

GSA TODAY

VOL. 15, No. 6

A PUBLICATION OF THE GEOLOGICAL SOCIETY OF AMERICA

JUNE 2005

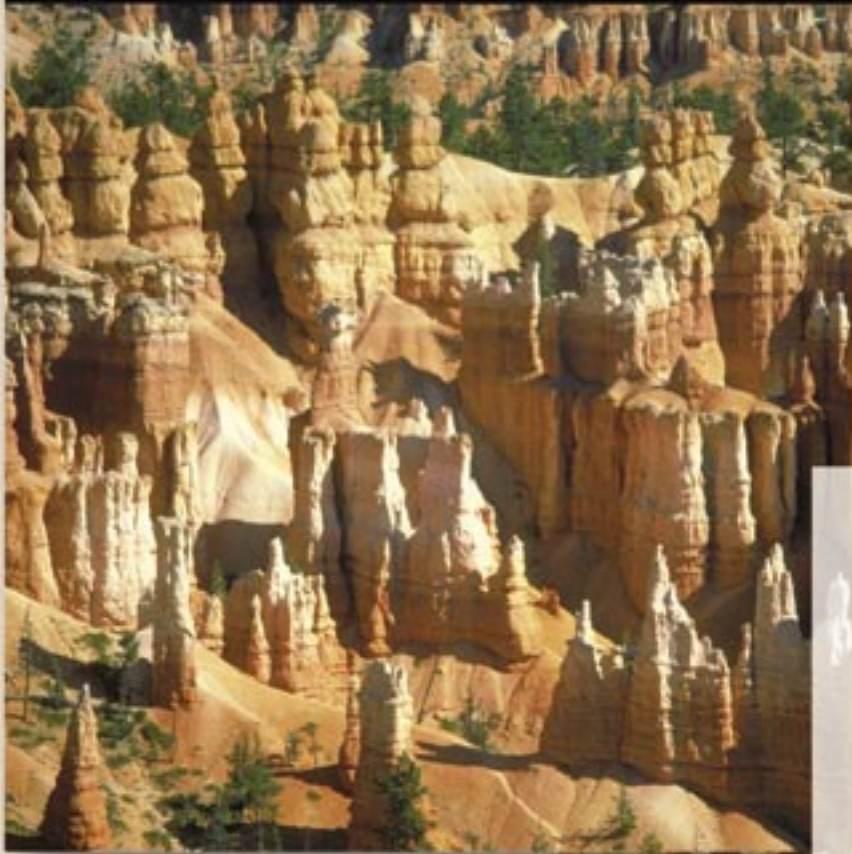
The Geological Society of America
Annual Meeting & Exposition

SLC 2005

Science • Learning • Colleagues

16–19 October 2005

Salt Palace Convention Center
Salt Lake City, Utah



THE GEOLOGICAL
SOCIETY OF AMERICA

Program



THE GEOLOGICAL
SOCIETY OF AMERICA

Abstracts with Programs

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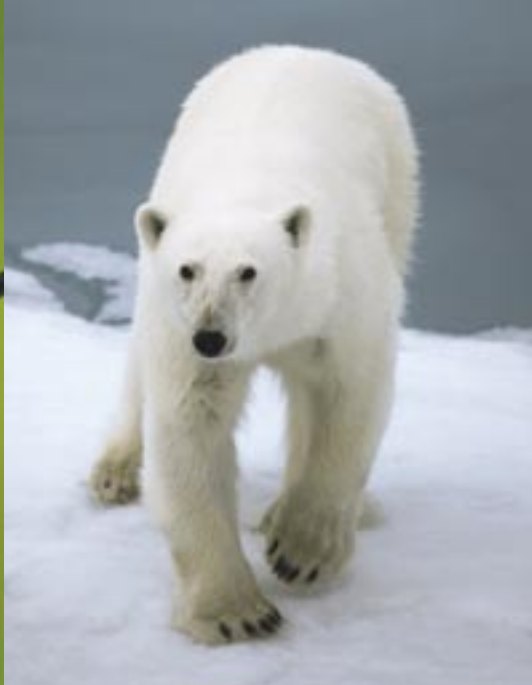
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GSA



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GSA TODAY

GSA TODAY publishes news and information for more than 18,000 GSA members and subscribing libraries. GSA Today lead science articles should present the results of exciting new research or summarize and synthesize important problems or issues, and they must be understandable to all in the earth science community. Submit manuscripts to science editors Keith A. Howard, khoward@usgs.gov, or Gerald M. Ross, lavaboy@verizon.net.

GSA TODAY (ISSN 1052-5173 USPS 0456-530) is published 11 times per year, monthly, with a combined April/May issue, by The Geological Society of America, Inc., with offices at 3300 Penrose Place, Boulder, Colorado. Mailing address: P.O. Box 9140, Boulder, CO 80301-9140, USA. Periodicals postage paid at Boulder, Colorado, and at additional mailing offices. Postmaster: Send address changes to GSA Today, GSA Sales and Service, P.O. Box 9140, Boulder, CO 80301-9140.

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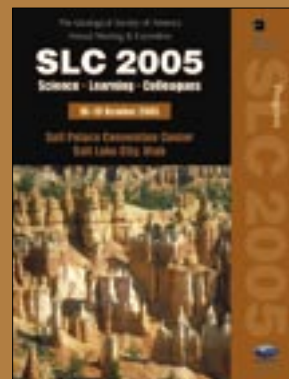
GSA ONLINE: www.geosociety.org

Printed in the USA using pure soy inks.

VOLUME 15, NUMBER 6

JUNE 2005

Cover: The GSA Annual Meeting returns to colorful Utah, bringing thousands of geoscientists together in Salt Lake City this October. Featured on both the meeting Program cover and the Abstracts with Programs volume is Bryce Canyon National Park, one of the many natural wonders of the area.



SLC 2005 Science • Learning • Colleagues

GSA Annual Meeting & Exposition

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SLC 2005

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GSA Annual Meeting & Exposition
16–19 October 2005, Salt Palace Convention Center
Salt Lake City, Utah

Time is quickly approaching for the 2005 Annual Meeting in Salt Lake City, where geoscientists from around the world will come together to share in the latest advances and exciting discoveries. With eight Pardee Symposia, 150 Topical Sessions, and a wide range of open discipline sessions, combined with an impressive lineup of field trips, workshops, and special events, the meeting has much to offer everyone in the earth sciences. The list of just a few of the sessions at right illustrates the breadth and depth of our science.

From effects of the South Asian tsunami, to controversies over teaching evolution, to the recently released Millennium Ecosystem Assessment, events show that science and society are closely linked. The Annual Meeting provides an exceptional forum for bringing together geoscientists, educators, and policy makers, where we can work to improve the understanding and application of science in our lives. This year's program features more than 20 sessions focused on education-related topics, as well as a plethora of sessions addressing geologic hazards, resource utilization, and environmental policy.

Set between the spectacular backdrop of the Wasatch Range and Great Basin, Salt Lake City is a dynamic location for the meeting. A variety of good restaurants, brew pubs, and cultural attractions can be found within walking distance of the convention center, while the surrounding area offers unique opportunities for geotherapy and recreation.

The Annual Meeting is one of the best venues for sharing our Science, continuing our Learning, and interacting with our Colleagues. As you make plans for October, I would like to issue this challenge: encourage at least one other student or colleague to attend the meeting and share in our growing community.

See you in Salt Lake City!

Adolph Yonkee
General Chair, Salt Lake City Local Committee

Important Dates, Events & Deadlines

Registration Opens:	Early June
Abstracts Deadline:	12 July
Standard Registration Deadline:	12 Sept.
Cancellation Deadline:	19 Sept.
Premeeting Field Trips:	Thurs.–Sat., 13–15 Oct.
Short Courses & Workshops:	Fri.–Sat., 14–15 Oct.
Presidential Address & Awards Ceremony:	Sat., 15 Oct., 7–9 p.m.
Welcoming Party & Exhibits Opening:	Sun., 16 Oct., 5:30–7:30 p.m.
Technical Program:	Sun.–Wed., 16–19 Oct.
Pardee Keynote Symposia:	Sun.–Wed., 16–19 Oct.
Private Alumni Reception:	Mon., 17 Oct., 5:30 p.m.–1 a.m.
Group Alumni Reception:	Mon., 17 Oct., 7–9:30 p.m.
Exhibit Hall Hours:	Sun., 16 Oct., 5:30–7:30 p.m. Mon.–Tues., 17–18 Oct., 9 a.m.–5:30 p.m. Wed., 19 Oct., 9 a.m.–2 p.m.
Hot Topics:	Sun.–Wed., 16–19 Oct., 12:15–1:15 p.m.
Postmeeting Field Trips:	Wed.–Sat., 19–22 Oct.



MEETING HIGHLIGHTS

PARDEE SYMPOSIA

- 2004 South Asian Tsunami (P1)
- The 2004–2005 Eruption of Mount St. Helens: New Insights and Hazard Management of an Extraordinary Dacitic Dome-Growth Eruption (P5)
- The Return to Saturn: Results from Cassini-Huygens (P6)
- Water Resources Science and Public Policy (P8)

TECHNICAL SESSIONS

- The Evolving Earth: Implications for Ore Deposit Formation, Evolution, and Benefaction (T5)
- Environmental Issues Related to Oil and Gas Exploration and Production (T12)
- Hydrogeology and Climate Change: Insights from the Past (T16)
- Nano- to Field-scale Processes Governing the Transport of Microbes and Colloids in the Subsurface and Colloids in the Subsurface (T23)
- Drought Related Geologic Hazards: A Worldwide Perspective (T38)
- What Goes Up Must Come Down: The Science and Policy of Dam Removal (T45)
- Carving the Western Landscape: The Evolution of the Colorado Drainage from Source to Sink (T56)
- Sedimentology Goes to Mars (T72)
- The Dawn of Animal Life: Evolutionary and Paleocological Patterns in the Neoproterozoic-Cambrian Animal Fossil Record (T83)
- It's About Time: Teaching the Temporal Aspects of Geoscience (T104)
- The Yellowstone Hotspot: Its Influence on the Magmatic and Tectonic Evolution of the Western U.S. (T129)
- Orogenic Plateaus from Top to Bottom (T135)
- EarthScope: Challenges in Understanding the Heterogeneity of the Lithosphere (T140)

GSA PRESIDENTIAL ADDRESS & AWARDS CEREMONY

Sat., 15 Oct., 7–9 p.m.

Hilton Salt Lake City Center, Grand Ballroom

Join us Saturday evening when President William A. Thomas gives his Presidential Address and presents the 2005 Awards and Medals. Recipients 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, the Subaru Outstanding Woman in Science Award, and the GSA Divisions Award winners will be announced in the July issue of *GSA Today*.

Come honor your fellow geoscientists, the award recipients, and the Honorary Fellows at the Presidential Address and Awards Ceremony. A reception will immediately follow the ceremony.

EXHIBITS OPENING & WELCOMING RECEPTION

Sun., 16 Oct., 5:30–7:30 p.m.

Salt Palace Convention Center

Exhibit Halls D and E

Come enjoy the opening of the Exhibit Hall Sunday evening, immediately following the technical sessions. The welcoming party proves to be a great networking time with colleagues and friends and a good opportunity to view the exhibits and enjoy a beverage.

AWARD LUNCHEONS AND OTHER TICKETED GROUP FUNCTIONS

Associated Societies and GSA Divisions invite their members and other interested guests to join them for their annual meeting meal functions, special addresses, and awards ceremonies. Only a few tickets will be available on-site, so please register early for ticketed functions. The location and time of events will appear on your ticket and in the 2005 Annual Meeting Program. You can also find more details on the official meeting Web site, www.geosociety.org/meetings/2005/.

GROUP ALUMNI PARTY

Mon., 17 Oct., 7–9:30 p.m.

Salt Lake City Marriott Downtown

Come join your former classmates and colleagues at this year's Group Alumni Party at the Salt Lake City Marriott Downtown.

To include your school in the Group Alumni Party, go to www.geosociety.org and complete the space request form or contact Melissa Cummiskey, mcummiskey@geosociety.org, +1-303-357-1058, for details.

PRIVATE ALUMNI RECEPTIONS

Mon., 17 Oct., 5 p.m.–1 a.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 2005 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 send an e-mail to mcummiskey@geosociety.org.

BEER & GEOLOGY SESSION

Sun., 16 Oct., 7:30–9:30 p.m., Salt Palace

Convention Center



Back by popular demand! Due to the overwhelming response we received last year, we will explore the effect of high plains desert geology on the brewing process. *You must be 21 years of age with proper identification to participate in the beer sampling portion of this session.* For details go to GSA's official meeting Web site, www.geosociety.org/meetings/2005/.

THINGS TO DO IN SALT LAKE CITY

Please see our meeting Web site. Go to www.geosociety.org/meetings/2005/, for additional things to do while in Salt Lake City.

Back by Popular Demand

GSA'S HALL OF FAME

This year, Salt Lake City's display will honor GSA's current and past geoscience award winners, AGI's current and past Medal in Memory of Ian Campbell recipients, the GSA Divisions' current and past awardees, GSA Fellows and Honorary Fellows, GSA's 50-year members, our Allied and Associated Society award recipients, and our top-ranked graduate student research grant recipients. Take a moment to acknowledge your colleagues, mentors, students, and maybe even yourselves, for all the hard work and deserved recognition!



GRADUATE SCHOOL INFORMATION FORUM

EXHIBIT HALL

Sun., 16 Oct., 8 a.m.–7:30 p.m.

Mon.–Wed., 17–19 Oct., 8 a.m.–5:30 p.m.

Meet face-to-face with prospective students in a relaxed, informal setting by participating in the Graduate School Information Forum (GSIF) during the GSA Annual Meeting. Take advantage of this excellent opportunity to promote your school to over 2,000 students.

The GSIF will be located between the Exhibits and the poster sessions. The booths are in a highly visible area. The forum will be open Sunday from 8 a.m. to 7:30 p.m. This coincides with the Welcoming Reception in the Exhibit Hall on Sunday evening. The

hours for Monday–Wednesday
are 8 a.m.–5:30 p.m.

You may choose to reserve space for one day or for all four days. Space is limited, and Sunday and Monday will be the first to sell out.

Schools reserving multiple days will be assigned first and to the most visible booths.

Participating schools will be promoted in the September *GSA Today* (pending submittal date of reservation form), the 2005 Annual Meeting Program, and as e-mail links on the GSA Web site so prospective students may schedule appointments prior to the Annual Meeting.

Go online to reserve your space at https://rock.geosociety.org/forms/xGSIF_form.asp. For more information, contact Kevin Ricker, +1-303-357-1090, kricker@geosociety.org.

DON'T DELAY—RESERVE YOUR SPACE NOW!



ANNUAL Campus Representatives Appreciation Breakfast

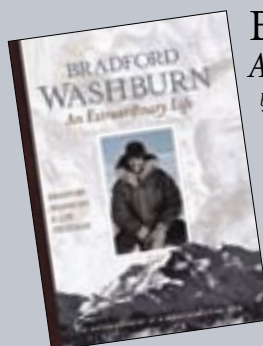
Mon., 17 Oct. 2005, 7–9 a.m.
Salt Palace Convention Center
Room TBA

GSA Campus Reps.: Please join us for a continental breakfast before you head off to the technical sessions. This is an informal, drop-in event, conveniently located in the Convention Center.

- Network with other campus representatives
- Talk about GSA membership and program opportunities for students
- Share your ideas with GSA staff hosts

Admission is free, but we ask that you register in order to help us make catering plans.

To register, check “(308) Campus Reps. Apprec. Bkfst.” on your registration form.



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ATTENTION, STUDENTS! PRESIDENT'S STUDENT BREAKFAST RECEPTION

SUN., 16 OCT., 7–8:30 A.M.

LOCATION TBA

SPONSORED BY: **ExxonMobil**

HOSTED BY:  THE GEOLOGICAL SOCIETY
OF AMERICA

GSA President Bill Thomas invites all students registered for the meeting to attend a free breakfast buffet sponsored by ExxonMobil Corporation. Bill and members of the GSA Leadership and representatives from GSA's Associated and Allied Societies, as well as ExxonMobil staff members, will be on hand to answer questions and address student issues. This will also be a time to recognize the Subaru Outstanding Woman in Science awardee and the top-ranked graduate student research grant recipients, as well as to acknowledge other student research grant recipients and all student division awardees.

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, meet the officers of GSA, and recognize fellow student award recipients!

2005 EXHIBITORS

As of press copy deadline, exhibitors by category. See up to the minute listings of exhibitors at www.geosociety.org/meetings/2005/xibits.htm.

Computer Hardware

Panasonic Computer Solutions Company

Computer Software

COMSOL Inc.
ESRI
GEON
iGage Mapping
Interactive Classroom Consulting/eInstruction
RockWare Inc.

Gems/Minerals Dealers, Jewelry/Gifts

Designs On You
Gems & Crystals Unlimited
IKON Mining & Cal Graeber
Komodo Dragon
Nature's Own
Roxy Gemstone Jewelry

General Educational Products

Digital Library for Earth System Education (DLESE)
IRIS Consortium

Geographic Supplies and Related Equipment

Armfield
ASC Scientific
Ben Meadows Company
Forestry Suppliers Inc.
Geology Outfitters Inc.
Rite in the Rain
WeatherWriter USA

Geological and Geophysical Instrumentation

Advanced Geosciences Inc.
Bruker AXS
Cameca Instruments Inc.
Campbell Scientific Inc.
CETAC Technologies
Corporation Scientifique Claisse Inc.
EDAX Inc.
Gatan Inc.
GV Instruments Inc.
Hach Environmental
Horiba Jobin Yvon Inc.
In-Situ Inc.
Jensen Inert Products
Leica Microsystems
Meiji Techno America
New Wave Research
Panalytical
Rigaku MSC
Soilmoisture Equipment Corp.
SPECTRO Analytical Instruments
SPEX Sampleprep LLC
Thermo Electron

Government Agencies (Federal, State, Local, International)

Los Alamos National Laboratory
NASA Science Mission Directorate
National Park Service
National Science Foundation
Office of Surface Mining
Oklahoma Geological Survey
Rocky Mountain Oilfield Testing Center (RMOTC)
Sigma Gamma Epsilon
U.S. Bureau of Land Management
U.S. Geological Survey
USDA Forest Service

Other

Earth Sciences Cyber-infrastructure
EarthScope
Environmental Careers Organization
Gemological Institute of America
Geosystems
Instrumentation Northwest Inc.
Joint Oceanographic Institutions
National Research Council
The Paleobiology Database
Risatec Pty Limited
SESAR: Solid Earth Sample Registry
Subaru of America Inc.*
UNAVCO Inc.
Ward's Natural Science

Professional Societies and Associations

AAPG Bookstore
American Association of Stratigraphic Palynologists
American Geological Institute
American Geophysical Union
American Institute of Professional Geologists
American Quaternary Association
Association for Women Geoscientists
Association of American State Geologists
Association of Earth Science Editors
Association of Engineering Geologists
Chronos
Council on Undergraduate Research—Geosciences Division
Cushman Foundation
Geochemical Society
GSA Headquarters
Geoscience Information Society
GeoScienceWorld
History of Earth Sciences Society (HESS)
Mineralogical Association of Canada
Mineralogical Society of America
National Assoc. of Geoscience Teachers
National Earth Science Teachers Assoc.
The Paleontological Society
Society for Advancement of Chicanos & Native Americans in Science
Society for Sedimentary Geology
Society of Economic Geologists
Southern California Earthquake Center
Utah Geological Association

Attention Annual Meeting attendees!
Come see the exhibits and support our GSA exhibitors. Join a community of over 6,000 geoscientists mingling with exhibitors at the Salt Palace Convention Center. We have a lot of new and exciting exhibitors this year, so stop by to visit, purchase, inquire, sign up, and catch up!

Publications, Maps, Films

Allen Press Inc.
Blackwell Publishing
Brooks/Cole, Thomson
Cambridge University Press
Columbia University Press
Elsevier
John Wiley & Sons
Kendall/Hunt Publishing
McGraw-Hill Higher Education
The Micropaleontology Project Inc.
Mountain Press
NRC Research Press
Oxford University Press
Paleontological Research Institution
Prentice Hall
Springer
University of Chicago Press
W.H. Freeman & Company
W.W. Norton & Company

Services (Exploration, Laboratories, Consulting, and others)

Activation Laboratories Ltd.
Beta Analytic Inc.
Blackhawk GeoServices Inc.
DOSECC Inc.
Environmental Isotope Lab

State Surveys

New Mexico Bureau of Geology
Utah Geological Survey

Universities/Schools

Auburn University—Geology
Baylor University—Geology Department
Brigham Young University—Geology Department
CODES, Centre for Ore Deposit Research
Colorado School of Mines
Desert Research Institute
Mississippi State University
Montana State University
Ohio State University—Dept. of Geological Sciences
University of Nevada—Las Vegas
University of Nevada—Reno
University of Texas at Austin—Jackson School of Geoscience

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Exhibits Opening & Welcoming Reception

Sun., 16 Oct. 5:30–7:30 p.m.

Exhibit Hall Hours

Mon.–Tues., 17–18 Oct. 9 a.m.–5:30 p.m.
Wed., 19 Oct. 9 a.m.–2 p.m.



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9 a.m.-5:30 p.m.
Wed., 19 Oct.,
9 a.m.-2 p.m.

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GSA MENTOR PROGRAMS

at the 2005 Salt Lake City Annual Meeting

Looking for a job—now or in the future?

Plan to attend the Careers Roundtable Discussions Mentor Program

Join this group of mentors for one-on-one career advice, networking opportunities, and job-market perspectives. They represent a broad range of geoscience-related professions including academics, industry, and government agencies. This FREE come-and-go event is open to everyone.

Registration not required. Sun., 16 Oct., 1–3 p.m., Salt Palace Convention Center, Ballrooms G and I. For more information, contact Karlon Blythe, kblythe@geosociety.org.

Attention Students Pursuing a Hydrogeology Career Path—This Mann Mentor Program is for You!

The Mann Mentors in Applied Hydrogeology Program underwrites the cost for up to 25 students to attend the distinguished Hydrogeology Division Luncheon and Awards Presentation. That's right—no cost to students. **Eligible students are those who have: (1) ticked the box on their membership application indicating their professional interest in hydrology/hydrogeology, AND (2) registered for the Annual Meeting by 12 September 2005.** The lucky recipients of these tickets will have the chance to

meet with some of the nation's most distinguished hydrogeologists. FREE tickets will be awarded to the first 25 students who respond to an **e-mail invitation**, based on the eligibility criteria above. **Registration required.** Date and location TBA. For more information, contact Karlon Blythe, kblythe@geosociety.org.

Students: check out the GEOLOGY IN GOVERNMENT MENTOR PROGRAM!

A **FREE lunch** for undergraduate and graduate students will be held at GSA's Salt Lake City meeting. This popular annual event will feature a select panel of mentors representing various government agencies. Mentors will invite questions from the students, offer advice about preparing for a career, and comment on the prospects for current and future job opportunities within their agencies. Mon., 17 Oct., 11:30 a.m.–1 p.m., location TBA. **Registration not required.** Every student registered for the Annual Meeting will receive a ticket to this event along with their badge; however, attendance is limited, so arrive early! For more information, contact Karlon Blythe, kblythe@geosociety.org.

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GSA Annual Meeting, 16–19 October 2005
Salt Palace Convention Center, Salt Lake City, Utah

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GSA Annual Meeting 16–19 October 2005
Salt Palace Convention Center, Salt Lake City, Utah

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*Interviewing at the GSA Annual Meeting is optional and is included in the Employment Service Center registration fee.

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GUEST PROGRAM

We extend a warm welcome to all guests at the 2005 GSA Annual Meeting & Exposition in Salt Lake City, Utah!

To register as a guest, please complete the registration form online at www.geosociety.org or send the registration form in this issue to GSA, P.O. Box 9140, Boulder, CO 80301-9140, USA, fax +1-303-357-1072.

The guest registration fee of US\$80 per person is for non-geologist spouses, family members, or friends of a professional and/or student registrant. The guest registration fee is required for those attending all guest activities, tours, seminars, access to the Exhibit Hall, and for refreshments in the Guest Hospitality Suite. The guest registration fee will not provide access to technical sessions; however, guests can sign in with the hostess in the Guest Hospitality Suite to get a visitor badge, allowing entrance to specific presentations. Formal guest tours, listed in the following section, are at an additional cost and include professional tour guides, round-trip transportation, admission fees, and gratuities.

Tours

All GSA Annual Meeting guests are welcome to register for the following guest program tours. Reservations for all tours will be accepted on a first-come, first-served basis. The tour operator requires a final guarantee weeks in advance. Most tours have attendance minimums as well as maximums.

Tours may be canceled if minimum attendance is not met. Please register early to guarantee your spot.

Plan to arrive at the departure location 15 minutes before the scheduled departure time to make sure you don't miss the bus. Guests should check in at the Guest Hospitality Suite and will then be directed to the departure location at the Salt Lake City Marriott Downtown Hotel.

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

Bird Watching [101]

Sat. 15 Oct., 8 a.m.–noon

Bird watching is the very best kind of fun: easy, inexpensive, healthful, and satisfying. Enjoy the pleasure of seeing a beautiful bird for the first time while surrounded by some of Earth's most impressive scenery. Add in large expanses of uncrowded space and a relaxing western atmosphere and you will understand why birding in Utah is an unforgettable experience. Cost: \$39. Minimum: 20 people.

Mormon Tabernacle Choir and Crossroads of the West Tour [102]

Sun., 16 Oct., 8 a.m.–1:00 p.m.

Begin your morning with a 30-minute nationally broadcast session at Temple Square with the world-renowned Mormon Tabernacle Choir. Your guide will give you a complete look

at what makes Salt Lake City unique from other cities. You'll explore downtown, the historic Avenues District, University of Utah, Fort Douglas, Olympic sites, and more! This is your chance to get a top-notch overview of Salt Lake City! Cost: \$39. Minimum: 30 people.

Utah Olympic Park and Park City Gallery Stroll [103]

Sun., 16 Oct., 10 a.m.–4 p.m.

Tour the Utah Olympic Park: This venue was the host of the bobsled, ski jumping, luge, and skeleton events. Your tour will continue in Park City, where you'll learn its fascinating history as a mining boomtown. You will enjoy catered light hors d'oeuvres in one of the 25 galleries found in this thriving cultural area and have time to wander through the quaint boutiques and shops on your own. Cost: \$49. Minimum: 30 people.

Alps of Utah with lunch [104A] or without lunch [104B]

Mon., 17 Oct., 9 a.m.–4 p.m.

The Rocky Mountains are breathtaking as you make your way through Provo Canyon on your way to Robert Redford's Sundance Resort. Take time to walk around and enjoy the beautiful alpine splendor in the shadows of majestic Mount Timpanogos. Your tour continues through the charming Swiss village of Midway, located in the very heart of the "Alps" of Utah. Finally, find yourself in Utah's most famous resort town, Park City, where you will have time to enjoy lunch on your own and explore the many unique shops along Main Street before returning to Salt Lake City. Cost: \$49 without lunch; \$61 with lunch. Minimum: 20 people.

Best of Salt Lake City Tour [105]

Mon., 17 Oct., 12:30 p.m.–4 p.m.

This tour is a complete look at what makes Salt Lake City unique. You will tour the historic downtown area, including the world-famous Mormon Temple, which took 40 years to build. You will see the Union Pacific Depot, Olympic sites, Abravanel Hall and the Capitol Theater, the "Avenues," the University of Utah, Fort Douglas, and This is the Place Heritage Park—the landmark where the Mormon pioneers entered the Salt Lake Valley in 1847 and Brigham Young uttered the now famous words, "This is the place." Your final stop will be the shopping paradise of The Gateway. Here you will have the opportunity to spend the rest of the afternoon shopping on your own or return to the Convention Center. Cost: \$34. Minimum: 30 people.

