedimentary Geology Division** is cosponsoring a few field trips and will subsidize all students who are valid division members. (See individual trip descriptions for those sponsored.) You must pay the full field trip fee when registering, but will be reimbursed \$100 after the meeting by the Sedimentary Geology Division. To be reimbursed, apply in writing to Paul K. Link, Dept. of Geology, Box 8072, Idaho State University, Pocatello, ID 83209-8072, (208) 282-3365, linkpaul@isu.edu.

The **GSA Structural Geology and Tectonics Division** offers up to five \$100 scholarships to division-affiliated student members for division-sponsored field trips. Apply in writing, giving name, institution, class, specialty, poster or talk title, short-course title, and a one-paragraph rationale, to Laurel B. Goodwin by e-mail only, lgoodwin@nmt.edu. The deadline to apply is September 1. See the Structural Geology and Tectonics newsletter for more information.

extent, rate, and timing of collapse. Salinity aspects will be discussed in the Glenwood hot springs pool.

7. Formation, Reactivation, and Evolution of Proterozoic Shear Zones in the Colorado Rocky Mountains: From Continental Assembly to Intracontinental Orogeny [407]

Fri. and Sat., Oct. 25–26. Colin A. Shaw, Dept. of Earth and Environmental Sciences, New Mexico Institute of Mining and Technology, Socorro, NM 87801, (505) 835-5657, fax 505-835-6436, colins@nmt.edu; Karl E. Karlstrom. Max.: 36; min.: 12. Cost: \$185 (1B, 2L, 2D, R, 1ON, vans).

This trip will explore the kinematics, timing, and tectonic significance of Proterozoic ductile shear zones that may have controlled faulting, mineralization, and plutonism within the Colorado Mineral Belt. We will integrate geologic observations with new seismic results from the CD-ROM experiments to seek to understand how these ancient structures affected the evolution of the lithosphere.

8. Neotectonics of the Rio Grande Rift in Colorado [408]

Fri. and Sat., Oct. 25–26. Cosponsored by *GSA Quaternary Geology and Geomorphology Division* and *GSA Structural Geology and Tectonics Division*. Jim McCalpin, GEO-HAZ Consortium, P.O. Box 837, Crestone, CO 81131, (719) 256-5227, fax 719-256-5228, mcalpin@geohaz.com; Alan Nelson; Dean Ostenaar; Andrew Valdez. Max.: 45; min.: 24. Cost: \$170 (1B, 2L, 1D, R, 1ON, bus).

The Rio Grande rift displays Holocene faulting in the San Luis Valley, but farther north in the Upper Arkansas Valley latest faulting appears older (latest Pleistocene?). Even farther north and northeast rift-related faulting fragments and diffuses (Mosquito Range, Gore Range, Blue River Valley). We will see results of recent 1:24 000-scale mapping near the northern rift terminus, and then continue south to see fault scarps and several open paleoseismic trenches in the San Luis Valley.

9. Structure and Stratigraphy of the Southern Colorado Front Range–Cañon City Syncline, Colorado [409]

Fri. and Sat., Oct. 25–26. Cosponsored by *GSA Sedimentary Geology Division*. Paul R. Krutak; P. Krutak Geoservices International, P.O. Box 369, 2118 Main Street, Rye, Colorado 81069-0369, telephone and fax (719) 489-2282, pkrutakgeos@hotmail.com. Max.: 24; min.: 8. Cost: \$160 (2L, R, 1ON, vans).

The first day of the field trip involves study of the Cheyenne Mountain Fault Zone (thrust?) which has locally overturned both Paleozoic and Mesozoic strata south of NORAD (North American Aerospace Defense Command). The day ends at the Garden of the Gods where spectacular high-angle reverse faults offset Fountain and Lyons rocks. The second day includes a visit to Four Mile Creek that contains the Cope–Marsh Dinosaur quarries and the second oil well drilled in the U.S., as well as impressive views of the Royal Gorge of the Arkansas. We will end this day in Florence near the site of the Florence Oil Field that produces from fractured Pierre shales.

10. Borehole Image Logging in Geology and Hydrogeology [410]

Sat., Oct. 26. Cosponsored by *GSA Hydrogeology Division*. John H. Williams, U.S. Geological Survey, 425 Jordan Road, Troy, NY 12180-8349, (518) 285-5670, fax 518-285-5601, jhwillia@usgs.gov; Carole Johnson; Roger Morin; Fred Paillet; John Stowell. Max.: 24; min.: 12. Cost: \$95 (1L, R, vans).

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Borehole image logging techniques based on acoustic and optical sensors have revolutionized geotechnical interpretations of the subsurface. Fully digital image logging systems can be used to identify lithology and fractures in situ and to fill in intervals of missing or badly damaged core. This field trip will demonstrate acoustic and optical image logging, and the processing of image log data at a well site in the Denver area.

11. Debris Flows Along the I-70 Corridor, Floyd Hill to the Eisenhower Tunnel [411]

Sat., Oct. 26. Jeff Coe, U.S. Geological Survey, Denver Federal Center, MS 966, Box 25046, Denver, CO 80225, (303) 273-8606, fax 303-273-8600, jcoeo@usgs.gov; Jonathan Godt. Max.: 24; min.: 12. Cost: \$85 (1L, R, vans).

The trip will make stops at debris fans along the I-70 corridor to examine Holocene and historic debris-flow deposits. About 150 debris flows occurred at high elevations in this area during a July 1999 rainstorm. If weather allows, several of these sites will be visited (Bakerville, Arapahoe Basin ski area). If weather is bad, stops will be made at debris fans at lower elevations near Idaho Springs and Georgetown. Discussion will focus on interpretation of deposits, radiocarbon dating, and recurrence intervals, fan morphology, and debris-flow hazards.

12. Eco-Geo Hike Along the Dakota Hogback North of Boulder, Colorado [412]

Sat., Oct. 26. Peter Birkeland, Dept. Geological Sciences, University of Colorado, Boulder, CO 80309 (retired),

birkelap@stripe.Colorado.edu; Ralph Shroba; Ven Barclay; Parker Calkin; Edwin Larson; Mary McMillan. Max.: 21; min.: 7. Cost: \$35 (1L, R). *Begins and ends in Boulder.*

Retired and active geologists will lead an eco-geo hike (6 mi./1200 ft vertical) to discuss work mainly mapped by others, or used in classes. We will traverse the Dakota hogback and discuss: (1) sedimentary rocks (Fountain Formation to Pierre Shale), (2) paleomagnetic dating of Laramide uplift, (3) various kinds of landslides on the hogback, (4) erosional history and formation of Quaternary fluvial terraces, and (5) Boulder Creek floodplain.

13. Environmental and Engineering Geology of the I-70 Corridor Denver-Eisenhower Tunnel [413]

Sat., Oct. 26. Cosponsored by *GSA Engineering Geology Division*. Ed Nuhfer, Dept. of Geology, Geography, and Environmental Science, University of Colorado at Denver, Campus Box 137, P.O. Box 173364, Denver, CO 80217-3364, (303) 556-4915, fax 303-556-6197, enuhfer@carbon.cudenver.edu; William Savage. Max.: 36; min.: 12. Cost: \$65 (1L, R, vans).

This trip will provide an overview of Denver's geologic setting in the Front Range followed by road stops for approximately 40 miles up Interstate 70 to the Continental Divide. Emphasis will be on environmental and engineering problems (slope instability, flash flooding, alluvial fans, acid drainage, tunnels, and mining) associated with the development and highway construction along the route. Participants should count on unpredictable weather and temperature changes typical of a route that passes from over 5000 ft to over 11,000 ft elevations.

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14. Geoarchaeology of South Park: A Prairie Ecosystem in the Rocky Mountains [414]

Sat., Oct. 26. Cosponsored by *GSA Archaeological Geology Division*. Steve Holen, Curator of Archaeology, Denver Museum of Nature and Science, 2001 Colorado Blvd., Denver, CO 80205, (303) 370-8261, sholen@dmns.org; Tom Lincoln. Max.: 30; min.: 10. Cost: \$70 (1L, R, vans).

This field trip will leave Denver for South Park, a large prairie ecosystem and basin in the Rocky Mountains about one hour southwest of Denver. The trip will visit archaeological sites spanning the range of human occupation in South Park. Participants will view a wide range of landscapes and visit Paleoindian occupations in various geomorphic settings. The trip will require some short hikes over rough terrain.

15. Geologic Reconnaissance of the Denver Front Range and Dinosaur Ridge [415]

Sat., Oct. 26. Cosponsored by *GSA Geoscience Education Division*. Norb Cygan, Friends of Dinosaur Ridge, 16831 W. Alameda Parkway, Morrison, CO 80465, (303) 697-3466, fax 303-697-8911, necygan@aol.com; "T" Caneer; Betty Rall; Duff Kerr; Bob Reynolds; Pete Modreski; Susan Landon. Max.: 45, min.: 12. Cost: \$70 (1L, R, bus).

This trip is a geologic reconnaissance of the Rocky Mountain foothills at Dinosaur Ridge, outcrops in Red Rocks Park, and the Dakota Hogback. Regional geology will be reviewed. Other outcrops visited will include an oil seep, a fault, and a textbook example of an uranium roll front.

16. Laramide Structure and Synorogenic Sedimentation of the Colorado Front Range [416]

Sat., Oct. 26. Cosponsored by *GSA Sedimentary Geology Division*. Edward J. (Ned) Sterne, Savant Resources, 730 17th Street, Suite 410, Denver, CO 80202, (303) 592-1905, ext. 103, fax 303-592-1909, nedsterne@savantresources.com; Robert G. (Bob) Reynolds; Christine Smith Siddoway. Max.: 36, min.: 12. Cost: \$65 (1L, R, vans).

This day trip focuses on the Laramide thrusts and synorogenic sediments associated with the uplift of the Colorado Front Range. Both forethrusts and backthrusts occur within a complex triangle zone. The synorogenic debris record the uplift of the range and need to be understood as man develops them for drinking water and possible coalbed methane.

17. Modern-Day Consequences of Historic Coal Mining in the Foothills and Boulder and Weld Counties, Colorado [417]

Sat., Oct. 26. Cosponsored by *GSA Coal Geology Division*. Christopher J. Carroll, Colorado Geological Survey, 1313 Sherman St., Room 715, Denver, CO 80203, (303) 866-3501, fax 303-866-2461, Chris.Carroll@state.co.us; Celia Greenman; Nicole Koenig. Max.: 24; min.: 8. Cost: \$80 (1L, R, vans).

This trip will be a tour to observe the geologic consequences of 100-year-old coal mining along the margin of the Laramide uplift of the Denver Basin. Nearly 7 million tons of coal were extracted between 1864 and 1950 from near-vertical coal beds of the Cretaceous Laramie Formation. Modern consequences of this industry include subsidence in an area of heavy population growth, methane gas leakage from underground coal mine gas storage, and renewed interest in developing the coalbed methane potential from an old petroleum field. The trip will include visits to inactive mine sites where past mining practices, their associated disasters, and active subsidence and coal fires will be discussed.

18. Tepee Buttes: Fossilized Methane-Seep Ecosystems [418]

Sat., Oct. 26. Cosponsored by *GSA Geobiology and Geomicrobiology Division*. Russell S. Shapiro, Dept. of Geoscience, University of Nevada, Las Vegas, 4505 Maryland Parkway, Las Vegas, NV 89154-4010, (702) 895-1239, fax 702-895-4064, rshapiro@nevada.edu; Henry Fricke. Max.: 20 (firm); min.: 7. Cost: \$80 (1L, R, vans).

This trip will visit the beautifully exposed Tepee Buttes (Cretaceous) near Colorado Springs, Colorado. The Buttes are carbonate mounds that formed in conjunction with methane seepage along early Laramide structures and provide an excellent fossil analogue to modern methane-seep ecosystems. In addition to the macrofauna dominated by lucinid bivalves and heteromorphic ammonoids, we will also investigate the role of bacteria in the formation of the mounds through outcrop and thin-section analyses.

HALF DAY—DURING THE MEETING

19. Tour of U.S. Geological Survey Mapping and Geologic Facilities, Denver Federal Center [419]

Tues., Oct. 29, 12:30–5 p.m. Peter J. Modreski, U.S. Geological Survey, MS 915, Box 25046, Denver Federal Center, Denver, CO 80225-0046, (303) 202-4766, fax 303-202-4742, pmodreski@usgs.gov; Joseph J. Kerski. Max.: 24; min.: 8. Cost: \$25 (R, vans).

A tour of the U.S. Geological Survey facilities that will include the Rocky Mountain Mapping Center (map distribution, visitor's center, research, and production, including digital cartography), the National Ice Core Laboratory, and the Drill Core Research Center.

Postmeeting

20. Permian-Triassic Depositional Systems, Paleogeography, Paleoclimate, and Hydrocarbon Resources in Canyonlands and Monument Valley, Utah [420]

Thurs.–Mon., Oct. 31–Nov. 4. Cosponsored by *GSA Sedimentary Geology Division*. Jacqueline E. Huntoon, Dept. of Geological Engineering and Sciences, Michigan Technological University, Houghton, Michigan 49931, (906) 487-2412, fax 906-487-3371, jeh@mtu.edu; Russell F. Dubiel; John D. Stanesco; Debra Mickelson. Max.: 20; min.: 7. Cost: \$615 (5L, 1D, 4ON, vans).

This trip will examine Permian to Triassic strata in the Paradox Basin on the Colorado Plateau in southeastern Utah. Three major themes will be emphasized: (1) stratigraphy, depositional systems, and sand-body architecture; (2) paleogeography and paleoclimate; and (3) hydrocarbon migration pathways and trapping mechanisms. The trip will highlight excellent exposures of rocks that reflect the interaction of tectonics, climate, and sea-level change along the margin of Pangea during the late Paleozoic and early Mesozoic.

21. Approaches to Characterizing Complex Geology for Watershed Investigations in Fractured Crystalline Bedrock: The Idealized and the Reality [421]

Thurs., Oct. 31. Jonathan Saul Caine, U.S. Geological Survey, P.O. Box 25046, MS 973, Denver, CO 80225-0046, (303) 236-1822, fax 303-236-3200, jscaine@usgs.gov; Clifford Bossong; Geoffrey Thyne. Max.: 30; min.: 10. Cost: \$85 (1L, R, vans).

The Turkey Creek watershed in the Colorado Rocky Mountain Front Range provides an excellent example of the hydrogeology of a complexly deformed, fracture-dominated crystalline bedrock aquifer system in mountainous terrain. Several representative field localities will be used to (1) facilitate dialogue regarding approaches to geological characterization; (2) present modeling results used to derive idealized hydraulic parameters and link geology to hydrology; and (3) illustrate the challenges in understanding the occurrence, flow, and processes related to groundwater in this type of watershed.


22. Consequences of Living with Geology: A Model Field Trip for the General Public [422]

Thurs., Oct. 31. Cosponsored by *GSA Engineering Geology Division*, *GSA Geoscience Education Division*, and *American Institute of Professional Geologists*. David M. Abbott Jr., Consulting Geologist, 2266 Forest St., Denver, CO 80207, (303) 394-0321, fax 303-394-0543, dimageol@msn.com; David C. Noe. Max.: 90; min.: 42. Cost: \$65 (1L, R, bus).

This is an example of a trip that can be held anywhere for nongeologists and local decision makers. We'll examine sites along the Front Range affecting everyday life in Colorado including mine subsidence, flooding, underground gas storage, swelling soils, and natural-resource deposits to discuss how such features affect us. Geologists can contribute to local decision making by leading similar trips.

23. Field Trip to Glenwood Caverns–Fairy Cave, Glenwood Springs, Colorado: An Introduction to CO₂ and H₂S Speleogenesis [423]

Thurs., Oct. 31. Cosponsored by *GSA Hydrogeology Division*. Fred G. Luiszer, Dept. of Geological Sciences, University of Colorado, Campus Box 399, Boulder, CO 80309-0399, (303) 492-5251, fax 303-492-2606, luiszer@spot.colorado.edu; Harvey DuChene. Max.: 45; min.: 22. Cost: \$95 (R, bus).



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to the Geology of the Colorado Plateau


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The purpose of this trip is to introduce participants to hypogene caves formed by carbon dioxide and hydrogen sulfide. The route from Denver to Glenwood Springs along Interstate 70 passes through the Front and Gore Ranges of the Rocky Mountains, the Eagle evaporite basin and Glenwood Canyon. At Glenwood Springs, we will visit Glenwood Caverns (Fairy Cave), a limestone quarry, and the Hot Springs Pool, where the participants will be "steeped" in the geohydrology of the area.

24. Structural Geometry and Thermal History of Pseudotachylyte from the Homestake Shear Zone, Sawatch Range, Colorado [424]

Thurs., Oct. 31. Cosponsored by *GSA Structural Geology and Tectonics Division*. Joseph L. Allen, Dept. of Physical Sciences, Concord College, Athens, WV 24712-1000, (304) 384-5238, fax 304-384-6225, allenj@concord.edu; Kieran D. O'Hara; David P. Moecher. Max.: 33; min.: 12. Cost: \$75 (1L, R, vans).

Pseudotachylyte fault veins record frictional melting during coseismic slip and offer unique insights into processes that occur within an earthquake hypocenter. This trip will examine a 25 km system of pseudotachylyte that formed during strike-slip faulting in Proterozoic bedrock. We will examine structural controls on the overprinting rupture geometry, results from a new geothermometer, and mineralogic evidence for high-*T* melting.

ASSOCIATION FOR WOMEN GEOSCIENTISTS

Cleanup of the Rocky Flats Environmental Technology Site

Sat., Oct. 26, 1–5 p.m. Sponsored by the *Denver Chapter, Association for Women Geoscientists*. Leaders: Norma Castañeda,

U.S. Department of Energy, Rocky Flats; Elizabeth Pottorff, Colorado Department of Public Health and Environment.

The Rocky Flats Site is a Department of Energy environmental cleanup site on a path toward accelerated closure by 2006. Historically, Rocky Flats manufactured components for nuclear weapons using various radioactive and hazardous materials, including plutonium, uranium, and beryllium. Significant accomplishments are being made in five major work areas, such as special nuclear materials stabilization, facility deactivation and decommissioning, environmental cleanup, offsite shipment, and property and document disposition. This trip will highlight the work being accomplished in environmental cleanup. A valid driver's license is required to obtain a site badge. No cameras are allowed. Max.: 45. Cost: \$25 professional; \$15 student. Preregistration required. Registration deadline: September 30. Information and registration: Norma Castañeda, (303) 966-4226 or norma.castaneda@rf.doe.gov. Please submit your name, phone number, social security number, and date of birth. Due to the national security crisis in this country, only U.S. citizens are allowed on the tour.

SOCIETY OF ECONOMIC GEOLOGISTS

Costs and registration forms for the following trips are available at www.segweb.org. Inquiries may also be directed to the Society of Economic Geologists, 7811 Shaffer Parkway, Littleton, CO 80127, (720) 981-7882, fax 720-981-7874. Preregistration is required.

Cripple Creek Gold Mining District

Fri., Oct. 25. Sponsored by *Society of Economic Geologists*. Leader: David Vardiman, AngloGold (Colorado) Corporation, P.O. Box 191,

100 N. 3rd Street, Victor, CO 80860, (719) 689-4019, fax 719-689-3254, dvardiman@anglogoldNA.com.

Cripple Creek is a world-class Au-Te deposit that formed at 30–32 Ma after emplacement of a phonolitic diatreme complex, during initial extension of the Rio Grande rift. Since 1890, > 650 tonnes of Au have been produced, most from underground mines. The modern CC&V surface mine operation is budgeted to produce 315,000 ounces of gold during 2002. Participants will tour the district geology, the modern Cresson Surface Mine, and process facilities, see specimens of high-grade ore, and learn about the sociopolitical and environmental requirements for modern-day mining. Max.: 44. Cost: Early registration (before August 30)—\$100 SEG members, \$185 nonmembers, \$50 SEG student members; late registration—\$150 SEG members, \$235 nonmembers.

Field Workshop: Interpretation of Leached Cappings and Evaluation of Copper Deposits for Solvent Extraction and Electrowinning Copper Production.

Thurs.–Sat., Oct. 31–Nov. 2. Sponsored by *Society of Economic Geologists*. Leaders: Richard L. Nielsen, Geocon, Inc., 13741 Braun Drive, Golden, CO 80401, (303) 279-3118, rlnggeocon@aol.com; John E. Dreier, 13790 Braun Road, Golden, CO 80401, (303) 278-0828, fax 303-278-0838, jedreier@worldnet.att.net.

At the Silver Bell and Ray porphyry Cu deposits, participants will review geology, learn to identify and map appropriate limonite and alteration types, and use this information to define drill targets, estimate acid consumption and leach kinetics, and evaluate oxide and chalcocite deposits for copper extraction. Max.: 20. Cost: \$390 SEG members, \$490 nonmembers, \$195 SEG student members. *Begins and ends in Phoenix, Arizona.*

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GSA-SPONSORED PROFESSIONAL DEVELOPMENT COURSES

GSA short courses will be held immediately before the Annual Meeting and are open to members and nonmembers. If you register for *only* a short course, you must pay a \$40 nonregistrant fee in addition to the course fee. This fee may be applied toward meeting registration if you decide to attend the meeting. Preregistration is recommended; on-site registration is \$30 additional.

CONTINUING EDUCATION UNIT (CEU) SERVICE

All courses sponsored by GSA offer CEUs. A CEU is defined as 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. A contact hour is defined as a typical 60-minute classroom instructional session or its equivalent. Ten instructional hours are required for one CEU. For CEU record-keeping purposes, please be sure to include your Social Security number on the registration form.

CANCELLATION DEADLINE: SEPTEMBER 27

For more information, contact Edna Collis, GSA Program Officer for Professional Development, (303) 357-1034, or ecollis@geosociety.org. For a more detailed course description, please visit GSA's Web site, www.geosociety.org/meetings/2002/crs-wks.htm.

1. Anisotropy of Magnetic Susceptibility and Applications to Granitic Rocks [501]

Fri. and Sat., Oct. 25–26, 8 a.m.–5 p.m. both days. Colorado Convention Center. Cosponsored by *GSA Structural Geology and Tectonics Division*.

This course is intended for researchers and graduate students. Content will include rock magnetism and mineralogy applied to granites, variations of susceptibility with temperature, field, grain size, sampling, and orienting procedures, measurements, data processing, orogenic and anorogenic granites, paramagnetic and ferromagnetic granites, case studies in various tectonic contexts, and experimental studies. Participants may bring their own data for discussion. **Faculty:** Eric C. Ferré, Dept. of Geology and Geophysics, University of Wisconsin; Ph.D., University of Toulouse, France; Mike Jackson, Institute for Rock Magnetism, University of Minnesota; Ph.D., University of Michigan. Limit: 30. Fee: \$320, students \$300; includes course manual and lunches. CEUs: 1.6.

2. Managing Environmental Projects [502]

Fri. and Sat., Oct. 25–26, 8 a.m.–5 p.m. both days. Colorado Convention Center. Cosponsored by *GSA Engineering Geology Division*.

This course will present an overview of all aspects of the field of environmental project management. Includes in-depth discussions of all federal and many state environmental laws and regulations and how they are applied to insure regulatory compliance and protection of human health and the environment. The course will present the “science” of environmental management including applications of chemistry, biology, toxicology, and geology-hydrology. It will also cover pollution prevention, emergency preparedness, health and safety issues, regulatory permitting, risk assessments, sampling and monitoring protocols, remediation

methods, professional liability and ethics, and project management skills. An optional exam will be offered on the afternoon of the second day for those interested in Registered Environmental Manager (REM) certification through the National Registry of Environmental Professionals (NREP). There is an additional fee for the exam that also includes one year's registration with NREP.

Faculty: Raymond C. Kimbrough, Consultant; B.A., University of Alabama. Limit: 30. Fee: \$300, students \$280; includes course manual and lunches. CEUs: 1.6.

3. Abrupt Climate Changes [503]

Sat., Oct. 26, 8 a.m.–5 p.m. Colorado Convention Center. Cosponsored by *GSA Quaternary Geology and Geomorphology Division*.

The record in Greenland ice tells us that Earth's climate system has undergone large and abrupt changes, raising the question as to whether the ongoing increase in atmospheric CO₂ will lead to a similar nonlinear response. The course will emphasize the record of these climate jumps and what they are trying to tell us about the joint operation of our ocean-atmosphere system. **Faculty:** Wallace S. Broecker, Lamont-Doherty Earth Observatory, Columbia University; Ph.D., Columbia University. Limit: 30. Fee: \$240, students \$220, includes course manual and lunch. CEUs: 0.8.

4. Estimating Rates of Groundwater Recharge [504]

Sat., Oct. 26, 8 a.m.–5 p.m. Colorado Convention Center. Cosponsored by *GSA Hydrogeology Division*.

Good estimates of groundwater recharge are required to accurately assess water resources and evaluate aquifer vulnerability to contamination. This course will review theory, assumptions, uncertainties, advantages, and limitations of different approaches for estimating recharge rates. We will discuss physical, tracer, and numerical modeling techniques based on surface water, unsaturated zone, and saturated zone data. The course content is aimed at practicing hydrologists and advanced hydrology students.

Attention Students

The **GSA Engineering Geology Division** will subsidize the first five student registrants who are valid division members. You **must pay the full course fee** when registering, but will be reimbursed \$50 after the meeting by the Engineering Geology Division.

The **GSA Hydrogeology Division** will subsidize the first student registrant who is a valid division member. You **must pay the full course fee** when registering, but will be reimbursed \$50 after the meeting by the Hydrogeology Division.

The **GSA Structural Geology and Tectonics Division** offers up to five \$100 Scholarships to division-affiliated student members for division-sponsored field trips. Apply in writing, giving name, institution, class, specialty, poster or talk title, short-course title, and a one-paragraph rationale, to Laurel B. Goodwin by e-mail only, lgoodwin@nmt.edu. The deadline to apply is September 1. See the Structural Geology and Tectonics newsletter for more information.

Faculty: Richard W. Healy, U.S. Geological Survey, Denver; B.S., University of Illinois; Bridget R. Scanlon, Bureau of Economic Geology, University of Texas, Austin; Ph.D., University of Kentucky. Limit: 30. Fee: \$275, students \$255; includes course manual and lunch. CEUs: 0.8.

5. Laser Ablation ICP-MS: Fundamentals and Applications to Environmental and Biological Samples [505]

Sat., Oct. 26, 8 a.m.–5 p.m. Colorado Convention Center. Cosponsored by *GSA Archaeological Geology Division*.

Laser ablation–inductively coupled plasma–mass spectrometry (LA-ICP-MS) is a solid sampling technique that allows the quantitative determination of elements at trace (ppm) levels whilst preserving the textural context of the analysis. LA-ICP-MS is seeing widespread use in geochemistry as new analytical methods come online and is beginning to be used for the analysis of biological materials. The short course introduction will focus on the fundamentals of LA-ICP-MS and leads into discussion of specific examples where LA-ICP-MS is used to address environmental issues. The structure allows for the active interchange of experiences and ideas between the course participants. **Faculty:** Alan E. Koenig, Cetac Technologies, Omaha; M.S., Colorado State University; Ian Ridley, U.S. Geological Survey, Denver; Ph.D., Royal School of Mines, University of London. Limit: 30. Fee: \$275, students \$255; includes course manual and lunch. CEUs: 0.8.

6. Practical Methods in Applied Contaminant Geochemistry: From Characterization to Remediation [506]

Sat., Oct. 26, 8 a.m.–5 p.m., Colorado Convention Center. Cosponsored by *GSA Hydrogeology Division*.

Geochemical data obtained as part of regulatory-driven hydrogeologic investigations are commonly too incomplete, of scant number, and of insufficient quality to use the kinds of geochemical approaches that are normally learned in university courses on acid-base and chemical-equilibrium geochemistry. This course will teach the “practical” essentials of contaminant geochemistry and how to effectively apply them in consulting (and, arguably, academic) practice. **Faculty:** Donald I. Siegel, Dept. of Earth Sciences, Syracuse University; Ph.D., University of Minnesota. Limit: 30. Fee: \$250, students \$230; includes course manual and lunch. CEUs: 0.8.

OTHER COURSES, WORKSHOPS, AND FORUMS

Registration and information can be obtained from the contact person listed for each course.

Sequence Stratigraphy for Graduate Students

Fri. and Sat., Oct. 25–26, 8 a.m.–5 p.m. both days. Co-sponsored by *British Petroleum* and *ExxonMobil Exploration Company*.

This free short course is designed to teach graduate students the principles, concepts, and methods of sequence stratigraphy. Sequence stratigraphy is an informal chronostratigraphic methodology that uses stratal surfaces to subdivide the stratigraphic record. This methodology allows the identification of coeval facies, documents the time-transgressive nature of classic lithostratigraphic units, and provides geoscientists with an additional way to analyze and subdivide the stratigraphic record. Using exercises that utilize outcrop, core, well-log, and seismic data, the course provides a hands-on experience to learning sequence stratigraphy. The exercises include classic case studies from which many sequence stratigraphic concepts were originally developed.

Instructors: Art Donovan (BP), Morgan Sullivan (ExxonMobil), and

Kirt Campion (ExxonMobil). Limit: 40. No fee. Preregistration required. Information and registration: Art Donovan, donovan@bp.com.

Phosphates: Geochemical, Geobiological, and Materials Importance

Sat.–Sun., Oct. 26–27. Holiday Inn, Golden, Colorado. Sponsored by *Mineralogical Society of America*.

The diverse mineralogy and chemistry of phosphates fosters diverse research in earth and materials science. This short course will provide an overview of phosphate mineralogy and then focus on applications in geochronology (U-Th/Pb, fission track, U-Th/He), petrology, and biogeochemistry (stable isotopes and trace elements). **Organizers:** John M. Hughes, Matthew Kohn, and John Rakovan. Limit: 120. Fees: professional—\$225 MSA/GS members, \$310 nonmembers; students—\$100 MSA/GS members, \$140 nonmembers (fees applicable if registration is received before Aug. 31, 2002). For information and registration, contact the MSA Business Office, 1015 18th St NW, Ste. 601, Washington, D.C. 20036-5212, (202) 775-4344, fax 202-775-0018; business@minsocam.org, or visit and register on the MSA home page, www.minsocam.org.

The Art of Technical Writing: Improving Your Technical Reports

Sat., Oct. 26. Sponsored by *National Ground Water Association*.

This one-day workshop will focus on providing the tools to improve technical writing skills. The program is divided into six modules: Communication, Writing Process, Principles and Rules, Style, Report Organization and Presentation, and Miscellaneous Tips and Suggestions. The workshop is organized in and will be presented in an interactive manner, providing instructions, exercises, hints, and checkpoints that can be used for future references to continuously improve writing skills. Participants should bring a recent sample of their writing. These will be used to establish a current style and identify those areas that can be improved. **Faculty:** George R. Lytwynshyn is a senior regional program manager at ENSR Corporation. He has over 26 years of diverse professional environmental experience in industry, consulting, and construction (remediation). His areas of specialization include: environmental management, environmental investigation, design and remediation, environmental due diligence, and regulatory negotiations. He has performed environmental audits and assessments for various industrial and commercial operations in the areas of permit compliance, operations, and information management. Lytwynshyn has authored several publications in the areas of remedial system assessments, energy alternatives, technology application, rock mechanics, and geology. He is also an adjunct professor for environmental project management in the Masters of Project Management Program at Northwestern University. Limit: 38. Fee: \$225; includes notebook and refreshments. Information and registration: NGWA, Customer Service Representatives, 601 Dempsey Road; Westerville, OH 43081; (800) 551-7379, fax 614-898-7786, www.ngwa.org.

The Fossil Record of Predation

Sat., Oct. 26, 8:15 a.m.–5:30 p.m. Sponsored by *Paleontological Society*.

This short course provides the first comprehensive overview of research on the fossil record of predation for nonspecialists and specialists alike. The speakers represent a wide array of disciplines including micropaleontology, marine invertebrate paleontology, paleontomology, vertebrate paleontology, and physical anthropology.

The course is subdivided into three parts: (1) methods, focused on analytical and sampling strategies used to acquire data on the fossil record of predation; (2) patterns, providing comprehensive review of the current knowledge of the fossil record of predation from protists to tetrapods; and (3) processes, offering up-to-date syntheses of the current understanding of the role of predator-prey interactions through the history of life, including their evolutionary, ecological, and behavioral implications. **Faculty:** Michal Kowalewski and Patricia H. Kelley. No fee or registration. Information: Michal Kowalewski, Department of Geological Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061, (540) 231-5951, fax 540-231-3386, michalk@vt.edu.

Professional Licensing for Geologists: How Does It Affect You?

Sat., Oct. 26, 9 a.m.–noon. Cosponsored by *Association for Women Geoscientists* and *GSA Engineering Geology Division*.

Most states require some form of licensing for geologists whose practice affects public health and safety. Learn about the pros and cons of licensing, the status of licensing laws, the legislative process, regulatory bodies, who must be licensed, suggested curricula, qualifications, and preparing for exams. The speakers are expert geologists who have guided the growth of licensure over 25 years.

Speakers: Robert A. Larson, Los Angeles County; Christopher C. Mathewson, Texas A&M University and Executive Director of the Association of Engineering Geologists; Janet S. Roemmel, SECOR International; William J. Siok, Executive Director of the American Institute of Professional Geologists; Robert E. Tepel, California State Mining and Geology Board. Limit: 50. Fees, professional: \$35, students \$15. Preregistration required by Oct. 21.

Information and registration: Mary L. Gillam, 115 Meadow Road East, Durango, CO 81301, 970-250-0966, gillam@rmi.net.

Digital Forum

Tues., Oct. 29, 8:30–11:30 a.m. Sponsored by *Geoscience Information Society*.

Each year, this forum provides a venue where scientists, information specialists, and publishers gather to discuss issues concerning electronic resources and to view new applications in electronic data for the earth scientist. No fee or registration. Open to all meeting registrants. Information: Adonna Fleming, James A. Michener Library, University of Northern Colorado, Greeley, CO 80639, (970) 351-1530, fax 970-351-2963, acflemi@unco.edu.

Job Hunting in the Geosciences

Tues., Oct. 29, 11 a.m.–1 p.m. Sponsored by *Association for Women Geoscientists*.

Learn the job-hunting skills necessary to survive in today's changing and challenging job market. These skills may be applied to jobs in government, industry, and academia. Topics include: how to search for advertised jobs in your area of specialty and network for the hidden job market; how to network through professional organizations as well as through casual contacts; how to write a résumé and curriculum vitae (AWG's excellent, moderately priced résumé-writing workbook for geoscientists will be available); and how to develop interviewing skills that will differentiate you from the competition. Limit: 100. No fee. Preregistration required by Oct. 21. For information and registration: Pranoti M. Asher, Department of Geology and Geography, Herty Building, Room 1100, Georgia Southern University, Statesboro, GA 30460-8149, (912) 681-0338, fax 912-681-0668, pasher@GaSoU.edu.

Visit the ODP Drillship *JOIDES Resolution*



Always wanted to tour the vessel used by scientists around the world for ocean drilling? The ODP drillship, *JOIDES Resolution*, will make its final two US port calls this summer, and we invite you to tour it. The port calls are scheduled to take place in San Francisco from July 8-12 and in San Diego from September 6-10. If you will be in the area and are interested in seeing the vessel, please contact Kasey White (kwhite@joiscience.org or 202-232-3900) for information on how to sign up for a tour.

You can also take a virtual tour on the web: www-odp.tamu.edu/public/onboard.html

Look for ODP and IODP booths and a Town Meeting at the GSA Fall Meeting!

IEE Workshop

Rational Science for Rational Policy: Geology in Service of Society Through Communications with Government and Media

Mon., Oct. 28, 8 a.m.–noon. Sponsored by *Institute for Earth Science and the Environment (IEE)*.

An audience-interactive discussion and lectures on first-things-first priorities in policy; consequences if geology is ignored; why geology is important to public policy; economic impacts of public policy participation by geoscience professionals; case studies; ethical considerations; balancing science and societal needs; and delivering the message. **Instructors:** Lee C. Gerhard, Kansas Geological Survey, University of Kansas, Lawrence, KS 66047-3726, (785) 864-3965, lgerhard@kgs.ukans.edu; Victor J. Yannacone, (516) 758-9468, v.yannacone@abanet.org. Limit: 50.

Free. Preregistration required (see the GSA Annual Meeting preregistration form on page 23).



Title Sponsor of the 2002 GSA Annual Meeting.

K-16 teachers, graduate students, and scientists: Please join us for an exciting and diverse series of workshops for educators at all grade levels. Plan to preregister to ensure your spot in the session of your choice. Meeting registration is required in addition to the course fee (\$40 registration for K-12 professionals or for week-end-only workshop participation). Graduate-level recertification credits from the Colorado School of Mines or the University of

Colorado will be offered to participants in the workshops for an additional fee and a written assignment. Credit information will be available at the workshops.

Look for the Share-a-thon in the Geoscience Education Division and Education Committee booths, #251-253, in the Exhibit Hall. If you would like to participate, please contact Julie Sexton, (303) 357-1005, jsexton@geosociety.org.

1. Exploring Plate Tectonics: A Hands-On Approach, Part I [601]

Sun., Oct. 27, 1:30-4:30 p.m. Cosponsored by *National Association of Geoscience Teachers* and *Tasa Graphics, Inc.*

During this active hands-on and inquiry-based workshop, we will explore evidence for the structure of lithospheric plates and investigate seafloor spreading. Maps and models (including the Plate Tectonics 3-D Puzzle) will be used throughout the session. Participants will receive a seafloor map poster and copies of the activities. Cost: \$10. Registration is required. Information: Leslie Reynolds Sautter, sautterl@cofc.edu.

2. Earthquakes—A One-Day Workshop for College Faculty [602]

Sun., Oct. 27, 8:30 a.m.-4:30 p.m.

This workshop is intended for college faculty (from two-year and four-year colleges and universities) who teach introductory earth science courses and who wish to learn more about earthquakes, seismology, and related plate tectonics for use in their teaching. Topics to be covered include: causes of earthquakes, earthquakes and plate tectonics, propagation of seismic waves, seismographs, earthquake locations, statistics and data, Earth's interior structure, and earthquake hazards. Lessons and activities that are associated with these topics, which also will be demonstrated and practiced during the workshop, emphasize hands-on and inquiry-based learning. The activities are suitable for use in introductory undergraduate earth science courses as demonstrations and laboratory exercises. About \$120 worth of materials (notebook with lessons and hands-on activities, maps, curriculum materials, earthquake book, posters, software and other teaching aids) will be provided to each participant. Cost: Free. Registration is required. Information: Larry Braile, braile@purdue.edu, (765) 494-5979.

3. GIS for Earth Science Educators

Sat., Oct. 26, 8 a.m.-noon.

ESRI is hosting two one-day geographic information systems (GIS) workshops for K-12, Community College, and University educators. The workshops will be taught in a hands-on computer lab environment, with one, possibly two students, assigned to computers. The one-day workshops will be taught in succession on the weekend before the Annual Meeting. Students will use ESRI GIS software, including ArcView 8.1, and ArcGIS Extensions Spatial Analyst and 3D Analyst to create maps, analyze data, and solve problems. Data used in both workshops includes real-world geological examples from locations such as Golden, Colorado, Death Valley, Nevada and California, Yucca Mountain, Nevada, Arches-Canyonlands, Utah, and the Sandia Mountains, New Mexico.