The Great Salt Lake & Kennecott Copper Mine [106]

Tues., 18 Oct., 9 a.m.–1 p.m.

Visit "America's Dead Sea," the Great Salt Lake. Continue along the base of the Oquirrh Mountains as you make your way to Kennecott's Bingham Canyon Copper Mine. The largest open pit mining operation ever undertaken, the Kennecott Mine is one of only two man-made objects visible from space. Cost: \$29. Minimum: 30 people.

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Utah Olympic Park and Park City [107]

Tues., 18 Oct., 1 p.m.–5 p.m.

Tour the Utah Olympic Park: This venue was the host of the bobsled, ski jumping, luge, and skeleton events. You will continue your tour in Park City (home of the Sundance Film Festival) and learn its fascinating history as a mining boomtown. You will have time to wander through the quaint boutiques and historical buildings like the Park City Museum and Territorial Jail. Cost: \$39. Minimum: 20 people.

Gardner Village Shopping Tour [108]

Wed., 19 Oct., 10 a.m.–1 p.m.

You will enjoy an afternoon of shopping and history as you visit Gardner Village. Gardner was one of the original settlers in Utah and built a water-powered flour mill on this land in 1877. Today, this land is complete with historic cabins, houses, and buildings that have been restored into quaint and unique shops and craft-style boutiques. Cost: \$29. Minimum: 20 people.

Payment of the guest registration fee entitles you to attend the guest seminars at no extra charge. Seminar names, descriptions, and locations will be listed in the September issue of *GSA Today* and in the Annual Meeting Program.

Guest Hospitality Suite Hours

Sun.–Wed., 16–19 Oct. 2005,

8 a.m.–5:30 p.m.

Salt Lake City Marriott Downtown

Beginning Sunday, 16 October, guests are invited to visit the Guest Hospitality Suite in the Salt Lake City Marriott Downtown. A hostess will provide a resource center with abundant information about Salt Lake City and its various attractions and sightseeing opportunities, and 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 Exhibit Hall.

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2005 Tyler Prize

The Tyler Prize Medallion

Charles David Keeling

Scripps Institution of Oceanography
University of California, San Diego

Lonnie G. Thompson

Byrd Polar Research Center
The Ohio State University

The Tyler Prize Executive Committee announces the awarding of the 2005 Tyler Prize for Environmental Achievement on its thirty-second anniversary to Dr. Charles David Keeling, Professor, Scripps Institution of Oceanography, University of California, San Diego and Dr. Lonnie G. Thompson, University Professor, Byrd Polar Research Center of Ohio State University. Drs. Keeling and Thompson are recognized for their pioneering research, which has laid the foundation for and provided the clearest evidence of the growing impact of global climate change.

Charles David Keeling is recognized for his rigorous time series measurements of atmospheric carbon dioxide and their interpretation. These carefully made observations conducted over four and a half decades, and continued today, have revealed world wide increases in carbon dioxide with striking spatial and temporal patterns of variability that show relationships between the carbon cycle and climate, and reveal unanticipated links between these components and the earth system. From his remarkable lifetime of scientific investigations, we know that humans are altering the global physical environment. Web: http://earthguide.ucsd.edu/globalchange/keeling_curve/01.html

Lonnie G. Thompson is recognized for his pioneering work in the collection and analysis of valuable climatic information contained in tropical glacier ice cores from all over the world. These tropical ice cores have provided understanding of paleoclimatic conditions against which current climate changes can be compared. The high altitude collection of these evidences of past climatic conditions is a heroic feat of mountaineering that requires courage, daring and physical endurance comparable to the legendary explorers of yore. Web: <http://www.geology.ohio-state.edu/modules.php?op=modload&name=Faculty&id=thompson.3@osu.edu&file=faculty.profile>

The Tyler Prize was established in 1973 by the late John and Alice Tyler as an international award honoring achievements in environmental science, policy, energy and health of worldwide importance conferring great benefit on humanity. The Tyler Prize consists of a cash award of \$200,000 and a gold Tyler Prize medallion.

For additional information contact Dr. Linda E. Duguay, Executive Director, The Tyler Prize
Phone (213) 740-9760, Fax (213) 740-1313,
Email tylerprz@usc.edu • Home Page www.usc.edu/tylerprize

The Tyler Prize is administered by the University of Southern California

SLC 2005 FIELD TRIPS

Students, spouses, and interested guests are cordially encouraged to attend these field trips. Trips are technical in nature, and some can be physically rigorous. Participants should be prepared for a variety of weather conditions, from cold and wet to warm and sunny. Trips are one to four days in duration 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 nonregistrant fee of US\$40 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 Salt Lake City at the Salt Palace Convention Center, *unless otherwise indicated*. Upon return, some postmeeting trips can stop at the Salt Lake City International Airport to discharge participants who have evening flights or 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, as those times are estimates and delays in the field can occur. For a list of hotels near the airport, contact Edna Collis, Program Officer, GSA Headquarters, +1-303-357-1034, ecollis@geosociety.org.

CANCELLATION DEADLINE: 19 September 2005

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 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.

PREMEETING

1. Neoproterozoic Uinta Mountain Group of Northeastern Utah: Pre-Sturtian Geographic, Tectonic, and Biologic Evolution [401]

Thurs.–Fri., 13–14 Oct. Cosponsored by *GSA Sedimentary Geology Division*. Carol M. Dehler, Dept. of Geology, Utah State University, Logan, UT 84321, +1-435-797-0764, fax +1-435-797-1588, chuaria@cc.usu.edu; Susannah Porter; Doug Sprinkel. Max.: 27; min.: 12. Cost: US\$185 (2L, R, 1ON, vans). *This field trip is in conjunction with the Pocatello Formation and Overlying Strata, Southeastern Idaho: Snowball Earth Diamictites, Cap Carbonates, and Neoproterozoic Isotopic Profiles field trip held Sat., 15 Oct.*

This trip will focus on the stratigraphy, sedimentology, isotope geochemistry, and paleontology of the siliciclastic Neoproterozoic (pre-Sturtian) Uinta Mountain Group. We will examine deposits representing offshore marine to fan-delta to fluvial environments and contemplate how these rocks fit into the picture of Rodinia break up, severe climate changes, and biologic evolution of the Neoproterozoic era.

2. Basaltic Volcanism of the Central and Western Snake River Plain and its Relation to the Yellowstone Plume [402]

Thurs.–Sat., 13–15 Oct. John Shervais, Dept. of Geology, Utah State University, Logan, Utah 84322, +1-435-797-1274, fax +1-435-797-1588, shervais@cc.usu.edu; John Kauffman; Kurt Othberg; Virginia Gillerman. Max.: 22; min.: 12. Cost: US\$325 (3L, R, 2ON, vans).

Volcanic features at the intersection of the central and western Snake River Plain include subaerial and hydrovolcanic vents, pillow lava deltas, plagioclase flotation cumulates in ferrobasalt, and water escape structures in massive lava flows. Other features include stratigraphic relationships with rhyolites and lake sediments, unconformities in the older basalts, and the effects of the great Bonneville flood.

3. From Cirques to Canyon Cutting: New Quaternary Research in the Uinta Mountains [403]

Thurs.–Sat., 13–15 Oct. Cosponsored by *GSA Quaternary Geology and Geomorphology Division*. Jeffrey Munroe, Geology Dept., Middlebury College, Middlebury, VT 05753, +1-802-443-3446, fax +1-802-443-2072, jmunroe@middlebury.edu; Joel Pederson; Benjamin Laabs; Eric Carson. Max.: 30; min.: 14. Cost: US\$255 (3L, 1D, R, 2ON, vans).

This trip will tour the north and south flanks of the Uinta Mountains and sections of the Green River. Subjects will include glacial and fluvial geomorphology, new constraints on the timing of the local Last Glacial Maximum, dynamics of late Pleistocene glaciations, post-glacial adjustments of alpine fluvial systems, as well as paleoflooding, canyon cutting, and integration of the Green River.

Attention Students

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

GSA's **Sedimentary Geology Division** is cosponsoring several field trips and will subsidize ten student members of their division (see individual trip descriptions for those sponsored). Students must pay the full field trip fee when registering, but will be reimbursed US\$100 after the GSA meeting by the Sedimentary Geology Division. To be reimbursed, students must apply by e-mail, before the Annual Meeting, to Paul K. Link, secretary of the Sedimentary Geology Division, at linkpaul@isu.edu. In the application, students must provide their GSA member number, certify that they are members of the Sedimentary Geology Division, and provide their social security number and address.

GSA's **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, field trip title, and a one-paragraph rationale by e-mail only to David Lageson, lageson@montana.edu. The deadline to apply is September 1. See the Structural Geology and Tectonics newsletter for more information.

4. Geomorphology and Rates of Landscape Change in the Fremont River Drainage, Northwestern Colorado Plateau [404]

Thurs.–Sat., 13–15 Oct. Cosponsored by *GSA Quaternary Geology and Geomorphology Division*. David Marchetti, Dept. of Geology and Geophysics, University of Utah, Salt Lake City, UT 84112, +1-801-581-7062, fax +1-801-581-8219, dwmarche@mines.utah.edu; John Dohrenwend; Thure Cerling. Max.: 25; min.: 10. Cost: US\$315 (2B, 3L, 2D, R, 2ON, vans).

This trip will take us from the high volcanic plateaus of south-central Utah through Capitol Reef National Park and on to the badlands north of the Henry Mountains. We will investigate the geomorphology of the Fremont River basin as well as several boulder armored paleo-surfaces along the route and discuss our dating results for these surfaces.

5. Ice in Equatorial Pangea: The Unaweep-Cutler System [405]

Thurs.–Sat., 13–15 Oct. Cosponsored by *GSA Sedimentary Geology Division; GeoSystems*. G.S. (Lynn) Soreghan, School of Geology and Geophysics, University of Oklahoma, Norman, OK 73019, +1-405-325-4482, fax +1-405-325-3140, lsoreg@ou.edu. Max.: 24; min.: 12. Cost: US\$270 (3L, R, 2ON, vans).

This trip will highlight emerging data documenting late Paleozoic glaciation in the Uncompahgre-Paradox region (western Colorado), focusing on Unaweep Canyon and the Cutler Formation. The Cenozoic evolution of Unaweep Canyon will also be addressed. Documentation of glaciation in equatorial Pangea bears on our understanding of late Paleozoic climate and regional tectonics.

6. Lacustrine Records of Laramide Landscape Evolution, Green River Formation [406]

Thurs.–Sat., 13–15 Oct. Cosponsored by *GSA Limnogeology Division; GSA Sedimentary Geology Division*. Alan Carroll, Dept. of Geology & Geophysics, University of Wisconsin, Madison, WI 53706, +1-608-262-2368, fax +1-608-262-0693, carroll@geology.wisc.edu; Paul Buchheim; Arvid Aase. Max.: 33; min.: 10. Cost: US\$340 (3B, 3L, 1D, R, 2ON, vans).

The Green River Formation contains a relatively complete and highly resolved record of the geomorphic evolution of the surrounding landscape. This trip will examine the utility of lake basins for interpreting past orogenic and geomorphic processes and will also provide an introduction to the sedimentology and stratigraphy of large lake systems. A collecting stop for fossil fish is also planned.

7. Late Cretaceous Stratigraphy, Depositional Environments, and Macrovertebrate Paleontology in Grand Staircase–Escalante National Monument, Utah [407]

Thurs.–Sat., 13–15 Oct. Cosponsored by *GSA Geobiology and Geomicrobiology Division; GSA Sedimentary Geology Division*. Alan L. Titus, Grand Staircase–Escalante National Monument, 190 E. Center Street, Kanab, UT 84741, +1-435-644-4332, fax +1-435-644-4350, Alan_Titus@blm.gov; John D. Powell; Eric

Roberts; Stonnie Pollock; Jim Kirkland; L. Barry Albright. Max.: 36; min.: 12. Cost: US\$220 (3L, R, 2ON vans).

Grand Staircase–Escalante National Monument contains one of the most continuous records of Late Cretaceous terrestrial biota in North America. This record occurs in a spectacular 2000+ meter thick foreland basin sequence deposited in a coastal plain setting. Recent finds in the monument include dinosaur skeletons with soft tissue preservation and several new species of larger vertebrates. This trip will provide an overview of the region's Cretaceous geology and paleontology, emphasizing findings of the Bureau of Land Management–sponsored research.

8. Transect across the Northern Walker Lane, Northwest Nevada and Northeast California: An Incipient Transform Fault along the Pacific–North American Plate Boundary [408]

Thurs.–Sat., 13–15 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. James E. Faulds, Nevada Bureau of Mines and Geology, MS 178, University of Nevada, Reno, NV 89557, +1-775-784-6691, ext. 159, fax +1-775-784-1709, jfaulds@unr.edu; Christopher D. Henry; Nicholas H. Hinz. Max.: 29; min.: 12. Cost: US\$285 (3L, 1D, R, 3ON, vans). *Begins and ends in Reno.*

The northern Walker Lane is one of the youngest and least developed parts of the Pacific–North American transform boundary and thus offers insight into how strike-slip fault systems develop. This trip will assess the geometry and kinematics of this curiously left-stepping, dextral fault system and view spectacular exposures of tuff-filled Oligocene paleovalleys that constrain offset on the strike-slip faults.

9. Brittle Deformation, Fluid Flow, and Diagenesis in Sandstone at Valley of Fire State Park, Nevada [409]

Fri.–Sat., 14–15 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. Peter Eichhubl, Physical and Life Sciences Dept., Texas A&M University, Corpus Christi, TX 78412, +1-361-825-2309, fax +1-361-825-3345, peichhubl@falcon.tamucc.edu; Eric Flodin. Max.: 20; min.: 10. Cost: US\$170 (2L, R, 1ON, vans). *Begins and ends in Las Vegas.*

Brittle deformation, fluid flow, and diagenetic reactions are coupled phenomena. We will study the interaction among these processes at various scales at Valley of Fire State Park near Lake Mead. Brittle structures and diagenetic alteration patterns in Jurassic Aztec Sandstone provided a record of multiple stages of basinal fluid flow that correlate with Sevier and Basin and Range tectonics.

10. Evolution of a Miocene-Pliocene Supradetachment Basin, Northeastern Great Basin [410]

Sat., Oct. 15. Cosponsored by *GSA Structural Geology and Tectonics Division*. Alexander Steely, Dept. of Geology, Utah State University, Logan, UT 84321, +1-435-797-1273, fax +1-435-797-1588, asteely@cc.usu.edu; Susanne Janecke; Stephanie Carney; Sean Long; Robert Oaks, Jr. Max.: 25; min.: 12. Cost: US\$95 (1L, R, vans).

The Miocene-Pliocene Bannock detachment system in southeastern Idaho provides a unique opportunity to exam-

ine evidence for fault formation and slip at low angles along low-angle normal faults, flat-on-flat geometries, and changes in structural style across a lateral ramp. We will also examine evidence for the stratigraphic evolution of the supradetachment basin and its later disruption by Basin-and-Range normal faults.

11. Geology and Natural Burning Coal Fires of the Ferron Sandstone Member of the Mancos Shale, Emery Coalfield, Utah [411]

Sat., 15 Oct. Cosponsored by *GSA Coal Geology Division*. Glenn B. Stracher, East Georgia College, Swainsboro, GA 30401, +1-478-289-2073, fax +1-478-289-2080, stracher@ega.edu; Paul B. Anderson; David E. Tabet; Janet L. Stracher. Max.: 36; min.: 12. Cost: US\$90 (1L, 1D, R, vans).

On this trip we will travel to the Emery coalfield in central Utah where we will examine and discuss the structural geology and coal stratigraphy of the Ferron Sandstone Member of the Mancos Shale, visit actively burning natural coal fires, and gain hands-on experience with data collecting techniques for mine fires research. Subsidence features, gas vents, and ground fissures associated with Utah's coal fires will be observed.

12. Latest Pleistocene–Early Holocene Human Occupation in the Bonneville Basin [412]

Sat., 15 Oct. Cosponsored by *GSA Archaeological Geology Division*. David Rhode, Desert Research Institute, Reno, NV 89512, +1-775-673-7310, fax +1-775-673-7397, dave.rhode@dri.edu; Ted Goebel; Bryan Hockett; Kevin Jones; David Madsen. Max.: 48; min.: 12. Cost: US\$75 (1L, R, vans).

This excursion visits archaeological cave sites and paleoenvironmental localities in the western Bonneville Basin that give a detailed picture of human occupation and environmental change during the terminal Pleistocene and early Holocene. Danger Cave and Bonneville Estates Rockshelter contain the earliest well-dated evidence of human occupation in the region. Post-pluvial environmental change is highlighted at Blue Lakes, an expansive marshland adjacent to the Great Salt Lake Desert.

13. Neotectonics and Paleoseismology of the Wasatch Fault, Utah [413]

Sat., 15 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. Ronald L. Bruhn, Dept. of Geology and Geophysics, University of Utah, Salt Lake City, UT 84112, +1-801-581-6619, fax +1-801-581-8219, rlbruhn@mines.utah.edu; Ronald Harris; William R. Lund; Christopher DuRoss. Max.: 40; min.: 12. Cost: US\$70 (1L, R, bus).

The trip will highlight recent research on the neotectonics and paleoseismology of the Wasatch fault zone, one of the world's foremost sites for developing techniques to investigate the earthquake history and rupturing properties of normal faulting. We will visit segment-boundaries, fault scarps and bedrock exposures on the Great Salt Lake and Provo segments, and a new paleoseismology trench on the Nephi fault segment.

14. Pocatello Formation and Overlying Strata, Southeastern Idaho: Snowball Earth Diamictites, Cap Carbonates, and Neoproterozoic Isotopic Profiles [414]

Sat., 15 Oct. Cosponsored by *GSA Sedimentary Geology Division*. Paul Link, Dept. of Geosciences, Idaho State University, Pocatello, ID 83209, +1-208-282-3846, fax +1-208-282-4414, linkpaul@isu.edu; Frank Corsetti; Nathaniel Lorentz. Max.: 30; min.: 10. Cost: US\$80 (1L, R, vans). *This field trip is in conjunction with the Neoproterozoic Uinta Mountain Group of Northeastern Utah: Pre-Sturtian Geographic, Tectonic, and Biologic Evolution field trip held Thurs.–Fri., 13–14 Oct.*

This trip will traverse two Neoproterozoic sections in the Portneuf Narrows area, southeastern Idaho, requiring climbs of 800 and 400 ft. Sections are Scout Mountain Member, Pocatello Formation, including ca. Ma 710 glacial diamictites, dolomite cap, 667 Ma tuff, and upper caplike carbonate; and cyclic Blackrock Canyon Limestone, with upward-shallowing siliciclastic to carbonate cycles and microbial mounds.

DURING THE MEETING

15. Geology of the Wasatch—A Two Billion Year Tour through the Upper Third of the Crust—A One-Day Trip [415]

Mon., 17 Oct. Cosponsored by *National Association of Geoscience Teachers*. Michael Bunds, Dept. of Earth Science, Utah Valley State College, Orem, UT 84058, +1-801-863-6306, fax +1-801-863-8064, bundsmi@uvsc.edu; William Dinklage; Daniel Horns. Max.: 36; min.: 12. Cost: US\$60 (1L, R, vans).

We will traverse the Wasatch Mountains to examine its two-billion-year-long geologic history, including sedimentation, plutonism and contact metamorphism, volcanism, mountain front uplift during Basin-and-Range extension, earthquakes, and glaciation. The trip is a great opportunity for professional geologists, academics, and teachers looking for an overview of the local geology.

16. Unique Geologic Features of Timpanogos Cave National Monument—A Half-Day Trip [416]

Tues., 18 Oct. Cosponsored by *National Park Service*. Jon Jasper, Timpanogos Cave National Monument, American Fork, UT 84003, +1-801-492-3647, fax +1-801-756-5661, jon_jasper@nps.gov; Dave Herron. Max.: 20; min.: 10. Cost: US\$95 (1L, vans).

Come join us on a geology field trip to Timpanogos Cave to discuss its unique concentration of spiraling helictites, green and yellow coloration, fault-controlled passages, and alpine karst setting. This after-season tour will require all participants to be able to hike the 1.5 mile trail gaining 1,100 ft to reach the cave.

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17. Biogeochemistry, Limnology, and Ecology of Great Salt Lake—A Half-Day Trip [417]

Wed., 19 Oct. David Naftz, U.S. Geological Survey, 2329 Orton Circle, Salt Lake City, UT 84119, +1-801-908-5053, fax +1-801-908-5001, dlnaftz@usgs.gov; Wayne Wurtsbaugh; Don Paul; Terry Kenney. Max.: 45; min.: 33. Cost: US\$75 (1L, boat ride, bus).

Great Salt Lake is the world's fourth largest terminal lake. Biogeochemical, limnological, and ecological issues concerning the Great Salt Lake ecosystem will be presented and discussed while touring the lake aboard a 65-ft luxury cruise liner (outside and inside seating available). Avid bird watchers and accompanying spouses will also enjoy the three-hour cruise. Catch-of-the-day lunch included.

POSTMEETING

18. Anatomy of Reservoir-Scale Normal Faults in Central Utah: Stratigraphic Controls and Implications for Fault Zone Evolution and Fluid Flow [418]

Wed.–Fri., 19–21 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. Peter Vrolijk, ExxonMobil Upstream Research Company, Houston, TX 77252, +1-713-431-4151, fax +1-713-431-4114, mpeter.vrolijk@exxonmobil.com; Zoe K. Shipton; Rod Myers; James P. Evans; Mike Sweet. Max.: 24; min.: 10. Cost: US\$220 (2L, 1D, R, 2ON, vans).

We will examine the way that faults nucleate and grow through complex, 3-D stratigraphic sequences and more homogeneous sequences in Jurassic deposits, central Utah. Along-fault and cross-fault fluid flow will be considered in this context. This trip is intended to attract structural geologists, stratigraphers, and hydrogeologists interested in interdisciplinary research.

19. Sheet-like Emplacement of Satellite Laccoliths, Sills, and Bysmaliths of the Henry Mountains, Southern Utah [419]

Wed.–Fri., 19–21 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. Sven Morgan, Dept. of Geology, Central Michigan University, Mount Pleasant, MI 48859, +1-989-774-1082, fax +1-989-774-2142, sven.morgan@cmich.edu; Eric Horsman; Basil Tikoff; Michel de Saint Blanquat. Max.: 36; min.: 12. Cost: US\$195 (3L, R, 2ON, vans).

We will examine four satellite intrusions of the Henry Mountains, which may represent successive stages in the progressive growth of igneous bodies. Our research suggests that these intrusions have multiple, sometimes cryptic, sheets. Spectacular outcrops, outstanding scenery, and gourmet lunches will stimulate discussion of various emplacement models. The trip involves moderately strenuous hiking and very little local driving.

20. Folds, Fabrics, and Kinematic Criteria in Rheomorphic Ignimbrites of the Snake River Plain, Idaho: Insights into Emplacement and Flow [420]

Wed.–Sat., 19–22 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. Graham D.M. Andrews, Dept. of Geology, University of Leicester, Leicester, UK, (+44)1162523930, gdma1@le.ac.uk; Steve Temperley; Mike J. Branney. Max.: 24; min.: 10. Cost: US\$225 (1L, R, 3ON, vans).

The Grey's Landing Ignimbrite provides an unrivalled opportunity to examine deformation structures in a rheomorphic ignimbrite and establish appropriate emplacement and deformation models. We will examine key localities displaying the range of features present and the relationships between them. This trip is aimed equally at physical volcanologists and structural geologists with interests in rheomorphism, lava emplacement, and ductile shear zones.

21. Mesozoic Lakes of the Colorado Plateau [421]

Wed.–Sat., 19–22 Oct. Cosponsored by *GSA Limnogeology Division*; *GSA Sedimentary Geology Division*. Tim Demko, Dept. of Geological Sciences, University of Minnesota, Duluth, MN 55812, +1-218-726-8340, fax +1-218-726-8275, tdemko@umn.edu; Kathleen Nicoll; Steve Hasiotis; Lisa Park; Joe Beer. Max.: 30; min.: 10. Cost: US\$300 (3L, 1D, R, 3ON, vans).

This trip will highlight the lacustrine deposits in the Mesozoic strata of the southern Colorado Plateau. We will examine the evolution of lacustrine deposystems within the themes of continental ecosystems and Pangaeian and post-Pangaeian paleogeography and paleoclimatology. Stops will examine lake deposits of the Triassic Chinle and Jurassic Morrison Formations in the Moab, Four Corners, and Glen Canyon–Capitol Reef areas.

22. Birth of the Lower Colorado River—Stratigraphic and Geomorphic Evidence for its Inception and Evolution near the Conjunction of Nevada, Arizona, and California [422]

Thurs.–Sat., 20–22 Oct. Cosponsored by *GSA Quaternary Geology and Geomorphology Division*. P. Kyle House, Nevada Bureau of Mines and Geology, University of Nevada, Reno, NV 89557, +1-775-784-6691, ext. 176, fax +1-775-784-1709, khouse@unr.edu; Philip A. Pearthree; Keith A. Howard; John W. Bell. Max.: 30; min.: 12. Cost: US\$245 (3L, R, 2ON, SUVs). *Begins and ends in Las Vegas*.

This trip will focus on new stratigraphic evidence for the evolution of the lower Colorado River downstream from the Grand Canyon. Highlights include exposures that link latest Miocene catastrophic flooding and lacustrine inundation to river inception, evidence for massive fluvial aggradation in the early Pliocene related to excavation of the Grand Canyon, and evidence for multiple Quaternary aggradation and degradation cycles.

23. Classic Geology of Zion and Bryce Canyon National Parks and Cedar Breaks National Monument [423]

Thurs.–Sat., 20–22 Oct. Grant C. Willis, Utah Geological Survey, P.O. Box 146100, Salt Lake City, UT 84114, +1-801-537-3300, fax +1-801-537-3400, grantwillis@utah.gov; Robert F. Biek. Max.: 45; min.: 15. Cost: US\$290 (3L, R, 2ON, bus).

The cliffs of Zion National Park are carved from 2,000 m of colorful Mesozoic strata. Bryce Canyon and Cedar Breaks display the spectacular salmon-colored Claron Formation. Dinosaur tracks abound in nearby Jurassic strata. We will examine the classic geology of southwest Utah's most famous parks and geologic sites. A good trip for spouses and friends!

24. Development of Miocene Faults and Basins in the Lake Mead Region: A Tribute to Ernie Anderson and Review of New Research on Basins [424]

Thurs.–Sat., 20–22 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division*. Paul Umhoefer, Dept. of Geology, Northern Arizona University, Flagstaff, AZ 86011, +1-928-523-6464, fax +1-928-523-9220, paul.umhoefer@nau.edu; Thomas Hickson; Ernie Anderson; L. Sue Beard; Melissa Lamb. Max.: 33; min.: 12. Cost: US\$320 (3B, 3L, 2D, R, 2ON, vans). *Begins and ends in Las Vegas*.

The Lake Mead area offers world-class exposures of Miocene rocks and faults related to large-scale extension. We will examine the development of Miocene faults and basins from Frenchman Mountain near Las Vegas to Overton Arm of Lake Mead. We will focus on critical framework studies and ongoing basinal studies and honor the fundamental contributions of Ernie Anderson.

25. Don R. Currey Memorial Field Trip to the Shores of Pleistocene Lake Bonneville: Stratigraphy, Geomorphology, and Climate Change [425]

Thurs.–Sat., 20–22 Oct. Cosponsored by *GSA Quaternary Geology and Geomorphology Division*. Holly Godsey, Dept. of Geology and Geophysics, University of Utah, Salt Lake City, UT 84112, +1-801-209-2940, fax +1-801-581-8219, hgodsey@mines.utah.edu; Elliott Lips; David Miller; Mark Milligan; Jack Oviatt. Max.: 40; min.: 20. Cost: US\$185 (3L, 1D, R, vans).