Workshop I: Introduction to GIS and ArcView 8.1 (ArcGIS) for Geoscience Education [603a]

Sat., Oct. 26, 8:30 a.m.-4 p.m.

Workshop I is an all-day workshop for educators new to GIS and those wishing to learn to use the new ArcView 8.1 (ArcGIS) software including ArcMap, ArcCatalog, and ArcToolbox. This workshop provides an overview of GIS applications in earth science education, hands-on activities ready for the classroom, and an introduction to current GIS theory and practice. Data sources for educators are presented and explored. This workshop is suited for educators at all levels (K-12, community colleges, and universities) with minimal GIS experience. Familiarity with the Microsoft Windows operating environment is helpful, although not necessary. Cost: \$40. Registration is required. Information: Mike Price, mprice@esri.com.

Workshop II: Hands-on GIS Workshop: Intermediate ArcGIS using Spatial, 3-D and Geostatistics Extensions [603b]

Sun., Oct. 27, 8:30 a.m.-4:30 p.m.

Workshop II is an all-day workshop targeting earth science educators familiar with basic GIS concepts and ArcGIS software (ArcMap, ArcCatalog, and ArcToolbox). It highlights ArcGIS extensions for geologic research and classroom teaching. Hands-on activities introducing spatial, 3-D and geostatistical extensions for geologic data visualization and advanced geospatial analysis. Spatial processes, including vector-to-raster interpolation and conversion, slope analyses, viewsheds, proximity calculation, and watershed definition are also introduced. Participants receive interactive training in these techniques, preparing them for effective use in their classroom or research. Cost: \$40. Registration is required. Information: Mike Price, mprice@esri.com.

4. Writing K-14 Grant Proposals to the National Science Foundation—A Workshop [604]

Sat., Oct. 26, 1:30-4:30 p.m.

Hour 1: Overview of NSF (focus is on NSF Education and Human Resources and Geosciences directorates), review of proposal contents and submittal process (lecture with visuals and materials). Hour 2: Break-out groups review one or two proposals (small group, cooperative, guided). Hour 3: Review of break-out groups' proposal evaluations, align outcomes with typical panel review (large group, participant reporting, directed discussion); then general Q&A (directed discussion). Cost: \$20. Registration is required. Information: Marilyn J. Suiter, msuiter@nsf.gov.

5. The Science of Rock Climbing: Geology and Physics [605]

Sat., Oct. 26, 8:30 a.m.–4:30 p.m.

Participants will learn how to incorporate climbing into science class by exploring how rock type, weathering, erosion, and geomorphology affect the climbing experience and how physics concepts such as friction help you climb and stop you from falling. Instruction will combine experiments, hands-on activities and interactive lecture with top-rock climbing instruction on the American Mountaineering Center's indoor climbing wall. Cost: \$50. Registration is required. Information: Lisa Gardiner, Education Specialist, gardil@cmc.org, (303) 279-3080, ext. 107.

6. Learning from the Fossil Record [606]

Sat., Oct. 26, 8:30 a.m.–5:30 p.m.

How have scientists used fossil evidence to reconstruct the past? How can teachers use students' interest in fossils to encourage them to be scientists themselves? Join paleontologists and educators from across North America for this full-day workshop of interactive, hands-on experiences in using paleontology to teach science. Highlights include: paleontology and scientific literacy, paleontology and the World Wide Web, paleontology from microfossils to dinosaurs, more than 25 classroom activities, and a complimentary copy of a 300-page book full of information, activities, and resources. Cost: \$25. Registration is required. Information: Judy Scotchmoor, University of California, Berkeley, Museum of Paleontology, Berkeley, CA 94720, (510) 642-4877, jscotch@unlink4.berkeley.edu.

7. Proposal Writing Strategies for Faculty at Primarily Undergraduate Institutions [607]

Sun., Oct. 27, 8:30 a.m.–4 p.m.

This workshop will present strategies and approaches for writing grant proposals. It is open to all, but is aimed at faculty who have never prepared a proposal or been successful with past proposal submission. The workshop will focus on proposal writing for research, laboratory and curriculum development at primarily undergraduate institutions. Presentations will include the rhetoric of the grant proposal, budget preparation, and expressing the role of

undergraduates in their work. Breakout sessions and group discussions will be used to: (1) review proposals draft, (2) develop individual plans, and (3) design departmental boiler-plate language for use in proposals. Intended for graduate students and college faculty. Cost: \$20. Registration required. Information: Lori Bettison-Varga, lbettison@acs.wooster.edu.

8. An NAGT Workshop for Graduate Students: Preparing for Teaching and Academic Career [608]

Sat., Oct. 26, 8 a.m.–4 p.m.

This workshop for graduate students interested in an academic career will include sessions on educational research about student learning, effective teaching strategies, academic jobs and job research, teaching statements and portfolios, and career planning. The workshop will also include a panel discussion with early career geoscience faculty. The instruction will be interactive, with short presentations by the presenters, discussions, small-group work, time for sharing by participants, and a panel presentation by two or three early career faculty members. Registration required. Cost: \$15. Information: Heather Macdonald, rhmack@wm.edu.

9. Online and Interactive But Not Inefficient: Creating Low-Maintenance Interactive Web Resources [609]

Sun., Oct. 27, 9 a.m.–4 p.m.

This workshop will briefly introduce the structure of HTML and JavaScript. Each participant will create their own set of customized Web resources, including two online quizzes (one multiple choice and one rating question) as well as a mouse-over animation. This will be done by providing program templates that you can edit, adapt, and paste into new Web pages (not to mention take home). Once you have made one of these resources, you can continue to create new resources based on your original model. You do not need experience with either HTML or JavaScript, but you must be comfortable with a text editor. To fully benefit from this workshop you should be able to produce simple graphics in the program of your choice. Registration required. Cost: \$50. Information Wayne Powell, wpowell@brooklyn.cuny.edu.

K–12 Field Trip:

Geological Reconnaissance of Dinosaur Ridge and Vicinity [610]

Sat., Oct. 26.

This trip is a geologic reconnaissance of the Rocky Mountain foothills at Dinosaur Ridge, outcrops in Red Rocks Park, and the Dakota Hogback. Regional geology will be reviewed. Other outcrops visited will include an oil seep, a fault, and a textbook example of a uranium roll front. Cost: \$27 (*K–12 Teachers ONLY*; remainder subsidized by GSA Geoscience Education Division). Registration is required. Information: Norb Cygan, (303) 660-9792, necygan@aol.com; "T" Caneer; Duff Kerr; Betty Rall; Bob Reynolds; Friends of Dinosaur Ridge, Morrison, Colorado.



Triassic Moenkopi-Shinarump contact, Dinosaur National Monument, Colorado. Photo by Martin Miller.

REGISTRATION

Registration

- ☉ Register online at www.geosociety.org.
- ☉ Register by **mail** to: 2002 GSA Annual Meeting, P.O. Box 9140, Boulder, Colorado 80301-9140.
- ☉ Register by **fax** at 303-357-1071 or 303-357-1072 (if using a credit card). If you register by fax, please do not send another copy in the mail.

Preregistration deadline: September 20

Cancellation deadline: September 27

The member fees apply to members of both GSA and GSA Associated Societies (listed on the form).

Registrations will not be processed unless full payment is received. Unpaid purchase orders are NOT accepted as valid registration. The confirmation sent by GSA will be your only receipt. You should receive it within two weeks after your registration is submitted.

A guest registration fee is available for a nongeologist spouse or friend of a professional or student registrant and is required for those attending guest activities, using the Guest Hospitality Suite, participating in formal guest tours, and visiting the Exhibit Hall. The guest registration fee will not provide technical session access. Any guest wishing to see a specific presentation should sign up with the hostess in the Guest Hospitality Suite.

Students: A CURRENT student ID is required to obtain student rates. You will have to pay the professional fee unless you have the ID.

Please register only one professional or student per form and retain a copy for yourself.

All registrations received after September 20 will be considered ON-SITE registrations and charged accordingly. Absolutely no registrations should be mailed or faxed after September 27. After this date we will handle registrations at the Convention Center during the registration hours listed below.

On-site fees for Professional Development Courses are an additional \$30.

As a special consideration, GSA is offering a discount rate to our members who are 70 years of age and older. Please write your membership number in the space provided, and be sure to bring a photo ID to ensure your discount.

CANCELLATIONS, CHANGES, AND REFUNDS

All requests for additions, changes, and cancellations must be made in writing and received by September 27. Faxes are accepted. GSA will refund or credit preregistration fees for cancellations received in writing by September 27. NO REFUNDS WILL BE MADE ON CANCELLATION NOTICES RECEIVED AFTER THIS DATE. Refunds will be mailed from GSA after the meeting. Refunds for fees paid by credit card will be credited according to the card number on the preregistration form. There will be NO refunds for on-site registration, *Abstracts with Programs* volumes, and ticket sales.

BADGES? YES, YOU NEED 'EM!

Badges are needed for access to ALL activities, 8 a.m., Sunday, October 27, through 5:30 p.m., Wednesday, October 30. If your registration form is received at GSA by September 20, your badge will be mailed to you two weeks before the meeting.

If you register after September 20, pick up your badge at the GSA Registration Desk, Colorado Convention Center.

HOW TO SAVE \$

GSA and GSA Associated Society members SAVE \$80 (professional) and \$30 (student) by preregistering.

Nonmembers SAVE an additional \$20 (professional) and \$20 (student) by joining GSA now. See section below on how to join.

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If you are not yet a GSA member, isn't it time you joined? There are two ways to join, and both ways save you money!

If you pay the nonmember registration rate for the full meeting AND complete your membership application at the meeting, you will receive complimentary membership for 2003. Just look for our Membership booth on-site in the Exhibit Hall.

OR

Join now, pay the lower member registration rate for the meeting, and take advantage of member benefits for the rest of 2002.

Professionals and students who join GSA save a substantial amount on their registration fee by paying the member rate. It's like joining GSA for free!

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REGISTRATION FEES

	Advance (by 9/20/02)		Onsite (after 9/20/02)	
	FULL MEETING	ONE DAY	FULL MEETING	ONE DAY
Professional Member	\$280	\$175	\$360	\$185
Professional GSA Member (70 or older)	\$225	\$120	\$300	\$130
Professional Nonmember	\$360	\$200	\$450	\$210
Student Member or Student Associate	\$90	\$60	\$120	\$60
Student Nonmember	\$120	\$75	\$150	\$75
Guest or Spouse	\$80	N/A	\$80	N/A
K-12 Professional	\$40	N/A	\$40	N/A
Field Trip or Course Only	\$40	N/A	\$40	N/A

ON-SITE REGISTRATION HOURS

Colorado Convention Center—Lobby A

Sat., Oct. 26 7 a.m.–4:30 p.m.

Sun., Oct. 27 7 a.m.–7:30 p.m.

Mon. and Tues., Oct. 28–29 7 a.m.–4:30 p.m.

Wed., Oct. 30 7–11 a.m.

Preregistration Form

GSA ANNUAL MEETING • DENVER
 Preregistration deadline: September 20 Cancellation deadline: September 27
 Register online at www.geosociety.org.

OCTOBER 27-30, 2002
 GUEST PROGRAM (P. 8)

GSA Member # _____

First Name _____ Last Name _____

Mailing address Is this a permanent address? Yes No Is this home or work

City _____ State or Province _____ ZIP or Postal Code _____ Country _____

E-mail _____ Daytime Phone _____ Fax _____

City Amount

14. Geomorphology of South Park (414) \$70

15. Dinosaur Ridge (415) \$70

16. Laramide Structure (416) \$65

17. Consequences of Hist. Coal Mining (417) \$80

18. Tepee Buttes (418) \$80

19. Tour of USGS Facilities (419) \$25

20. Permian-Triassic Depositional Systems (420) \$615

21. Characterizing Complex Geology (421) \$85

22. Living with Geology (422) \$65

23. Glenwood Caverns-Fairy Cave (423) \$95

24. Structural Geometry (424) \$75

Badge Information

First Name/Nickname _____ Last Name _____

School/Company _____ City/State/Prov. _____

Spouse/Guest First Name/Nickname _____ Last Name _____

SHORT COURSES (P. 17)

For CEU credit—Social Security #:

1. Anisotropy of Magnetic Susceptibility Professional (501) \$320

Student (501) \$300

2. Managing Environmental Projects Professional (502) \$300

Student (502) \$280

3. Abrupt Climate Changes Professional (503) \$240

Student (503) \$220

4. Estimating Rates of Groundwater Recharge Professional (504) \$275

Student (504) \$255

5. Laser Ablation CP-MS Professional (505) \$275

Student (505) \$255

6. Applied Contaminant Geochemistry Professional (506) \$250

Student (506) \$230

Do you or your guest require any special considerations? Yes No

Will you be working in the exhibit hall? Yes No

Preregistration Fees (US\$)

Professional Member* (10) \$280

Professional Member 70 or Older (12) \$225

Professional Nonmember (14) \$360

Student Member or Student Associate* (30) \$ 90

Student Nonmember (32) \$120

Guest or Spouse** (90) \$ 80

K-12 Professional (60) \$ 40

Short Course or Field Trip Only (95) \$ 40

SPECIAL EVENT (P. 5)

1. Dinner and Colorado Symphony, Sat. (201) \$85

TICKETED GROUP FUNCTIONS

1. G&PP Breakfast, Sat. (301) \$23

2. NAGT & GSA Geoscience Div. Lunch, Sun. (302) \$34

3. AWG Breakfast, Mon. Professional (303a) \$23

Student (303b) \$10

4. GIS Lunch, Mon. (304) \$34

5. History of Geology Lunch, Mon. (305) \$34

6. Paleontological Society Lunch, Mon. (306) \$34

7. MSA Lunch, Tues. (307) \$34

8. Eng. Geology Div. Lunch, Tues. (308) \$34

9. Hydrogeology Div. Lunch, Tues. (309) \$34

10. SEG Lunch, Tues. (310) \$34

11. MSA/GS Joint Reception, Tues. Professional (311a) \$10

Student (311b) \$5

12. NABGG Scholarship Awards Lunch, Wed. (312) \$34

Check member affiliation(s) (to qualify for registration member discount): (a) GSA (b) AASG (c) AASP (d) AEG (e) AESE (f) AGID (g) AIPG (h) AWG (i) CF (j) CUR (k) GIS (l) GS (m) HESS (n) MSA (o) NABGG (p) NAGT (q) NESTA (r) NGWA (s) PRI (t) PS (u) SEG (v) SEPM (w) SGE (x) SVP (y) GSL

*Member fee applies to any current Professional OR Student Member of GSA or Associated Societies listed above. Discount does not apply to guest registrants.
 **Guest or Spouse registration fee does not allow access to technical sessions.

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Payment by (check one): Check # _____ American Express VISA MasterCard Discover

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FIELD TRIPS (P. 11)

1. Geology of Green River Basin, Wyo. (401) \$315

2. Jurassic Dinosaur, Bighorn Basin, Wyo. (402) \$495

3. Cleanup at Summitville (403) \$280

4. High Plains to Rio Grande Rift (404) \$225

5. Key Rocks and Seminal Thinkers (405) \$220

6. Incision-Driven Evaporite Tectonism (406) \$160

7. Evolution of Proterozoic Shear Zones (407) \$185

8. Neotectonics, Rio Grande Rift, Southern Colorado (408) \$170

9. Structure and Stratigraphy, Borehole Image Logging (409) \$160

10. Debris Flows, I-70 Corridor (410) \$95

11. Eco-Geo Hike, Dakota Hogback (411) \$85

12. Eco-Geo Hike, Dakota Hogback (412) \$35

13. Enviro. & Eng. Geology, I-70 Corridor (413) \$65

Total Column A \$ _____

Total Column B \$ _____

TOTAL FEES REMITTED \$ _____

IEE-SPONSORED WORKSHOP (P. 19)

1. Rational Science for Rational Policy (550) FREE

K-16 WORKSHOPS AND FIELD TRIP (P. 20)

1. Exploring Plate Tectonics (601) \$10

2. Earthquakes for College Faculty (602) FREE

3a. Intro to GIS & ArcView 8.1 (603a) \$40

3b. Intermediate ArcGIS (603b) \$40

4. NSF K-14 Grant Writing (604) \$20

5. Science of Rock Climbing (605) \$50

6. Learning from Fossil Record (606) \$25

7. Proposal Writing Strategies (607) \$20

8. NAGT Preparing for Teaching (608) \$15

9. Low Maintenance Interactive Web (609) \$50

10. Dinosaur Ridge Field Trip (K-12 only) (610) \$27

Total Column C \$ _____

Total Column B \$ _____

Total Column A \$ _____

WORKSHOPS AND FIELD TRIP (P. 20)

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10. Dinosaur Ridge Field Trip (K-12 only) (610) \$27

Signature _____

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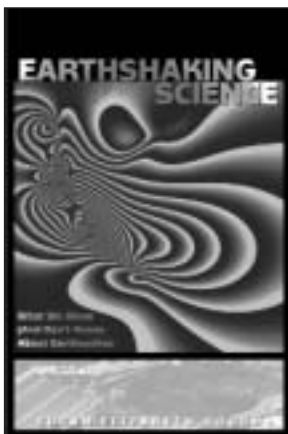
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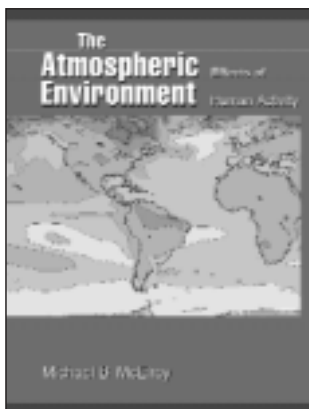
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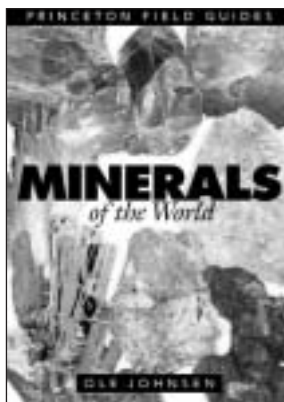
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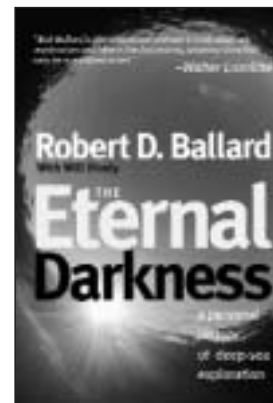
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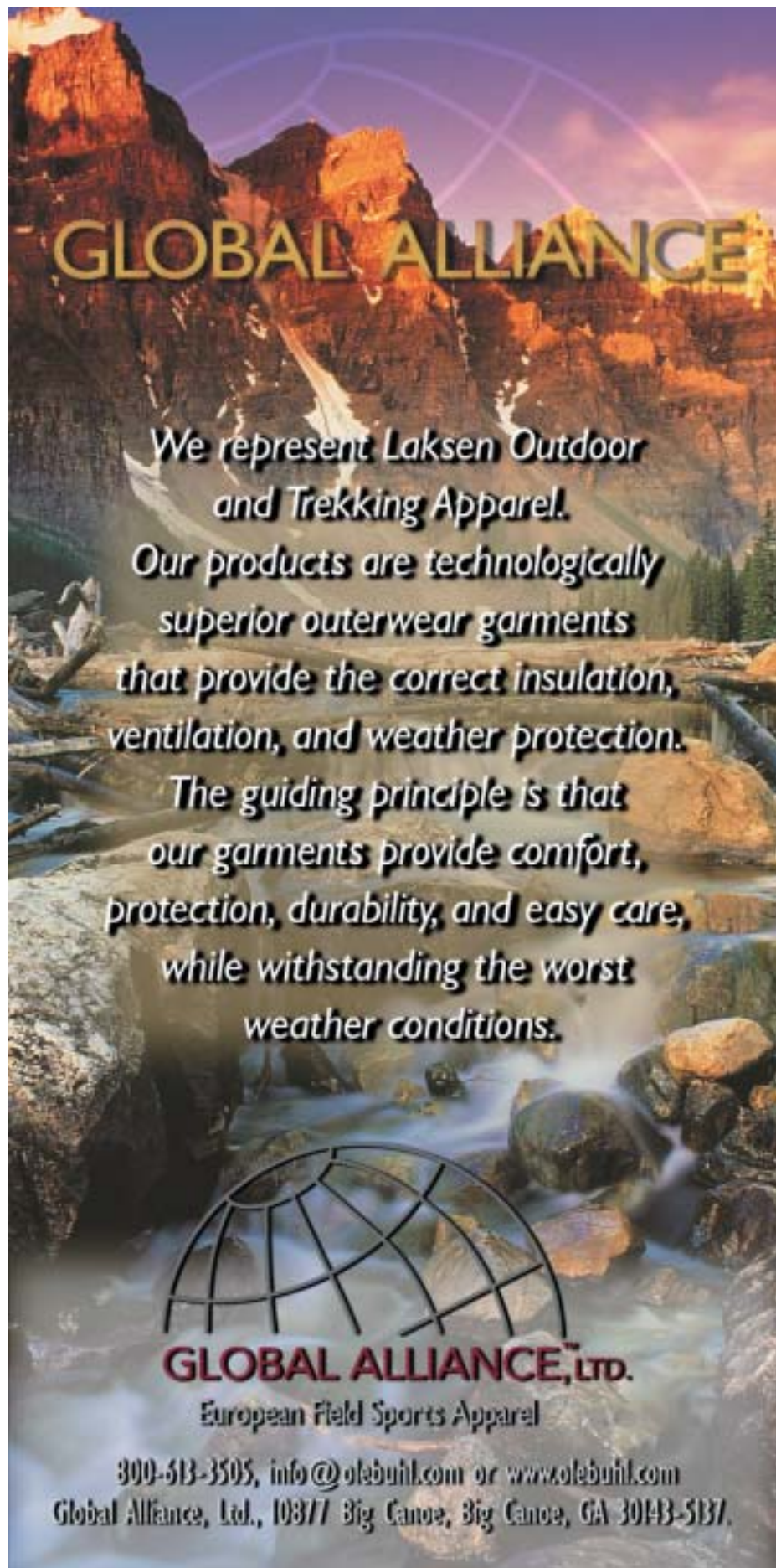
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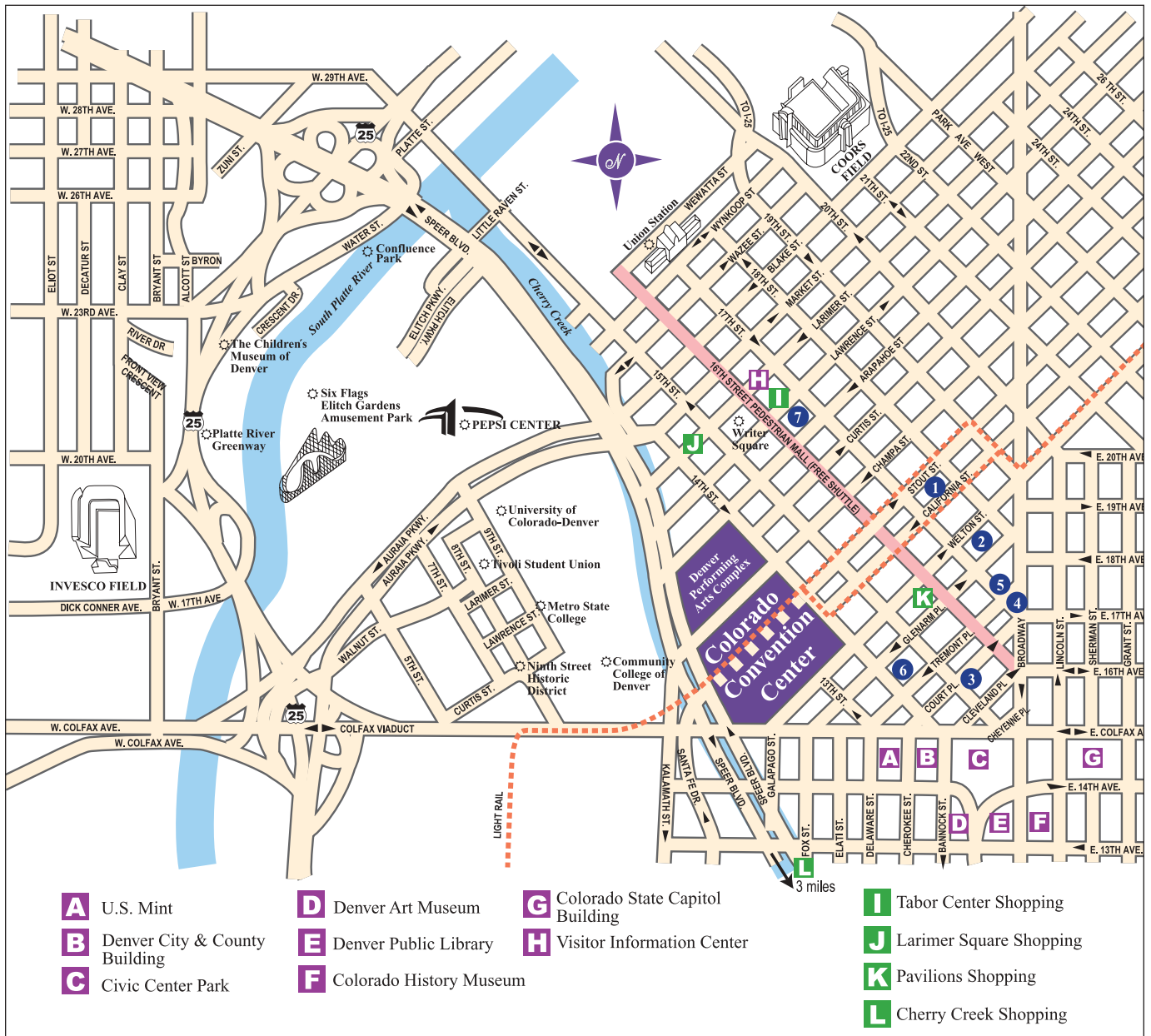
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GSA 2002 Annual Meeting & Exposition—Denver Hotels



DENVER HOTELS	RATES (SINGLE/DOUBLE)	NO. ON MAP	DISTANCE TO COLORADO CONVENTION CENTER
Marriott City Center*	\$155/\$174	①	4 blocks
Hyatt Regency Hotel*	\$140/\$157	②	4 blocks
Adam's Mark Hotel	\$155/\$170	③	4 blocks
Brown Palace Hotel	\$156/\$178	④	5 blocks
Comfort Inn Downtown	\$106/\$116	⑤	5 blocks
Holiday Inn	\$105/\$115	⑥	1.5 blocks
Westin Tabor Center	\$137/\$137	⑦	4 blocks

*co-headquarters hotel

Denver Hotel Features

The **Adam's Mark Hotel** Denver, the largest hotel in Colorado, is located on the 16th Street Mall, four blocks from the Colorado Convention Center. Amenities: work desk, color TV, in-room movies, phone with voice mail, room service, full-service business center, health club, the Supreme Court Lounge, Trattoria's & Bravos Restaurant, Players Sports Bar, and Capital Lounge.

A 109-year-old luxury landmark, **The Brown Palace Hotel** is steps from the free 16th Street Shuttle, and five blocks from the convention center. Amenities: two phones (with fax/modem and voice mail), movies on demand, iron and ironing board, plush terry robes, full-service concierge, valet parking, fitness center, 24-hour room service, hair salon, cigar bar, four restaurants.

The **Comfort Inn Downtown**, five blocks from the convention center and one block from the 16th Street Mall, features affordable, newly remodeled guest rooms (one- and two-bedroom suites also available). Amenities: cable TV, room service, same-day laundry and valet service, complimentary continental breakfast, and dining (across second-floor skywalk in the award-winning restaurants of The Brown Palace).

Delight in the comfort and hospitality of the **Holiday Inn Denver Downtown**, the closest hotel to the convention center. The hotel offers restaurant and room service from 6:30 a.m. until 11 p.m. Conveniently located within walking distance of restaurants, shopping, and entertainment.

Four blocks from the convention center, the **Hyatt Regency Denver** offers 511 of the region's largest guest rooms. Amenities: three telephones with computer modem capabilities and voice mail, coffee maker, hair dryer, iron, ironing board, cable TV, HBO, Spectra Vision, indoor pool, health club, and full-service restaurant. A magnificent 20-foot sandstone fireplace is a lobby focal point.

Four blocks from the convention center, the Denver **Marriott City Center** offers guest rooms with an array of amenities, including two telephones, spectacular views, and room service. The Marriott houses Allie's American Grille, Tabernash Pub, a coffee bar, Pizza Hut, an indoor swimming pool, weight room, whirlpool and sauna.

The award-winning **Westin Tabor Center**, located four blocks from the convention center, offers spacious guest rooms. Amenities: the four-diamond Augusta Restaurant, 24-hour room service, indoor-outdoor pool, racquetball courts, and health club. Over 70 shops and restaurants are in the attached Tabor Center. Historic Larimer Square is two blocks from the hotel.

For complete details and to view the hotels, go to the online Hotel Reservation Form at www.geosociety.org.

Plan to Learn More Modeling Skills during Your GSA Trip

PRACTICAL SIMULATION OF VARIABLE-DENSITY FLOW, SOLUTE TRANSPORT, AND SEAWATER INTRUSION

October 21 - 25, 2002 – By Dr. Clifford Voss and Dr. Craig Simmons

The aim of this course is to familiarise attendees with: 1) the basics of solute transport processes for both constant and variable-density flow, 2) numerical aspects of simulating constant and variable-density flow with solute transport, 3) setting up, running, post-processing and evaluating flow and transport models, and 4) practical aspects of transport modeling and case studies. Attendees will learn to run a variable-density flow and solute transport simulator (U.S. Geological Survey's SUTRA code) using a graphical interface.

MODFLOW: INTRODUCTION TO NUMERICAL MODELING

October 23 - 26, 2002 – By Dr. Eileen Poeter

This course is designed for the hydrogeologist and environmental engineer familiar with ground-water flow concepts, but who have limited or no experience with ground-water flow modeling. Basic modeling concepts: conceptual model development, definition of boundary and initial conditions, parameter specification, finite-differencing, gridding, time stepping, and solution control using MODFLOW-2000 and UCODE. Basic modules of MODFLOW are explained and concepts are reinforced with hands-on exercises. Calibration is presented via the public domain universal inversion code, UCODE.

UCODE: UNIVERSAL INVERSION CODE FOR AUTOMATED CALIBRATION

October 25 - 26, 2002 – By Dr. Eileen Poeter

If you have a working knowledge of ground-water flow modeling and some knowledge of basic statistics, you will benefit the most from this short course. This course introduces to ground-water professionals to inverse modeling concepts and their use via UCODE, relying heavily on hands-on exercises for automatic calibration of ground-water models to promote understanding of UCODE and avoid "black-boxing."

SUBSURFACE MULTIPHASE FLUID FLOW AND REMEDIATION MODELING

October 31 - November 1, 2002 – By Dr. John McCray

This course presents approaches and modeling tools for solving realistic subsurface multiphase-flow problems related to vadose-zone and saturated-zone transport and remediation. The course begins with a detailed conceptual and mathematical description of multiphase fluid flow and interphase partitioning of organic chemicals between phases. A graphical user interface for T2VOC, Petrasim, by Thunderhead Engineering, will be used in this course.

PHREEQC MODELING: THE BASICS

October 31 - November 1, 2002 – By Dr. Geoffrey Thyne

This course uses a hands-on approach to teaching. Students will learn environmental applications of modeling through a series of short lectures followed by problem sessions directly related to the lecture. Problems are designed to provide a review of basic geochemical principles, specifically by using the PHREEQC code. Lectures are interspersed with modeling sessions to discuss and reinforce the geochemical and modeling concepts set forth in class problems.

For more information, contact: [International Ground-Water Modeling Center](http://www.igwmc.org)



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HOTEL PREFERENCE (please write out hotel name)

1. _____
2. _____
3. _____

If hotel choices are unavailable, which is more important? RATE LOCATION

TYPE OF ACCOMMODATIONS REQUESTED (circle correct number)

NUMBER OF PEOPLE: 1 2 3 4 NUMBER OF BEDS: 1 2

REQUEST ROLLAWAY BED REQUEST NON-SMOKING REQUEST WHEELCHAIR ACCESSIBLE ROOM

LIST OTHER ACCOMMODATIONS NEEDED: _____

All reservations require a one-night room and tax deposit. By sending in this form, you agree to the hotel charging your credit card for this deposit, or you will **send a check directly to the HOTEL** upon receipt of the official housing acknowledgment. You also understand that if you do not send a deposit or provide a credit card, your reservation will be canceled. **DO NOT SEND DEPOSIT CHECK TO THE HOUSING BUREAU OR GSA.**

INDICATE FORM OF PAYMENT: American Express Visa MasterCard by check made payable to hotel

(If paying by check, send check directly to hotel upon receipt of the official housing acknowledgment. Do not send any checks to the Housing Bureau or GSA.)

NAME AS APPEARS ON CARD: _____

CARD NUMBER _____ EXP. DATE: _____

SIGNATURE: _____

All reservations must be processed through the Denver Housing Bureau. TELEPHONE RESERVATIONS WILL NOT BE ACCEPTED. If you are sharing a room, send only one form with the names of all persons occupying the room. The Housing Bureau will acknowledge reservations within 5–7 days of receipt of this form. Only reservations received by the Housing Bureau by September 27, 2002, will be processed. Reservations are assigned on a first-come, first-served basis and according to room availability. Changes and cancellations prior to September 27, 2002, may be phoned in to the Housing Bureau.



AIR TRAVEL

Denver International Airport (DIA) is the largest airport in the nation and one of the largest in the world. DIA is located 24 miles northeast of downtown Denver.

The following airlines have been contracted to provide convention rates to and from Denver for the GSA Annual Meeting & Exposition. You can save up to 20% on published airfares by booking through the group reservation desks at the numbers listed below.

FRONTIER AIRLINES

1-800-908-9068

Ticket Designator #: G368

Frontier Airlines is offering discounts of 10% off restricted fares, 15% off unrestricted fares, and an additional 5% discount will be given if the ticket is booked and ticketed 21 days or more prior to the travel date. Discount applies only to tickets with a base amount of \$225.00 or more. Call 1-800-908-9068 and reference Ticket Designator Number G368.

UNITED AIRLINES

1-800-521-4041

Meeting ID #: 594SX

United is offering a 10% discount off the unrestricted, fully refundable coach fare or 5% discount off the lowest applicable fares, including first class, to all attendees of the GSA Annual Meeting. An additional 5% discount will apply when tickets are purchased at least 60 days in advance of the attendee's travel. This special offer applies to travel on domestic segments of all United Airlines, United Express and Shuttle by United flights. United's convenient schedule and discounted fares are available through United's Meeting Desk or your travel agent. Call 1-800-521-4041 and reference Meeting ID Number 594SX. Dedicated reservationists are on duty seven days a week, 8 a.m.–10 p.m. EST.

TRANSPORTATION OPTIONS TO AND FROM DIA

DIA Ground Transportation Information counters are located on the 5th level of the main terminal, near the baggage claim. The 5th level also has the airport car rental desks, commercial shuttle desks, and baggage claim. Taxis can be found outside of baggage claim near the sidewalks. For more information, contact DIA's Ground Transportation Information Center at (303) 342-4059.

CAR RENTAL

Alamo Rent-A-Car 1-800-732-3232 or www.alamo.com

Group ID #: 699477

Plan Code: GR

Alamo Rent-A-Car will provide convention rates from \$30/day to \$109/week and up, with no charge for an additional driver. Call Alamo's 800 number or book online to make your car rental reservations.

SHUTTLE SERVICE

To arrange commercial shuttle transfer from the airport to/from the hotels, purchase ticket inside the main terminal, 5th level, at the shuttle company transportation desk.

SuperShuttle: (303) 370-1300, (800) BLUE-VAN (258-3826) or (800) 525-3177, www.supershuttle.com. Shuttles operate daily from 4:30 a.m. to midnight serving all downtown hotels to and from DIA for \$18 each way or \$28 round-trip (special round-trip rate for the GSA Meeting; please bring coupon that will be printed in the October issue of *GSA Today*). Travel time is 45 minutes to one hour depending on hotel and number of stops. To arrange passage, stop at the SuperShuttle counter on the 5th level at the airport or order from a hotel doorman.

TAXIS

East Terminal—exit door 507; West Terminal—exit door 510.

Freedom Cab: (303) 292-8900—up to 4 people per cab

Metro Taxi: (303) 333-3333—up to 5 people per cab

Yellow Cab: (303) 777-7777—up to 5 people per cab

Rates:

DIA to downtown, flat rate of \$45.00

Around downtown, \$1.60 to start, \$1.60 per mile

WHEELCHAIR-ACCESSIBLE BUSES, SHUTTLES, TAXIS OR VANS

All of RTD's SkyRide buses are wheelchair accessible. SuperShuttle, Yellow Taxi, and Metro Taxi have wheelchair-accessible vehicles and can provide assistance for limited numbers with prior notice and reservations. The following companies will pick up with prior notice at DIA and provide specialized transportation: Mobility Transportation and Service Inc.: (303) 295-3900
Mobile Access: (303) 274-9895
Wheelchair Getaways: (303) 674-1498 (Rent vans—\$89.00/day)
Regional Transportation District (RTD) (303) 299-6000 (Wheelchair Accessible) public buses are available outside Level 6, exit door 613 in the East Terminal. Route information is available at the RTD booth on Level 5. Downtown Denver is serviced by Route AF. Routes AS, AB, and AF serve Stapleton Transit Center, where transfers to seven local routes are available.

TRANSPORTATION OPTIONS IN DENVER

GSA will NOT be providing shuttle service from the hotels to the convention center this year, but Denver does have the following inexpensive—or free!—options for getting around downtown. The Light Rail is available from some downtown hotels and drops you off directly in front of the Colorado Convention Center. Alternative arrangements to/from the GSA hotels and the Colorado Convention Center will be provided by GSA for the elderly or disabled. For more information, contact Tammy White, twhite@geosociety.org, (303) 357-1041.

LIGHT RAIL

Denver's Light Rail runs from some downtown Denver hotels to the Colorado Convention Center, to the suburbs, Invesco Field at Mile High, the Pepsi Center, and much more. Catch the "C Line" to LoDo or the "D Line" to the heart of Downtown Denver. Hop on the 16th Street free shuttle bus at Union Train Station or at bus stops all along the 16th Street Mall. Get off at the Market Street Station and transfer to another RTD bus, or take SkyRide to the airport.

You must have a validated ticket before you board Light Rail. To purchase a ticket, use the stainless-steel ticket vending machines (TVMs) located at each station. Your ticket will be automatically validated with the date and time when you purchase it from the machine. For more information call (303) 628-9000 or visit them at www.rtd-denver.com.

PUBLIC BUSES

The Regional Transportation District (RTD) of Denver provides one of the country's finest public transportation systems. The Market Street Station is located at 16th Street and Market. For complete RTD route information throughout the Denver Metro area, call (303) 299-6000 or visit them at www.rtd-denver.com.