This field trip will visit the beautifully preserved shoreline remnants of Lake Bonneville that make up a large part of the northern Utah landscape. We will visit classic field localities including Antelope Island, Stockton Bar, Stansbury Gulch, the Brigham City delta, and Hansel Valley. We will discuss lake processes, stratigraphy, geomorphology, climate change, and the preservation of pristine lake features.

26. Paleoseismology and Geomorphology of the Hurricane Fault/Escarpment [426]

Thurs.–Sat., 20–22 Oct. Cosponsored by *GSA Structural Geology and Tectonics Division; GSA Quaternary Geology and Geomorphology Division*. Lee Amoroso, U.S. Geological Survey, 2255 N. Gemini Drive, Flagstaff, AZ 86001, +1-928-556-7186, fax +1-928-556-7196, lamoroso@usgs.gov; Cassie Fenton; Jason Raucci. Max.: 20; min.: 5. Cost: US\$175 (Camping, SUVs). *Begins and ends in Las Vegas*.

We will see paleoseismic, structural, and geomorphic features of the Hurricane fault in southwestern Utah and north-eastern Arizona. We will see examples of Quaternary deformation, fault linkage features, and visit the faulted lava flows in Whitmore Canyon. We will visit Pleistocene deposits that are evidence of the influence of pluvial climates on the geomorphic development along the Hurricane Escarpment.

27. Sedimentology and Sequence Stratigraphy of Isolated Shelf Turbidite Bodies, Book Cliffs, Utah [427]

Thurs.–Sat., 20–22 Oct. Cosponsored by *GSA Sedimentary Geology Division*. Simon A.J. Pattison, Dept. of Geology, Brandon University, Brandon, Manitoba R7A 6A9, Canada,

+1-204-727-7468, fax +1-204-728-7346, pattison@brandonu.ca; Huw Williams; Trevor A. Hoffman. Max.: 30; min.: 5. Cost: US\$240 (3L, R, 2ON, vans).

This field trip will examine the sedimentology, sedimentary architecture, sequence stratigraphy, paleogeography, and depositional model of Mancos Shale–encased, isolated sandstone bodies in the Green River to Thompson area, Book Cliffs, eastern Utah. Inner shelf turbiditic channels and lobes are concentrated in the upper Aberdeen and lower Kenilworth members. Implications for shoreline-to-shelf facies models and sequence stratigraphic models will be discussed.

28. Geologic Hazards of the Wasatch Front, Utah [428]

Thurs., 20 Oct. Cosponsored by *GSA Engineering Geology Division; Association of Engineering Geologists*. Barry J. Solomon, Utah Geological Survey, P.O. Box 146100, Salt Lake City, UT 84114, +1-801-537-3388, fax +1-801-537-3400, barysolomon@utah.gov; Francis X. Ashland; Bill D. Black; Richard L. Ford; Richard Giraud; David H. Hart; Michael D. Hylland. Max.: 42; min.: 12. Cost: US\$80 (1L, R, bus).

The Wasatch Front is characterized by a unique combination of geology, topography, and climate. Its population is growing at a rapid rate, and interaction between the built and natural environments provides opportunities for exposure to a variety of geologic hazards. We will examine several types of geologic hazards encountered along the Wasatch Front and discuss recent related research.

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Please check the GSA Web site, www.geosociety.org/grants/, in August for updates on date, time, and location.



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SOCIETY OF ECONOMIC GEOLOGISTS FIELD TRIPS

Bingham Canyon Porphyry Cu-Au-Mo Deposit

Fri., 14 Oct. Sponsored by *Society of Economic Geologists*.
Leaders: Ken Krahulec, Utah Geological Survey, 1594 W. North
Temple, P.O. Box 146100, Salt Lake City, UT 84114-6100, +1-
801-537-3308, fax +1-801-537-3400, kenkrahulec@utah.gov;
Ricardo Presnell, Kennecott Exploration Co., 224N 2200W Salt
Lake City, UT 84116, +1-801-238-2414, fax +1-801-238-2430,
ricardo.presnell@kennecott.com. Max.: 50.

This one-day field trip will visit the world-class Bingham
Porphyry Cu-Au-Mo deposit. The visit will consist of an over-
view of the Bingham Mining district and open-pit geology,
review of significant core intervals, and possibly a visit into
the open pit. Participants must provide their own hard hat,
safety glasses, and steel-toe boots. A jacket and gloves are
also recommended. Please contact trip leaders for further
information.

Lisbon Valley Sediment-Hosted Cu Deposits and Paradox Basin Fluids

Thurs.–Fri., 20–21 Oct. Sponsored by *Society of Economic
Geologists*. Leaders: Jon Thorson, 5515 Nuthatch Road,
Parker, CO 80134, +1-303-805-2502, fax +1-303-805-
2503, jonthorson@rmi.net; Ricardo D. Presnell, Kennecott
Exploration Co., 224N 2200W Salt Lake City, UT
84116, +1-801-238-2414, fax +1-801-238-2430, ricardo.
presnell@kennecott.com. Max.: 20. *Begins and ends in Grand
Junction, Colorado.*

The Lisbon Valley copper deposits are the result of two
episodes of basin dewatering fluid flow. On day 1, we will
review regional stratigraphy of the northeastern Paradox
Basin, reducing pyritic alteration of the Permian through
Lower Cretaceous section by an early basinal fluid, and
copper mineralization by a later fluid. Day 2 will be a visit
to Constellation Copper Corporation's Lisbon Valley Mine
and SXEW copper facility. A short but demanding hike is
included. Participants must provide their own hard hat, safety
glasses, and appropriate boots required for the mine visit.
Please contact Jon Thorson by e-mail for further information.

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WHEN YOU NEED TO BE SURE



SALT LAKE CITY 2005 SHORT COURSES

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 US\$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 an additional US\$30.

Continuing Education Unit (CEU) Service

All professional development courses and workshops 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.

Cancellation Deadline: 19 September 2005.

1. Introduction to Geographic Information Systems (GIS), Using ArcGIS9 for Geological Applications [501]

Fri.–Sat., 14–15 Oct., 8 a.m.–5 p.m. Cosponsored by *GSA Geoscience Education Division; Environmental Systems Research Institute.*

This short course will introduce the use of GIS in geology related applications through brief lectures, and hands-on computer exercises. Concepts in creating a GIS project in geology will be discussed including creation of data (GPS, RS, digitizing), conversion of data, metadata, different data formats (vector and raster) and accessing data from several sources (tables, shapefiles, coverages, CAD, geodatabases and grids). Participants do not need to have experience with ArcGIS, but familiarity with Windows OS is beneficial.

Faculty: Ann B. Johnson, Higher Education Manager, Environmental Systems Research Institute, Redlands, Calif., Ph.D., California State University; Willy Lynch, Instructor, Environmental Systems Research Institute, Denver, Colo., M.S., University of Utah; Esther Worker, Education Account Manager, Environmental Systems Research Institute, Denver, Colo., B.A., University of Colorado–Boulder. Limit: 24. Fee: US\$330; includes course manual and lunch. CEU: 1.6.

2. Measurement of Indoor Radon in Geologically Diverse Terrains [502]

Fri.–Sat., 14–15 Oct., 8 a.m.–5 p.m. Cosponsored by *GSA Engineering Geology Division.*

This course provides hands-on training to understand, anticipate, and measure geologically dependent indoor radon and waterborne radon. Course is designed for teachers and researchers. An optional exam earns a Radon Measurement Specialist Certificate (National Radon Safety Board, info@nrbsb.org) for full- or part-time employment as a home inspector in the real estate market. A general knowledge of soil and hydrology is required.

Faculty: Douglas Mose, George Mason University, Fairfax, Va., Ph.D., University of Kansas; George Mushrush, George Mason University, Fairfax, Va., Ph.D., Georgetown University. Limit: 40. Fee: US\$360; includes course manual and lunch. CEU: 1.6. *Optional Exam: Earn a Radon Measurement Specialist Certificate. Cost: US\$150.*

3. A Tracer Runs through It: Applications of the Tracer-Injection Methods [503]

Sat., 15 Oct., 8 a.m.–5 p.m. Cosponsored by *GSA Hydrogeology Division.*

Tracer-injection techniques have characterized mining-impacted watersheds, but are applicable to many water-quality problems, particularly Total Maximum Daily Load studies. This course covers theoretical and practical details of tracer-injection studies in streams and small rivers. Applications include estimation of discharge for synoptic studies and characterization of groundwater–surface water interaction. Field aspects (planning, equipment, sampling) and data analysis (loading computations) are covered. Participants should have a general background in hydrology, but detailed chemistry not required.

Faculty: Briant A. Kimball, U.S. Geological Survey, Salt Lake City, Utah, Ph.D., University of Wyoming; Robert L. Runkel, U.S. Geological Survey, Denver, Colo., Ph.D., University of Colorado–Boulder. Limit: 40. Fee: US\$310; includes course manual and lunch. CEU: 0.8.

4. Science in Environmental Policymaking [504]

Sat., 15 Oct., 8 a.m.–5 p.m. Cosponsored by *GSA Geology and Society Division.*

This interactive course is for scientists whose research informs natural hazard, waste management, water, and other environmental and resource policy decisions. Participants will learn skills to help ensure that science is not ignored, marginalized, or misrepresented by decision makers. They will learn to work effectively within both the traditional adversarial regulatory process and alternative stakeholder-driven, collaborative problem solving approaches.

Faculty: Herman Karl, Massachusetts Institute of Technology, Cambridge, Mass., Ph.D., University of Southern California–Los Angeles; Judith Layzer, Massachusetts Institute of Technology,

Attention Students

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

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

For more information, contact Edna Collis, GSA Program Officer for Professional Development, ecollis@geosociety.org, (303) 357-1034.

Cambridge, Mass., Ph.D., Massachusetts Institute of Technology; Christine Turner, U.S. Geological Survey, Denver, Colo., Ph.D., University of Colorado–Boulder. Limit: 30. Fee: US\$340; includes course manual and lunch. CEU: 0.8.

5. Springs Inventory and Classification Course and Field Trip [505]

Sat., 15 Oct., 8 a.m.–5 p.m. *Cosponsored by GSA Hydrogeology Division.*

Participants will learn the theory and techniques of inventorying and classifying the physical and biological characteristics of spring ecosystems. This course includes a half-day field trip to introduce the theory and to demonstrate the materials and techniques. Anyone involved with teaching earth sciences, managing spring ecosystems, or in conducting basic science of springs should attend.

Faculty: Abe Springer, Northern Arizona University, Flagstaff, Ariz., Ph.D., Ohio State University; Larry Stevens, Stevens Ecological Consulting, Flagstaff, Ariz., Ph.D., Northern Arizona University; Heidi Kloepfel, Grand Canyon Wildlands Council, Flagstaff, Ariz., M.S., Northern Arizona University. Limit: 25. Fee: US\$305; includes course manual, field trip, and boxed lunch. CEU: 0.8.

6. Three-Dimensional Geologic Mapping for Groundwater Applications Workshop [506]

Sat., 15 Oct., 8 a.m.–5 p.m. *Cosponsored by GSA Geology and Society Division; GSA Hydrogeology Division.*

Increased diligence in management of groundwater systems for the long term is coinciding with progress in digital data, analytical methods, and computing power. Geologic mappers seeking to support groundwater applications should attend this workshop to obtain an overview of 3D methods made possible by these advances, including basin analysis, data management, model construction, geophysical methods, and hydrogeological characterization.

Faculty: Richard C. Berg, Illinois State Geological Survey, Champaign, Ill., Ph.D., University of Illinois–Urbana-Champaign; Hazen Russell, Geological Survey of Canada, Ottawa, Ph.D., University of Ottawa; Harvey Thorleifson, Minnesota Geological Survey, University of Minnesota, Ph.D., University of Colorado–Boulder. Limit: 50. Fee: US\$200; includes course manual and lunch. CEU: 0.8.

OTHER COURSES

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

Sequence Stratigraphy for Graduate Students

Fri.–Sat., 14–15 Oct., 8 a.m.–5 p.m. Free short course for graduate students. *Cosponsored by ExxonMobil and British Petroleum.*

This free, two-day 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-trans-

gressive 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 for learning sequence stratigraphy. The exercises include classic case studies from which many sequence stratigraphic concepts were originally developed.

Instructors: Art Donovan (BP) and Kirt Campion (ExxonMobil). Limit: 40. No fee. Preregistration required. For information and registration: Kirt Campion, kirt.m.campion@exxonmobil.com.

Thermochronology

Fri.–Sat., 14–15 Oct., 8 a.m.–5 p.m. Snowbird Resort, Snowbird, Utah. Sponsored by *Mineralogical Society of America.*

Applications of thermochronology include dating of weathering, shock metamorphism, wildfires, and extended time-temperature histories from single crystals. The results tell us about timing and development of topography, architecture and dynamics of orogenic wedges, and relationships among erosion, uplift, and climate. This short course focuses on measuring and interpretation techniques and case studies integrating multiple low-temperature thermochronometers for experienced practitioners as well as earth scientists seeking to use thermochronologic constraints in their research.

Organizers: Peter W. Reiners, Dept. of Geology and Geophysics, Yale University, +1-203-432-3761, peter.reiners@yale.edu; Todd A. Ehlers, Dept. of Geological Sciences, University of Michigan, +1-734-763-5112, tehlers@umich.edu. Max.: 100. Fees: Professional: US\$400 MSA/GSA member, US\$450 nonmembers; Students: US\$40 MSA/GSA member, US\$60 nonmembers (fees applicable if registration is received before 15 Aug. 2005). For information and registration, contact the MSA Business Office, 1015 18th St. NW, Ste. 601, Washington, DC 20036-5212, +1-202-775-4344, fax +1-202-775-0018, business@minsocam.org, or visit and register on the MSA home page, <http://www.minsocam.org>.

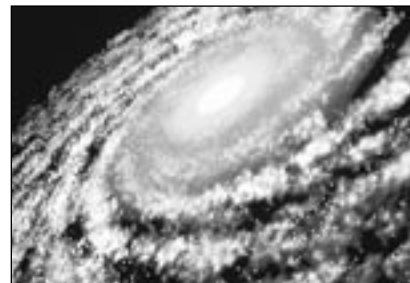
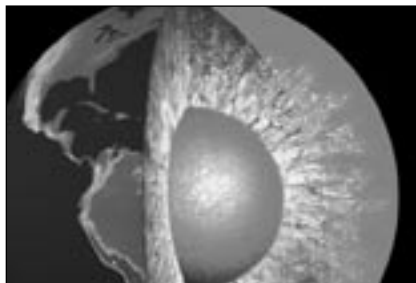
Paleobiogeography: Generating New Insights into the Coevolution of the Earth and Its Biota

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

Paleobiogeography is a scientific discipline that has established important causal links between geological and climatic changes and the evolution of life. It has a rich scientific heritage that extends back to before the publication of Darwin's *On the Origin of Species*, and currently serves as a discipline bridging evolutionary biology and geology. This free short course will consider foci of biogeographic research with relevance to paleontology, geology, and evolutionary biology.

Faculty: Bruce Lieberman and Alycia Stigall Rode. No fee or registration required. Information: Bruce Lieberman, Dept. of Geology, 323 Lindley Hall, University of Kansas, 1475 Jayhawk Boulevard, Lawrence, KS 66045-7613, +1-785-864-2741, fax +1-785-864-5276, blieber@ku.edu; Alycia Stigall Rode, Dept. of Geological Sciences, Ohio University, Clippinger Laboratory 316, Athens, OH 45701-2979, +1-740-593-0393, rode@ohio.edu.

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ISSN: 0084-6597 ISBN: 0-8243-2033-6

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College and University Faculty, K-12 Teachers, Undergraduate and Graduate Students, Informal Educators:

Please join us for an exciting and diverse series of workshops and events for education at all levels. Annual Meeting registration and payment of the workshop fee are required in order to participate in the K-16 workshops. GSA K-12 Teacher Members who are only attending the workshops do not have to pay the meeting registration fee (US\$44). Annual Meeting registration is US\$44 for nonmember K-16 teachers or for others who will participate only in the weekend workshops. A special Subaru of America grant is available to Utah graduate students and two-year college faculty that will cover half of the registration fee. Please visit www.geosociety.org/meetings/2005/rSubaru.htm for information. Preregister to ensure your spot.

SATURDAY WORKSHOPS

1. Earthquakes—A One-Day Workshop for College and University Faculty [601]

Sat., 15 Oct., 8 a.m.–5 p.m. Cosponsored by *IRIS Consortium; U.S. Geological Survey; National Science Foundation; Purdue University*.

Intended audience: College and university faculty. Fee: US\$10.

This workshop will cover the following topics: causes of earthquakes, plate tectonics, propagation of seismic waves, seismographs, statistics and data, Earth's structure, and earthquake hazards. Learning activities emphasizing hands-on and inquiry-based learning will be used to deliver content to participants. Participants are encouraged to reflect on how these activities could be used in their classrooms. **Materials (hands-on activities, maps, earthquake book, posters, software and other teaching aids) will be provided to participants** as part of the workshop. **Information:** Michael Hubenthal, hubenth@iris.edu; Larry Braile; John Lehr; John Taber; Lisa Wald.

2. Inquiry-Based Groundwater Science Instructional Materials and Curricula [602]

Sat., 15 Oct., 9 a.m.–5 p.m. Cosponsored by *Kansas Geological Survey; AGI Foundation*.

Intended audience: Middle and high school teachers, college and university faculty, informal educators. Fee: US\$30.

Workshop attendees will be introduced to basic science concepts and inquiry-based curricular materials for use in earth and environmental science classes. Attendees will participate in demonstrations, examine AGI's curricular materials, learn about Internet resources, and play with problem-based computer software if they bring lap-top computers. All instructional and AGI curricular materials samples will be provided. **Information:** P. Allen Macfarlane, dowser@kgs.ku.edu; Ann Benbow, aeb@agiweb.org.

3. How to Establish and Sustain an Undergraduate Research Program [603]

Sat., 15 Oct., 1–5 p.m. Cosponsored by *Council on Undergraduate Research*.

Intended audience: College and university faculty, graduate students. Fee: US\$35.

This workshop will present strategies for developing and sustaining research programs at the undergraduate level. It is open to all but is designed for new geosciences faculty, graduate students applying for academic positions, and faculty interested in expanding their research programs to include undergraduates. Presentations will cover strategies for obtaining a job at a predominantly undergraduate institution, funding opportunities to support undergraduate research, project selection and mentoring of undergraduates, and models of successful undergraduate research programs. **Information:** Lydia Fox, lkfox@pacific.edu.

4. Teaching Introductory Geology with Art: Sharing Effective Materials and Activities [604]

Sat., 15 Oct., 1–5 p.m. Cosponsored by *National Association of Geoscience Teachers; National Science Foundation*.

Intended audience: College and university faculty. Fee: US\$20.

The teaching of introductory geology in conjunction with art is an emerging practice at a number of universities. This interactive workshop will provide a forum for current instructors of such courses to share effective class activities and/or materials. The workshop leaders, a geologist and an art educator who team-teach an art and geology course, will facilitate. They will also disseminate information regarding and solicit participation in their educational materials development project, the goal of which is the production of an art and geology textbook. Funding may be available to cover costs associated with workshop attendance. **Information:** Denise Battles, dbattles@georgiasouthern.edu.

SUNDAY WORKSHOP

5. Designing Effective Geoscience Education Research: Qualitative and Quantitative Methods [605]

Sun., 16 Oct., 8 a.m.–noon. Cosponsored by *Ohio University; National Science Foundation*.

Intended audience: Graduate students, college and K-12 educators, and researchers. Fee: US\$15.

In this workshop, participants will learn about the qualitative and quantitative data collection and analysis methods used in geoscience education research. Workshop leaders will use case studies, demonstrations, and hands-on activities to introduce participants to the variety of education research methods. This workshop is geared for students, college and K-12 educators, and researchers who are engaged in or who plan to be engaged in education research. Written materials will be handed out to augment the content in the workshop. **Information:** Julie Sexton, ju.sexton@colostate.edu; Julie Libarkin, libarkin@ohio.edu.



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2005 REGISTRATION

- **Register online at www.geosociety.org.**
- **Register by mail** to 2005 GSA Annual Meeting, P.O. Box 9140, Boulder, Colorado 80301-9140.
- **Register by fax** at +1-303-357-1071 or +1-303-357-1072 if using a credit card. If you register by fax, please do not send another copy in the mail.

Standard Registration Deadline: 12 September

Cancellation Deadline: 19 September

Member fees apply to members of both GSA Allied and 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. Badges are needed for access to ALL activities, 8 a.m. Sunday through 5:30 p.m. Wednesday.

A **guest registration** fee of US\$80 per person is available for nongeologist spouses or family members and friends of a professional and/or student registrant and is required for those attending all guest activities, tours, and seminars, and for refreshments in the Guest Hospitality Suite and access to the Exhibit Hall. Formal guest tours are at an additional cost and include professional tour guides, round-trip transportation, admission fees, and gratuities. The guest registration fee does NOT allow access to technical sessions. However, guests can sign in with the hostess in the Guest Hospitality Suite and get a visitor badge allowing them to attend a specific presentation.

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 12 September will be considered *on-site* registrations and charged accordingly. Online registration will remain open until 7 October. **Absolutely no registrations should be mailed or faxed after 7 October.** After this date, we will handle registrations at the Salt Palace Convention Center during normal registration hours.

On-site fees for Continuing Education Courses are an additional US\$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 picture ID to ensure your discount.

Cancellations, Changes, and Refunds

All requests for additions, changes, and cancellations must be made in writing and received by 19 September 2005. Faxes are accepted. **A US\$30 processing fee will be charged for cancellation of a full- or one-day professional registration received in writing prior to 19 September.** 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 registration form. There will be NO refunds for on-site registration, *Abstracts with Programs* volumes, and ticket sales.

Badges? Yes, You Need Them!

Badges are needed for access to ALL activities, 8 a.m. Sunday through 5:30 p.m. Wednesday. If your registration form is received at GSA by 12 September, your badge will be mailed to you two weeks before the meeting. If you register after 12 September or are located outside the U.S., you can pick up your badge at the GSA Registration Desk, Salt Palace Convention Center, South Lobby.

How to Save \$

GSA Allied and Associated Society members SAVE US\$80 (professional) and US\$30 (student) by registering before the standard registration deadline. **Nonmembers** SAVE an additional US\$80 (professional) and US\$30 (student) by joining GSA now. See section below on how to join.

GSA Members Pay Less! Join Now or at the Meeting!

Are you taking Advantage of the Member Rate?

If you are not a GSA member or a member of one of the Associated or Allied Societies, isn't it time you joined GSA? Pay less for your meeting registration and attend the GSA Annual Meeting as a GSA member. Professional members save US\$80 on registration for the full meeting and Student members save US\$30 (*registration received by 12 Sept.*)—membership pays for itself!

Join GSA and take advantage of all of the benefits of membership. Visit our secure Web site or contact our service team today.

www.geosociety.org/members

+1-888-443-4472 or +1-303-357-1000, option 3.

Annual Meeting Sponsor



Title Sponsor of the 2005 GSA Annual Meeting.

THE GSA MEMBERSHIP ADVANTAGE

REGISTRATION HOURS (ONSITE)

Salt Palace Convention Center—South Lobby

Sat.	15 Oct.	7 a.m.–4:30 p.m.
Sun.	16 Oct.	6:30 a.m.–7 p.m.
Mon.–Tues.	17–18 Oct.	7 a.m.–4:30 p.m.
Wed.	19 Oct.	7–11 a.m.

REGISTRATION FEES

	Standard Reg. June–12 Sept.	Onsite/Late Reg. after 12 Sept.
Professional Member—Full Meeting	US\$299	US\$380
Professional Member—1 Day	US\$194	US\$205
Professional Member >70—Full Meeting	US\$244	US\$320
Professional Member >70—1 Day	US\$139	US\$150
Professional Nonmember—Full Meeting	US\$379	US\$470
Professional Nonmember—1 Day	US\$219	US\$230
Student Member—Full Meeting	US\$94	US\$125
Student Member—1 Day	US\$64	US\$65
Student Nonmember—Full Meeting	US\$124	US\$155
Student Nonmember—1 Day	US\$79	US\$80
K–12 Professional—Full Meeting	US\$44	US\$45
K–12 Workshop-only—Member	US\$00	US\$00
Field Trip or Short Course Only	US\$40	US\$40
Guest or Spouse	US\$80	US\$80

REGISTRATION AND TRAVEL GRANTS AVAILABLE

Registration Grant Sponsored by



Subaru of America Inc. is once again sponsoring grants to cover one half of the registration fee for member and non-member earth science and geology faculty of Utah state community colleges and member and nonmember graduate students of Utah state universities. For more information, please visit www.geosociety.org/meetings/2005/rSubaru.htm.

GSA Student Travel Fund

GSA is pleased to offer assistance to member undergraduate and graduate students to help cover some of the costs associated with attending the GSA Annual Meeting. A fund has been set up within the GSA Foundation for attendee contributions, and GSA and the Foundation will each contribute US\$1,000 for the 2005 Salt Lake City Annual Meeting. The number and amount of awards will be solely based on contributions received, and 100% of the contributions received will go to help fund student travel. For more information on this fund or to apply online for the Student Travel Fund, please visit www.geosociety.org/meetings/2005/stravel.htm.

Students: Sign Up to Volunteer and Reap the Rewards!



Do you ever feel the only way you can afford to go to a meeting is to panhandle? Now you don't have to! Become a student volunteer and offset your meeting costs.

No upfront meeting registration fee required!

FREE registration if you volunteer
just 10 hours of your time.

FREE Abstracts with Programs volume
by volunteering 15 hours.

Additionally, volunteers receive a stipend of \$25 for each half-day (5 hours) volunteered at the meeting. (Stipends can only be issued to students who have a U.S. government-issued Social Security Number, Green Card, or Student Work Visa.) Optional partial food stipend available.

For more information contact Kevin Ricker, kricker@geosociety.org, or visit www.geosociety.org/meetings/2005/students.htm.

GSA Member #

First Name _____
Last Name _____
Mailing Address _____
City _____ State or Province _____
ZIP or Postal Code _____ Country _____
Is this a change of address? Yes No
 Home or Work
E-mail _____
Daytime Phone _____
Fax _____

CHECK MEMBER AFFILIATION(S) (to qualify for member registration discount)

(a) GSA (b) AAPG (c) AASG (d) AASP (e) AEG
 (f) AESE (g) AGA (h) AGID (i) AIPG (j) AMQUA
 (k) ARMA (l) ASLO (m) AWG (n) CF (o) CUR
 (p) EEGS (q) GAC (r) GS (s) GS Aus (t) GIS
 (u) GSL (v) GSSA (w) HESS (x) IAGC (y) IAH
 (z) KWI (aa) MSA (bb) NABGG (cc) NAGT (dd) NESTA
 (ee) NGWA (ff) PRI (gg) PS (hh) SEG (ii) SEPM
 (jj) SGE (kk) SGM (ll) SSSA (mm) SVP


REGISTRATION FEES (all fees are in U.S. dollars [US\$])

	STANDARD (BY 12 SEPT.)	LATE/ON-SITE (AFTER 12 SEPT.)	QTY.	USDS AMT.
(10) Professional Member*—full meeting	\$299	\$380	1	\$
(11) Professional Member*—1 day	\$194	\$205	1	\$
(12) Professional Member* (70+)—full meeting	\$244	\$320	1	\$
(13) Professional Member* (70+)—1 day	\$139	\$150	1	\$
(14) Professional Nonmember—full meeting	\$379	\$470	1	\$
(15) Professional Nonmember—1 day	\$219	\$230	1	\$
(30) Student Member*—full meeting	\$94	\$125	1	\$
(31) Student Member*—1 day	\$64	\$65	1	\$
(32) Student Nonmember—full meeting	\$124	\$155	1	\$
(33) Student Nonmember—1 day	\$79	\$80	1	\$
(60) K-12 Professional—full meeting	\$44	\$45	1	\$
(62) K-12 Workshop-Only—Member**	\$0	\$0	1	\$
(95) Field Trip or Short Course Only	\$40	\$40	1	\$
(90) Guest or Spouse***	\$80	\$80	1	\$

REGISTRATION FEES SUBTOTAL \$

*Member Fee applies to any current Professional or Student Member of GSA or Associated/Allied Societies listed above. Discount does not apply to guest registrants.
**K-12 Workshop-Only gives you access to the K-16 Workshops you register for. It does not allow access to the full meeting or technical sessions or the *Abstracts with Programs* on CD.
***Guest or Spouse registration fee and field trip or short course only fee does NOT allow access to technical sessions, and does not include *Abstracts with Programs* on CD.