16TH STREET PEDESTRIAN MALL SHUTTLE BUS

The 16th Street Mall is located between Market and Broadway Streets in the heart of downtown Denver, just two blocks from the Colorado Convention Center. This mall is a 14-block-long pedestrian promenade built of granite blocks in various shades of gray, rose, and pink. 16th Street is lined with shops, restaurants and cafes, trees, street performers, cart vendors, and a sculpture that doubles as a chessboard. The 2,000 chairs and benches set along the mall near fountains and flowers make it the perfect place to sit and watch Denver walk by. Traffic is banned from this street except for the shuttle buses. The 16th Street Mall Shuttle is a free service that runs in a continuous loop up and down 16th Street. The buses run every 1 to 2 minutes from 6 a.m. – 10:30 p.m. and every half-hour until 12:55 a.m. It's a perfect way to get from the hotels to the restaurants and entertainment in "LoDo," the Lower Downtown. So, hop on the buses for a free ride. It also is a great connection to the Market Street Station for regional buses to the entire area, including Boulder.

General Meeting Information

ACCESSIBILITY FOR REGISTRANTS WITH SPECIAL NEEDS

GSA is committed to making the Annual Meeting accessible to all people interested in attending. If you need auxiliary aids or services because of a disability, check the appropriate box on the registration form. If you have suggestions or need further information, contact Kevin Ricker at kicker@geosociety.org, (303) 357-1090. Please let us know your needs by September 27.

TOURIST INFORMATION

For general information about sightseeing, accommodations, restaurants, and shopping, visit www.denver.org, or see the GSA Meetings and Excursions section at www.geosociety.org for additional area information.

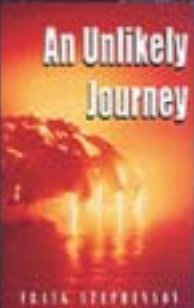
WEATHER AND CLIMATE

Denver is located just east of a high mountain barrier and a long distance from any moisture source. Denver has a mild, dry, and arid climate. The average temperature in October is 66°F for a high, and 36°F for a low, with only 0.98 inches of precipitation for the month. Denver normally records over 300 days of sunshine a year.

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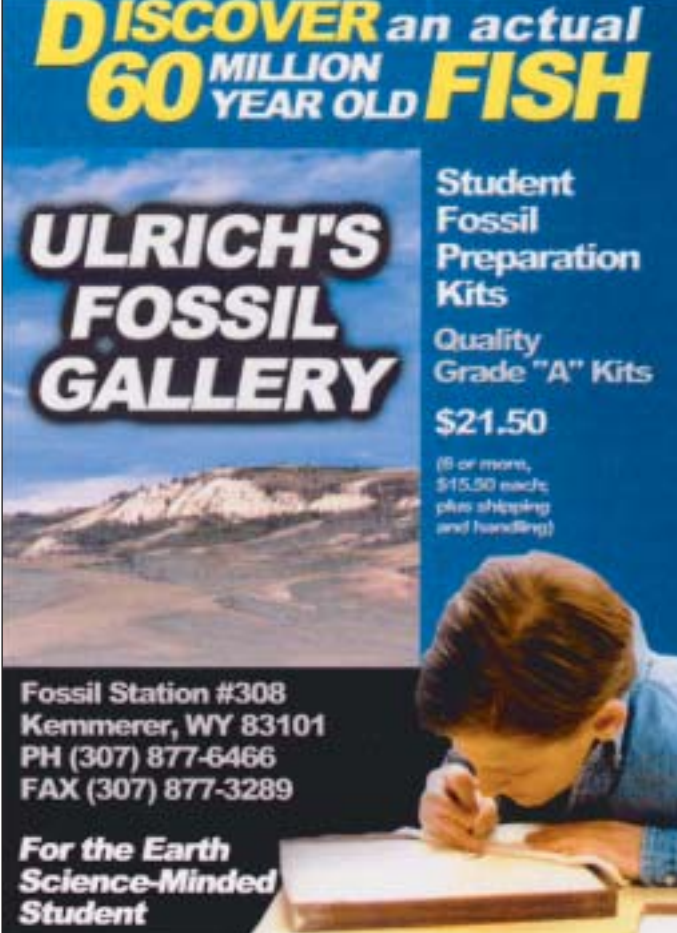
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The author has been a registered professional engineer since 1971 and is co-owner of Hyperion International Technologies, LLC, Tempe, Arizona.

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Robert G. Johnson

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TECHNOLOGY, APPLICATION AND POLICY



Authors: M Brown, B Barley, H Wood

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Invited Papers

The Pardee Keynote Symposia, made possible by a grant from the Joseph T. Pardee Memorial Fund, are special events of broad interest to the geoscience community. They represent topics on the leading edge in a scientific discipline or area of public policy, address broad fundamental issues, and are interdisciplinary. Selection was on a competitive basis. This year's seven Pardee Keynote Symposia were reviewed and accepted by the Annual Program Committee. **(All speakers are invited.)**

K1 Earth Sciences Challenges in the National Problem of High-Level Radioactive Waste Disposal

John S. Stuckless, Evergreen, Colo.; William W. Dudley, Lakewood, Colo. Mon., Oct. 28, 8 a.m.–noon.

This session examines major issues regarding the geologic and hydrologic suitability of a mined geologic nuclear-waste repository and confidence in predictive modeling of natural components of the repository system.

K2 Evolution of the Early Atmosphere, Hydrosphere, and Biosphere: Constraints from Ore Deposits

Society of Economic Geologists; Geochemical Society; NASA Astrobiology Division. Hiroshi Ohmoto, Astrobiology Research Center, University Park, Penn.; Stephen Kesler, University of Michigan, Ann Arbor, Mich. Tues., Oct. 29, 8 a.m.–noon.

Review of the role of new information on banded iron formation, uranium-bearing conglomerate, and laterite and exhalative deposits, and their role in constraining estimates of the composition of early Earth's atmosphere, hydrosphere, and biosphere.

K3 Flood Hazard on Dynamic Rivers: Human Modification, Climate Change, and the Challenge of Non-Stationary Hydrology

GSA Quaternary Geology and Geomorphology Division; American Geological Institute. Nicholas Pinter, Southern Illinois University, Carbondale, Ill.; Jeffrey F. Mount, University of California, Davis, Calif. Wed., Oct. 30, 1:30–5:30 p.m.

Geomorphic and hydrologic evidence suggests that many rivers worldwide are dynamic, not static, systems. This change is manifested on some rivers by systematic increases in flooding. Themes of the symposium include: documenting hydrologic change, human magnification of flooding, climate change, and flood-frequency assessment in dynamic systems.

K4 Geologic and Ecologic Responses to Landscape Disturbances

GSA Quaternary Geology and Geomorphology Division. Jon J. Major, U.S. Geological Survey, Vancouver, Wash.; Frederick J. Swanson, Oregon State University, Corvallis, Ore. Sun., Oct. 27, 8 a.m.–noon.

This session is intended to expand the awareness of practicing scientists, educators, and land managers on the commonalities and differences that exist among landscape responses to a spectrum of disturbances and to highlight the symbiosis that exists between physical and ecological responses.



Colorado National Monument, Fruita, Colorado; Book Cliff View. Photo by Susan Meng.

K5 The Role of the Earth Sciences in Fostering Global Equity and Stability

GSA International Division; U.S. National Committee for the Geological Sciences; U.S. National Committee for Geodesy and Geophysics. Eldridge M. Moores, University of California, Davis, Calif.; W.G. Ernst, Stanford University, Stanford, Calif.; Grant H. Heiken, Los Alamos, N.Mex.; Susan M. Landon, Golden, Colo.; P. Patrick Leahy, U.S. Geological Survey, Reston, Va. Mon., Oct. 28, 1:30–5:30 p.m.

This session will bring together a broad spectrum of earth scientists, policy makers, and ethicists to discuss the role of the earth sciences in achieving a global sustainable society, global equity, and stability.

K6 There and Back Again: Terrestrial Approaches to Extraterrestrial Problems

GSA Planetary Geology Division. Tracy K.P. Gregg, University at Buffalo, State University of New York, Buffalo, N.Y.; Louise Prockter, Johns Hopkins University Applied Physics Lab. Wed., Oct. 30, 8 a.m.–noon.

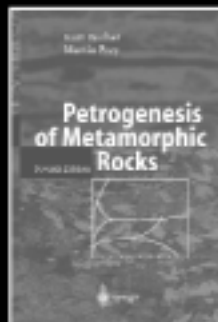
A diverse group of planetary and terrestrial scientists brought together to discuss extraterrestrial dilemmas and their terrestrial analogs. Topics include oceans, life, volcanism, and tectonism on the terrestrial planets.

K7 Toward a Better Understanding of the Complicated Earth: Insights from Geologic Research, Education, and Cognitive Science

National Association of Geoscience Teachers. Cathryn A. Manduca, Carleton College, Northfield, Minn.; David W. Mogk, Montana State University, Bozeman, Mont. Tues., Oct. 29, 1:30–5:30 p.m.

Geoscientists integrate visual, theoretical, experimental, and model data in complicated ways to understand Earth. This session addresses how we can increase our ability to learn about Earth by better understanding the learning process. Discussion will focus on maps, visualizations, and models as learning tools for researchers and students.

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Topical Sessions

Below is a listing of all approved Topical Sessions. These sessions are topically focused with a mix of invited and volunteered papers. Sessions are designed to promote the exchange of interdisciplinary, state-of-the-art information. Papers can be submitted to a specific topical session, and may choose up to three scientific categories. After each topical description below, the categories are identified as they appear on the abstract form. PLEASE SUBMIT ONLY IN THE MODE (oral or poster) AND CATEGORIES INDICATED in the description. An abstract submitted in the incorrect mode will be transferred automatically to a discipline session.

TOPICAL SESSIONS

T1 Application of GIS and Remote Sensing to Archaeological Geology

GSA Archaeological Geology Division. William C. Johnson, University of Kansas, Lawrence, Kans.; Kenneth L. Kvamme, University of Arkansas, Fayetteville, Ark. ORAL

Archaeological Geology; Remote Sensing/Geographic Info System; Quaternary Geology/Geomorphology

T2 Nature, Effects, and Control of Groundwater at Archaeological Sites

GSA Archaeological Geology Division; GSA Hydrogeology Division. David P. Gold and Richard R. Parizek, Pennsylvania State University, University Park, Penn. ORAL and POSTER

Archaeological Geology; Hydrogeology; Engineering Geology

T3 Obsidian Sources and the Distribution of Archaeological Sites from These Sources

GSA Archaeological Geology Division. Mark L. Howe, Arizona State University, Tempe, Ariz. ORAL and POSTER

Archaeological Geology

T4 Coal Resource and Utilization Issues

GSA Coal Geology Division; The Society for Organic Petrology (TSOP).

Peter D. Warwick and Margaret S. Ellis, U.S. Geological Survey, Reston, Va. ORAL and POSTER

Coal Geology; Economic Geology

T5 Wetlands Paleoecology Through Time

GSA Coal Geology Division; Paleontological Society. Stephen F. Greb, Kentucky Geological Survey, Lexington, Ky.; William A. DiMichele, National Museum of Natural History, Washington, D.C. ORAL and POSTER

Coal Geology; Paleontology/Paleobotany

T6 Chemostratigraphy: An Emphasis on Metal-Rich Black Shale Deposits

Department of Geography and Environmental Planning, Elmhurst College, GSA Sedimentary Geology Division, Society for Sedimentary Geology. Richard B. Schultz, Elmhurst College, Elmhurst, Ill. ORAL and POSTER

Economic Geology; Stratigraphy; Geochemistry, Organic

Abstracts Deadline: July 16

Please use the online electronic abstract form found on the GSA Web site. An abstract submission fee will be charged. The fee is \$15 for all students; \$25 for all others. If you cannot submit your abstract electronically, contact Nancy Carlson, (303) 357-1061, ncarlson@geosociety.org.

Discipline Sessions

From the list found on the abstract form, you may choose up to three discipline categories you feel your abstract would best fit. The JTPC representatives organize the papers in sessions focused on disciplines—for example, environmental geoscience or mineralogy.

T7 Diverse Origins of Sedimentary Rock-Hosted Disseminated Gold Deposits: A Global Perspective

Society of Economic Geologists; U.S. Geological Survey. Albert H. Hofstra, U.S. Geological Survey, Denver, Colo. ORAL and POSTER
Economic Geology

T8 Evolution of the Early Atmosphere, Hydrosphere, and Biosphere: Constraints from Ore Deposits

Society of Economic Geologists, Geochemical Society, NASA Astrobiology Division, GSA Geobiology and Geomicrobiology Division. Hiroshi Ohmoto, Astrobiology Research Center, University Park, Penn.; Stephen Kesler, University of Michigan, Ann Arbor, Mich. ORAL

Economic Geology; Geochemistry, Other; Paleoclimatology/Paleoceanography

T9 Mining in the Twenty-First Century: Meeting the Environmental Challenges

Society of Economic Geologists. Craig A. Johnson, U.S. Geological Survey, Denver, Colo.; Murray W. Hitzman, Colorado School of Mines, Golden, Colo.; Geoffrey S. Plumlee, U.S. Geological Survey, Denver, Colo. ORAL

Economic Geology; Environmental Geoscience; Geochemistry, Other

T10 Role of Mafic Magmas in the Generation of Porphyry Copper Deposits

Society of Economic Geologists. Alexandra Skewes, University of Colorado, Boulder, Colo.; Jeffrey Keith, Brigham Young University, Provo, Utah. ORAL

Economic Geology; Petrology, Igneous; Volcanology

T11 Society of Economic Geologists Special Session: The Global Tectonic Setting of Ore Deposits—Present Understanding and New Advances

Society of Economic Geologists. Richard J. Goldfarb and Carol Finn, U.S. Geological Survey, Denver, Colo. ORAL

Economic Geology; Tectonics

T12 The Changing Vision of Marine Minerals

Society of Economic Geologists. Peter A. Rona, Rutgers University, New Brunswick, N.J.; David S. Cronan, Imperial College, University of London, London, UK. ORAL

Economic Geology; Marine/Coastal Science; Geomicrobiology

T13 Case Studies in Landslide Problem Solving, Landslide Monitoring, and Alarm Methodology: In Honor of David J. Varnes

GSA Engineering Geology Division; Association of Engineering Geologists. Lynn Highland, U.S. Geological Survey, Denver, Colo.; Scott Burns, Portland State University, Portland, Ore. ORAL
Engineering Geology; Environmental Geoscience; Quaternary Geology/Geomorphology

T14 Integrated Studies of the Effects of Abandoned Mines on the Environment

GSA Engineering Geology Division; GSA Hydrogeology Division. Katherine Walton-Day, U.S. Geological Survey, Denver, Colo.; Mary W. Stoertz, Ohio University, Athens, Ohio; Joseph J. Donovan, West Virginia University, Morgantown, W.Va.; David A. Nimick, U.S. Geological Survey, Helena, Mont.; Stanley E. Church, U.S. Geological Survey, Denver, Colo. ORAL

Environmental Geoscience; Geochemistry, Aqueous; Hydrogeology

T15 Decay and Conservation of Stone Buildings and Monuments

GSA Engineering Geology Division; Stone Weathering and Atmospheric Network. Alice V. Turkington, University of Kentucky, Lexington, Ky.; Mark Liebman, AMEC Earth and Environmental Inc., Kirkland, Wash. ORAL

Engineering Geology; Environmental Geoscience; Archaeological Geology

T16 Evaporite Karst and Engineering and Environmental Problems in the United States

GSA Engineering Geology Division; GSA Hydrogeology Division; GSA Quaternary Geology and Geomorphology Division. Kenneth S. Johnson, Oklahoma Geological Survey, Norman, Okla.; James T. Neal, Prescott, Ariz. ORAL and POSTER

Engineering Geology; Environmental Geoscience; Hydrogeology

T17 Bentonitic Claystone—Geologic Hazards, Engineering Properties, and Land-Use Issues

GSA Engineering Geology Division; Association of Engineering Geologists, Rocky Mountain Section. Stephen Hart, Colorado School of Mines, Lakewood, Colo.; David Noe, Colorado Geological Survey, Denver, Colo. ORAL

Engineering Geology; Geoscience Information/Communication; Public Policy

T18 Geohazards and Transportation Routes

GSA Engineering Geology Division. John F. Shroder, University of Nebraska, Omaha, Nebr. ORAL

Engineering Geology; Quaternary Geology/Geomorphology

T19 Groundwater and Hardrock Mining

GSA Hydrogeology Division; International Association of Hydrogeologists. Mike Wireman, Carol Russell, and John Moore, U.S. Environmental Protection Agency Region 8, Denver, Colo. ORAL and POSTER

Geochemistry, Aqueous; Hydrogeology; Environmental Geoscience

T20 Humans as a Geologic Agent: In Honor of George Kiersch

GSA Engineering Geology Division. Judy Ehlen, USA Engineer Research and Development Center, Alexandria, Va.; William C. Haneberg, Haneberg Geoscience, Port Orchard, Wash.; Robert A. Larson, Los Angeles County Department of Public Works,

Alhambra, Calif. ORAL

Engineering Geology; Environmental Geoscience; Quaternary Geology/Geomorphology

T21 Remote Sensing and Geographic Information Systems in the New Millennium: Their Use in Environmental and Engineering Geology

GSA Engineering Geology Division. Norman S. Levine and Robert K. Vincent, Bowling Green State University, Bowling Green, Ohio. ORAL

Environmental Geoscience; Engineering Geology; Remote Sensing/Geographic Info System

T22 Rumbling in Below the Radar: Earthquake Hazards in Areas Where Seismic Potential is Underrecognized

GSA Engineering Geology Division. Paul M. Santi, Colorado School of Mines, Golden, Colo.; Vincent Matthews, Littleton, Colo. ORAL

Neotectonics/Paleoseismology; Engineering Geology; Quaternary Geology/Geomorphology

T23 Working with Geological Chaos: Characterization, Design, and Construction Problems of Fault Rocks, Melanges, Sapolites, and other Block-in-Matrix Rocks (Bimrocks)

GSA Engineering Geology Division. Edmund Medley and Elizabeth L. Mathieson, Exponent® Failure Analysis Associates, Menlo Park, Calif.; Gunter Riedmueller, Technical University Graz, Austria. ORAL

Engineering Geology; Structural Geology; Environmental Geoscience

T24 Human Health Sciences and Geosciences: Bridging the Gap

Joseph E. Bunnell, U.S. Geological Survey, Reston, Va.; Thomas L. Ziegler, U.S. Geological Survey, Denver, Colo. ORAL

Environmental Geoscience

T25 Modern and Ancient Tidal Flats Reflecting Environmental and Climate Changes for Past and Future

GSA Sedimentary Geology Division, Society for Sedimentary Geology Nora Noffke, Old Dominion University, Norfolk, Va. ORAL

Environmental Geoscience; Paleoclimatology/
Paleoceanography; Paleontology/Paleobotany

T26 Sigma Gamma Epsilon Student Research

Sigma Gamma Epsilon. Donald W. Neal, East Carolina University, Greenville, N.C.; Charles J. Mankin, Oklahoma Geological Survey, Norman, Okla. POSTER

Environmental Geoscience

T27 From Geochemistry of the Geosphere, Atmosphere, and Cosmos to Forensic Environmental Geochemistry: A Tribute to Ian Kaplan

Geochemical Society; Organic Geochemistry Division of the Geochemical Society. Ronald J. Hill, U.S. Geological Survey, Denver, Colo.; Ken Peters, ExxonMobil Upstream Research Co., Houston, Tex. ORAL
Geochemistry, Organic; Environmental Geoscience; Geochemistry, Other

T28 Geochemical and Mineralogical Records from Ancient Lake Sediments

GSA Sedimentary Geology Division; GSA Limnogeology Division. Daniel M. Deocampo, Smithsonian Institution, Washington, D.C.;