BADGE INFORMATION

First Name _____
Nickname _____
School/Company _____
City _____ State/Prov. _____
Spouse/Guest First Name/Nickname _____
Last Name _____
City _____ State/Prov. _____
 Do you or your guest require any special considerations? Yes No
Will you be working in the Exhibit Hall? Yes No

Yes, I would like to contribute to the GSA Student Travel Fund

\$10 \$25 \$50 \$75 \$100 Other \$ _____
(May be tax deductible, consult tax advisor).

SUBTOTAL (P. 1) USDS

SUBTOTAL (P. 2) USDS

TOTAL OF ALL FEES REMITTED USDS

A \$30 processing fee will be charged for cancellation of a full or one day professional registration received in writing prior to 19 September. No refunds will be given after the cancellation deadline of 19 September for all registration types.

Photographs will be taken at the 2005 GSA Annual Meeting and Exposition. By registering for this meeting, you agree to allow GSA to use photographs that may include shots of you in any GSA-related publications, marketing and promotional materials, or Web site.

FAX TO: +1-303-357-1071 or +1-303-357-1072

**MAIL TO: 2005 GSA ANNUAL MEETING
P.O. Box 9140, Boulder, CO 80301-9140**

REGISTER ONLINE AT: WWW.GEOSOCIETY.ORG

Remit in U.S. funds payable to:

2005 GSA ANNUAL MEETING

(All registrations must be prepaid. Purchase orders not accepted.)

PAYMENT BY (CHECK ONE): Check (No.)

American Express Visa MasterCard Discover

Card Number _____

Expiration Date _____

Signature _____
(name as appears on card)

Registration confirmations will be sent via one of the following methods:

① E-mail (if valid e-mail address is provided) or ② Fax, or ③ Mail

REGISTER ONLINE AT WWW.GEOSOCIETY.ORG.

		QTY.	USDS	AMT.
GUEST PROGRAM (P. 11)				
1. Bird Watching, Sat.	(101)	\$39		\$
2. Mormon Tabernacle Choir and Crossroads of the West Tour, Sun.	(102)	\$39		\$
3. Utah Olympic Park and Park City Gallery Stroll, Sun.	(103)	\$49		\$
4. Alps of Utah, Mon. Lunch included	(104A)	\$61		\$
Lunch NOT included	(104B)	\$49		\$
5. Best of Salt Lake City Tour, Mon.	(105)	\$34		\$
6. The Great Salt Lake & Kennecott Copper Mine, Tues.	(106)	\$29		\$
7. Utah Olympic Park and Park City, Tues.	(107)	\$39		\$
8. Gardner Village Shopping Tour, Wed.	(108)	\$29		\$

SPECIAL EVENTS & TICKETED FUNCTIONS (P. 6)				
1. Geology & Public Policy Lunch, Fri.	(301)	\$28		\$
2. SEG 100th Anniversary & Awards Dinner, Sat.				
Professional	(302A)	\$65		\$
Student	(302B)	\$30		\$
3. NAGT/GSA Geoscience Ed. Div. Lunch, Sun.	(303)	\$28		\$
4. Beer and Geology Session, Sun.	(304)	\$10		\$
5. AWG Breakfast, Mon.				
Professional	(305A)	\$20		\$
Student	(305B)	\$10		\$
6. History of Geology Div. Lunch, Mon.	(306)	\$28		\$
7. Paleontological Society Lunch, Mon.				
Professional	(307A)	\$28		\$
Student	(307B)	\$15		\$
8. Campus Reps. Apprec. Breakfast, Mon.	(308)	FREE	Limit 1	<input type="checkbox"/>
9. Hydrogeology Division Lunch, Tues.	(309)	\$28		\$
10. GSIS Lunch, Tues.	(310)	\$28		\$
11. MSA Lunch, Tues.	(311)	\$28		\$
12. Engineering Geology Div. Lunch, Tues.	(312)	\$28		\$
13. MSA/GS Recept., Tues.				
Professional	(313A)	\$10		\$
Student	(313B)	\$5		\$

WORKSHOPS (P. 12)				
1. Research Proposal Writing Workshop	(650)	FREE		<input type="checkbox"/>

FIELD TRIPS (P. 13)				
1. Neoproterozoic Uinta Mountain Group of Northeastern Utah: Pre-Sturtian Geographic, Tectonic, and Biologic Evolution	(401)	\$185		\$
2. Basaltic Volcanism of the Central and Western Snake River Plain and its Relation to the Yellowstone Plume	(402)	\$325		\$
3. From Cirques to Canyon Cutting: New Quaternary Research in the Uinta Mountains	(403)	\$255		\$
4. Geomorphology and Rates of Landscape Change in the Fremont River Drainage, Northwestern Colorado Plateau	(404)	\$315		\$
5. Ice in Equatorial Pangea: The Unaweep-Cutler System	(405)	\$270		\$
6. Lacustrine Records of Laramide Landscape Evolution, Green River Formation	(406)	\$340		\$
7. Late Cretaceous Stratigraphy, Depositional Environments, and Macrovertebrate Paleontology in Grand Staircase-Escalante National Monument, Utah	(407)	\$220		\$
8. Transect across the Northern Walker Lane, Northwest Nevada and Northeast California: An Incipient Transform Fault along the Pacific-North American Plate Boundary	(408)	\$285		\$
9. Brittle Deformation, Fluid Flow, and Diagenesis in Sandstone at Valley of Fire State Park, Nevada	(409)	\$170		\$
10. Evolution of a Miocene-Pliocene Supradetachment Basin, Northeastern Great Basin	(410)	\$95		\$
11. Geology and Natural Burning Coal Fires of the Ferron Sandstone Member of the Mancos Shale, Emery Coal Field, Utah	(411)	\$90		\$
12. Latest Pleistocene-Early Holocene Human Occupation in the Bonneville Basin	(412)	\$75		\$
13. Neotectonics & Paleoseismology of the Wasatch Fault, Utah	(413)	\$70		\$

		QTY.	USDS	AMT.
14. Pocatello Formation and Overlying Strata, Southeastern Idaho: Snowball Earth Diamictites, Cap Carbonates, and Neoproterozoic Isotopic Profiles	(414)	\$80		\$
15. Geology of the Wasatch—A Two Billion Year Tour through the Upper Third of the Crust—A One Day Trip	(415)	\$60		\$
16. Unique Geologic Features of Timpanogos Cave National Monument—A Half-Day Trip	(416)	\$95		\$
17. Biogeochemistry, Limnology, and Ecology of Great Salt Lake—A Half-Day Trip	(417)	\$75		\$
18. Anatomy of Reservoir-Scale Normal Faults in Central Utah: Stratigraphic Controls and Implications for Fault Zone Evolution and Fluid Flow	(418)	\$220		\$
19. Sheet-like Emplacement of Satellite Laccoliths, Sills and Bysmaliths of the Henry Mountains, Southern Utah	(419)	\$195		\$
20. Folds, Fabrics, and Kinematic Criteria in Rheomorphic Igimbrites of the Snake River Plain, Idaho: Insights into Emplacement and Flow	(420)	\$225		\$
21. Mesozoic Lakes of the Colorado Plateau	(421)	\$300		\$
22. Birth of the Lower Colorado River—Stratigraphic and Geomorphologic Evidence for its Inception and Evolution near the Conjunction of Nevada, Arizona, and California	(422)	\$245		\$
23. Classic Geology of Zion and Bryce Canyon National Parks and Cedar Breaks National Monument	(423)	\$290		\$
24. Development of Miocene Faults and Basins in the Lake Mead Region: A Tribute to Ernie Anderson and Review of New Research on Basins	(424)	\$320		\$
25. Don R. Currey Memorial Field Trip to the Shores of Pleistocene Lake Bonneville: Stratigraphy, Geomorphology, and Climate Change	(425)	\$185		\$
26. Paleoseismology and Geomorphology of the Hurricane Fault/Escarpment	(426)	\$175		\$
27. Sedimentology and Sequence Stratigraphy of Isolated Shelf Turbidite Bodies, Book Cliffs, Utah	(427)	\$240		\$
28. Geologic Hazards of the Wasatch Front, Utah	(428)	\$80		\$

SHORT COURSES (P. 19)				
1. Introduction to Geographic Information Systems (GIS), Using ArcGIS9 for Geological Applications	(501)	\$330		\$
2. Measurement of Indoor Radon in Geologically Diverse Terrains	(502)	\$150		\$
3. A Tracer Runs through It: Applications of the Tracer-Injection Methods	(503)	\$310		\$
4. Science in Environmental Policymaking	(504)	\$340		\$
5. Springs Inventory & Classification Course and Field Trip	(505)	\$305		\$
6. Three-Dimensional Geologic Mapping for Groundwater Applications Workshop	(506)	\$195		\$

K-16 WORKSHOPS (P. 22)				
1. Earthquakes—A One Day Workshop for College and University Faculty	(601)	\$10		\$
2. Inquiry-Based Groundwater Science Instructional Materials and Curricula	(602)	\$30		\$
3. How to Establish & Sustain an Undergraduate Research Program	(603)	\$35		\$
4. Teaching Introductory Geology with Art: Sharing Effective Materials and Activities	(604)	\$20		\$
5. Designing Effective Geoscience Education Research: Qualitative and Quantitative Methods	(605)	\$15		\$

ABSTRACTS WITH PROGRAMS VOLUME This year GSA will provide each meeting registrant* with a copy of the *Abstracts with Programs* on CD-ROM. The 2005 Section Meeting Abstracts are also included on CD.

1. <i>Abstracts with Programs</i> book	(901A)	\$30		\$
AWP shipped within CO subject to 7.25% sales tax	(901B)	\$2.39		\$

AWP will be mailed out approximately 3 weeks prior to the meeting. Delivery prior to the start of the meeting is not guaranteed.

2. <i>Abstracts with Programs</i> book* (to be picked up on-site)	(902)	\$30		\$
3. Additional copy(s) of Abstracts on CD-ROM** (to be picked up on-site)	(903)	\$24		\$

* Field Trip or Short Course only, K-16 Workshop only, and Guest or Spouse registrants are excluded.
**Includes 2005 Section Meetings Abstracts.

SUBTOTAL (P. 2)		USDS		
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REGISTER ONLINE AT WWW.GEOSOCIETY.ORG.

TRAVEL & TRANSPORTATION

TRAVELING TO SALT LAKE CITY

Traveling to Salt Lake City is simple and convenient. Salt Lake City is known as the “Crossroads of the West” due to its easy access by road, rail, and air. Interstates 15 & 80, and U.S. Highway 89 go through the city. Amtrak provides a link to the east and west by rail. By air, half the U.S. population is within two and a half-hour’s distance. Salt Lake City International Airport is closer to the city it serves than nearly any other airport.

AIR TRAVEL

Salt Lake City International Airport (Airport code—SLC) is one of the largest airports in the world and is served by most major airlines. The airport is located 7 miles east of downtown Salt Lake City. The following airlines have been contracted to provide convention rates to and from Salt Lake City for the 2005 GSA Annual Meeting & Exposition. You can save up to 15% on published airfares by booking through the group reservation desks at the numbers listed below.

Frontier Airlines

www.frontierairlines.com
+1-800-243-6297

Ticket Designator #**MC058B**

Frontier Airlines is offering discounts of 10% off all published round-trip fares. Call +1-800-908-9068 and reference Ticket Designator Number **MC058B**.

United Airlines

+1-800-521-4041
Meeting ID #**530GJ**

United Airlines is offering a 5% discount off the lowest applicable discount fare, including first class, or a 10% discount off full fare unrestricted coach fares purchased 7 days in advance. An additional 5% discount will apply when tickets are purchased at least 30 days in advance of your travel date. Discounts also apply on Shuttle by United and United Express. 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 **530GJ**. Dedicated reservationists are on duty seven days a week, 8 a.m.–10 p.m. EST.

Delta

While Salt Lake City is Delta’s third largest hub, Delta has discontinued their meeting discount program as of 5 January 2005.

TRAINS

www.amtrak.com
+1-800-USA-RAIL (+1-800-872-7245)
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BUSES

www.greyhound.com
Fare and schedule information: +1-800-231-2222
ifsr@greyhound.com
TDD/TTY +1-800-345-3109
International callers without toll-free access: +1-214-849-8100

TRANSPORTATION OPTIONS TO/FROM SALT LAKE CITY INTERNATIONAL AIRPORT

There is a ground transportation desk located at the far end of the baggage claim in both terminals at which ground transportation options and information can be obtained. Ground transportation can also be arranged at the ground transportation desks. For more information, contact SLC’s Ground Transportation Information Center, +1-801-575-2477.

CAR RENTAL

Enterprise Rent-A-Car

1-800-736-8227, www.enterprise.com
Group Code: **CUT4401**

You may book reservations online at www.enterprise.com; simply enter your special account number, **CUT4401**, in the optional account box and hit enter, then enter the first 3 letters of your event name, **GEO**, and hit enter. You may also book through Enterprise’s National Reservations Center at **1-800-Rent-a-Car**. All renters must be at least 21 years of age and have a valid driver’s license and credit card in their possession when they plan to pick up the rental vehicle.

SHUTTLE SERVICE

Express Shuttle

+1-800-397-0773 or +1-801-596-1600
www.xpressshuttleutah.com.

Shuttles operate daily from 4 a.m. to 12:30 a.m., serving all of downtown Salt Lake City. The cost is US\$7.00 per person each way. Travel time is about 10 minutes depending on hotel and number of stops. To arrange passage, stop at the Express Shuttle counter on the same level as the baggage claim.

TAXIS

There is a ground transportation desk located at the far end of the baggage claim in both terminals.

City Cab +1-801-363-5550
Ute Cab +1-801-359-7788
Yellow Cab +1-801-521-2100

Wheelchair-Accessible Buses, Shuttles, Taxis, or Vans

All of the buses and the TRAX system are wheelchair accessible. The following company will pick you up with prior notice at Salt Lake City International Airport and provide specialized transportation. Please make arrangements before your arrival.

Handi Van Inc. +1-801-281-8416

TRANSPORTATION OPTIONS IN SALT LAKE CITY

GSA will NOT be providing shuttle service from the hotels to the convention center, but Salt Lake City does have the following inexpensive—or free—options for getting around downtown. Alternative arrangements to/from the GSA hotels and the Salt Palace will be provided by GSA for the elderly or disabled. For more information, contact Erin Pitner, epitner@geosociety.org, +1-303-357-1006.

Public Transportation Services

Once you arrive, getting around the city is easy. The airport is just 10 minutes from downtown. The Utah Transit Authority provides mass transit throughout the Salt Lake area, including the airport and mountain resorts.

CITY BUSES

Most buses run 6 a.m.–midnight on weekdays and 7 a.m.–midnight on Saturday. Sunday service has limited regular routes.

Salt Lake Area: RIDE-UTA (+1-888-743-3882)

In State Toll Free: +1-888- RIDE-UTA (+1-888-743-3882)

Outside of Utah: +1-801-RIDE-UTA (+1-801-743-3882)

Hours: Mon.–Sat., 6 a.m.–7 p.m. CLOSED SUNDAY.

TRAX LIGHT-RAIL

Salt Lake City has a light-rail system known as TRAX. The 15-mile line runs between 10000 South in Sandy (South Salt Lake Valley) and the Delta Center in Downtown Salt Lake City.

Trains stop every 10 to 30 minutes from 5:30 a.m. to 11 p.m. on weekdays and on Saturday until 1 a.m. No service on Sundays. There are also free park and ride lots at most stations excluding downtown.

Fares: The standard one-way fare within the valley is US\$1.25. A large section of the downtown area, including Temple Square and the area just west of the State Capitol, is a fare-free zone and there is no charge if commuters or visitors enter and exit a bus or TRAX between the designated streets. Full-fare tickets may be purchased from vending machines or when boarding the bus. These tickets are valid for two hours from the time of purchase and can be used as often as necessary on both buses and light rail. A full day pass is valid for unlimited rides on buses and TRAX for US\$2.50. These passes may also be bought at vending machines or from pass sales outlets at supermarkets and other retailers. They are self-validating and can be purchased in quantity and used as needed.

GENERAL MEETING INFO

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, kricker@geosociety.org, +1-303-357-1090. Please let us know your needs by 15 September.

TOURIST INFORMATION

For general information about sightseeing, accommodations, restaurants, and shopping in Salt Lake City, visit www.visitsaltlake.com/home.shtml, or see the GSA Meeting Web site for additional area information.

WEATHER AND CLIMATE

The average maximum daytime temperature for Salt Lake City in October is 53 °F (~11 °C), with an average rainfall of 1.4 inches (3.5 cm). Low humidity and lots of sunshine are two favorable aspects of Utah's weather: The sun shines in SLC an average of 237 days a year, with about 14 days of clear skies in October.

“ THE FARTHER BACKWARD YOU CAN
LOOK, THE FARTHER FORWARD YOU
ARE LIKELY TO SEE ”

-WINSTON CHURCHILL

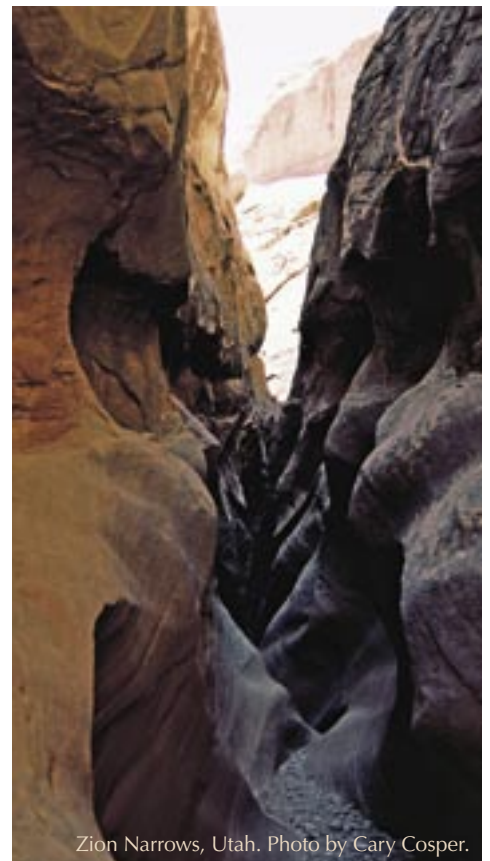
Human civilization
faces an urgent need
to understand, model
and predict climatic
extremes, abrupt
climate shifts and
biotic responses.



DEEP-TIME
GEO SYSTEMS

WWW.GEOSYSTEMS.ORG

VISIT BOOTH #1028 AT THE
GSA MEETING TO REGISTER
AS A COMMUNITY MEMBER



Zion Narrows, Utah. Photo by Cary Cosper.



HOTEL RESERVATION FORM

Geological Society of America
2005 Annual Meeting & Exposition
16-19 October 2005
Salt Palace Convention Center

INSTRUCTIONS

Reservations can be made in one of the following ways:

INTERNET:

www.geosociety.org

TELEPHONE:

Toll free (US): 800-217-0002
 International: 801-521-9025

FAX:

801-355-0250

MAIL:

SLCVB/GSA HOUSING BUREAU
 90 South West Temple
 Salt Lake City, UT 84101

DEADLINE

Reservations must be made by phone, fax, mail or internet by **14 September 2005** in order to guarantee convention rates.

CONFIRMATIONS

The SLCVB/GSA HOUSING BUREAU will send you a confirmation of your reservation. Please review all information for accuracy. E-mail confirmations will be sent if an e-mail address is provided (preferred), or they can be faxed or mailed. If you do not receive a confirmation or have questions, please call the SLCVB/GSA HOUSING BUREAU. **You will not receive a confirmation from the hotel.**

TAX RATE and REQUESTS

All rates are per room and are subject to 11.2% tax (subject to change). Special requests can not be guaranteed, however hotels will do their best to honor all requests. Hotels will assign specific rooms upon check-in, based on availability.

ROOM DEPOSIT REQUIRED TO SECURE RESERVATION:

Reservations will not be accepted without a Room Deposit of one night's room rental plus tax for each room reserved. Room Deposits will be accepted in the form of a check made payable to: SLCVB/GSA HOUSING BUREAU, 90 South West Temple, Salt Lake City, UT 84101; or a valid credit card with signature authorizing the credit card to be charged for the Room Deposit. If the charge to the credit card is denied, we reserve the right to release your reservation.

CANCELLATION POLICY

Cancellations after 14 September 2005 and prior to 72 hours before arrival date will be subject to a \$25.00 cancellation fee. One night's room and tax will be forfeited entirely if cancellation occurs within 72 hours of arrival.

GUEST INFORMATION

Arrival Date _____ **Departure Date** _____

First Name _____ M.I. _____ Last Name _____

E-mail Address: _____

Daytime Phone: _____ Fax: _____

Company _____

Address _____

Address 2 _____

City/State/Province _____

Zip/Postal Code, Country _____

HOTEL SELECTION

Hotel	Preference*	Single	Double	Triple	Quad
**Hilton Salt Lake City Center	_____	\$145.00	\$145.00	\$160.00	\$175.00
**Salt Lake Marriott Downtown	_____	\$149.00	\$149.00	\$159.00	\$169.00
Best Western Plaza Hotel	_____	\$108.00	\$108.00	\$113.00	\$113.00
Radisson Hotel Downtown	_____	\$129.00	\$129.00	\$139.00	\$149.00
Red Lion Salt Lake Downtown	_____	\$ 95.00	\$ 95.00	\$105.00	\$105.00
Sheraton City Centre	_____	\$ 89.00	\$ 89.00	\$ 89.00	\$ 89.00
Salt Lake Marriott City Center	_____	\$146.00	\$146.00	\$156.00	\$156.00

*Please number hotels in order of preference (1st, 2nd, 3rd, etc.) above

**Co-Headquarters Hotels

Room Type Requested: _____ One Bed _____ Two Beds

Submit only one room request per form. Should additional forms be needed, please make copies. If requested hotels are unavailable, a reservation will be made at the next available hotel. Please select criteria:

Comparable room rate Proximity to conference site

To request a suite please contact your hotel directly.

List all room occupants: _____

Check here if you have a disability requiring special services Non smoking request

Special requests: _____

DEPOSIT INFORMATION

All reservations requests must be accompanied by a credit card guarantee or check for one night's deposit. Housing Forms received without a valid guarantee/deposit will not be processed. Faxed requests must include a valid credit card. Check deposits must be mailed with a completed housing form.

Visa Discover Diner's Club
 MasterCard American Express

Card Number _____ Exp. Date _____

Name on Credit Card _____

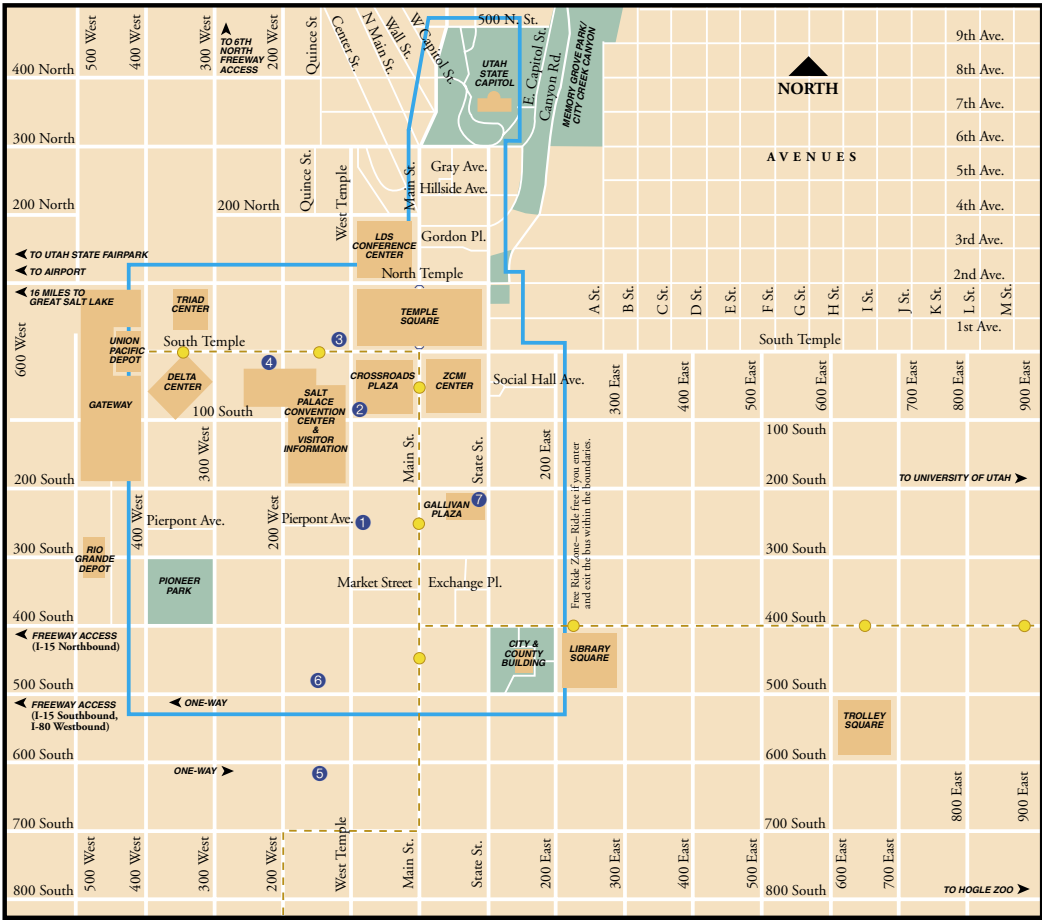
Cardholder's Signature* _____

*I hereby authorize SLCVB/GSA HOUSING BUREAU or any one of the participating hotels, to process a charge to my credit card for each Room Deposit in accordance with the policies and information provided herein no sooner than 14 September 2005.

One night's check deposit enclosed and made payable to SLCVB Housing. Mail housing forms to: SLCVB/GSA HOUSING BUREAU, 90 South West Temple, Salt Lake City, UT 84101.

2005 Salt Lake City Hotel Map

SALT LAKE ACCOMMODATIONS



GEOLOGICAL SOCIETY OF AMERICA 2005 ANNUAL MEETING & EXPOSITION

16-19 October 2005

- | | | |
|---|--|--|
| <p>1 Hilton Salt Lake City Center
Co-Headquarters Hotel
\$145/\$145</p> <p>2 Marriott Salt Lake City Downtown
Co-Headquarters Hotel
\$149/\$149</p> | <p>3 Best Western Salt Lake Plaza Hotel
\$108/\$108</p> <p>4 Radisson Hotel Salt Lake City Downtown
\$129/\$129</p> <p>5 Red Lion Hotel Salt Lake Downtown
\$95/\$95</p> | <p>6 Sheraton City Centre Hotel Salt Lake City
\$89/\$89</p> <p>7 Marriott Salt Lake City Center
\$146/\$146</p> |
|---|--|--|

— Indicates Free Ride Zone. It's free to ride the bus and TRAX in the area shown.
- - - ● Indicates TRAX light-rail route.
○ Indicates a Pedestrian Mall. Closed to vehicles.