Robin W. Renaut, University of Saskatchewan, Saskatoon, Saskatchewan, Canada. ORAL and POSTER
Geochemistry, Aqueous; Sediments, Carbonates; Sediments, Clastic

T29 Sources, Transport, Fate, and Toxicology of Trace Elements in the Environment: A Tribute to Gunter Faure

International Association of Geochemistry and Cosmochemistry. David T. Long, Michigan State University, East Lansing, Mich.; W. Berry Lyons, Ohio State University, Columbus, Ohio. ORAL

Environmental Geoscience; Geochemistry, Aqueous; Geomicrobiology

T30 Microbial Sulfur Transformations Throughout Earth's History: Development, Changes, and Future of the Biogeochemical Sulfur Cycle

GSA Geobiology and Geomicrobiology Division. Jan P. Amend, Washington University, Saint Louis, Mo.; Katrina Edwards, Woods Hole Oceanographic Institution, Woods Hole, Mass. ORAL

Geomicrobiology; Geochemistry, Aqueous; Environmental Geoscience

T31 Micropaleontological Applications to Problems of Urbanization

Cushman Foundation. David B. Scott, Dalhousie University, Halifax, Nova Scotia, Canada; Pamela Muller Hallock, St. Petersburg, Fla. ORAL

Geomicrobiology; Environmental Geoscience; Paleontology/Paleobotany

T32 Magnetic Mapping of North American Geology

Mark Pilkington, Geological Survey of Canada, Ottawa, Ontario, Canada; Carol Finn, U.S. Geological Survey, Denver, Colo.; Israel Hernandez, Consejo de Recursos Minerales, Pachuca, Mexico. POSTER

Geophysics/Tectonophysics/Seismology; Structural Geology; Tectonics

T33 New Views of Extensional Basins and Related Volcanic Fields Using Geophysics and Remote Sensing

GSA Geophysics Division. V.J.S. Grauch, U.S. Geological Survey, Denver, Colo.; G. Randy Keller, University of Texas, El Paso, Tex. ORAL and POSTER

Geophysics/Tectonophysics/Seismology; Structural Geology; Volcanology

T34 The Anisotropy of Magnetic Susceptibility of Granitic Rocks: New Methodological Developments, Interpretations, and Challenges

GSA Structural Geology and Tectonics Division. Eric C. Ferré, University of Wisconsin, Madison, Wis.; Michel de Saint-Blanquat, OMP Université Paul Sabatier, Toulouse, France; R.D. Law, Virginia Polytechnic Institute and State University, Blacksburg, Va. ORAL

Geophysics/Tectonophysics/Seismology; Structural Geology; Tectonics

T35 Design and Assessment of Computer-Based Instructional Materials for the Geosciences

GSA Geoscience Education Division; National Association of Geoscience Teachers; National Earth Science Teachers Association. Jacqueline Huntoon, Michigan Technological University, Houghton, Mich.; Gary Novak, California State University Los Angeles, Los

Angeles, Calif. ORAL

Geoscience Education; Geoscience Information/Communication

T36 Digital Libraries as Vehicles for Systemic Educational Change

National Association of Geoscience Teachers. Mary Marlino, DLESE Program Center, Boulder, Colo.; Cathryn Manduca, Carleton College, Northfield, Minn.; Edward Geary, Colorado State University, Fort Collins, Colo. ORAL and POSTER

Geoscience Education; Geoscience Information/Communication

T37 Educational Issues in Teaching and Research at Two-Year Colleges

National Association of Geoscience Teachers. Laura A. Guertin, Penn State Delaware County, Media, Penn.; Brittina Argow, SUNY/Westchester Community College, Valhalla, N.Y. ORAL

Geoscience Education

T38 Geology in the National Parks: Research, Mapping, Education, and Interpretation

Bruce A. Heise and James F. Wood, National Park Service, Lakewood, Colo. ORAL

Geoscience Education; Environmental Geoscience; Geoscience Information/Communication

T39 Geoscience Research Partnerships as a Strategy for Engaging K–16 Students and Teachers in Inquiry-Based Learning

National Association of Geoscience Teachers. Paul G. Harnik and Robert M. Ross, Paleontological Research Institution, Ithaca, N.Y. ORAL

Geoscience Education; Geoscience Information/Communication

T40 Special Session I in Honor of John C. Butler: Water Where the Grass Is Greener—Emerging Uses of Technology in Geoscience Education

National Association of Geoscience Teachers. Warren D. Huff, University of Cincinnati, Cincinnati, Ohio; Michelle N. Lamberson, WebCT, Inc., Vancouver, British Columbia, Canada. ORAL

Geoscience Education; Geoscience Information/Communication

T41 Special Session II in Honor of John C. Butler: Multimedia in Earth Science Education—Creation, Use, and Limitations

National Association of Geoscience Teachers. James D. Myers, University of Wyoming, Laramie, Wyo.; Scott R. Linneman, Western Washington University, Bellingham, Wash. ORAL

Geoscience Education; Geoscience Information/Communication

T42 Undergraduate Research in the Geosciences: Faculty and Student Perspectives

Council of Undergraduate Research: Geoscience Division. Edward C. Hansen, Hope College, Holland, Mich.; Karen H. Fryer, Ohio Wesleyan University, Delaware, Ohio. POSTER

Geoscience Education

T43 Urbanizing Geoscience Education

Center for the Advancement of Science and Technology Education, Middle Tennessee State University. Mark J. Abolins, Middle Tennessee State University, Murfreesboro, Tenn. ORAL and POSTER

Geoscience Education; Environmental Geoscience; Public Policy

T44 New Heights in Geoscience Information: Access and Technology

Geoscience Information Society. Lisa G. Dunn and Joanne V. Lerud, Colorado School of Mines, Golden, Colo. ORAL

Geoscience Information/Communication; Geoscience Education; Public Policy

T45 Implementing Geoinformatics for Knowledge Integration and Decision Management

A. Keith Turner, Colorado School of Mines, Golden, Colo. ORAL

Geoscience Information/Communication; Environmental Geoscience; Hydrogeology

T46 Contributions of American Geologists to Theoretical Tectonics on the Basis of Research Done West of the 100th W Meridian in the Latter Half of the 19th Century

GSA History of Geology Division. A.M. Celâl Şengör, Istanbul Technical University, Istanbul, Turkey; Michele L. Aldrich, Hatfield, Mass. ORAL

History of Geology; Tectonics; Structural Geology

T47 Advances in Karst Modeling

GSA Hydrogeology Division. John J. Quinn, Argonne National Laboratory, Argonne, Ill.; Carol M. Wicks, University of Missouri, Columbia, Mo. POSTER

Hydrogeology; Environmental Geoscience

T48 Application of Biological and Hydrochemical Tracers in Groundwater Quality Investigations

GSA Hydrogeology Division, GSA Geobiology and Geomicrobiology Division. Brian G. Katz, U.S. Geological Survey, Tallahassee, Fla.; Ralph Davis, University of Arkansas, Fayetteville, Ark. ORAL

T49 Artificial Recharge: Hydrologic, Hydrogeochemical, and Microbiologic Aspects

GSA Hydrogeology Division, GSA Geobiology and Geomicrobiology Division. Jean M. Bahr, University of Wisconsin, Madison, Wis. ORAL

T50 Characterizing Geochemical Processes: When is There Sufficient Information?

GSA Hydrogeology Division. William L. Dam, U.S. Nuclear Regulatory Commission, Washington, D.C.; Lauren Browning, Southwest Research Institute, San Antonio, Tex.; John Bradbury, U.S. Nuclear Regulatory Commission, Washington, D.C. ORAL and POSTER

T51 Delineation of Contributing Areas for Wells in Challenging Hydrogeologic Settings: Methods, Uncertainty, & Verification

GSA Hydrogeology Division. Kenneth R. Bradbury, Wisconsin Geological and Natural History Survey, Madison, Wis.; Todd W. Rayne, Hamilton College, Clinton, N.Y. ORAL

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T52 Denver Basin Bedrock Aquifers—Past, Present, and Future

GSA Hydrogeology Division; Colorado Ground-Water Association. John Moore, U.S. Environmental Protection Agency Region 8, Denver, Colo. ORAL

Hydrogeology; Stratigraphy; Sediments, Clastic

T53 Experimental, Field, and Modeling Studies of Geological Carbon Sequestration

GSA Hydrogeology Division; Geochemical Society. Chen Zhu, University of Pittsburgh, Pittsburgh, Penn.; Eric Oelkers, Directeur de Recherches de CNRS, Toulouse, France; Curt White, National Energy Technology Lab, Pittsburgh, Penn. ORAL

Geochemistry, Aqueous; Hydrogeology; Mineralogy/Crystallography

T54 Flow and Transport in Fractured Aquifers—From Field Characterization to Model Construction

GSA Hydrogeology Division. Todd Halihan, Oklahoma State University, Stillwater, Okla.; David Benson, Desert Research Institute, Reno, Nev. ORAL

Hydrogeology; Environmental Geoscience; Engineering Geology

T55 Geophysical Evaluation of Aquifer Properties

GSA Hydrogeology Division; GSA Sedimentology Geology Division; GSA Geophysics Division. Jo Leslie Eimers, U.S. Geological Survey, Raleigh, N.C.; Gary S. Weissmann, Michigan State University, East Lansing, Mich.; Gregory S. Baker, University at Buffalo, Buffalo, N.Y.; Fredrick Stumm, U.S. Geological Survey, Coram, N.Y.; Frederick L. Paillet, Littleton, Colo. ORAL

Hydrogeology; Geophysics/Tectonophysics/Seismology

T56 Groundwater Depletion and Overexploitation: A Global Problem

GSA Hydrogeology Division; International Association of Hydrogeologists. Leonard F. Konikow, U.S. Geological Survey, Reston, Va.; Lois K. Ongley, Lewiston, Maine. ORAL

Hydrogeology; Environmental Geoscience; Engineering Geology

T57 Hydrogeologic Framework and Basin Hydrology of the Desert Southwestern United States

U.S. Geological Survey. Donald S. Sweetkind, U.S. Geological Survey, Denver, Colo.; Keith A. Howard, U.S. Geological Survey, Menlo Park, Calif. ORAL and POSTER

Hydrogeology; Stratigraphy; Tectonics

T58 Hydrogeology and Water Resources of the High Plains Aquifer: Issues for Public Policy Over the Next 50 Years

GSA Hydrogeology Division; High Plains Aquifer Coalition of State Geological Surveys. Alan R. Dutton, University of Texas, Austin, Tex.; Richard R. Luckey, U.S. Geological Survey, Denver, Colo. ORAL

Hydrogeology; Public Policy; Stratigraphy

T59 Mass and Energy Transport in Groundwater: In Memory of Patrick Domenico

GSA Hydrogeology Division. Alan E. Fryar, University of Kentucky, Lexington, Ky.; Frank W. Schwartz, Ohio State University, Columbus, Ohio. ORAL

Hydrogeology; Environmental Geoscience; Engineering Geology



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T60 Rivers in Karst: Processes and Applications

GSA Hydrogeology Division; Karst Waters Institute; GSA Sedimentary Geology Division; GSA Quaternary Geology and Geomorphology Division. Ira D. Sasowsky, Office for Terrestrial Records of Environmental Change, Akron, Ohio; Gregory S. Springer, Colorado State University, Fort Collins, Colo. ORAL and POSTER

Hydrogeology; Quaternary Geology/Geomorphology; Paleoclimatology/Paleoceanography

T61 The Platte River Basin of Colorado, Nebraska, and Wyoming: Where Geology, Hydrology, Endangered Species, People, and Politics Attempt to Coexist

GSA Hydrogeology Division. Richard R. Luckey, U.S. Geological Survey, Denver, Colo.; Gary L. Lewis, Parsons Engineering Science, Inc., Denver, Colo.; Duane A. Woodward. ORAL

Hydrogeology; Environmental Geoscience

T62 The Role of Analytic Elements in Groundwater Modeling

GSA Hydrogeology Division. Hendrik M. Haitjema, Indiana University, Bloomington, Ind.; Randy J. Hunt, U.S. Geological Survey, Middleton, Wis. ORAL

Hydrogeology; Environmental Geoscience; Engineering Geology

T63 The Terrestrial-Aqueous Interface: Multidisciplinary Research and Opportunities

GSA Hydrogeology Division. F. Edwin Harvey, University of Nebraska, Lincoln, Nebr.; Donald I. Siegel, Syracuse University, Syracuse, N.Y. ORAL and POSTER

Hydrogeology; Geochemistry, Aqueous; Environmental Geoscience

T64 The What, When, Why, and How Much of Chemical (Nutrient) Supplements for Bioremediation

GSA Hydrogeology Division, GSA Geobiology and Geomicrobiology Division. J.F. Devlin and J.R. Rogers, University of Kansas, Lawrence, Kans. ORAL

Hydrogeology; Environmental Geoscience

T65 Characterization, Attenuation, and Remediation of Subsurface Organic Contaminants in Heterogeneous Chemical or Physical Settings

GSA Hydrogeology Division; Geochemical Society. John E. McCray, Colorado School of Mines, Golden, Colo.; Thomas B. Boving, University of Rhode Island, Kingston, R.I. ORAL

Hydrogeology; Geochemistry, Aqueous; Geochemistry, Organic

T66 Fate, Transport, and Treatment of Pollutants from Municipal Solid Waste Landfills

GSA Hydrogeology Division; Geochemical Society. Geoff Thyne and Richard Statom, Colorado School of Mines, Golden, Colo. ORAL

Hydrogeology; Geochemistry, Aqueous; Geochemistry, Organic

T67 Watershed Processes Within Tropical Montane Catchments

Russell S. Harmon, U.S. Army Research Office, Durham, N.C.; Ellen Wohl, Colorado State University, Fort Collins, Colo. ORAL

Hydrogeology; Quaternary Geology/Geomorphology; Environmental Geoscience

T68 Yucca Mountain Update: Recent Advances from Scientific Investigations of the Unsaturated Zone

U.S. Department of Energy—Yucca Mountain Project. Robert Levich, U.S. Department of Energy, Las Vegas, Nev.; Ronald Linden, Golder Assoc. Inc, Las Vegas, Nev. ORAL

Hydrogeology; Public Policy; Environmental Geoscience

T69 Phosphates: Geochemical, Geobiological, and Materials Importance

Mineralogical Society of America; Geochemical Society; GSA Geobiology and Geomicrobiology Division. John Rakovan, Miami University, Oxford, Ohio; Matthew J. Kohn, University of South Carolina, Columbia, S.C. ORAL

Mineralogy/Crystallography; Geochemistry, Other

T70 Antarctica During the Neogene

GSA Sedimentary Geology Division, Society for Sedimentary Geology.

Allan C. Ashworth, North Dakota State University, Fargo, N.Dak. ORAL

Paleoclimatology/Paleoceanography; Paleontology/Paleobotany; Stratigraphy

T71 Feedback in Earth Systems—Determining System Response to Perturbation Through Observations and Modeling

J. Alcock, Penn State, Abington College, Abington, Penn.; Lee Kump, Penn State University, University Park, Penn. ORAL and POSTER

Paleoclimatology/Paleoceanography; Planetary Geology; Environmental Geoscience

T72 Geologic Records of Paleoelevation

Henry Fricke, Colorado College, Colorado Springs, Colo. ORAL

Paleoclimatology/Paleoceanography; Tectonics; Hydrogeology

T73 Global Biogeochemical Change During PETM Events

GSA Geobiology and Geomicrobiology Division; GSA Sedimentary Geology Division, Society for Sedimentary Geology.

Gerald R. Dickens, Rice University, Houston, Tex.; Lisa C. Sloan, University of California, Santa Cruz, Calif. ORAL and POSTER

Paleoclimatology/Paleoceanography; Paleontology/Paleobotany; Stratigraphy

T74 Isotopic and Elemental Tracers of Late Quaternary Climate Change

Geochemical Society. Donna Surge and German Mora, Iowa State University, Ames, Iowa. ORAL and POSTER

Paleoclimatology/Paleoceanography; Geochemistry, Other; Quaternary Geology/Geomorphology

T75 Paleosols and Phanerozoic Climate: Geochemistry to Trace Fossils

Nathan D. Sheldon, University of Oregon, Eugene, Ore.; Neil Tabor, University of California, Davis, Calif. ORAL

Paleoclimatology/Paleoceanography; Geochemistry, Other; Sediments, Clastic

T76 Three Billion Years of Reef Evolution

Paleontological Society. George D. Stanley, University of Montana, Missoula, Mont. ORAL

Paleontology/Paleobotany; Sediments, Carbonates; Stratigraphy

T77 Advances in the Fossil Record of Insects and Terrestrial Arthropods

Paleontological Society; GSA Geobiology and Geomicrobiology Division. Robert E. Nelson, Colby College, Waterville, Maine. ORAL and POSTER

Paleontology/Paleobotany; Stratigraphy

T78 Developing Perspectives on the Ecological Context of Biological Evolution Across the Neoproterozoic-Cambrian Transition

Paleontological Society; GSA Geobiology and Geomicrobiology Division. Loren E. Babcock, Ohio State University, Columbus, Ohio. ORAL

Paleontology/Paleobotany; Precambrian Geology; Stratigraphy

T79 Evolutionary Paleobiology and Paleoecology of the Bivalvia

Paleontological Society; GSA Geobiology and Geomicrobiology Division. Peter D. Roopnarine and Carol M. Tang, California Academy of Sciences, San Francisco, Calif. ORAL

Paleontology/Paleobotany; Paleoclimatology/Paleoceanography

T80 New Frontiers in the Fossil Record of Insects and Terrestrial Arthropods

GSA Geobiology and Geomicrobiology Division; GSA Sedimentary Geology Division, Society for Sedimentary Geology. Robert Nelson, Colby College, Waterville, Maine; Cary Easterday, Columbus, Ohio. ORAL and POSTER

Paleontology/Paleobotany; Stratigraphy

T81 Paleobiogeography: Integrating Plate Tectonics and Evolution

Paleontological Society; GSA Geobiology and Geomicrobiology Division. Bruce S. Lieberman, University of Kansas, Lawrence, Kans. ORAL

Paleontology/Paleobotany; Tectonics

T82 Paleontology in National Parks: Sharing the Fossil Record with Managers and the Public

National Park Service. H. Gregory McDonald, National Park Service, Denver, Colo.; Ted Fremd. ORAL and POSTER

Paleontology/Paleobotany; Geoscience Information/Communication; Geoscience Education

T83 Phenotypic Variation: Discriminating Between Evolution and Environment

Paleontological Society. Steven J. Hageman, Appalachian State University, Boone, N.C.; Peter Kaplan, University of Michigan, Ann Arbor, Mich. ORAL

Paleontology/Paleobotany

T84 Seafood Through Time—The Ecologic Context of the History of Life: In Honor of Richard K. Bambach

Paleontological Society; GSA Geobiology and Geomicrobiology Division. Andrew M. Bush, Harvard University, Cambridge, Mass.; Roderic Brame, Wright State University, Dayton, Ohio. ORAL

Paleontology/Paleobotany; Paleoclimatology/Paleoceanography; Stratigraphy

T85 Microprobe Monazite Geochronology: New Developments and Applications

Mineralogical Society of America. Robert J. Tracy, Virginia Tech, Blacksburg, Va.; Michael L. Williams, University of Massachusetts, Amherst, Mass. ORAL and POSTER

Petrology, Metamorphic; Tectonics; Geochemistry, Other

T86 Chesapeake Bay Impact Structure: Geology, Geophysics, and Geohydrology of America's Largest Crater

GSA Planetary Geology Division. C. Wylie Poag, U.S. Geological

Survey, Woods Hole, Mass.; Gregory S. Gohn, U.S. Geological Survey, Reston, Va. ORAL

Planetary Geology; Marine/Coastal Science; Stratigraphy

T87 Drilling into Impact Structures: Petrology, Geochemistry, and Geophysics

GSA Planetary Geology Division; Geological Society of South Africa; European Science Foundation IMPACT Program. Christian Koeberl, University of Vienna, Vienna, Austria; Wolf Uwe Reimold, University of the Witwatersrand, Johannesburg, South Africa. ORAL and POSTER

Planetary Geology; Petrology, Metamorphic; Geochemistry, Other

T88 Early Mars

GSA Planetary Geology Division. Herbert Frey, NASA Goddard Space Flight Center, Greenbelt, Md. ORAL and POSTER

Planetary Geology; Tectonics; Volcanology

T89 Impact Stratigraphy

GSA Planetary Geology Division; GSA Sedimentary Geology Division. David T. King, Auburn University, Auburn, Ala.; Michael Robert Rampino, New York University, New York, N.Y. ORAL and POSTER

Planetary Geology; Stratigraphy

T90 Terrestrial Approaches to Extraterrestrial Problems and Vice Versa

GSA Planetary Geology Division. Louise M. Prockter, Applied Physics Lab, Laurel, Md.; Tracy K.P. Gregg, University at Buffalo, State University of New York, Buffalo, N.Y. ORAL

Planetary Geology; Structural Geology; Volcanology

T91 A-Type Plutons and Convergent Margins: Orogenic Links to Anorogenic Magmatism?