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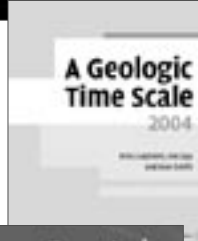


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C.M.R. Fowler

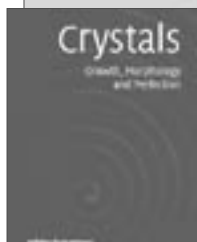
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James Ogg, and Alan Smith

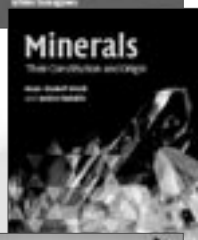
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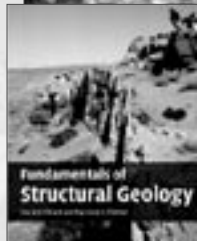
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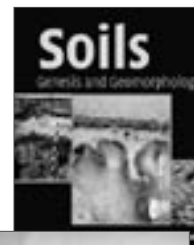
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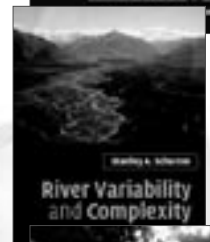
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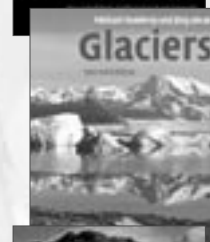


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**Prices subject to change.*

PARDEE KEYNOTE SYMPOSIA

INVITED PAPERS

The Pardee Keynote Symposia are made possible by a grant from the Joseph T. Pardee Memorial Fund.

These Pardee keynote sessions are *special events* of broad interest to the geoscience community. They represent hot issues 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 eight Pardee Symposia were reviewed and accepted by the Annual Program Committee. **(All speakers are invited.)**

P1. 2004 South Asian Tsunami

GSA Geophysics Division; GSA International Division; GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Divisions; GSA Geology and Society Division
Sun., 16 Oct., 1:30–5:30 p.m.

Marine/Coastal Science; Neotectonics/Paleoseismology; Public Policy

Joanne Bourgeois, University of Washington, Seattle, Wash.; Brian F. Atwater, U.S. Geological Survey, Seattle, Wash.

The South Asian Tsunami of 26 December 2004 raises questions about the parent earthquake, the tsunami's generation and runup, and global access to the benefits of science.

P2. Research Opportunities, New Frontiers, and the Questioning of Paradigms in Structural Geology and Tectonics: Celebrating the 25th Anniversary of the SGT Division

GSA Structural Geology and Tectonics Division; NSF Tectonics Program

Tues., 18 Oct., 8 a.m.–noon

Structural Geology; Tectonics; Neotectonics/Paleoseismology
William Matthew Dunne, University of Tennessee, Knoxville, Tenn.; John Geissman, University of New Mexico, Albuquerque, N.Mex.; David Lageson, Montana State University, Bozeman, Mont.; Elizabeth Schermer, Western Washington University, Bellingham, Wash.; Peter Vrolijk, ExxonMobil Upstream Research Co., Houston, Tex.

The Structural Geology and Tectonics Division will use the opportunity of its 25th anniversary to convene a group of 12 leading geoscientists to present papers about exciting new opportunities and frontiers for the future of structural geology and tectonics, while encouraging all to challenge existing paradigms.

P3. Science, Politics, and Environmental Policy

GSA Geology and Society Division; Geology and Public Policy Committee; U.S. Geological Survey Science Impact Program
Tues., 18 Oct., 1:30–5:30 p.m.

Public Policy; Geoscience Information/Communication; Geoscience Education

Herman A. Karl, Massachusetts Institute of Technology and U.S. Geological Survey, Cambridge, Mass.; Judith A. Layzer, Massachusetts Institute of Technology, Cambridge, Mass.

Too often scientists find their work ignored, marginalized, or misrepresented in environmental policy debates. This ses-

sion explores the relationship between science and politics and describes emerging processes that aim to improve the effectiveness of science in environmental problem solving.

P4. Speaking Out for Evolution: Rationale and Resources for Supporting the Teaching of Evolution

Paleontological Society; Society of Vertebrate Paleontology
Sun., 16 Oct., 8 a.m.–noon

Geoscience Education; Paleontology, Diversity, Extinction, Origination; Stratigraphy

Judy Scotchmoor, University of California Museum of Paleontology, Berkeley, Calif.; Carol M. Tang, California Academy of Sciences, San Francisco, Calif.

Hear the latest efforts to strengthen the teaching of evolution, deep time, and geologic history in American classrooms. Through talks and a panel discussion, understand the relevance, strategies, resources, rationale, and support for teaching evolution.

P5. The 2004–2005 Eruption of Mount St. Helens: New Insights and Hazard Management of an Extraordinary Dacitic Dome-Growth Eruption

GSA Quaternary Geology and Geomorphology Division; GSA Geophysics Division; GSA Engineering Geology Division
Wed., 19 Oct., 1:30–5:30 p.m.

Volcanology; Geophysics/Tectonophysics/Seismology; Geoscience Information/Communication

Jon Major, U.S. Geological Survey, Vancouver, Wash.; Cynthia Gardner, U.S. Geological Survey, Vancouver, Wash.

The 2004–2005 eruption of Mount St. Helens afforded unprecedented documentation of uncommonly rapid, steady-state growth of a lava dome. This session explores connections among petrology, geodesy, geochemistry, seismicity, mechanics, hydrology, hazard management, and public communication associated with dacitic dome growth.

P6. The Return to Saturn: Results from Cassini-Huygens

GSA Planetary Geology Division

Mon., 17 Oct., 1:30–5:30 p.m.

Planetary Geology; Remote Sensing/Geographic Info System; Geoscience Education

Thomas R. Watters, Smithsonian Institution, Washington, D.C.; Louise Prockter, Applied Physics Lab, Laurel, Md.

Twenty-three years after the last robotic probe encountered Saturn, the Cassini-Huygens mission is returning unprecedented views of the gas giant, its rings, and its moons. The session will present the latest results from this international mission of science and exploration.

P7. The Wasatch Range–Great Salt Lake Hydroclimatic System

GSA Hydrogeology Division; International Association of Hydrogeologists/U.S. National Chapter; American Geophysical Union; GSA Quaternary Geology and Geomorphology Division; Friends of the Great Salt Lake
Mon., 17 Oct., 8 a.m.–noon

Hydrogeology; Quaternary Geology/Geomorphology; Paleoclimatology/Paleoceanography

continued on page 34

continued from page 33

Christopher J. Duffy, Pennsylvania State University, University Park, Pa.; Danny Marks, Agricultural Research Service, U.S. Department of Agriculture, Boise, Idaho; David G. Tarboton, Utah State University, Logan, Utah; Craig B. Forster, University of Utah, Salt Lake City, Utah

This broadly interdisciplinary session on the dynamic Wasatch Range–Great Salt Lake system will integrate geologic, hydrologic, and ecologic issues of the water cycle, under pressure today from climate change and resource manipulation.

P8. Water Resources Science and Public Policy

GSA Hydrogeology Division; GSA Geology and Society Division; Geology and Public Policy Committee
Wed., 19 Oct., 8 a.m.–noon

Hydrogeology; Public Policy; Environmental Geoscience
David M. Diodato, U.S. Nuclear Waste Technical Review Board, Arlington, Va.; Peter F. Folger, American Geophysical Union, Washington, D.C.; Tamara L. Dickinson, National Academy of Sciences, Washington, D.C.

The health and economic security of American citizens depend upon a safe and reliable water supply. At this symposium, prominent national policy makers and scientists discuss present and future challenges and opportunities of water resources science and public policy.

Announcing
**BACKBONE
OF THE AMERICAS**
FROM PATAGONIA TO ALASKA
3–7 April 2006 · Mendoza, Argentina

Backbone of the Americas: From Patagonia to Alaska is a GSA special meeting cosponsored with the Asociación Geológica Argentina. The principal themes are ridge collision, shallow subduction, and plateau uplift along the Americas. Field trips are planned to Patagonia before and the Chilean flat-slab or Central Andean Puna plateau after the meeting. Suzanne Kay and Victor Ramos are serving as meeting co-chairs.

Co-convened by:

Asociación Geológica Argentina

THE GEOLOGICAL SOCIETY OF AMERICA

See www.geosociety.org/meetings/06boa/index.htm
for details and to sign up for e-news.



EARTHCACHING

GSA puts an earth science education spin on geocaching: *Earthcaches*. Earthcaches are “virtual” caches—Earthcache visitors learn about each site they visit (using Global Positioning System [GPS] technology) through online cache notes.

Earthcaches work well in both rural and urban settings. One Earthcache provides a guided tour of the building stones used in Denver, with notes on each stone type. Active Earthcaching sites in Australia, Canada, and the United States feature cache notes about local faults, folds, fossils, minerals, glacial features, and waterfalls.

Learn more at www.earthcache.org or contact Gary Lewis, glewis@geosociety.org, or Wesley Massey, wmassey@geosociety.org.

GSA is developing these Earthcaches in association with the U.S. Park Service and U.S. Forest Service and in partnership with Groundspeak Inc. and Subaru of America, Inc.

Call for Papers: GSA's *Geosphere*

Submit a paper to *Geosphere*, GSA's new online journal. *Geosphere* is using an online manuscript submission and tracking system accessible through www.geosociety.org (click on “Publications Services,” then “Submit a Manuscript”) or <http://gsa-geosphere.allentrack.net>. (If you have submitted papers to *Geology* or to *GSA Bulletin*, you'll find the process familiar.)

Geosphere:

- seeks high-quality papers from a broad spectrum of geoscience disciplines;
- maintains rigorous standards for peer review;
- strives for a high impact factor;
- is entirely electronic, and the format is extremely flexible;
- encourages innovative approaches to scientific publication, extensive use of color, animations, and interactivity;
- welcomes oversized figures (maps, cross sections, seismic sections);
- allows for the presentation and preservation of basic data, images, etc., through linkage to data archives; and
- aims to evolve with technological advances.

Geosphere science editor: G. Randy Keller,
University of Texas at El Paso.

For more on *Geosphere* see
www.geosociety.org/pubs/geosphere/.

TOPICAL AND DISCIPLINE SESSIONS

Abstracts Deadline: 12 July

Please use the online electronic abstract form found on the GSA Web site, www.geosociety.org. An abstract submission fee will be charged. The fee is \$18 for all students; \$30 for all others. If you cannot submit your abstract electronically, contact Nancy Carlson, (303) 357-1061, ncarlson@geosociety.org.

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 you 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.

DISCIPLINE SESSIONS

From the list found on the electronic abstract form, you may choose up to three discipline categories you feel your abstract would best fit. Joint Technical Program Committee representatives organize the papers in sessions focused on disciplines (e.g., environmental geoscience, mineralogy).

T1. Centennial Celebration Symposia for the Society of Economic Geologists

Society of Economic Geologists

Economic Geology; Petrology, Igneous; Tectonics
Brian Hoal, Society of Economic Geology, Littleton, Colo.
ORAL

T2. Advances in Geophysics and New Techniques: Lithospheric and Crustal Architecture, Ore Deposit Visualization, and New Technologies in Analytical Techniques and Mineral Processing

Society of Economic Geologists

Economic Geology; Geophysics/Tectonophysics/Seismology; Remote Sensing/Geographic Info System
Karin O. Hoal, Golden, Colo.; Ricardo D. Presnell, Kennecott Exploration, Salt Lake City, Utah; Albania. ORAL

T3. Advances in the Understanding of Tectonic Settings and Structural Control of Ore Deposits

Society of Economic Geologists

Economic Geology; Tectonics; Structural Geology
John F. Thompson, Teckcominco, Vancouver, British Columbia. ORAL

T4. Sources of Porphyry Copper Deposits: Magmas, Metals, and Fluids

Society of Economic Geologists

Economic Geology; Petrology, Igneous; Geochemistry, Other

John H. Dilles, Oregon State University, Corvallis, Ore.; Jeffery D. Keith, Brigham Young University, Provo, Utah. ORAL

T5. The Evolving Earth: Implications for Ore Deposit Formation, Evolution, and Benefaction

Society of Economic Geologists

Economic Geology; Tectonics; Precambrian Geology
Murray Hitzman, Colorado School of Mines, Golden, Colo.
ORAL

T6. Borates, Uranium, Mineral Sands, and Bulk Commodities: Deposit Models, Processes, and Descriptions

Society of Economic Geologists

Economic Geology; Limnogeology; Coal Geology
Siegfried Muessig, Pasadena, Calif.; Ricardo D. Presnell, Kennecott Exploration, Salt Lake City, Utah. ORAL

T7. A Tribute to Hans-Olaf Pfannkuch: From Darcy to the Modern World of Environmental and Contaminant Hydrogeology

GSA Hydrogeology Division; American Institute of Hydrology; Minnesota Ground Water Association

Hydrogeology; Environmental Geoscience; History of Geology

E. Calvin Alexander Jr., University of Minnesota, Minneapolis, Minn.; Martin O. Saar, University of Minnesota, Minneapolis, Minn. ORAL

T8. Artificial Recharge of Groundwater—Hydrogeologic Characterization and Implementation

GSA Hydrogeology Division

Hydrogeology; Environmental Geoscience; Public Policy
Hugh A. Hurlow, Utah Geological Survey, Salt Lake City, Utah; Mike Lowe, State of Utah Department of Natural Resources, Salt Lake City, Utah; Marek Matyjasik, Weber State University, Ogden, Utah. ORAL and POSTER

T9. Bedrock Infiltration: Advances in Understanding Vadose-Zone Processes, Percolation through Macropores and Shallow Soils, and Recharge to Consolidated-Rock Aquifers

International Association of Hydrogeologists; GSA Hydrogeology Division

Hydrogeology; Geochemistry, Aqueous; Geophysics/Tectonophysics/Seismology

Victor M. Heilweil, U.S. Geological Survey, Salt Lake City, Utah; Lorraine E. Flint, U.S. Geological Survey, Sacramento, Calif. ORAL

T10. Chemistry, Ecology, and Groundwater Hydrology of Lakes, Streams, Playas, and Springs: Observations at the Interface

GSA Hydrogeology Division; GSA Limnogeology Division; GSA Geobiology and Geomicrobiology Division

Limnogeology; Geochemistry, Aqueous; Geomicrobiology
Alison J. Smith, Kent State University, Kent, Ohio; Donald Rosenberry, U.S. Geological Survey, Denver, Colo.; Emi Ito. ORAL and POSTER

T11. Dissolution, Precipitation, and Redox Reaction Kinetics in Aquifers

GSA Hydrogeology Division; Geochemical Society; GSA Geobiology and Geomicrobiology Division
Geochemistry, Aqueous; Hydrogeology; Environmental Geoscience
Chen Zhu, Indiana University, Bloomington, Ind.; Mark Person, Indiana University, Bloomington, Ind.; Niel Plummer, U.S. Geological Survey, Reston, Va. ORAL

T12. Environmental Issues Related to Oil and Gas Exploration and Production

GSA Hydrogeology Division; International Association of GeoChemistry (IAGC)
Hydrogeology; Environmental Geoscience; Geochemistry, Aqueous
Yousif K. Kharaka, U.S. Geological Survey, Menlo Park, Calif.; James K. Otton, U.S. Geological Survey, Lakewood, Colo. ORAL and POSTER

T13. Fault Zone Controls on Fluid Movement, Earth Resources, and Processes: Perspectives from Field, Laboratory, and Modeling Studies

GSA Hydrogeology Division; GSA Structural Geology and Tectonics Division; GSA Geophysics Division
Hydrogeology; Structural Geology; Geophysics/Tectonophysics/Seismology
Victor F. Bense, Indiana University, Bloomington, Ind.; Jonathan Caine, U.S. Geological Survey, Denver, Colo. ORAL and POSTER

T14. Flowpaths Integrating Terrestrial and Aquatic Components of Catchment Ecosystems

GSA Hydrogeology Division; GSA Geobiology and Geomicrobiology Division
Hydrogeology; Geochemistry, Aqueous; Geomicrobiology
Madeline E. Schreiber, Virginia Tech, Blacksburg, Va.; H. Maurice Valett, Virginia Tech, Blacksburg, Va. ORAL

T15. Groundwater Quality and Quantity Interconnections: The Effects of Natural and Anthropogenic Contamination on Groundwater Availability

GSA Hydrogeology Division; National Ground Water Association/Association of Ground Water Scientists and Engineers
Hydrogeology; Environmental Geoscience; Geochemistry, Aqueous
Michael J. Moran, U.S. Geological Survey, Rapid City, S.Dak.; Vicki Kretsinger, Luhdorff and Scalmanini, Consulting Engineers, Woodland, Calif. ORAL

T16. Hydrogeology and Climate Change: Insights from The Past

GSA Hydrogeology Division
Hydrogeology; Limnogeology; Quaternary Geology
Vicki Remenda, Queens University, Kingston, Ontario; Mark Austin Person, Indiana University, Bloomington, Ind. ORAL and POSTER

T17. Identification, Quantification, and Simulation of Contaminant Exchange at the Atmosphere and Land Interface

GSA Hydrogeology Division
Geochemistry, Aqueous; Hydrogeology; Limnogeology
William Blanford, Louisiana State University, Baton Rouge, La.; Thomas Boving, University of Rhode Island, Kingston, R.I. ORAL

T18. Innovations and New Frontiers in Hydrologic Modeling

GSA Hydrogeology Division; National Ground Water Association; International Association of Hydrogeologists; GSA Engineering Geology Division
Hydrogeology; Limnogeology
Frank W. Schwartz, The Ohio State University, Columbus, Ohio; Motomu Ibaraki, The Ohio State University, Columbus, Ohio. ORAL

T19. Innovative Methods of Estimating Recharge in Humid Climates

GSA Hydrogeology Division
Hydrogeology; Environmental Geoscience
Todd W. Rayne, Hamilton College, Clinton, N.Y.; Kenneth R. Bradbury, Wisconsin Geological and Natural History Survey, Madison, Wis.; Randy J. Hunt, U.S. Geological Survey, Middleton, Wis. ORAL

GeoScience Educators' Social Reception

Sat., 15 Oct., 5–7 p.m.
Location: TBD

The GSA Education Committee, the National Association of Geoscience Teachers, the GSA Division of Geoscience Education, Cutting Edge, DLESE, and others would like to invite all educators to a relaxing forum for socializing, sharing ideas, and meeting other geoscience community members interested in education.

Come and meet the GSA Education Staff.
Appetizers and cash bar provided.

T20. Innovative Monitoring and Modeling Techniques for Assessing the Performance of Passive Remediation Projects for Contaminated Water and Soil

GSA Hydrogeology Division

Hydrogeology; Environmental Geoscience; Geochemistry, Aqueous

David Naftz, U.S. Geological Survey, Salt Lake City, Utah; Christopher Fuller, U.S. Geological Survey, Menlo Park, Calif.; Terry Snyder, Bureau of Land Management, Salt Lake City, Utah. ORAL

T21. Innovative Use of Natural and Artificial Tracers in Mountain Catchments Underlain by Fractured Rocks

GSA Hydrogeology Division; International Association of Hydrogeologists

Hydrogeology

Mike Wireman, U.S. Environmental Protection Agency Region 8, Denver, Colo.; Mark Williams, University of Colorado, Boulder, Colo. ORAL

T22. Interactions of Groundwater and Surface Water at the Land-Sea Margin

GSA Hydrogeology Division

Hydrogeology; Marine/Coastal Science; Geochemistry, Aqueous

René M. Price, Florida International University, Miami, Fla.; Jaye E. Cable, Louisiana State University, Baton Rouge, La. ORAL

T23. Nano- to Field-Scale Processes Governing the Transport of Microbes and Colloids in the Subsurface

GSA Hydrogeology Division

Hydrogeology; Geochemistry, Aqueous; Geomicrobiology

William P. Johnson, University of Utah, Salt Lake City, Utah; Joseph N. Ryan, University of Colorado, Boulder, Colo. ORAL and POSTER

T24. Naturally Occurring Perchlorate (and Other Oxyanions) in the Hydrologic Cycle—Origins, Accumulation, Transformations, and Transport

GSA Hydrogeology Division; GSA Geobiology and Geomicrobiology Division

Environmental Geoscience; Hydrogeology; Geomicrobiology

David A. Stonestrom, Menlo Park, Calif.; Scott W. Tyler, University of Nevada, Reno, Nev.; Andrew W. Jackson, Texas Tech University, Lubbock, Tex. ORAL and POSTER

T25. Arsenic Occurrence and Fate in Hydrogeologic Systems

GSA Hydrogeology Division; Geochemical Society; GSA Geobiology and Geomicrobiology Division

Hydrogeology; Geochemistry, Aqueous; Geomicrobiology

Alan Fryar, University of Kentucky, Lexington, Ky.; Abhijit Mukherjee, University of Kentucky, Lexington, Ky.; Alan Welch, U.S. Geological Survey, Carson City, Nev. ORAL and POSTER

T26. Quantifying Controls on Microbial Reaction Rates in Subsurface Environments

GSA Hydrogeology Division; National Ground Water Association; GSA Geobiology and Geomicrobiology Division

Hydrogeology; Geomicrobiology; Environmental Geoscience

Barbara Bekins, U.S. Geological Survey, Menlo Park, Calif.; Eric Roden, University of Alabama, Tuscaloosa, Ala.; Gary P. Curtis, U.S. Geological Survey, Menlo Park, Calif. ORAL and POSTER

T27. Seafloor Hydrogeology: Investigating Fluid Flow through the Oceanic Crust and Seafloor Sediments

GSA Hydrogeology Division

Hydrogeology; Geochemistry, Aqueous; Marine/Coastal Science

Jennifer D. Shosa, Colby College, Waterville, Maine; Lindsay B. Masters, Colby College, Waterville, Maine. ORAL

T28. Stream-Hyporheic Interactions: Hydrology, Geochemistry, and Biology

GSA Hydrogeology Division

Hydrogeology; Geochemistry, Aqueous; Quaternary Geology/Geomorphology

Eric W. Peterson, Illinois State University, Normal, Ill.; Robert A. Payne, Utah State University, Logan, Utah. ORAL

T29. Surface and Subsurface Geologic Characterization of the Edwards and Trinity Carbonate Aquifer Systems, Central Texas (Posters)

GSA Hydrogeology Division

Hydrogeology; Structural Geology; Geophysics/Tectonophysics/Seismology

Charles D. Blome, Denver, Colo.; Geary M. Schindel, Edwards Aquifer Authority, San Antonio, Tex. POSTER

T30. The Hydrosystem of the Great Salt Lake Basin: New Frontiers for Observing and Modeling Human-Impacted Hydrologic, Climatic, and Geomorphologic Processes

GSA Hydrogeology Division; American Geophysical Union

Hydrogeology; Paleoclimatology/Paleoceanography; Environmental Geoscience

David Tarboton, Utah State University, Logan, Utah; Craig Forster, University of Utah, Salt Lake City, Utah; Christopher J. Duffy, Penn State University, University Park, Pa.; Danny Marks, Agricultural Research Service, U.S. Department of Agriculture, Boise, Idaho. ORAL and POSTER

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**T31. The Role of Colloids and Semicrystalline/
Amorphous Materials in Environmental Cycling of
Trace Elements**

GSA Hydrogeology Division

Geochemistry, Aqueous; Environmental Geoscience;
Geochemistry, Other

Katherine Walton-Day, U.S. Geological Survey, Denver, Colo.;
Lisa Stillings, U.S. Geological Survey, Reno, Nev. ORAL

**T32. Water Resource Management and Planning for
Fractured and Karstic Aquifers**

GSA Hydrogeology Division

Hydrogeology; Public Policy; Environmental Geoscience

Todd Halihan, Oklahoma State University, Stillwater, Okla.;
Maureen Muldoon, University of Wisconsin, Oshkosh, Wis.;
Stanley T. Paxton, Oklahoma State University, Stillwater, Okla.
ORAL

**T33. Water, Solute, and Sediment Fluxes through
Carbonate and Karst Aquifers**

*GSA Hydrogeology Division; GSA Sedimentary Geology
Division; Karst Waters Institute*

Hydrogeology; Quaternary Geology/Geomorphology;
Sediments, Clastic

Ira D. Sasowsky, University of Akron, Akron, Ohio; Jonathan
B. Martin, University of Florida, Gainesville, Fla. ORAL and
POSTER

**T34. Springs: Keys to Understanding Geochemical
Processes in Aquifers**

*GSA Hydrogeology Division; International Association of
Hydrogeologists; Karst Waters Institute*

Hydrogeology; Geochemistry, Aqueous; Environmental
Geoscience

Brian G. Katz, U.S. Geological Survey, Tallahassee, Fla.;
Dorothy J. Vesper, West Virginia University, Morgantown,
W.Va. ORAL and POSTER

**T35. Riparian Corridors in Semi-Arid and Arid
Environments: Results and Approaches of
Integrative Studies in Support of Scientifically
Based Management and Restoration, with
Emphasis on the Great Basin**

Hydrogeology; Quaternary Geology/Geomorphology;
Environmental Geoscience

David Jewett, U.S. Environmental Protection Agency, Ada,
Okla.; Mark Lord, Western Carolina University, Cullowhee,
N.C.; Dru Germanoski, Lafayette College, Easton, Pa. ORAL
and POSTER

**T36. Debris Flows Initiated by Runoff and Erosion:
Processes, Recognition, and Hazard Implications**

GSA Engineering Geology Division

Engineering Geology; Geomorphology; Quaternary Geology/
Geomorphology

Jeffrey A. Coe, U.S. Geological Survey, Denver, Colo.; Susan
H. Cannon, U.S. Geological Survey, Denver, Colo. ORAL

**T37. Debris-flow Processes, Stratigraphy,
Geomorphology, and Societal Response**

*GSA Engineering Geology Division; GSA Geology and Society
Division*

Engineering Geology; Environmental Geoscience;
Geomorphology

Jeffrey R. Keaton, AMEC Earth and Environmental, Inc.,
Anaheim, Calif.; Richard E. Giraud, Utah Geological Survey,
Salt Lake City, Utah; John D. Kiefer, University of Kentucky,
Lexington, Ky. ORAL

**T38. Drought Related Geologic Hazards: A Worldwide
Perspective**

GSA Engineering Geology Division

Engineering Geology; Quaternary Geology; Geomorphology

David C. Noe, Colorado Geological Survey, Denver, Colo.;
L. Darlene Batatian, Planning and Development Services
Division, Salt Lake City, Utah. ORAL and POSTER

T39. Exploring How Private Projects Affect Public Land

*GSA Engineering Geology Division; GSA Geology and Society
Division*

Engineering Geology; Public Policy

Jerome V. DeGraff, USDA Forest Service, Clovis, Calif.;
Thomas J. Evans, Wisconsin Geological and Natural History
Survey, Madison, Wis. ORAL

**T40. Genesis, Behavior, Mapping, and Treatment of
Collapsible Soils**

GSA Engineering Geology Division

Engineering Geology; Quaternary Geology; Geomorphology

Paul M. Santi, Colorado School of Mines, Golden, Colo.;
Jonathan L. White, Colorado Geological Survey, Denver, Colo.
ORAL

T41. Geologic Remote Sensing

GSA Engineering Geology Division

Remote Sensing/Geographic Info System

Vern Singhroy, Canada Centre for Remote Sensing, Ottawa,
Ontario; Farouk El-Baz, Boston University, Boston, Mass.
ORAL