International Geologic Correlation Program Project 426: Granite Systems and Proterozoic Lithospheric Processes. W.R. Van Schmus, University of Kansas, Lawrence, Kans.; O. Tapani Rämö, University of Helsinki, Helsinki, Finland; Jorge S. Bettencourt, Universidade de São Paulo, São Paulo, Brazil. ORAL and POSTER

Precambrian Geology; Petrology, Igneous; Tectonics

T92 Effective Communication and/or Partnership Among Geoscientists, the Public, and Policy Makers: Case Studies

National Association of Geoscience Teachers; GSA Geology and Public Policy Committee, Critical Issues Caucus. Paul H. Reitan, SUNY at Buffalo, Buffalo, N.Y.; Christine Turner, U.S. Geological Survey, Denver, Colo. ORAL

Public Policy; Geoscience Education; Geoscience Information/Communication

T93 Hydrogeology in Developing Countries: Opportunities and Challenges

GSA Hydrogeology Division. Stephen E. Silliman, University of Notre Dame, Notre Dame, Ind.; Michael D. Guebert, Taylor University, Upland, Ind. ORAL

Hydrogeology; Environmental Geoscience; Public Policy

T94 Injecting Geoscience Into Public Policy: Strategies That Work

David Wunsch, New Hampshire Geological Survey, Concord, N.H.; David Applegate, American Geological Institute, Alexandria, Va. ORAL

Public Policy

T95 Whetting the Appetite of Politicians: Water Issues in the American West

Association of Earth Science Editors; GSA Geology and Public Policy Committee. Richard W. Jones, Wyoming State Geological Survey, Laramie, Wyo.; Monica G. Easton, Ontario Geological Survey, Sudbury, Ontario, Canada. ORAL and POSTER

Public Policy; Hydrogeology; Geoscience Information/Communication

T96 Workforce and Education: Exploring the Industry-Academia Connection Toward Developing a Capable and Sufficient Science and Technology Labor Pool

GSA Geology and Public Policy Committee; GSA Professional Development Committee. Marilyn J. Suiter and Richard M. Taber, National Science Foundation, Arlington, Va. ORAL

Public Policy; Geoscience Education

T97 Geoecology—The Emergence of an Old Concept to Solve Problems in the 21st Century

GSA Quaternary Geology and Geomorphology Division. Alan Gallegos, USDA Forest Service, Clovis, Calif.; Hugh D. Safford, USDA Forest Service, Vallejo, Calif. ORAL

Quaternary Geology/Geomorphology; Environmental Geoscience

T98 Geological and Ecological Responses to Landscape Disturbances

GSA Quaternary Geology and Geomorphology Division. Frederick J. Swanson, USDA Forest Service, Corvallis, Ore.; Jon J. Major, U.S. Geological Survey, Vancouver, Wash. POSTER

Quaternary Geology/Geomorphology; Environmental Geoscience; Sediments, Clastic

T99 Geology, Biogeochemistry, and Ecology: A New Synthesis for Arid Landscape Processes

GSA Quaternary Geology and Geomorphology Division; GSA Geobiology and Geomicrobiology Division. Marith Cady Reheis, U.S. Geological Survey, Denver, Colo.; Robert L. Sanford, Denver University, Denver, Colo. ORAL and POSTER

Quaternary Geology/Geomorphology; Geomicrobiology; Geochemistry, Other

T100 Geomorphic Impacts of Wildfire

GSA Quaternary Geology and Geomorphology Division; GSA Engineering Geology Division. Susan H. Cannon, Golden, Colo.; Deborah Martin, U.S. Geological Survey, Boulder, Colo.; Charles Luce, USDA Forest Service, Boise, Idaho. ORAL and POSTER

Quaternary Geology/Geomorphology; Engineering Geology; Hydrogeology

T101 Interdisciplinary Approaches to Understanding Soil and Vadose Zone Hydrology of Saprolite: Integration of Hydrogeology, Sedimentology, Geomorphology, Pedology, and Biology

GSA Hydrogeology Division; GSA Sedimentary Geology Division; SEPM—Society for Sedimentary Geology; GSA Quaternary Geology and Geomorphology Division. Steven G. Driese and Larry D. McKay, University of Tennessee, Knoxville, Tenn. ORAL

Hydrogeology; Quaternary Geology/Geomorphology; Sediments, Clastic

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T102 Post-Laramide Uplift and Erosion of the Rocky Mountains and Colorado Plateau

GSA Sedimentary Geology Division. Joel L. Pederson, Utah State University, Logan, Utah; Frank J. Pazzaglia, Lehigh University, Bethlehem, Penn. ORAL and POSTER

Quaternary Geology/Geomorphology; Tectonics; Geophysics/Tectonophysics/Seismology

T103 Quaternary Sciences from Land to Sea: In Honor of John T. Andrews

GSA Quaternary Geology and Geomorphology Division. Peter U. Clark, Oregon State University, Corvallis, Ore.; Gifford H. Miller, University of Colorado, Boulder, Colo. ORAL and POSTER

Quaternary Geology/Geomorphology; Paleoclimatology/Paleoceanography

T104 Quaternary Stratigraphy and the Glacial Environment: In Honor of Ernest H. Muller

GSA Quaternary Geology and Geomorphology Division. P. Jay Fleisher, State University College, Oneonta, N.Y.; David A. Franzi, Plattsburgh State University of New York, Plattsburgh, N.Y. ORAL

Quaternary Geology/Geomorphology

T105 Response of Dryland Geomorphic Systems to Climate Change and Variability

GSA Quaternary Geology and Geomorphology Division. Nicholas Lancaster, Desert Research Institute, Reno, Nev. ORAL and POSTER
Quaternary Geology/Geomorphology; Hydrogeology

T106 Remotely Sensed Data for Geologic and Environmental Studies

GSA Geophysics Division. Wendy M. Calvin, University of Nevada, Reno, Nev.; Trude V.V. King, U.S. Geological Survey, Denver, Colo. ORAL and POSTER

Environmental Geoscience; Remote Sensing/Geographic Info System

T107 New Perspectives on Chert, Its Origin, Diagenesis, and Economic Significance

GSA Sedimentary Geology Division, Society for Sedimentary Geology. James P. Rogers, Consultant, Aurora, Colo.; Mark W. Longman, Lakewood, Colo. ORAL

Sediments, Carbonates; Sediments, Clastic; Geomicrobiology

T108 The Green River Formation Revisited: Crucible for New Concepts and Advances in Paleoclimatology, Tectonics, Chronostratigraphy, Sequence Stratigraphy, Isotope Geochemistry, and Paleontology

International Association of Limnogeologists; GSA Sedimentary Geology Division, Society for Sedimentary Geology. H. Paul Buchheim, Loma Linda University, Loma Linda, Calif.; Alan R. Carroll, University of Wisconsin, Madison, Wis.; Arvid Aase, Fossil Butte National Monument, Kemmerer, Wyo. ORAL and POSTER

Sediments, Carbonates; Paleontology/Paleobotany; Paleoclimatology/Paleoceanography

T109 Deltas—Old and New

GSA Sedimentary Geology Division. Janok P. Bhattacharya, University of Texas at Dallas, Richardson, Tex.; Liviu Giosan, Woods Hole Oceanographic Institution, Woods Hole, Mass. ORAL

Sediments, Clastic; Marine/Coastal Science; Environmental Geoscience

T110 Tectonics, Climate Change, and the Late Cenozoic Evolution of the Rocky Mountains, Colorado Plateau, and Western Great Plains

GSA Sedimentary Geology Division. Margaret E. McMillan, University of Wyoming, Laramie, Wyo.; Catherine Riihimaki, University of California, Santa Cruz, Calif. ORAL

Stratigraphy; Tectonics; Quaternary Geology/Geomorphology

T111 Detrital Thermochronology—Dating of Exhumation and Landscape Evolution in Mountain Belts

GSA Structural Geology and Tectonics Division. Matthias Bernet, Yale University, New Haven, Conn.; Cornelia Spiegel, Universität Tübingen, Tübingen, Germany. ORAL and POSTER

Tectonics; Sediments, Clastic; Quaternary Geology/Geomorphology

T112 EarthScope Town Hall Meeting

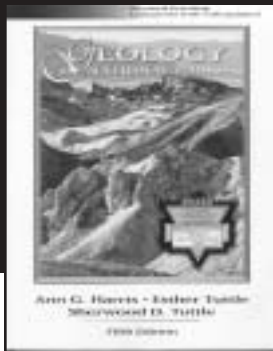
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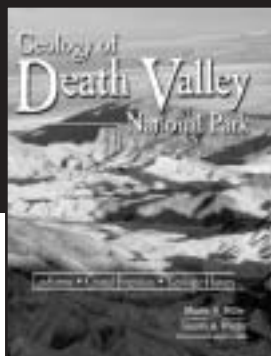
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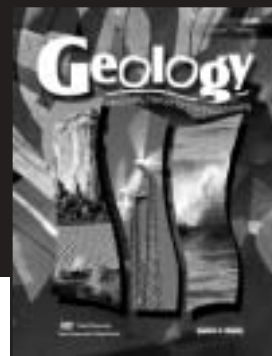
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T113 Extensional Tectonics in the Southern Basins and Ranges, United States, and in Western Turkey

GSA Structural Geology and Tectonics Division. Ibrahim Çemen, Oklahoma State University, Stillwater, Okla.; John Bartley, University of Utah, Salt Lake City, Utah. ORAL and POSTER

Tectonics; Structural Geology; Geophysics/Tectonophysics/Seismology

T114 Forward Modeling in Tectonics and Structural Geology

GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division. Bruno C. Vendeville, University of Texas, Austin, Tex.; Martha O. Withjack, Rutgers University, Piscataway, N.J.; Joel H. Le Calvez, College Station, Tex. ORAL and POSTER

Structural Geology; Tectonics; Stratigraphy

T115 Geometry, Kinematics, and Vorticity of High-Strain Zones

GSA Structural Geology and Tectonics Division. Christopher M. Bailey, College of William & Mary, Williamsburg, Va.; Dazhi Jiang, University of Maryland, College Park, Md.; Andy Bobyarchick, University of North Carolina, Charlotte, N.C. ORAL

Structural Geology; Tectonics

T116 Kinematics of the Himalayan-Tibetan Orogen—Comparing the Present with the Past

GSA Structural Geology and Tectonics Division. Michael Murphy, Houston, Tex; Paul Kapp, University of Arizona, Tucson, Ariz. ORAL and POSTER

Tectonics

T117 Lithospheric Structure and Evolution of Rocky Mountain Region, from Deep Mantle to Mountain Tops

GSA Structural Geology and Tectonics Division. Karl E. Karlstrom, University of New Mexico, Albuquerque, N.Mex.; Michael L. Williams, University of Massachusetts, Amherst, Mass. ORAL

Tectonics; Geophysics/Tectonophysics/Seismology

T118 New Constraints on Mesoproterozoic–Early Neoproterozoic Supercontinent Assembly and Dispersal

GSA Structural Geology and Tectonics Division; GSA Sedimentary Geology Division, Society for Sedimentary Geology. Richard E. Hanson, Texas Christian University, Fort Worth, Tex.; Samuel Bowring, Massachusetts Institute of Technology, Cambridge, Mass. ORAL

Tectonics; Precambrian Geology

T119 Nonconventional Fold-Thrust Belts: Assessing the Spectrum of Variation in a Structural Style

GSA Structural Geology and Tectonics Division; Ocean Energy, Inc. Oscar E. Gilbert, Ocean Energy Inc., Houston, Tex.; Dietrich Roeder, Murnau Geodynamics Inc., Denver, Colo. ORAL and POSTER

Structural Geology; Tectonics; Geophysics/Tectonophysics/Seismology

T120 Structure and Tectonics of the Midcontinent, North America

GSA Structural Geology and Tectonics Division. Gregory C. Ohlmacher and Pieter Berendsen, University of Kansas, Lawrence, Kans. ORAL

Structural Geology; Tectonics; Engineering Geology

T121 Tackling Transpression and Transtension in Orogenesis. Tools of Structural Geology from Microfabric to Tectonic Reconstruction

GSA Structural Geology and Tectonics Division. M.A. Edwards, Institut für Geologie, Freiberg, Germany; Nicholas W. Hayman, University of Washington, Seattle, Wash.; John Dewey, University of California, Davis, Calif. ORAL and POSTER

Structural Geology; Tectonics

T122 Tectonic Evolution of the Middle East and Adjacent Regions: The Confluence of the Alpine and Himalayan Orogenic Systems and a Window into Processes of Continental Dynamics

GSA Structural Geology and Tectonics Division. Bernard Guest, University of California, Los Angeles, Calif.; Jahan Ramezani, Massachusetts Institute of Technology. ORAL and POSTER

Tectonics; Neotectonics/Paleoseismology; Geophysics/Tectonophysics/Seismology

T123 Tectonic Modeling Applied to the Characterization and Evaluation of Yucca Mountain as a National Nuclear Waste Repository Site: Concepts, Methods, and Hazard Analyses at Local and Regional Scales

Dennis O'Leary, U.S. Geological Survey, Denver, Colo. ORAL

Tectonics; Neotectonics/Paleoseismology; Volcanology

T124 Thermal and Mechanical Significance of Gneiss Domes in the Evolution of Orogens

GSA Structural Geology and Tectonics Division; Mineralogical Society of America. Donna L. Whitney, University of Minnesota, Twin Cities, Minneapolis, Minn.; Christian Teyssier, University of Minnesota, Minneapolis, Minn.; Kip V. Hodges, Massachusetts Institute of Technology, Cambridge, Mass. ORAL and POSTER

Tectonics; Petrology, Metamorphic; Structural Geology

T125 Thrust Belt Curvature: Integrating Paleomagnetic and Structural Analyses

GSA Structural Geology and Tectonics Division. Aviva J. Sussman, University of Arizona, Tucson, Ariz.; Arlo B. Weil, University of Michigan, Ann Arbor, Mich. ORAL and POSTER

Tectonics; Structural Geology; Geophysics/Tectonophysics/Seismology

T126 Reconstructing the Cambrian World: Temporal and Spatial Changes in Physical and Biotic Environments

GSA Sedimentary Geology Division, Society for Sedimentary Geology. Ed Landing, New York State Museum, Albany, New York; Gerd Geyer, Universität Würzburg, D-97070 Würzburg, Germany. ORAL

Paleontology/Paleobotany; Geochemistry, Organic

T127 The Role of the Earth Sciences in Fostering Global Equity and Stability

GSA International Division; U.S. National Committee for the Geological Sciences; U.S. National Committee for Geodesy and Geophysics. Eldridge M. Moores, University of California, Davis, Calif.; W.G. Ernst, Stanford University, Stanford, Calif.; Grant H. Heiken, Los Alamos, N.Mex.; Susan M. Landon, Golden, Colo.; P. Patrick Leahy, U.S. Geological Survey, Reston, Va. ORAL

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- Geophysics/Tectonophysics/Seismology
- Geoscience Information/Communication
- History of Geology
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- Neotectonics/Paleoseismology
- Paleoclimatology/Paleoceanography
- Paleontology/Paleobotany
- Petrology, Experimental
- Petrology, Igneous
- Petrology, Metamorphic
- Planetary Geology
- Precambrian Geology
- Public Policy
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The Joint Technical Program Committee (JTPC) selects abstracts and determines the final session schedule. All authors will be notified in August. The JTPC includes representatives from those GSA Associated Societies and Divisions participating in the technical program. The JTPC technical program chairs were approved by the GSA Council.

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COMMENTARY

A Solution to the Uncertain Fate of a Geologist's Library

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On reading "The uncertain fate of a geologist's library" in the July 1999 issue of *GEOTIMES*, Deborah Ajakaiye, a Nigerian postdoctoral geophysical researcher at the University of Houston, became concerned that an estimated 10 million geological books, maps, journals, and other reference materials belonging to a large number of retiring U.S.-based geologists likely would be discarded. Because of her firsthand knowledge of critical shortages of geological reference books and journals in African universities, she discussed the situation with Martin Cassidy (retired from Amoco, CASMAR Consulting, Inc., and a Ph.D. candidate at the University of Houston). Both discussed ways that some of these reference materials could be collected and distributed to university libraries overseas that could put them to good use.

The biggest stumbling blocks to implementing such a plan were costs for collecting, storing, packing, and shipping these reference materials overseas. Cassidy had already started to collect books and journals from retired and deceased geologists in Texas and surrounding states and storing them in storage lockers at his own expense. He successfully persuaded the University of Houston Geoscience Department to provide, at no cost, student help to catalog and pack the books and journals. Finally, because of his prior work in industry, Cassidy knew that oil companies working overseas often desire to help in the education of nationals in countries where they worked. He approached several companies about the possibility of their shipping books destined for certain universities in their regular container shipments to countries where they operated and arranging for import. One company, Conoco, in association with the Nigerian Association of Petroleum Geologists, agreed to underwrite a shipment of books to be distributed to universities in Nigeria in 2001. Thus the concept of establishing a

"publication pipeline overseas" was born. Even better, a solution to the disposal of private geological libraries emerged.

Cassidy formed a local committee in Houston with geologists who worked for major oil companies, academics, and consultants, including this author. Moreover, Cassidy met with Roby Griese, American Association of Petroleum Geologists (AAPG) president, who appointed Cassidy's existing committee as the AAPG Publication Pipeline Committee. This made the committee eligible for possible financial support from the AAPG Foundation, as well as related support to implement the collection, storage, packing, and shipping of books overseas.

Because the initial focus of the AAPG Publication Pipeline Committee was in Houston, committee members immediately implemented a plan to enlarge the committee membership to fully represent the various sections and interests of the entire profession on an intersociety basis. It is expected that the enlarged membership will provide books from sources nationwide, including those from retired faculty at universities in their region. In fact, at the time of this writing, GSA Council is in the process of appointing a conferee to work with this committee.

I must emphasize that books in ALL areas of geology are being collected so as to provide a broad base of reference materials for overseas university libraries. Thus, publications in areas removed from petroleum, such as mineral deposits, high-temperature geochemistry, and deep-mantle geophysics are also welcome. In fact, such donations are needed.

GSA members and Fellows who wish to donate their books and journals to the AAPG Publication Pipeline Committee, or who know of retiring geologists who may wish to make such donations, are encouraged, indeed, requested to contact Martin Cassidy, Chairman, AAPG Publication Pipeline Committee, c/o Dept. of Geosciences, University of Houston, 312 Science and Research Building 1, Houston, TX 77204-5007, pager 713-616-5853, jo1955mar@aol.com.

George D. Klein taught at the Universities of Pittsburgh, Pennsylvania, and Illinois (Champaign-Urbana). In 1993, he left Illinois to become executive director of the NJ Marine Sciences Consortium. In 1996, he opened a consulting firm (SED-STRAT Geoscience Consultants, Inc.) focusing on petroleum geology (domestic and international), advising on clastic reservoirs and facies, sequence stratigraphy, seismic sedimentology, reservoir characterization, and sedimentary basin evaluation.

Job Hunting?

Set the wheels in motion now to interview in October! To sign up for GSA's Employment Service at the Annual Meeting in Denver, visit www.geosociety.org. Go to Employment Opportunities, then to Employment Service.

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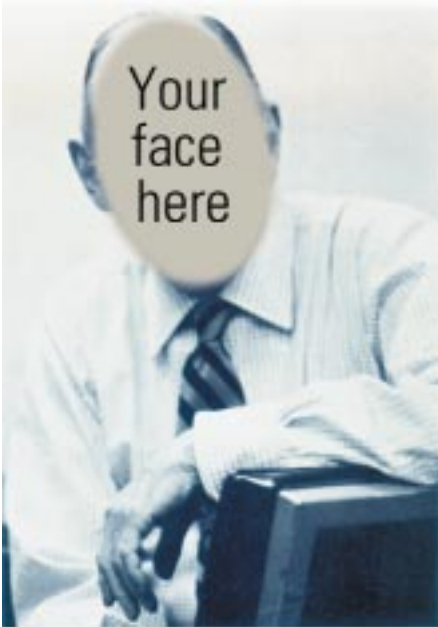
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About the Author

A GSA member, the author found fame when he took advantage of the GSA Bookstore's Members' Corner Book Display. His book gained national exposure at GSA meetings held around the country. The author now splits his time between Woods Hole, Massachusetts, and Saint-Tropez.

For information on the Members' Corner, contact Ann Crawford, 1-800-472-1988, ext. 1053, acrawford@geosociety.org. Books must be of direct relevance to the earth sciences. Selection of materials will be at the discretion of the GSA director of publications.

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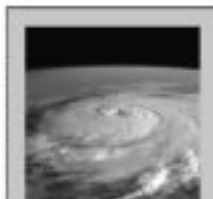
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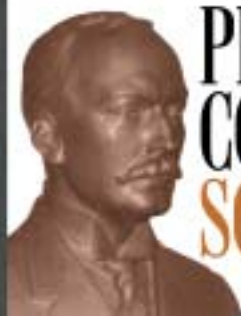
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PENROSE CONFERENCE SCHEDULED

Tectonics, Climate, and Landscape Evolution

January 13–17, 2003

Taroko National Park, Taiwan

<http://olympus.geology.washington.edu>

CONVENERS:

Sean Willett, Department of Earth and Space Sciences, University of Washington, Seattle, WA 98125, USA, (206) 543-8653, fax 206-543-0489, swillett@u.washington.edu

Niels Hovius, Department of Earth Sciences, Cambridge University, Cambridge CB2 3EQ, England, 44-1223-333453, nhovius@esc.cam.ac.uk

Mark Brandon, Department of Geology and Geophysics, Yale University, P.O. Box 208109, New Haven, CT 06520-8109, USA, (203) 432-3135, mark.brandon@yale.edu

Don Fisher, Department of Geosciences, Pennsylvania State University, University Park, PA 16802, (814) 865-3206, fisher@geosc.psu.edu

LOCAL ORGANIZING COMMITTEE:

Lu Chia-Yu, Department of Earth Sciences, National Taiwan University, Taipei, Taiwan, Republic of China, chia@ccms.ntu.edu.tw

Chu Hao-Tsu, Central Geological Survey, Taiwan, Republic of China, chuht@linx.moeacgs.gov.tw

Yue-Gau Chen, Department of Earth Sciences, National Taiwan University, Taipei, Taiwan, Republic of China, ygchen@ccms.ntu.edu.tw

The past decade has seen considerable interest in the coupling between tectonics, climate, surface processes, and the evolution of Earth's topography. General acceptance of the principles of the tectonic origin of topography, the increase in erosion rates with relief, and the importance of climate as a modulator between uplift and erosion has evolved into a desire for understanding of the processes, their rates, and the mechanisms of feedback implicit to these principles. This conference will examine progress made through geomorphological, geophysical, geochemical, and atmospheric studies, and will assess the current state of knowledge of the dynamic earth surface system.

Potential topics for presentation and discussion include:

- ① Surface processes and rates in active tectonic areas. What are the important processes and the rates at which they operate in mountain regions? What are the mechanisms of fluvial incision into bedrock? How important are deep-seated landslides or debris flows? Are chemical

processes and regolith formation important processes in tectonically active areas? What is the role of glacial erosion?

- ② The landscape response to tectonic deformation, uplift, and horizontal motion. What features of the landscape are characteristic of tectonic deformation in its diverse forms? Can we interpret landforms or a landscape in terms of tectonic or climatic forcing?
- ③ The landscape response to climate change. How does the landscape respond to changing climate conditions such as precipitation, temperature, storminess, or base-level change?
- ④ Feedback mechanisms between tectonics, climate, and surface processes. How does the generation of relief enhance rates of erosion? How does an increase in elevation affect climate? Do tectonic processes respond to erosion in measurable ways?
- ⑤ Coupled models. How well are we able to simulate the coupled tectonic–surface process–climate system? Do we understand how to quantify the relevant processes?
- ⑥ Response time and steady state in tectonically active landscapes. What is the time-dependent response of a landscape to tectonic or climatic forcing?

VENUE

The conference will be held in Taroko National Park, Taiwan. In Taiwan, active tectonism and mountain building is evidenced by 4000 m peaks, precipitation rates of several m/yr, and erosion rates as high as 5–10 mm/yr. The conference venue will be in the Taroko Gorge, a 1000-m-deep gorge in the heart of Taroko National Park, providing a dramatic example of the effects of high rates of uplift, precipitation, and erosion. First-rate hotel and conference facilities are available in the national park. Two half-day field trips will be conducted during the conference to showcase the Taroko Gorge environs. Cost of the five-day conference, including room and board, is expected to be less than \$850.

APPLY BY: SEPTEMBER 1, 2002

Potential participants should send a letter of application to one of the conveners, including a brief statement of interests and relevance of the applicant's work to the conference topic, as well as a short abstract of work to be presented at the meeting, if desired. Attendance is limited to 80 persons, although we hope to attract the participation of a broad range of earth and atmospheric scientists. Graduate students are encouraged to apply, and some funds will be available to help offset costs for students.

OPTIONAL FIELD TRIP

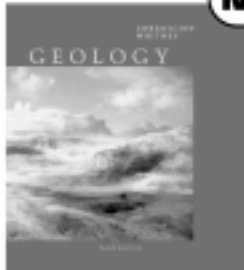
A four-day preconference field trip will be offered from January 9–12. This field trip will start in Taipei and finish at the conference site in Taroko Park, thereby crossing the modern orogenic belt from the foreland Coastal Plain to the metamorphic core. This trip will also provide an opportunity to visit surface deformation related to the 1999 magnitude 7 Chi-Chi earthquake. Cost of the field trip is expected to be less than \$500.

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U.S. GEOLOGICAL SURVEY PROGRAM COORDINATOR EARTHQUAKE HAZARDS PROGRAM

The U.S. Geological Survey (USGS) invites applications for the position of Program Coordinator, Earthquake Hazards Program, in Reston, VA. The incumbent also serves as the Program Coordinator for the Geomagnetism Program and the Global Seismographic Network. The Earthquake Hazards Program is part of the National Earthquake Hazards Reduction Program and thus requires close coordination with the Federal Emergency Management Agency, the National Science Foundation, and the National Institute of Standards and Technology. The Earthquake Hazards Program assesses and characterizes earthquake hazards, monitors and reports earthquake activity and crustal deformation, and conducts research into earthquake causes and effects. The Geomagnetism Program provides data and information on short-term and long-term variations in the strength and direction of the Earth's magnetic field and operates a network of geomagnetic observatories. The Program Coordinator plans, develops, and implements all earthquake hazards activities and provides leadership and funding guidance for these activities, including maintaining and monitoring the worldwide network of USGS seismographic stations and geomagnetic observatories.

Applicant must have a strong record of publications in refereed scientific literature and a state-of-the-art knowledge of the scientific concepts, principles, and practices of geology, geophysics, engineering, and related geoscience disciplines as they apply to earthquake hazards, surface faulting and earthquake-induced ground failure, earthquake seismology, and geomagnetism and extensive experience in one or more of these disciplines to develop and coordinate major hazards programs. The Earthquake Hazards Program supports external research and monitoring activities including research grants and cooperative agreements with universities, State agencies, and private technical firms; therefore, this position requires strong coordination and negotiation skills combined with demonstrated scientific stature and communications skills.

This is an interdisciplinary position that may be filled as either Geologist, GS-1350-15; Geophysicist, GS 1313-15; or Physical Scientist, GS-1301-15. It is a full-time, permanent position with the U.S. Geological Survey and has a salary range of \$92,060 to \$119,682 commensurate with experience. This is a permanent appointment, however, the successful candidate will serve a time-limited rotational assignment not to exceed 5 years. Upon completion of this rotational assignment the incumbent will be reassigned to a permanent position within the Geologic Discipline. The

position is located in Reston, VA. There are six vacancy announcements for this position but only one position will be filled amongst the six announcements. The following announcements are open to all U.S. Citizens: HQ-2002-0178, HQ-2002-0179, and HQ-2002-0180. The following announcements are open to all U.S. Citizens who are current or former Federal employees: HQ-2002-0181, HQ-2002-0182, HQ-2002-0183. The announcements are open from June 3, 2002 to July 2, 2002. For detailed vacancy announcement, including specific qualification requirements and application go to <http://www.usgs.gov/ohr/oars/>. **U.S. Citizenship is required.** Contact: Office of Personnel (703) 648-4484. The U.S. Geological Survey is an equal opportunity employer.

ASSISTANT PROFESSOR IN PALEOCLIMATOLOGY OREGON STATE UNIVERSITY

Position # 004-1901. Oregon State University (Corvallis, Oregon). The Department of Geosciences seeks to hire a full-time, 9-month, tenure track ASSISTANT PROFESSOR IN PALEOCLIMATOLOGY. For full consideration candidates should apply by September 15, 2002, and the successful applicant's availability will determine the start date. We seek a colleague whose research uses quantitative studies to address mechanisms of climate change across a range of time and spatial scales. This position will strengthen a research focal area for the department, composed of Geology and Geography Programs, and complement the efforts of OSU faculty working on a campus-wide research theme highlighting Atmosphere, Ocean, and Earth Systems. The successful candidate will conduct a vigorous, externally funded research program and teach at the undergraduate and graduate level in the Geosciences Department with an approximate distribution of effort at 50% research, 40% instruction, and 10% service. A Ph.D. is required at the time of hire. This position is funded through education and general funds.

Applicants should send a letter of application describing your research and teaching interests, and other qualifications for this position, curriculum vita, and names of three referees (with contact information) to: Chair, Paleoclimatology Search Committee, Department of Geosciences, Oregon State University, Corvallis, OR 97331-5506. Fax: 541-737-1200, Voice: 541-737-1201. E-mail: petersom@geo.orst.edu.

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DEPARTMENT OF EARTH & OCEAN SCIENCES UNIVERSITY OF BRITISH COLUMBIA ASSISTANT PROFESSOR, APPLIED SEDIMENTOLOGY/STRATIGRAPHY

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The University of British Columbia hires on the basis of merit and is committed to employment equity. We encourage all qualified persons to apply; however, Canadians and permanent residents of Canada will be given priority. For more information about the department and this position, visit our Web site at www.eos.ubc.ca.

Applicants should send their curriculum vitae, a statement of research and teaching interests, and the names and contact information (including e-mail addresses) of three referees to Dr. Paul Smith, Head, Department of Earth & Ocean Sciences, the University of British Columbia, 6339 Stores Road, Vancouver, British Columbia V6T 1Z4. Applications will be considered until October 11, 2002.

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Applicants should have a Ph.D. by the time of appointment. Send letter of application, statement of teaching and research interests, vita, college level transcripts, and three letters of reference to Carl Mendelson, Geology Search Committee, Beloit College, 700 College St., Beloit, WI 53511. This position will remain open until filled; to ensure full consideration, submit materials by 15 June 2002. Inquiries may be directed to Prof. Mendelson (608-363-2223 or mendelson@beloit.edu). More information about the department may be found at <http://geology.beloit.edu/>.

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Opportunities for Students

Remote Sensing and/or Volcanology Graduate Research Assistantships. The Space Studies Department at the University of North Dakota has three GRAs available for M.S. support over the next two years. Two GRAs will support geospatial activities with emphasis on agricultural and natural resource applications. Students with prior experience with satellite imagery and image processing preferred. For more information, contact Bob Andres (andres@space.edu). One GRA will support volcanology studies in the Andes. Field oriented students with an interest in physical volcanology and volcanic hazard assessment should apply. For more information, contact Shan de Silva (desilva@space.edu). All GRAs also include tuition waivers.

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Madison, Wisconsin

Responsibilities The Executive Vice President provides administrative leadership for the professional activities of the three Societies, provides management of Headquarters facilities and personnel, serves as Executive Director of the Agronomic Science Foundation, and supervises the implementation of policy decisions of the Executive Committee and the Board of Directors of each Society and the Board of Trustees of the Foundation. Responsibilities include providing leadership in developing communications and effective relationships with federal and state legislative and policy setting organizations, and with national and international non-governmental organizations. The position is located in Madison, Wisconsin.

Qualifications Applicants should have an advanced degree, experience in research, education or industry in agronomy, crop science, soil science, or a closely related field, and be a recognized leader in his or her profession. Administrative and managerial experience in a major commercial, academic or governmental organization is essential. Applicants must have demonstrated the interpersonal skills needed to work effectively with Headquarters personnel, Executive Committees, Boards of Directors, committees, and external groups. Leadership skills and a vision for the Societies' roles in the nation and world are essential.

Compensation Salary will be competitive and commensurate with qualifications and experience.

Closing Date Applications will be accepted until July 1, 2002, or until a suitable candidate is identified.

Position Available The new ASA-CSSA-SSSA Executive Vice President will be expected to begin work on January 1, 2003, or by negotiation.

Applications Applications must include a current resume, a one-page statement of the applicant's vision for the Societies, and a one-page description of the applicant's management style. Include telephone numbers, email and postal addresses of four references.

Send applications to: Dr. Lee Sommers, Chair
Search Committee for the EVP
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Fort Collins, CO 80523-3001
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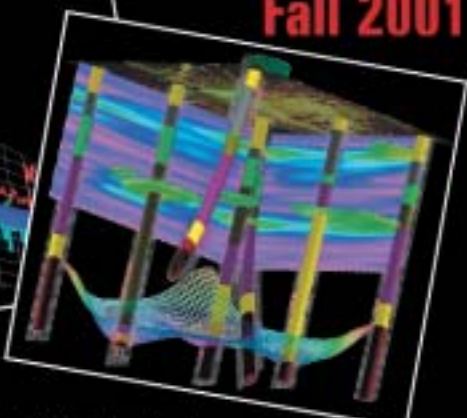
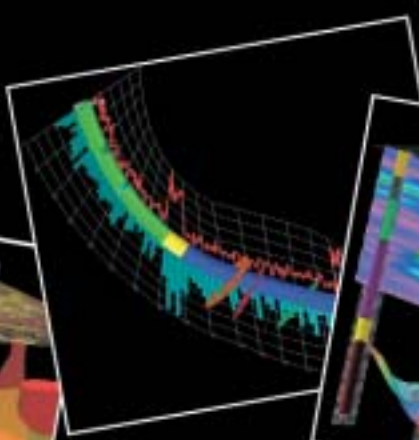
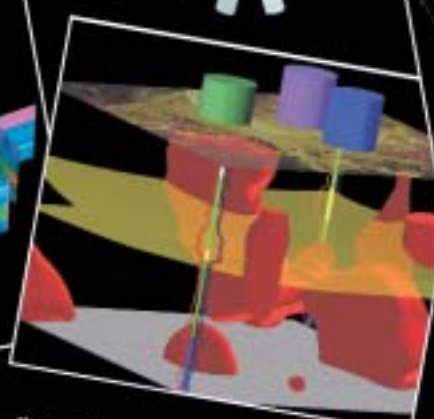
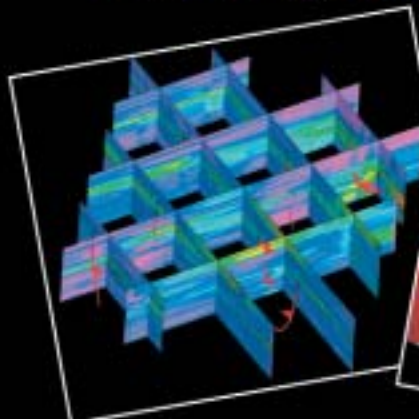
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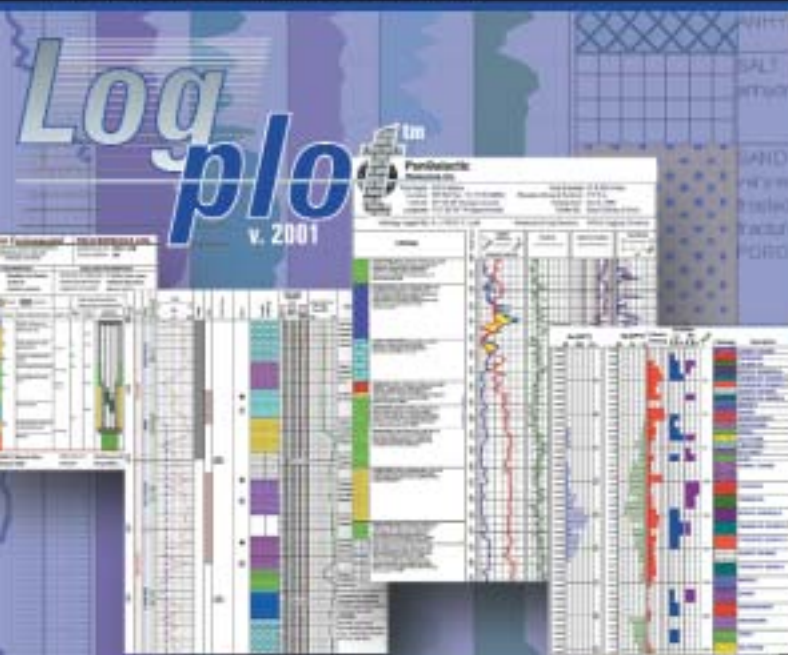


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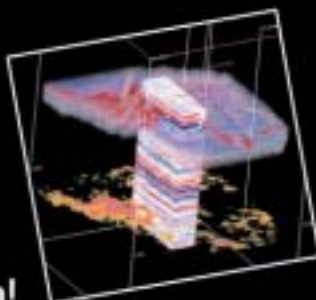
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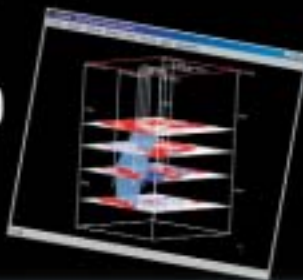
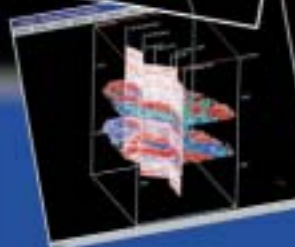
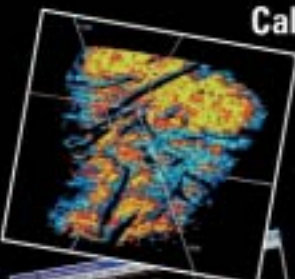
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