**T42. Mine Rock Piles and Pyritically Altered Areas:
Their Slope Stability and Effect on Water Quality**

GSA Engineering Geology Division; Geochemical Society

Hydrogeology; Engineering Geology; Geomicrobiology

Patrick Walsh, New Mexico Bureau of Geology and
Mineral Resources, Socorro, N.Mex.; Kathleen S. Smith, U.S.
Geological Survey, Denver, Colo.; Virginia T. McLemore, New
Mexico Tech, Socorro, N.Mex. ORAL and POSTER

**T43. Recognition and Characterization of Neogene
Faults**

*GSA Engineering Geology Division; GSA Structural Geology
and Tectonics Division*

Engineering Geology; Neotectonics/Paleoseismology;

Geophysics/Tectonophysics/Seismology

Vincent S. Cronin, Baylor University, Waco, Tex.; Keith A.
Sverdrup, University of Wisconsin, Milwaukee, Wis. ORAL
and POSTER

T44. Seismogenic Landslides

GSA Engineering Geology Division

Engineering Geology; Neotectonics/Paleoseismology;
Quaternary Geology/Geomorphology

Thomas C. Badger, Washington State Department of
Transportation, Olympia, Wash.; David K. Keefer, U.S.
Geological Survey, Menlo Park, Calif. ORAL

T45. What Goes up Must Come Down: The Science and Policy of Dam Removal

*GSA Engineering Geology Division; Geology and Public Policy
Committee*

Environmental Geoscience; Geomorphology; Public Policy
John F. Bratton, U.S. Geological Survey, Woods Hole, Mass.;
Walter Barnhardt, U.S. Geological Survey, Woods Hole, Mass.
ORAL

T46. Conservation and Management of Global Geoheritage Resources: Regional and Local Sites

*GSA Geology and Society Division; GSA International Division;
National Park Service; Geology and Public Policy Committee*

Public Policy; Environmental Geoscience; Geoscience
Education

John D. Kiefer, University of Kentucky, Lexington, Ky.; Robert
D. Higgins, National Park Service, Denver, Colo.; Maurice J.
Terman, Falls Church, Va. ORAL and POSTER

T48. Geology in the National Forests—Stewardship, Education, and Research

Geoscience Information/Communication; Environmental
Geoscience; Geoscience Education

Joseph Gurrieri, USDA Forest Service, Butte, Mont.; Andrew
H. Rorick, USDA Forest Service, Sandy, Ore. ORAL

T49. Geology in the National Parks: Research, Mapping, and Resource Management

National Park Service

Geoscience Education; Remote Sensing/Geographic Info
System; Environmental Geoscience

Bruce A. Heise, National Park Service, Lakewood, Colo.; Jim
Wood, National Park Service, Denver, Colo.; Tim Connors,
National Park Service, Denver, Colo. ORAL and POSTER

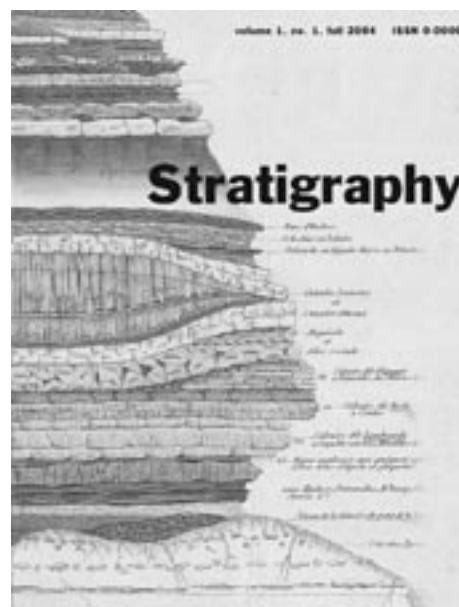
T50. Geology of Parks and Public Lands: Effective and Innovative Informal Earth Science Education for the Masses

*National Park Service; Bureau of Land Management;
Association of Earth Science Editors*

Geoscience Information/Communication; Geoscience
Education

Marion Malinowski, Bureau of Land Management, Lakewood,
Colo.; Monica Gaiswinkler Easton, Ministry of Northern
Development and Mines, Sudbury, Ontario; Jim F. Wood,
National Park Service, Lakewood, Colo. ORAL and POSTER

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T51. Investigation of Sources and Fates of Anthropogenic Inputs to the Environment through Isotopic Systematics

Environmental Geoscience; Geochemistry, Other;
Hydrogeology

P. Evan Dresel, Pacific Northwest National Laboratory,
Richland, Wash.; John N. Christensen, Lawrence Berkeley
National Laboratory, Berkeley, Calif. ORAL and POSTER

T52. Sources, Transport, Fate, and Toxicology of Trace Elements in the Environment

International Association of GeoChemistry

Geochemistry, Aqueous; Environmental Geoscience;
Geomicrobiology

LeeAnn Munk, University of Alaska, Anchorage, Alaska; David
Long, Michigan State University, East Lansing, Mich.; W. Berry
Lyons, Ohio State University, Columbus, Ohio. ORAL

T53. The Changing Planet: A Special Tribute Session Celebrating the Contributions of Fred T. Mackenzie

Environmental Geoscience; Geochemistry, Aqueous; Marine/
Coastal Science

Rolf S. Arvidson, Rice University, Houston, Tex.; Albert S.
Colman, Carnegie Institution of Washington, Washington,
D.C.; John W. Morse, Texas A&M University, College Station,
Tex. ORAL

T54. This Changing Planet: Explaining Geologic Hazards to the Media, Policy Makers, and the General Public

GSA Engineering Geology Division; GSA Geology and Society Division; Association of Earth Science Editors; National Park Service; Geology and Public Policy Committee
Geoscience Information/Communication; Public Policy; Environmental Geoscience

Monica Gaiswinkler Easton, Ministry of Northern Development and Mines, Sudbury, Ontario; Diane E. Lane, Association of Earth Science Editors, Pittsburgh, Pa.; Robert D. Higgins, National Park Service, Denver, Colo. ORAL and POSTER

T55. Advances and Applications of Tephrochronology and Tephrostratigraphy: In Honor of Andrei M. Sarna-Wojcicki

GSA Quaternary Geology and Geomorphology Division
Quaternary Geology/Geomorphology; Paleoclimatology/Paleoceanography; Neotectonics/Paleoseismology
Janet L. Slate, U.S. Geological Survey, Denver, Colo.; Jeffrey R. Knott, California State University, Fullerton, Calif.; Michael E. Perkins, University of Utah, Salt Lake City, Utah. ORAL

T56. Carving the Western Landscape: The Evolution of the Colorado Drainage from Source to Sink

GSA Quaternary Geology and Geomorphology Division
Quaternary Geology/Geomorphology; Sediments, Clastic; Tectonics
Joel L. Pederson, Utah State University, Logan, Utah; Kyle House, University of Nevada, Reno, Nev. ORAL and POSTER

T57. Paleoenvironmental Records in and around the Bonneville Basin: From Glacial/Interglacial Cycles to Anthropogenic Impacts

GSA Limnogeology Division; GSA Quaternary Geology and Geomorphology Division; GSA Archaeological Geology Division
Paleoclimatology/Paleoceanography; Quaternary Geology/Geomorphology; Limnogeology
Joseph G. Rosenbaum, U.S. Geological Survey, Denver, Colo.; Katrina A. Moser, University of Utah, Salt Lake City, Utah. ORAL and POSTER

T58. Recent Advances in Numerical Dating Techniques for Developing Quantitative Chronostratigraphies in Arid and Semi-Arid Environments

INQUA (International Union for Quaternary Research): Working Group on Dryland Dating
Quaternary Geology/Geomorphology; Stratigraphy; Paleoclimatology/Paleoceanography
Lewis A. Owen, University of Cincinnati, Cincinnati, Ohio; Ashok Singhvi, Physical Research Lab, Ahmedabad, India. ORAL and POSTER

T59. The 2004–2005 Eruption of Mount St. Helens: New Insights and Hazard Management of an

Extraordinary Dacitic Dome-Growth Eruption (Posters)

GSA Quaternary Geology and Geomorphology Division; GSA Geophysics Division; GSA Engineering Geology Division
Volcanology; Geophysics/Tectonophysics/Seismology; Geoscience Information/Communication
Cynthia Gardner, U.S. Geological Survey, Vancouver, Wash.; Jon Major, U.S. Geological Survey, Vancouver, Wash. POSTER

T60. Dendrogeology: Geologic Applications of Tree-Ring Studies

GSA Archaeological Geology Division
Environmental Geoscience; Hydrogeology; Geochemistry, Other
Gregg R. Davidson, University of Mississippi, University, Miss. ORAL

T61. Glacial Geology and Lake Sedimentology: In Memory of Geoffrey O. Seltzer

GSA Limnogeology Division
Quaternary Geology; Geomicrobiology; Limnogeology
Donald T. Rodbell, Union College, Schenectady, N.Y.; Jacqueline A. Smith, Syracuse University, Syracuse, N.Y. ORAL

T62. Ice Free versus Cold-Based Ice: Cosmogenic Nuclides, Trimlines, and Ice Sheet History of Differentially Weathered Landscapes

GSA Quaternary Geology and Geomorphology Division
Quaternary Geology; Geomorphology; Paleoclimatology/Paleoceanography
Jason P. Briner, SUNY Buffalo, Buffalo, N.Y.; Michael R. Kaplan, University of Edinburgh, Edinburgh, UK. ORAL

T63. Timing and Nature of Mountain Glacier Advances throughout the Last Glacial Cycle

Mountain Glacier Working Group, International Quaternary Union
Quaternary Geology; Geomorphology; Paleoclimatology/Paleoceanography
Glenn D. Thackray, Idaho State University, Pocatello, Idaho; Lewis A. Owen, University of Cincinnati, Cincinnati, Ohio. ORAL and POSTER

T64. Comparative Carbonate Sedimentology: A Tribute to the Career of R.N. Ginsburg

GSA Sedimentary Geology Division
Sediments, Carbonates; Environmental Geoscience; Stratigraphy
Peter Swart, University of Miami, Miami, Fla.; Gregor Eberli, University of Miami, Miami, Fla. ORAL and POSTER

T65. Establishment of an Integrated and Calibrated Chronostratigraphic Framework for High Resolution Sequence Stratigraphic Analysis, Stratal Correlation, and Sedimentary Basin Geohistory Reconstruction

GSA Sedimentary Geology Division
Stratigraphy; Sediments, Carbonates; Sediments, Clastic
Ernest A. Mancini, University of Alabama, Tuscaloosa, Ala. ORAL

T66. Petrographic Methods Applied to Sedimentary Rocks

GSA Sedimentary Geology Division; Society for Sedimentary Geology (SEPM)

Sediments, Carbonates; Sediments, Clastic; Mineralogy/Crystallography

Kitty Milliken, University of Texas at Austin, Austin, Tex.; F. Leo Lynch, Mississippi State University, Mississippi State, Miss. ORAL and POSTER

T67. Reading the Record of the Rocks: Resolving the Tectonic and Eustatic Signals in Stratigraphic Successions: In Honor of Don Swift on His 70th Birthday

Society for Sedimentary Geology (SEPM)

Stratigraphy; Geophysics/Tectonophysics/Seismology; Marine/Coastal Science

Nora Noffke, Old Dominion University, Norfolk, Va.; Donald J.P. Swift, Old Dominion University, Norfolk, Va. ORAL

T68. Recent Advances in the Application of Sedimentology and Stratigraphy to Tectonic Problems

GSA Sedimentary Geology Division; GSA Structural Geology and Tectonics Division

Tectonics; Stratigraphy; Geochemistry, Other

David Barbeau, University of South Carolina, Columbia, S.C.; Andrew Leier, The University of Arizona, Tucson, Ariz. ORAL and POSTER

T69. Refining the Global Neoproterozoic Geologic Record

GSA Sedimentary Geology Division; GSA Geobiology and Geomicrobiology Division

Precambrian Geology; Stratigraphy; Geochemistry, Other

Carol M. Dehler, Utah State University, Logan, Utah; Paul K. Link, Idaho State University, Pocatello, Idaho; Frank A. Corsetti, University of Southern California, Los Angeles, Calif. ORAL and POSTER

T70. Resolving the Late Paleozoic Gondwanan Ice Age in Time and Space: Integration of Southern and Northern Hemisphere Records

GSA Sedimentary Geology Division

Stratigraphy; Sediments, Clastic; Sediments, Carbonates

C.R. Fielding, University of Nebraska, Lincoln, Neb.; T.D. Frank, University of Nebraska, Lincoln, Neb.; J.L. Isbell, University of Wisconsin, Milwaukee, Wis. ORAL

T71. Sedimentary Basins in Transition: Stratigraphic and Structural Records of Plate Tectonic Reconfiguration (Posters)

GSA Sedimentary Geology Division

Tectonics; Stratigraphy; Structural Geology

Cari L. Johnson, University of Utah, Salt Lake City, Utah; Kenneth Ridgway, Purdue University, West Lafayette, Ind. POSTER

T72. Sedimentology Goes to Mars

GSA Planetary Geology Division; GSA Sedimentary Geology Division

Planetary Geology; Sediments, Clastic

R. Aileen Yingst, GSA Planetary Geology Division, Green Bay, Wis.; Kenneth Edgett, Malin Space Science Systems, San Diego, Calif. ORAL and POSTER

T73. Sedimentology, Stratigraphy, and Paleontology of Southern Utah Public Lands

Sediments, Clastic; Stratigraphy; Paleontology/Paleobotany

Robert L. Eves, Southern Utah University, Cedar City, Utah; Larry E. Davis, College of St. Benedict and St. John's University, Collegeville, Minn. ORAL

T74. Waves of Destruction: Historical and Geological Records of Tsunamis and Their Effects (Posters)

GSA Sedimentary Geology Division

Marine/Coastal Science; Neotectonics/Paleoseismology; Public Policy

Joanne Bourgeois, University of Washington, Seattle, Wash.; R. Heather Macdonald, College of William and Mary, Williamsburg, Va. POSTER

T75. Weathering, Sedimentation, and Diagenesis in Major Element Cycles

GSA Sedimentary Geology Division

Geochemistry, Other; Environmental Geoscience; Geochemistry, Aqueous

Robert A. Berner, Yale University, New Haven, Conn.; Miriam Kastner, Scripps Institute of Oceanography 0212, La Jolla, Calif.; Abraham Lerman, Northwestern University, Evanston, Ill. ORAL

T76. The Bureau of Land Management's National Landscape Conservation System as Outdoor Laboratories: New Research in Grand Staircase-Escalante National Monument and the Surrounding Area

Stratigraphy; Structural Geology; Sediments, Clastic

Alan L. Titus, Bureau of Land Management, Kanab, Utah; John D. Powell, Bureau of Land Management, Kanab, Utah. ORAL

T77. Advances and Applications with the Fossil Record of Non-Marine Arthropods (Paleoarthropods: Insecta, Chelicerata, Myriapoda, some Crustacea) for Geoscientists and Biologists

Paleontological Society; GSA Geobiology and Geomicrobiology Division; GSA Limnogeology Division

Paleontology, Diversity, Extinction, Origination;

Paleontology, Paleoecology/Taphonomy; Paleoclimatology/Paleoceanography

Cary R. Easterday, University of Illinois at Chicago, Chicago, Ill.; Sara H. Lubkin, Cornell University, Ithaca, N.Y. ORAL

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T78. Habitat Partitioning above, on, and within the Substrate

Paleontological Society; GSA Geobiology and Geomicrobiology Division

Paleontology, Paleoecology/Taphonomy; Paleontology, Diversity, Extinction, Origination; Paleontology/Paleobotany
A.A. Ekdale, University of Utah, Salt Lake City, Utah; Leif M. Tapanila, University of Utah, Salt Lake City, Utah. ORAL

T79. Jurassic Marine Paleobiology: Tracing the Roots of the Modern Biota

Paleontological Society

Paleontology/Paleobotany; Paleontology, Paleoecology/Taphonomy; Paleontology, Diversity, Extinction, Origination
Carol M. Tang, California Academy of Sciences, San Francisco, Calif.; Paul Taylor, Natural History Museum, London, UK.
ORAL

T80. Paleoenvironments and Taphonomy of Cambrian Lagerstätten

Paleontological Society

Paleontology, Paleoecology/Taphonomy; Sediments, Clastic; Geochemistry, Other
Wayne Powell, Brooklyn College, New York, N.Y.; Robert Gaines, Pomona College, Claremont, Calif. ORAL

T81. Protists in Extreme Environments: Fossil Evidence to Physiological Adaptations

Cushman Foundation; Paleontological Society

Environmental Geoscience; Geomicrobiology; Paleontology, Paleoecology/Taphonomy
Pamela Hallock, University of South Florida, St. Petersburg, Fla. ORAL

T82. Taphonomy: Process and Bias through Time

Paleontological Society

Paleontology, Paleoecology/Taphonomy; Sediments, Carbonates; Paleontology, Diversity, Extinction, Origination
Peter A. Allison, Imperial College London, UK; David J. Bottjer, University of Southern California, Los Angeles, Calif.
ORAL

T83. The Dawn of Animal Life: Evolutionary and Paleocological Patterns in the Neoproterozoic-Cambrian Animal Fossil Record

Paleontological Society; GSA Geobiology and Geomicrobiology Division

Paleontology, Paleoecology/Taphonomy; Paleontology, Diversity, Extinction, Origination
Stephen Q. Dornbos, University of Wisconsin, Milwaukee, Wis. ORAL

T84. Thinking about Fossils: The Emergence and Development of Paleontological Thought in North America from Native American Customs to the End of the Great Western Surveys

GSA History of Geology Division; History of Earth Sciences Society (HESS); GSA Archaeological Geology Division; Paleontological Society; Society of Vertebrate Paleontology
History of Geology; Paleontology/Paleobotany; Paleontology, Paleoecology/Taphonomy
Edward Rogers, History of the Earth Sciences Society, Poncha Springs, Colo.; Patrick Wyse Jackson, Trinity College, Dublin, Ireland. ORAL

T85. Traces of Life: Micro- to Macroscopic Evidence of Past and Present Biogenic Activity and Their Implications

Paleontological Society; GSA Geobiology and Geomicrobiology Division
Paleontology, Paleoecology/Taphonomy; Geomicrobiology; Paleontology/Paleobotany
Stephen T. Hasiotis, University of Kansas, Lawrence, Kans.; Jennifer A. Roberts, University of Kansas, Lawrence, Kans. ORAL and POSTER

T86. Collaboration for the Dissemination of Geologic Information among Colleagues

Geoscience Information Society
Geoscience Information/Communication; Public Policy; Geoscience Education
Adonna Fleming, Geoscience Information Society, Lincoln, Neb. ORAL and POSTER

T87. Communicating Geoscience Information through Public Speaking: Problems and Solutions

GSA Geology and Society Division; Association of Earth Science Editors; Geology and Public Policy Committee
Geoscience Information/Communication; Geoscience Education; Public Policy
Sarah Andrews, Sebastopol, Calif. ORAL

T88. Does Geology Serve Society? Let's Count the Ways!

Geology and Society Division; Geology and Public Policy Committee; Critical Issues Caucus
Public Policy; Geoscience Information/Communication; Geoscience Education
Paul H. Reitan, SUNY at Buffalo, Buffalo, N.Y. ORAL

T89. Efficient and Effective Practices in Using Web Sites and Technologies to Support and Manage Information, Student Learning and Recruitment, and Public Education

National Association of Geoscience Teachers
Geoscience Information/Communication; Geoscience Education; Remote Sensing/Geographic Info System
Christopher W. Thomas, Indiana University–Purdue University, Indianapolis, Ind. ORAL

T90. From Rocks to Records: Geological Preservation for the Profession and the Public Good

GSA Geology and Society Division
Public Policy; Geoscience Information/Communication; Geoscience Education
Donald G. Mikulic, Illinois State Geological Survey, Champaign, Ill.; Joanne Kluessendorf, Weis Earth Science Museum, Menasha, Wis. ORAL

T91. Geology and Art—Forever the Twain Shall Meet

Geoscience Education
Mary C. Simmons, University of Southern Indiana, Evansville, Ind. ORAL

T92. Keys to Opportunities with the National Park Service

National Park Service; Geological Society of America; American Geological Institute; Association for Women Geoscientists
Public Policy; Geoscience Information/Communication; Geoscience Education
Judy Geniac, National Park Service, Denver, Colo.; Gary Lewis, GSA Education and Outreach, Boulder, Colo.; Ann Benbow, Alexandria, Va.; Marguerite Toscano. ORAL

T93. The National Geologic Map Database (Posters)

U.S. Geological Survey; Association of American State Geologists
Geoscience Information/Communication
David Soller, U.S. Geological Survey, Reston, Va.; Thomas M. Berg, Ohio Geological Survey, Columbus, Ohio. POSTER

T94. Conservation and Management of Global Geoheritage Resources: A National Perspective

GSA International Division; GSA Geology and Society Division; National Park Service; Geology and Public Policy Committee
Public Policy
Robert D. Higgins, National Park Service, Denver, Colo.; Maurice J. Terman, Falls Church, Va.; Jim Wood, National Park Service, Denver, Colo. ORAL

T95. Conservation and Management of Global Geoheritage Resources: International Perspectives

GSA International Division; GSA Geology and Society Division; National Park Service; U.S. Geological Survey; Geology and Public Policy Committee
Public Policy; Geoscience Education; Geoscience Information/Communication
Maurice J. Terman, Falls Church, Va.; John D. Kiefer, University of Kentucky, Lexington, Ky.; Robert Higgins, National Park Service, Denver, Colo. ORAL

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T96. Geological Monitoring in National Parks*National Park Service*Marine/Coastal Science; Geomorphology; Remote Sensing/
Geographic Info SystemRobert S. Young, Western Carolina University, Cullowhee,
N.C.; Lisa Norby, National Park Service, Lakewood, Colo.
ORAL and POSTER**T97. Innovation, Evaluation, and Best Practices in
Informal Geoscience Education***National Association of Geoscience Teachers; GSA Geoscience
Education Division; Association of Earth Science Editors*Geoscience Education; Geoscience Information/
CommunicationRobert M. Ross, Paleontological Research Institution, Ithaca,
N.Y.; Warren D. Allmon, Paleontological Research Institution,
Ithaca, N.Y. ORAL**T98. Innovations in Geological Mapping (Posters)***GSA Engineering Geology Division; GSA Geology and Society
Division; GSA Hydrogeology Division; Geology and Public
Policy Committee; Association of American State Geologists;**GSA Quaternary Geology and Geomorphology Division*Quaternary Geology/Geomorphology; Stratigraphy;
Hydrogeology

Richard C. Berg, Champaign, Ill.; Peter T. Lyttle, U.S.

Geological Survey, Reston, Va.; Harvey Thorleifson, University
of Minnesota, St. Paul, Minn. POSTER**T99. Imparting Hands-on Geological Education:
Reaching out to Undergraduates and K–12
Students (Posters)**Geoscience Education; Geoscience Information/
Communication; Environmental GeoscienceNazrul I. Khandaker, York College of City University of New
York, Jamaica, N.Y.; Stanley Schleifer, York College of City
University of New York, Jamaica, N.Y. POSTER**T100. Integrating Research into Undergraduate
Geoscience Coursework***National Association of Geoscience Teachers*

Geoscience Education

C. Frederick Lohrengel, Southern Utah University, Cedar City,
Utah; Robert L. Eves, Southern Utah University, Cedar City,
Utah; Mark Colberg, Southern Utah University, Cedar City,
Utah. ORAL**T101. Interdisciplinary Education: Applications of GIS
and the Infusion of Spatial Concepts across the
Curriculum***National Association of Geoscience Teachers*Geoscience Education; Remote Sensing/Geographic Info
System; Geoscience Information/CommunicationRichard B. Schultz, Elmhurst College, Elmhurst, Ill.; Mark R.
Hafen, University of South Florida, Tampa, Fla.; J. Christopher
Haley, Virginia Wesleyan College, Norfolk, Va. ORAL and
POSTER**T102. International Undergraduate Field Trips:
Logistics, Challenges, and Successes**

Geoscience Education

Timothy P. Flood, St. Norbert College, DePere, Wis.; Nelson R.
Ham, St. Norbert College, DePere, Wis. ORAL**T103. Is it Science? Strategies for Addressing
Creationism in the Classroom and the
Community***National Association of Geoscience Teachers; GSA Geology
and Society Division; Geology and Public Policy Committee;
GSA Geoscience Education Division*Geoscience Education; Public Policy; Geoscience Information/
CommunicationMichael A. Phillips, Illinois Valley Community College,
Oglesby, Ill.; Robert C. Thomas, University of Montana–
Western, Dillon, Mont.; Sheila M. Roberts, University of
Montana–Western, Dillon, Mont. ORAL**T104. It's About Time: Teaching the Temporal Aspects
of Geoscience (Posters)***National Association of Geoscience Teachers; GSA Geoscience
Education Division*

Geoscience Education

R. Heather Macdonald, College of William and Mary,
Williamsburg, Va.; David W. Mogk, Montana State University,
Bozeman, Mont.; Barbara Tewksbury, Hamilton College,
Clinton, N.Y. POSTER**T105. Let's Rock Their World: Integrating Planetary
Science Data into Undergraduate Geoscience
Courses***GSA Planetary Geology Division; GSA Geoscience Education
Division; On the Cutting Edge; National Association of
Geoscience Teachers*

Planetary Geology; Geoscience Education

Eric B. Grosfils, Pomona College, Claremont, Calif.; Barbara
Tewksbury, Hamilton College, Clinton, N.Y. ORAL and
POSTER**T106. Methods of Assessing Teaching and Learning in
the Geosciences***National Association of Geoscience Teachers*

Geoscience Education

David N. Steer, The University of Akron, Akron, Ohio;
David A. McConnell, The University of Akron, Akron, Ohio;
Katherine Owens, The University of Akron, Akron, Ohio.
ORAL and POSTER**T107. Minorities, Women, and Persons with
Disabilities in the Geosciences: Avenues to
Success***Committee on Minorities and Women in the Geosciences*Geoscience Education; Geoscience Information/
Communication; Public PolicyMarc A. Carrasco, University of California, Berkeley, Calif.;
Denise A. Battles, Georgia Southern University, Statesboro,
Ga. ORAL and POSTER

T108. Museum-College Connections: Rich Opportunities for Earth Science Education (Posters)

National Association of Geoscience Teachers

Geoscience Education

Eleanor Miele, Brooklyn, N.Y.; Maritza Macdonald, American Museum of Natural History, New York, N.Y.; Wayne Powell, Brooklyn College, New York, N.Y. POSTER

T109. Providing Future Elementary and Middle School Teachers with Meaningful Geoscience Content Knowledge

GSA Geoscience Education Division; National Association of Geoscience Teachers

Geoscience Education

Heather L. Petcovic, Western Michigan University, Kalamazoo, Mich.; Elizabeth Nagy-Shadman, California State University, Northridge, Calif. ORAL and POSTER

T110. REU at 25: Its Impact on Undergraduate Geoscience Education

National Association of Geoscience Teachers; Council on Undergraduate Research, Geoscience Division

Geoscience Education; Geoscience Information/Communication

Jeffrey G. Ryan, University of South Florida, Tampa, Fla.; Lori Bettison-Varga, College of Wooster, Wooster, Ohio; Laura Guertin, Penn State University–Delaware County, Media, Pa. ORAL and POSTER

T111. Sigma Gamma Epsilon Student Research (Posters)

Sigma Gamma Epsilon

Environmental Geoscience

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

T112. Earthcaching—Educational Earth Science Geocaches that Link Public and Other Lands with the General Public via a Web-based Adventure Game

Geoscience Education; Geoscience Information/Communication

Gary B. Lewis, Geological Society of America, Boulder, Colo. ORAL

T113. Strategies for Teaching Introductory Geoscience in Large Lecture Classes

National Association of Geoscience Teachers

Geoscience Education

Michelle L. Stoklosa, Boise State University, Boise, Idaho; Karen Viskupic, Boise State University, Boise, Idaho. ORAL and POSTER

T114. We Can Continue to Do Better: More Alternatives to the Same Old Lab-Lecture Format in the College Classroom

GSA Geoscience Education Division; National Association of Geoscience Teachers

Geoscience Education

Elizabeth M. King, Illinois State University, Normal, Ill.; Dexter Perkins, University of North Dakota, Grand Forks, N.Dak. ORAL and POSTER

T115. Holocene Climate Change in Western North America: Spatial-Temporal Phasing of Climate Modes, Events, and Transitions

GSA Limnogeology Division; GSA Archaeological Geology Division

Limnogeology; Paleoclimatology/Paleoceanography; Quaternary Geology

Matthew E. Kirby, California State University, Fullerton, Calif.; Steve P. Lund, University of Southern California, Los Angeles, Calif.; Larry V. Benson, U.S. Geological Survey, Boulder, Colo.; Rob Negrini, California State University, Bakersfield, Calif. ORAL and POSTER

T116. Causes and Effects of the Paleocene-Eocene Thermal Maximum and Other Paleogene Hyperthermal Events

GSA Limnogeology Division

Paleoclimatology/Paleoceanography; Paleontology, Diversity, Extinction, Origination; Geochemistry, Other

Scott L. Wing, Smithsonian Institution, Washington, D.C. ORAL

T117. Terrestrial and Extraterrestrial Environments for Microbial Survival

GSA Geobiology and Geomicrobiology Division

Geomicrobiology

Stephen E. Grasby, Natural Resources Canada, Calgary, Alberta; Penny Morris; Susan Wentworth, Johnson Space Center, Houston, Tex. ORAL

T118. The Peña Blanca Uranium District, Chihuahua: A Natural Analogue for the Transport of Radionuclides in a Nuclear Waste Repository in Unsaturated, Welded Tuff

Geology and Public Policy Committee

Geochemistry, Aqueous; Geochemistry, Other; Hydrogeology
Ardyth M. Simmons, Los Alamos National Laboratory, Los Alamos, N.Mex.; Patrick F. Dobson, Lawrence Berkeley National Laboratory, Berkeley, Calif. ORAL

T119. Mercury in Coal: Origins to Emissions

GSA Coal Geology Division; GSA Geology and Society Division

Coal Geology; Environmental Geoscience; Public Policy

Jeffrey C. Quick, Utah Geological Survey, Salt Lake City, Utah; Allan Kolker, U.S. Geological Survey, Reston, Va. ORAL

T120. Experimental, Theoretical, Stable Isotope, and Predictive Studies of Sulfide Oxidation Processes in the Field and Laboratory

Environmental Geoscience; Geochemistry, Aqueous;

Geomicrobiology

W.C. Pat Shanks, U.S. Geological Survey, Denver, Colo.; Robert R. Seal, U.S. Geological Survey, Reston, Va. ORAL

T121. Thermochronology: Techniques, Applications, and Interpretations

Tectonics; Geomorphology; Geochemistry, Other
Todd A. Ehlers, University of Michigan, Ann Arbor, Mich.;
Peter W. Reiners, Yale University, New Haven, Conn. ORAL
and POSTER

T122. Dynamics of Metamorphic and Hydrothermal Processes: From Grain-Scale to Mountain Belt

Petrology, Metamorphic; Mineralogy/Crystallography;
Geochemistry, Aqueous
John R. Bowman, University of Utah, Salt Lake City, Utah;
C. Tom Foster, University of Iowa, Iowa City, Iowa. ORAL and
POSTER

T123. Mars Analogue Research and Instrument Field Testing

GSA Planetary Geology Division
Planetary Geology; Remote Sensing/Geographic Info System
John C. Armstrong, Weber State University, Ogden, Utah;
Luther Beegle, Jet Propulsion Laboratory, Pasadena, Calif.; R.
Glenn Sellar, Jet Propulsion Laboratory, Pasadena, Calif. ORAL

T124. The Lunar Exploration Initiative: Current Science Knowledge and Future Exploration

GSA Planetary Geology Division
Planetary Geology
Ben Bussey, Applied Physics Lab, Laurel, Md.; R. Aileen Yingst,
GSA Planetary Geology Division, Green Bay, Wis. ORAL

T125. 4-D Evolution of the Continents: Integrated Solutions through Cyberinfrastructure

GSA Geophysics Division; GSA Structure and Tectonic Division
Tectonics; Geophysics/Tectonophysics/Seismology; Structural
Geology
A.K. Sinha, Virginia Tech, Blacksburg, Va.; Robert D. Hatcher,
University of Tennessee, Knoxville, Tenn.; G. Randy Keller,
University of Texas, El Paso, Tex. ORAL and POSTER

T126. Accretionary Orogens in Space and Time

GSA Geophysics Division; International Lithosphere Program
Geophysics/Tectonophysics/Seismology; Precambrian
Geology; Tectonics
Kent C. Condie, New Mexico Institute of Mining and
Technology, Socorro, N.Mex.; Peter A. Cawood, University of
Western Australia, Crawley, Australia; Alfred Kroner, Johannes
Gutenberg–Universität Mainz, Mainz, Germany. ORAL and
POSTER

T127. Geometry and Evolution of Extensional Basins and Their Influence on Fluid Flow, Sedimentation, Seismicity, and Magmatism

GSA Geophysics Division; GSA Structural Geology and Tectonics Division
Tectonics; Geophysics/Tectonophysics/Seismology; Structural
Geology
Victoria E. Langenheim, U.S. Geological Survey, Menlo Park,
Calif.; V.J.S. Grauch, U.S. Geological Survey, Denver, Colo.
ORAL

T128. Processes of Basin and Range Extension: An EarthScope Primer

GSA Geophysics Division; GSA Structural Geology and Tectonics Division
Geophysics/Tectonophysics/Seismology; Tectonics;
Neotectonics/Paleoseismology
Dennis Harry, Colorado State University, Fort Collins, Colo.;
Craig H. Jones, University of Colorado, Boulder, Colo. ORAL
and POSTER

T129. The Yellowstone Hotspot: Its Influence on the Magmatic and Tectonic Evolution of the Western U.S.

GSA Geophysics Division; GSA Structural Geology and Tectonics Division
Geophysics/Tectonophysics/Seismology; Volcanology;
Tectonics
Robert B. Smith, University of Utah, Salt Lake City, Utah;
Richard Carlson, Carnegie Institution of Washington,
Washington, D.C.; John Shervais, Utah State University, Logan,
Utah. In conjunction with session T130. ORAL

T130. The Yellowstone Hotspot: Integrated Field, Geochemical, and Geophysical Studies

GSA Geophysics Division; Geochemical Society
Petrology, Igneous; Geophysics/Tectonophysics/Seismology;
Volcanology
John Shervais, Utah State University, Logan, Utah; Victor
Camp, San Diego State University, San Diego, Calif.; Dennis
J. Geist, University of Idaho, Moscow, Idaho; Jonathan M.G.
Glen, U.S. Geological Survey, Menlo Park, Calif. In conjunc-
tion with session T129. ORAL and POSTER

T131. Geophysical Studies for Improving Management of Land, Water, Environment, and Hazards (Posters)

GSA Geophysics Division; GSA Hydrogeology Division; GSA Engineering Geology Division
Geophysics/Tectonophysics/Seismology; Hydrogeology;
Engineering Geology
V.J.S. Grauch, U.S. Geological Survey, Denver, Colo.; Dennis
Harry, Colorado State University, Fort Collins, Colo. POSTER

T132. High-Pressure Mineral Physics: To Honor Ho-Kwang Mao, Roebling Medalist

Mineralogical Society of America; Geophysical Laboratory of the Carnegie Institution of Washington and COMPRES: Consortium for Materials Properties Research in Earth Sciences
Mineralogy/Crystallography; Petrology, Experimental;
Geophysics/Tectonophysics/Seismology
William A. Bassett, Cornell University, Ithaca, N.Y.; Russell
J. Hemley, Carnegie Institution of Washington, Washington,
D.C.; Anne Hofmeister, Washington University, St. Louis, Mo.
ORAL

T133. Insights into the Raising of the Colorado Plateau

GSA Geophysics Division

Geophysics/Tectonophysics/Seismology; Tectonics; Quaternary Geology/Geomorphology
Shari Kelley, New Mexico Institute of Mining and Technology, Socorro, N.Mex.; Mousumi Roy, University of New Mexico, Albuquerque, N.Mex. ORAL

T134. Mesozoic and Cenozoic Crustal Evolution of Alaska and Western Canada (Posters)

Neotectonics/Paleoseismology; Tectonics; Geophysics/Tectonophysics/Seismology

Jeff Trop, Bucknell University, Lewisburg, Pa.; Kenneth Ridgway, Purdue University, West Lafayette, Ind.; Peter Haeussler, U.S. Geological Survey, Anchorage, Alaska. POSTER

T135. Orogenic Plateaus from Top to Bottom

GSA Structural Geology and Tectonics Division; GSA Geophysics Division; GSA Sedimentary Geology Division

Tectonics; Geophysics/Tectonophysics/Seismology; Stratigraphy

Bradley D. Ritts, Indiana University, Bloomington, Ind.; Brian K. Horton, University of California, Los Angeles, Calif. ORAL and POSTER

T136. Out of the Tethys: The Making of Asia

Tectonics; Stratigraphy; Geophysics/Tectonophysics/Seismology

Rasoul Sorkhabi, University of Utah, Salt Lake City, Utah; Ezat Heydari, Jackson State University, Jackson, Miss. ORAL and POSTER

T137. The Backbone of America from Patagonia to Alaska: Plateau Uplift, Shallow Subduction, and Ridge Collision

GSA International Division

Tectonics; Petrology, Igneous; Geophysics/Tectonophysics/Seismology

Mark Cloos, University of Texas at Austin, Austin, Tex.; Suzanne Kay, Cornell University, Ithaca, N.Y. ORAL

T138. Tectonic Hazards of the SE Asian Region

GSA Structural Geology and Tectonics Division; GSA Geophysics Division

Tectonics; Geophysics/Tectonophysics/Seismology; Structural Geology

Ron Harris, Brigham Young University, Provo, Utah. ORAL and POSTER

T139. Tectonics in the Information Age: Large Datasets and Numerical Models in Solid Earth Science

GSA Geophysics Division

Tectonics; Geophysics/Tectonophysics/Seismology; Geoscience Information/Communication

Christopher L. Andronicos, University of Texas at El Paso, El Paso, Tex.; Aaron A. Velasco, University of Texas at El Paso, El Paso, Tex. ORAL

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T140. EarthScope: Challenges in Understanding the Heterogeneity of the Lithosphere

GSA Structural Geology and Tectonics Division; EarthScope National Office; GSA Geophysics Division

Tectonics; Geophysics/Tectonophysics/Seismology; Petrology, Metamorphic

Rick Aster, New Mexico Institute of Mining and Technology, Socorro, N.Mex.; Karl Karlstrom, University of New Mexico, Albuquerque, N.Mex.; Mike Williams, University of Massachusetts, Amherst, Mass. ORAL and POSTER

T141. Geology and EarthScope

GSA Structural Geology and Tectonics Division; Integrated Solid Earth Sciences (ISES); Mineralogical Society of America
Geophysics/Tectonophysics/Seismology; Tectonics; Structural Geology

David W. Mogk, Montana State University, Bozeman, Mont.; Basil Tikoff, University of Wisconsin, Madison, Wis.; Michael Brown, University of Maryland, College Park, Md. ORAL

T142. Controversies, Conundrums, and Innovative Approaches in Extensional Tectonics: A Tribute to Ernie Anderson

GSA Structural Geology and Tectonics Division

Tectonics; Structural Geology; Petrology, Igneous
James E. Faulds, University of Nevada, Reno, Nev.; Robert G. Bohannon, U.S. Geological Survey, Denver, Colo.; Keith A. Howard, U.S. Geological Survey, Menlo Park, Calif.; L. Sue Beard, U.S. Geological Survey, Flagstaff, Ariz. ORAL and POSTER

T143. Great Basin Tectonics and Metallogeny

U.S. Geological Survey

Tectonics; Economic Geology

Albert H. Hofstra, U.S. Geological Survey, Denver, Colo.;
David A. Ponce, U.S. Geological Survey, Menlo Park, Calif.;
Alan Wallace, U.S. Geological Survey, Reno, Nev.; Jonathan
M.G. Glen, U.S. Geological Survey, Menlo Park, Calif. ORAL
and POSTER

**T144. The Edges of Extension: Boundaries of the Basin
and Range Province as Natural Laboratories for
Studying Tectonic and Structural Processes**

*GSA Structural Geology and Tectonics Division; GSA
Geophysics Division*

Structural Geology; Tectonics; Geophysics/Tectonophysics/
Seismology

Phillip Resor, Wesleyan University, Middletown, Conn.; Joseph
Colgan, Stanford University, Stanford, Calif.; Eric Flodin,
Indiana University–Purdue University, Fort Wayne, Ind. ORAL
and POSTER

**T145. The Nature, Significance, and Evolution of
Transtensional Tectonic Regimes**

GSA Structural Geology and Tectonics Division

Structural Geology; Tectonics; Neotectonics/Paleoseismology

Robert E. Holdsworth, University of Durham, Durham, UK;
Basil Tikoff, University of Wisconsin, Madison, Wis.; John
Waldron, University of Alberta, Edmonton, Alberta. ORAL and
POSTER

**T146. Young and Active Transtensional Deformation
along the Western Margin of North America:
Walker Lane Belt/Eastern California Shear Zone
to the Gulf of California**

*GSA Structural Geology and Tectonics Division; GSA
Geophysics Division; GSA Quaternary Geology and
Geomorphology Division*

Neotectonics/Paleoseismology; Tectonics; Structural Geology
Paul Umhoefer, Northern Arizona University, Box 4099,
Flagstaff, Ariz.; Jeffrey Lee, Central Washington University,
Ellensburg, Wash. ORAL and POSTER

**T147. Ductile Flow and Folding in Geo-Materials: A
Multidisciplinary Perspective**

GSA Structural Geology and Tectonics Division

Structural Geology; Tectonics; Volcanology

Graham D.M. Andrews, University of Leicester, Leicester,
UK; Steve Temperley, University of Leicester, Leicester, UK;
Michael J. Branney, University of Leicester, Leicester, UK.
ORAL and POSTER

**T148. What is a Magma Chamber? The Role of Sheets in
the Assembly of Intrusions**

GSA Structural Geology and Tectonics Division

Structural Geology; Geophysics/Tectonophysics/Seismology;
Petrology, Igneous

Sven Morgan, Central Michigan University, Mount Pleasant,
Mich.; Basil Tikoff, University of Wisconsin, Madison, Wis.;
Drew Coleman, University of North Carolina, Chapel Hill,
N.C. ORAL and POSTER

**T149. Rheological Information from Naturally
Deformed Materials: New Approaches to
Understanding Bulk Ductile Behavior**

GSA Structural Geology and Tectonics Division

Structural Geology; Tectonics; Geophysics/Tectonophysics/
Seismology

Dyanna Czeck, University of Wisconsin, Milwaukee,
Wis.; Cheryl Waters-Torney, Western Carolina University,
Cullowhee, N.C. ORAL and POSTER

**T150. Fracturing and Faulting of the Clastic Rocks of
the Colorado Plateau**

Structural Geology; Hydrogeology; Sediments, Clastic

Atilla Aydin, Stanford University, Stanford, Calif.; James P.
Evans, Utah State University, Logan, Utah. ORAL and POSTER

T151. The Echinoderm Legacy of N. Gary Lane

Paleontology, Biogeography/Biostratigraphy; Paleontology,
Diversity, Extinction, Origination; Paleontology, Paleoecology/
Taphonomy


Gary Webster, Washington State University, Pullman, Wash.;
William Ausich, Ohio State University, Columbus, Ohio. ORAL

About the Author

The author, a GSA member, found fame when she took advantage of the GSA Bookstore's Members' Corner Book Display. Her book gained national exposure at GSA meetings held around the country. The author now splits her time between Menlo Park, California, and West Bay, Grand Cayman.

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- Paleontology, Diversity, Extinction, Origination
- Paleontology, Paleoecology/Taphonomy
- Paleontology, Phylogenetic/Morphological Patterns
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- Planetary Geology
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Select your preferred mode of presentation: oral, poster, or either (no preference). **Please note:** The program organizers will do their best to fit you into your preferred mode; however, they will override your original mode selection if they feel your paper would fit well in a particular session with other compatible abstracts. The decision of the program organizers is final.

Oral Mode. This is a verbal presentation before a seated audience. The normal length of an oral presentation is 12 minutes, plus three minutes for discussion.

Poster Mode. Each poster session presenter is provided with one horizontal, freestanding display board approximately 8' wide and 4' high. Precise measurements will appear in the speaker guide, which will be posted on the GSA Web site in September. Speakers must be at their poster booths for at least two of the four presentation hours.

Papers for discipline sessions may be submitted in either oral or poster mode. Papers for topical sessions are to be submitted *only* in the mode noted in the session description. If a topical abstract is submitted in the incorrect mode, the abstract will be transferred automatically to a discipline session.

Speaker Equipment. GSA provides the following equipment in each Technical Session Room at no charge to speaker:

- 1 desktop computer (with Windows 2000 Operating System and MS Office XP. All Macintosh or MS PowerPoint XP presentations will work, but must be saved in a PC format).
- 1 LCD projector
- 1 screen
- 1 laser pointer
- 1 lectern/podium with light and microphone
- 1 wired lavalier microphone

Slide projectors and multiple screens are no longer available. More information on this is included in the speaker guide, which will be posted on the GSA Web site in September.

Annual Meeting Sponsor



Title Sponsor of the 2005 GSA Annual Meeting.

Abstract Body

Please keep the abstract's body to 2,000 characters or fewer. The online abstract system will reject it if it exceeds this limit.

You can include a table with your abstract, but understand that the table might reduce the number of words allowed in your abstract. Taken together, the body of the abstract should take up no more space than would be occupied by roughly 2,000 characters alone.

Check the spelling of the abstract's body and title using your own word processor. Then read it again and make sure that it is something the whole world should see. (We won't check or edit it for you.)

For typing and pasting, add an extra line between paragraphs or they will run together when displayed (you can do this before copying, after pasting, or while typing).

Abstract Fee

Once the abstract is in place, a window to submit payment will appear. The nonrefundable submission fee is \$18 for all students; \$30 for all others.

You May Present Only ONE Volunteered Abstract

- Please submit only one *volunteered* abstract as speaker or poster presenter in topical and/or discipline sessions. This helps avoid speaker scheduling conflicts and gives everyone an equal opportunity to be heard. **Multiple submissions as speaker-presenter will result in rejection of all abstracts.**
- This limitation does not apply to, nor does it include, *invited* contributions to keynote symposia or topical sessions.

JTPC to Finalize Program in Early August

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. GSA Council approved the JTPC technical program chairs.

Q. On What Fossilized Creature Would You Find a Pydigium?

Like Trivia? Get a team together and battle it out during GSA's second Geoscience Trivia Night at the GSA Annual Meeting in Salt Lake City!

GEOSCIENCE TRIVIA NIGHT

Tues., 18 Oct., 2005, 8–10 p.m.

(Location to be announced)

Come along and test your knowledge of geoscience trivia at this evening of fun. There are over 100 questions waiting for you to rack your brain and test your skills! Register a team or join a mixed team. Winning teams will be awarded fabulous prizes and the prestige of being the second-ever GSA Trivia Night winners!

For more information and team registration, e-mail Gary Lewis at glewis@geosociety.org.

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Call for GSA Committee Service

Stimulate **Growth** and *Change* Serve on a GSA Committee!

Most committee terms are for three years and begin 1 July 2006 (exceptions are noted below with their respective committees); student representatives serve for two years.

2006–2007 Committee Vacancies

GSA is seeking candidates to serve on Society committees and as GSA representatives to other organizations. Contribute to our science by volunteering yourself or nominating others you think should be considered for any of the following openings. Younger members are especially encouraged to become involved in Society activities. If you volunteer or make recommendations, please give serious consideration to the specified qualifications for serving on a particular committee. **Please be sure that your candidates are GSA Members or Fellows and that they fully meet the requested qualifications.**

You may now volunteer or nominate online! The nomination form and instructions are available at www.geosociety.org/aboutus/commtees. Click on the **2006–2007 Nomination Form** link to access the form. If you prefer, you may download and complete the paper nomination form, also located at this site, and return it to Ruth Harrison, GSA, P.O. Box 9140, Boulder, CO 80301, USA, fax +1.303.357.1070. If you have questions pertaining to nominations, please contact Ruth Harrison, rharrison@geosociety.org, +1.303.357.1000, ext. 0, or +1.800.472.1988, ext. 0.

Nominations received at GSA headquarters by **1 August 2005** on the official one-page form will be forwarded to the Committee on Nominations. Information requested on the form will assist the committee members with their recommendations for the July 2006 committee vacancies. Please use one form per candidate. The committee will present at least two nominations for each open position to Council at its fall meeting. Appointees will then be contacted and asked to serve, thus completing the process of bringing new expertise into Society affairs.

Graduate Students: You are eligible to serve on GSA committees as full members, and Council encourages you to volunteer or nominate others for committee service.

Annual Program Committee (AM, B/E, T/E)—4-year terms

Two vacancies: one member-at-large; one councilor or former councilor

Develops a long-range plan for increasing the quality of the annual and other Society-sponsored meetings in

terms of science, education, and outreach. Evaluates the technical and scientific programs of the annual meeting.

Qualifications: broad familiarity with different disciplines, previous program experience, or active involvement in applying geologic knowledge to benefit society and raising awareness of critical issues.

Arthur L. Day Medal Award (T/E)

Two member-at-large vacancies

Selects candidates for the Arthur L. Day Medal Award.

Qualifications: knowledge of those who have made “distinct contributions to geologic knowledge through the application of physics and chemistry to the solution of geologic problems.”

Education (AM, T/E)—4-year term

One graduate-level educator vacancy

Stimulates interest in the importance and acquisition of basic knowledge in the earth sciences at all levels of education and promotes the importance of earth science education to the general public. **Qualifications:** ability to work with other interested scientific organizations and science teacher groups to develop precollege earth science education objectives and initiatives.

Geology and Public Policy (AM, B/E, T/E)

Two member-at-large vacancies

Translates knowledge of earth sciences into forms most useful for public discussion and decision making. **Qualifications:** experience in public policy issues involving the science of geology; ability to develop, disseminate, and translate information from the geologic sciences into useful forms for the general public and for GSA members; familiarity with appropriate techniques for the dissemination of information.

Honorary Fellows (T/E)

Two member-at-large vacancies

Selects candidates for Honorary Fellows, usually non-North Americans. **Qualifications:** knowledge of geologists throughout the world who have distinguished themselves through their contributions to the science.

Joint Technical Program Committee (T/E)

Three vacancies: two environmental geoscience representatives; one public policy representative (terms begin 1 Jan. 2007)

Assists in finalizing the technical program of the Annual Meeting: reviews abstracts or provides names of reviewers to evaluate abstracts, participates in the Web-based activities in the selection and scheduling of abstracts, participates in Topical Session proposal review.

July 2006 Committee Vacancies • *Extensive time commitment required • AM—Meets at Annual Meeting
B/E—Meets in Boulder or elsewhere • T/E—Communicates by phone or electronically

Qualifications: must be familiar with computers and the Web, be a specialist in one of the specified fields, and be available in mid to late July for the organization of the electronic technical program.

Membership (B/E)—2-year term

Two vacancies: one student representative; one member-at-large (government employment category).

Evaluates membership benefits and develops recommendations that address the changing needs of the membership and attracts new members.

Qualifications: experience in benefit, recruitment, and retention programs is desired.

Minorities and Women in the Geosciences (AM)

Two member-at-large vacancies

Stimulates recruitment and promotes positive career development of minorities and women in the geoscience professions. **Qualifications:** familiarity with minority and female education and employment issues; expertise and leadership experience in such areas as human resources and education desired.

Nominations (B/E, T/E)

Two member-at-large vacancies

Recommends to Council nominees for the positions of GSA Officers and Councilors, committee members, and Society representatives to other permanent groups. **Qualifications:** familiarity with a broad range of well-known and highly respected geological scientists.

Penrose Conferences and Field Forums (T/E)

Two member-at-large vacancies

Reviews and approves Penrose Conference proposals and recommends and implements guidelines for the success of the conferences.

Qualifications: past convener of a Penrose Conference or a Field Forum.

Penrose Medal Award (T/E)

Two member-at-large vacancies

Selects candidates for the Penrose Medal Award. Emphasis is placed on "eminent research in pure geology, which marks a major advance in the science of geology." **Qualifications:** familiarity with outstanding achievers in the geosciences who are worthy of consideration for the honor.

Professional Development (T/E)

One member-at-large vacancy

Directs, advises, and monitors GSA's professional development program, reviews and approves proposals, recommends and implements guideline changes, and monitors the scientific quality of courses offered.

Qualifications: familiarity with professional development programs or adult education teaching experience.

Publications (AM, B/E, T/E)—4-year terms

Two vacancies: one member-at-large; one councilor

Nominates candidates for editor positions, approves editorial boards, reviews the quality and health of Society publications, and explores the initiation of new ventures, including electronic publishing. **Qualifications:** extensive publications experience.

Research Grants* (B/E)

Five member-at-large vacancies; one NSF delegate

Evaluates student research grant applications and selects grant recipients. **Qualifications:** should have experience in directing research projects and in evaluating research grant applications.

continued on page 54

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continued from page 53

Treatise on Invertebrate Paleontology Advisory Committee (AM)

One member-at-large vacancy (paleontologist)

Advises Council, the Committee on Publications, and the *Treatise* editor in matters of policy concerning this publication. **Qualifications:** must be a paleontologist.

Young Scientist Award (Donath Medal) (T/E)

Two member-at-large vacancies

Committee members investigate the achievements of young scientists who should be considered for this award and make recommendations to Council. **Qualifications:** should have knowledge of young scientists with "outstanding achievement(s) in contributing to geologic knowledge through original research which marks a major advance in the earth sciences."

GSA Representatives to Other Organizations

GSA Representative to the American Association for the Advancement of Science (AAAS)

Three Section representative vacancies: Section E—Geology and Geography; Section W—Atmospheric and Hydrospheric Sciences; Section X—Societal Impacts of Science and Engineering

Must be a member of the AAAS or be willing to join. Must represent the appropriate section background.

Liaison to the US National Committee on Soil Science (USNC/SS)

One vacancy

Should be a soil scientist and GSA member.

Committee, Section, and Division Volunteers: Council Thanks You!

The GSA Council acknowledges the many member-volunteers who, over the years, have contributed to the Society and to our science through involvement in the affairs of the GSA.

Nominate Your Next Officers and Councilors!

Nominations Due 1 August 2005

The GSA Committee on Nominations requests nominations for officers (vice president and treasurer) and councilors to serve on GSA Council beginning in 2006. Each nomination should be accompanied by basic data and a description of the qualifications of the individual for the position recommended.

The online nomination form is available at www.geosociety.org/aboutus/commtees/, or you may send materials for officer and councilor nominations to Ruth Harrison, GSA, P.O. Box 9140, Boulder, CO 80301-9140, +1-303-357-1000, ext. 0, +1-800-472-1988, ext. 0, rharrison@geosociety.org.

GSA Officers and Councilors

OFFICERS FOR 2005–JUNE 2006



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President
University of Kentucky
Lexington, Kentucky



Stephen G. Wells
Vice President
Desert Research Institute
Reno, Nevada



Rob Van der Voo
Past President
University of Michigan
Ann Arbor, Michigan



John Costa
Treasurer
U.S. Geological Survey
Portland, Oregon

COUNCILORS (2003–JUNE 2006)

Donald I. Siegel
Syracuse University
Syracuse, New York

Steven M. Stanley
Johns Hopkins University
Baltimore, Maryland

Michael A. Arthur
Pennsylvania State University
University Park, Pennsylvania

J. Christopher Hepburn
Boston College
Chestnut Hill, Massachusetts

COUNCILORS (2004–JUNE 2007)

Jean M. Bahr
University of Wisconsin
Madison, Wisconsin

Bruce F. Molnia
U.S. Geological Survey
Reston, Virginia

Carolyn G. Olson
U.S. Department of
Agriculture
Washington D.C.

COUNCILOR (2004–JUNE 2008)

Darrel S. Cowan
University of Washington
Seattle, Washington

COUNCILOR (2005–JUNE 2008)

Jonathan G. Price
Nevada Bureau of
Mines & Geology
Reno, Nevada

COUNCILORS (2005–JUNE 2009)

Nancy J. McMillan
New Mexico State University
Las Cruces, New Mexico

John W. Geissman
University of New Mexico
Albuquerque, New Mexico

Jill S. Schneiderman
Vassar College
Poughkeepsie, New York



GSA GEOTALES II HAS ARRIVED!



The second volume of *GSA GeoTales*, filled with exciting new stories and adventures from our GSA members, is now available. Any \$50 contribution received by the Foundation after 1 April 2005 entitles you to a copy of this second volume of *GSA GeoTales*. Any \$100 contribution received after 1 April 2005 entitles you to receive both volumes!

Please complete and return the coupon below to receive your copy(s). If we have already received your contribution toward *GeoTales II*, we'll be sending it out directly!



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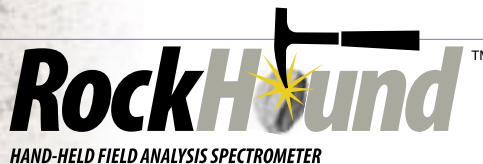
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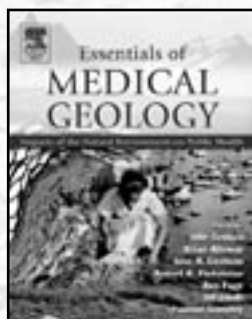
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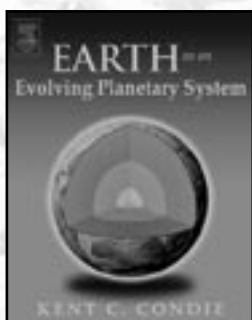


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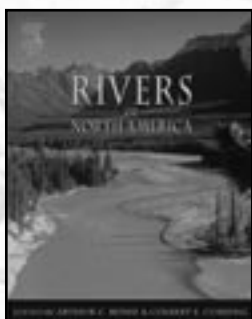
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ANNOUNCEMENTS

MEETINGS CALENDAR

2005

- | | |
|------------------|--|
| 11–15 June | 42nd Annual Meeting of the Clay Minerals Society, Burlington, Vermont, USA. Information: www.middlebury.edu/cms ; Chair: Peter Ryan, pryan@middlebury.edu . |
| 12–16 June | National Minerals Education Conference, Tucson, Arizona, USA. Information: www.seeuthere.com/MEC2005 . |
| 18–22 July | 4th Annual GML Days 2005, Geography mark-up language and Geo-Spatial Web Services for GIS Conference, British Columbia, Canada. Information: www.gmldays.com , +1.604.484.2750, or info@gmldays.com . |
| 18–29 July | International Association of Geomagnetism and Aeronomy IAGA 2005 Scientific Assembly, Toulouse, France. Information: cnfgg@eost.u-strasbg.fr , +33.3.88.450191, fax +33.3.88.603887. |
| 31 July–5 August | Gordon Research Conference (GRC) Metals in Ore-forming Systems: Sources, Transport, Deposition, Andover, New Hampshire, USA. Information: www.grc.uri.edu/programs/2005/inorgeo.htm ; Jean Cline, cline@cmail.nevada.edu ; Steve Garwin, Steve.Garwin@geoinformex.com ; Christopher Heinrich, heinrich@erdw.ethz.ch . |
| 8–11 August | Earth System Processes 2 (ESP2). Cosponsored by GSA and the Geological Society of Canada. Westin Hotel, Calgary, Alberta, Canada. Information: www.geosociety.org/meetings/esp2/ , or Deborah Nelson, dnelson@geosociety.org , +1.303.357.1014. |
| 9–12 August | 9th International Conference on Diffuse Pollution, Johannesburg, South Africa. Information: www.iwa-wisa-2005.com or contact Ralph Heath at ralphh@phd.co.za . |
| 11–14 September | 22nd Annual Meeting of the Society for Organic Petrology (TSOP), Louisville, Kentucky, USA. Information: James Hower, Center for Applied Energy Research, University of Kentucky, +1.859.257-0261, fax +1.859.257.0360, hower@caer.uky.edu , http://igs.indiana.edu/tsop2005 . |
| 11–16 September | Uranium Mining and Hydrogeology IV, Freiberg, Germany. Information: www.geo.tu-freiberg.de/umh/index.htm . |
| 12–13 September | Micro-organisms and Earth Systems: Advances in Geomicrobiology, Keele University, Keele, UK. Information: Society for General Microbiology, +44 (0)118.988.1805, fax +44 (0)118.988.5656, www.sgm.ac.uk/meetings . |
| 14–16 September | Bright or Dim? Detection and Quantification of Fluids and Reservoir Properties from Exploration through to Exploitation: An Integrated Geoscience View, The Geological Society, London. Information: Lydia Dumont, The Geological Society, +44 (0)20.7434.9944, fax +44 (0)20.7494.0579, lydia.dumont@geolsoc.org.uk . |
| 19–23 September | 14th Meeting of the Association of the European Geological Societies, Torino, Italy. Information: www.maegs14.com . |
| 19–23 September | 22nd IGES International Geochemical Exploration Symposium, Perth, Western Australia. Information: Don Pearce, Conference Coordinator, +61.8.9332.2900, fax +61.8.9332.2911. |
| 28–30 September | Tectonics of strike-slip restraining & releasing bends in continental & oceanic settings, London, UK. Tectonic Studies Group |

and Marine Studies Group, Geological Society of London.
Information: www.geolsoc.org.uk/template.cfm?name=TSG_and_MSG_Conference_.

8–13 October	American Institute of Professional Geologists 42nd Annual National Meeting, Lexington, Kentucky, USA. Information: Tom Spalding, +1.502.458.1209, aipg2005@yahoo.com, www.professionalgeologist.org.
19–20 October	Compressional Deformation within Passive Margins, The Geological Society, London, UK. Information: Lydia Dumont, The Geological Society, +44 (0)20.7434.9944, fax +44 (0)20.7494.0579, lydia.dumont@geolsoc.org.uk.
2–3 November	Groundwater Under The Pacific Northwest: Integrating Research, Policy, & Education 2005 Conference, Stevenson, Washington. Information: www.swwrc.wsu.edu/conference2005/, State of Washington Water Research Center, watercenter@wsu.edu, +1-509-335-5531.
30 Nov.–1 Dec.	Petroleum Geoscience Collaboration Conference, The Geological Society, London, UK. Information: Lydia Dumont, The Geological Society, +44 (0)20.7434.9944, fax +44 (0)20.7494.0579, lydia.dumont@geolsoc.org.uk.

Visit www.geosociety.org/calendar/
for a complete list of upcoming geoscience meetings.

About People

GSA Senior Fellow **A. Hope Jahren** will be awarded the James B. Macelwane Medal on 7 Dec. 2005 at the American Geophysical Union's annual meeting in San Francisco. In 2001, she also was awarded the Geological Society of America's Donath Medal, making her one of only four young scientists ever to have received both prestigious medals, and the only woman.

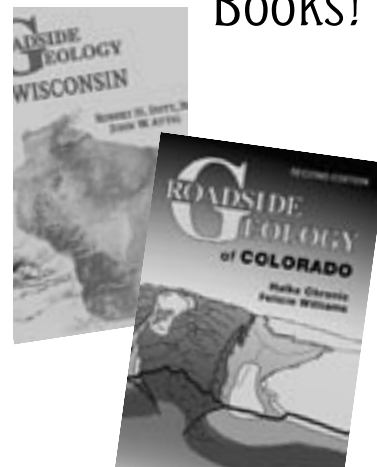
GSA Senior Fellow **Randolph W. Bromery** has been reappointed by President Bush to a three-year term on the President's Committee on the National Medal of Science. Bromery, who was originally appointed in 2003 to fill the remainder of an unexpired term, will now serve through 31 Dec. 2007. Bromery was awarded the GSA Distinguished Service Award in 1999.

The Kerry Kelts Research Awards of the Limnogeology Division

The application process for the Kerry Kelts Research Awards of the Limnogeology Division is now open. These awards are named in honor of Kerry Kelts, a visionary limnogeologist and inspiring teacher. Up to three awards of \$300 each for use in research related to limnogeology, limnology, and paleolimnology are available. Application for this award is simple and consists of a summary of the proposed research, its significance, and how the award will be used (five-page maximum). Please send your summary in PDF format along with your name and associated information to the chair of the Limnogeology Division, Thomas C. Johnson, tcj@d.umn.edu. **Application Deadline: 10 August 2005.** Awards will be announced at the Limnogeology Division Business Meeting and Reception at the 2005 GSA Annual Meeting in Salt Lake City in October.

We hope to increase the amount of the awards in succeeding years. If you are interested in supporting this awards program, please send your donations, designated for the Kerry Kelts Research Awards of the Limnogeology Division, to GSA Foundation, P.O. Box 9140, Boulder, CO 80301-9140, USA.

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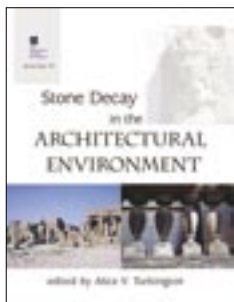
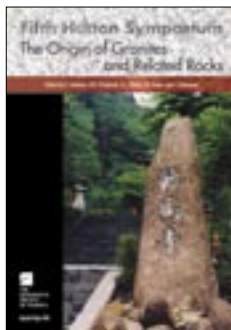
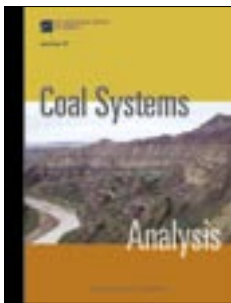
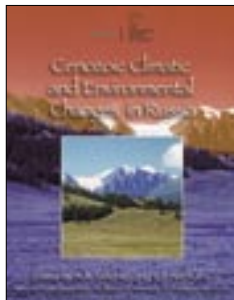
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Cenozoic Climatic and Environmental Changes in Russia *edited by A.A. Velichko and V.P. Nechaev (editors of the English-language edition are H.E. Wright Jr., T.A. Blyakharchuk, A.A. Velichko, and Olga Borisova)*

Today, the vast expanse of Russia, from Western Europe to the Pacific Ocean and from the Arctic Ocean to the countries of Central Asia, has mostly a strong continental climate, with maritime influence in the Far East. But through the Paleogene and Neogene, the great transgression of the Tethys and Paratethys seas expanded from the Mediterranean region northward over the West Siberian lowlands to the Arctic Ocean, bringing with them fluctuating subtropical and warm-temperate climatic conditions, as reconstructed from plant and animal fossils and other paleoclimatic proxies. A cooling trend in the Pliocene culminated in the Quaternary with repeated advances of the Scandinavian ice sheet west of the Ural Mountains, along with the development of permafrost and deposition of loess beyond the ice sheet and over much of Siberia. Compilation of isotopic and microfossil data from the bordering oceans expands the geographic scope of the paleoclimatic reconstructions. This book, translated from a Russian volume published by the Russian Academy of Sciences, Institute of Geography, summarizes the paleoclimatic aspects of the geologic and paleontologic records from ten different areas in Russia and provides quantitative estimates for the repeated changes in temperature and precipitation for the past 65 million years.

SPE382, 226 p., ISBN 0-8137-2382-5
\$70.00, **member price \$56.00**

Orogenic Curvature: Integrating Paleomagnetic and Structural Analyses

edited by Aviva J. Sussman and Arlo B. Weil

Most active and ancient orogenic systems display salients and recesses with varying degrees of curvature in map view. Within these arcuate orogens, many observations (e.g., out-of-plane strains, oblique slip, earthquake swarms, vertical-axis rotations) indicate that material is transported (or flows) in three dimensions, such that no single cross section can fully describe the motion. Although our conceptualization of the architecture of curved mountain belts has become increasingly sophisticated, many questions as to the kinematics and mechanics of forming arcuate orogenic systems still need to be answered. To this end, GSA Special Paper 383 brings together several investigations that integrate structural and paleomagnetic techniques. Examples of the multidisciplinary research presented in the volume include: the impact that vertical-axis rotations have on shortening estimates; magnetic anisotropy and strain distribution as a function of basement/cover decoupling; remagnetization and structural growth; mantle-lithosphere delamination caused by plate bending; and the relationship between shear zones and vertical-axis rotations.

SPE383, 258 p. plus index, ISBN 0-8137-2383-3
\$80.00, **member price \$64.00**

Large Meteorite Impacts III

edited by Thomas Kenkmann, Friedrich Hörz, and Alex Deutsch

The third volume of the series "Large Meteorite Impacts" provides an updated and comprehensive overview of modern impact crater research. In 26 chapters, more than 90 authors from Europe, the United States, Russia, Canada, and South Africa give a balanced, firsthand account of the multidisciplinary field of cratering science, with reports on field studies, geophysical analyses, and experimental and numerical simulations. Nine chapters focus on structure, geophysics, and cratering motions of terrestrial craters. Recent advances in impact ejecta studies and shock metamorphism are assembled, each with seven chapters, and three chapters extend the scope from a terrestrial to a planetary perspective.

SPE384, 457 p. plus index, ISBN 0-8137-2384-1
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www.geosociety.org

**Active Tectonics and Seismic Hazards of Puerto Rico,
the Virgin Islands, and Offshore Areas**

edited by Paul Mann

Puerto Rico and the Virgin Islands occupy a 450-km-long and 300-km-wide segment of the seismically active North America–Caribbean plate boundary zone. Geologic and seismological information on both onland and offshore plate boundary faults are critical for understanding the earthquake and tsunami hazards that these structures pose to a rapidly urbanizing island population of about 4 million inhabitants. This volume presents an integrated set of 15 chapters on the geological, geophysical, and seismological nature of late Quaternary plate boundary zone faults revealed by both onland and offshore studies. The volume chapters are grouped into four sections: (1) three introductory chapters establishing the regional tectonic setting of Puerto Rico and the Virgin Islands and its offshore area using GPS-based geodesy and regional geologic information; (2) three chapters on the instrumental and historical seismicity of the region; (3) five chapters on the identification of late Quaternary faults in Puerto Rico and its shallow coastal areas using onland mapping, fault trenching, and offshore geophysical mapping; and (4) four chapters on seismic sources, ground amplification, and paleoliquefaction.

SPE385, 287 p. plus index, ISBN 0-8137-2385-X
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**Reconstruction of Pleistocene Ice-Dammed Lake Outburst Floods
in the Altai Mountains, Siberia**

by Jürgen Herget

In the Altai Mountains, located in southern Siberia, some of the largest floods in Earth's history occurred in Pleistocene times. The floods were caused by ice-dammed lake outburst floods comparable with glacial Lake Missoula events. In this volume, the remnants of the repeated jökulhlaups and key features of the local Pleistocene environment are described in review. The volume also focuses on the paleohydraulic interpretation of the traces of the floods to reconstruct their magnitudes and characteristics. Herget applied several established methods in the study as well as developed and applied new approaches (e.g., hydraulic interpretation of run-up sediments, fluvial gravel dunes and local scour around obstacles).

SPE 386, 117 p., ISBN 0-8137-2386-8
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Coal Systems Analysis

edited by Peter D. Warwick

Coal is an important and required energy source for today's world. Current rates of world coal consumption are projected to continue at approximately the same (or greater) levels well into the twenty-first century. This collection of papers provides an introduction to the concept of coal systems analysis and contains examples of how coal systems analysis can be used to understand, characterize, and evaluate coal and coal gas resources. Coal systems analysis incorporates the various disciplines of coal geology to provide a complete characterization of the resource.

SPE387, 111 p., ISBN 0-8137-2387-6
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Fifth Hutton Symposium: The Origin of Granites and Related Rocks

*edited by S. Ishihara, W.E. Stephens, S.L. Harley, M. Arima,
and T. Nakajima*

Granitic rocks are the most important component of Earth's upper continent crust, but their origin remains a topic of considerable debate. Recent developments have underscored the importance of modeling physical and chemical processes as well as the application of field techniques. The Fifth Hutton Symposium on the Origin of Granites and Related Rocks was held in Toyohashi, Japan, in September 2003 to review current thinking on this age-old debate. Some 27 invited papers are collected in this volume and represent all principal areas of research activity. The volume includes papers describing unifying models and new paradigms consistent with recent research, and contributions span the range from anatexis to emplacement and late-stage mineralization. A significant feature of this particular volume is the major contribution by scientists from the Far East both to generic aspects of granite magmatism and to studies of regional importance.

SPE 389, 392 p., ISBN 0-8137-2389-2
\$95.00, **member price \$76.00**

In Press

Plates, Plumes, and Paradigms

*edited by Gillian R. Foulger, James H. Natland, Dean C. Presnall,
and Don L. Anderson*

This beautiful compendium of work on hotspot volcanism documents the development, current state-of-play, and future prospects of all branches of the subject. It contains extensive and indispensable reference resources in the form of hotspot, tectonic, volcano and tomographic maps and cross sections of Earth. Some chapters outline the history of the plume hypothesis and other theories for the genesis of hotspots, and several provide tutorials that will be valuable to students and cross-disciplinary scientists. Other chapters present innovative models and theories for individual localities, volcano genesis processes, and related global observations. Many of these include subject reviews, making them doubly valuable to specialists and non-specialists alike. The book is fully interdisciplinary, encompassing geophysics, geochemistry, noble gases, heat, temperature, tectonics, petrology, mantle dynamics, impacts, and syntheses reconciling several branches of earth science. Included are chapters that advocate the plume model and ones that advocate alternative models. The book will enjoy a long lifetime of usefulness and functions as a reference work for students, scholars, and informed lay people. It is equally valuable for supporting advanced undergraduate or post-graduate courses and research scientists working at the forefront of hotspot science. It is an essential addition to the bookshelves of every science library, earth science teacher, and research scientist who aspires to understand the frontiers of this exciting subject. With over 150 color plates, it makes a beautiful addition to the library of anyone fascinated by volcanoes—one of nature's most exciting and extraordinary phenomena.

SPE 388, plus index, ISBN 0-8137-2388-4, in press

Stone Decay in the Architectural Environment

edited by Alice V. Turkington

Some structures are constantly under threat from natural and human-induced decay processes, yet stone buildings, structures, and works of art remain a permanent feature in our cultural heritage. This volume presents recent research by an international group of geologists and geomorphologists on stone decay in the architectural environment, and it updates the latest theoretical and methodological advances in this field. The volume will be informative to earth scientists concerned with rock weathering in natural and urban locales, and it will be of benefit to those conservators, practitioners, scientists, and students whose interest lies at the interface between research and its application.

SPE390, 61 p., ISBN 0-8137-2390-6, in press

**Net Dextral Slip, Neogene San Gregorio–Hosgri Fault Zone, Coastal
California: Geologic Evidence and Tectonic Implications**

*by William R. Dickinson, Mihai Ducea, Lewis I. Rosenberg,
H. Gary Greene, Stephan A. Graham, Joseph C. Clark, Gerald E. Weber,
Steven Kidder, W. Gary Ernst, and Earl E. Brabb*

The San Gregorio–Hosgri fault is the major subsidiary strand of the San Andreas fault system in coastal California, where its course is partly onshore and partly offshore. Understanding the path and amount of San Gregorio–Hosgri fault displacements is important for understanding the geologic history of California and seismic hazard along the California coast. This Special Paper summarizes evidence for 156 km of net San Gregorio–Hosgri fault slip based on an analysis of onshore and offshore geologic mapping supplemented by reappraisal of key geologic features offset by San Gregorio–Hosgri fault movements.

SPE391, 43 p., ISBN 0-8137-2391-4, in press

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The Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry is recruiting for the position of Senior Geologic Scientist, DCNR. This position is responsible for advanced geologic services for DCNR as they specifically relate to oil and gas exploration, drilling and production operations, reservoir management, and contract maintenance on state owned lands and waters. In addition, this position provides fiscal accountability from the oil, gas, and gas storage programs administered by the Department.

Requires two years as a Geologic Scientist, DCNR, OR three years of professional geologic work and a Bachelor's degree in Geology. Graduate study in the field of geology may be substituted for the required experience on a year-for-year basis OR possession of a license as a professional geologist issued by the Pennsylvania State Registration Board for Professional Engineers, Land Surveyors, and Geologists.

This is a civil service position. The required application material must be obtained by contacting Jason Rothmel, DCNR Human Resources, at 1-717-787-8737 or 1-800-654-5984 (TT#) through the PA AT&T Relay Service; or by sending an e-mail to dcnrjobs@state.pa.us. Completed Civil Service application and supplement must be postmarked by June 30, 2005. Resumes alone will not be accepted.

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UNIVERSITY OF NEVADA—LAS VEGAS POSITION ANNOUNCEMENT POSITION NUMBER 4638

The Department of Geoscience at the University of Nevada Las Vegas seeks a post-doctoral scholar for a 2-year appointment in southern Nevada commencing Summer-Fall 2005. The successful candidate will have the opportunity to develop the project, which will be coordinated with the USGS and Nevada Bureau of Mines and Geology. The project presents an excellent opportunity to investigate the relationship between epithermal mineralization and coeval intrusive activity in an exposed cross-section in the Colorado River Extensional Corridor.

Successful applicants will have a Ph.D. with an emphasis in economic geology, igneous petrology, or geochemistry. Candidates with demonstrated experience working with hydrothermal systems and intrusive and extrusive igneous rocks will be given preference. The successful candidate must have their Ph.D. prior to start date.

Salary will be commensurate with qualifications and experience. Position contingent upon funding.

Application materials should include a cover letter that describes the candidate's suitability for the position, detailed curriculum vitae, and complete contact information for three reference providers. Materials should be addressed to Dr. Jean Cline, and are to be submitted via online application at <https://hrsearch.unlv.edu>. Review of applications will commence on June 25, 2005. For assistance with UNLV's online applicant portal, contact Bob Sitts at 1-702-895-1655 or email hrsearch@cmail.unlv.edu.

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DIRECTOR/STATE GEOLOGIST KANSAS GEOLOGICAL SURVEY

The University of Kansas (KU) Office of the Vice Provost for Research in conjunction with the State of Kansas is searching for a Director/State Geologist to lead the Kansas Geological Survey (KGS), a non-regulatory, multidisciplinary research and service division of KU. The KGS is among the premier earth science research and service institutions in the U.S. with a reputation for research excellence, scientific leadership, and service to the state. Duties include fostering an environment for creative research and service at the Survey to meet the needs of Kansas and the geoscience professions; providing administrative and scientific leadership in the areas of energy, water, minerals, environmental impact, geologic hazards, data collection and analysis, basic and applied research in geology, geophysics, geohydrology, and geochemistry; providing access and dissemination of research results and natural resources data; establishing policies to oversee program development; maintaining knowledge of geoscience research needs of Kansas and significant developments in geoscience research and technology; sustaining involvement in

committees and advisory boards, especially for the state of Kansas, research, professional societies, state and national natural resource discussions; maintaining a positive working relationship with all divisions of the university, legislature, governmental agencies, industry and the public; recruiting, developing and retaining high quality staff as well as managing all business personnel, and financial affairs of the KGS.

Required qualifications include a doctorate in the geosciences or related field and a minimum of 10 years of professional experience in the geosciences; a minimum of 3 years of administrative experience including budgeting, personnel evaluation, and program development; national/international recognition in a chosen field of geoscience research; demonstrated ability to work with a wide constituency of personnel and deal effectively with public policy issues; experience in obtaining financial support through a competitive, merit-based process; and knowledge of natural resources and environmental aspects of their use. Reviews begin July 1, 2005. A full description and application is available at <https://jobs.ku.edu>. EO/AA.

POSTDOCTORAL RESEARCH ASSOCIATE LUNAR AND PLANETARY LABORATORY UNIVERSITY OF ARIZONA

Applications are invited for two postdoctoral positions associated with the High Resolution Imaging Science Experiment (HiRISE) located at the Lunar and Planetary Laboratory at the University of Arizona. Research emphasis will be on Mars and to serve as targeting specialists for the HiRISE project to be launched on the Mars Reconnaissance Orbiter in August of 2005. Work will begin in 2005 or early 2006 and support is expected to be available for at least three years with a starting salary range of \$36,000 to \$42,000 (which may be negotiable). The research area of special interest is Mars geology that is relevant to HiRISE, including field work on terrestrial analogs and quantitative studies using digital topography and other data. Researchers with primary experience and training in terrestrial geology are welcome. The University of Arizona is an AA/EEO employer—M/W/D/V.

For a complete job description, minimum qualifications, and to apply online, please see www.hr.arizona.edu/ and reference job #32449.

EDITOR JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION (JAWRA) REQUEST FOR PROPOSALS SUBMISSION DEADLINE: JULY 30, 2005

The American Water Resources Association (AWRA) is requesting proposals for a new Editor for its flagship publication—the Journal of the American Water Resources Association (JAWRA). JAWRA is a multidisciplinary journal focusing on applied aspects of water resources science and management. Common topics for JAWRA articles include surface water hydrology, watershed processes and management, water quality modeling and monitoring, fluvial processes, economics and policy, aquatic ecology, subsurface hydrology, atmospheric science and hydrometeorology, geospatial analysis, and riparian ecology and management. In 2004, JAWRA published 117 papers in six issues.

The term of the editor is three years beginning January 1, 2006. Transition responsibilities will begin October 1, 2005. Qualifications for the editor are: Substantial expertise in a water resources discipline. Interdisciplinary experience desirable; significant publication record in the water resources arena; and experience as a journal editor or associate editor preferred.

Interested applicants must submit a proposal (4 page maximum) by July 30, 2005. A complete request for proposals is located at www.awra.org. For additional information contact Dr. Jim Wigington at wigington.jim@epa.gov (phone: 1-541-754-4341).

3 SPECIALIST POSITIONS—STRATIGRAPHY CONOCOPHILLIPS HOUSTON

ConocoPhillips is seeking 3 geological specialists who will: support global exploration, business development, and production teams through application of stratigraphic principles in seismic and well log interpretation and in descriptive observations of outcrop, core, cuttings, or thin sections to address questions of reservoir architecture and continuity; guide industrial and academic research projects; and disseminate knowledge internally. Some domestic and foreign travel required.

Successful candidates need to quickly fit into multidisciplinary teams, manage multiple projects, and influence business decisions as collaborative team players. Strong capability in integration of diverse geoscience data (pore- to seismic-scale) into regional- to reservoir-

scale studies essential. Strong computing and workstation skills required.

1. Siliciclastics Stratigrapher/Sedimentologist Houston Texas

Focus: Fluvial, Lacustrine, Aeolian, Coastal, Shallow Marine Siliciclastics

0–15 years industry experience with M.S./Ph.D. degree in Clastic Sedimentology/Stratigraphy required.

Strong geoscience interpretation skills (core, well log, regional scale analysis, seismic interpretation).

2. Carbonate Stratigrapher/Sedimentologist Houston Texas

Focus: Carbonates and Diagenesis

0–15 years industry experience with M.S./Ph.D. in Carbonate Sedimentology/Stratigraphy required.

Demonstrated competence in understanding carbonate deposition and diagenesis in a sequence stratigraphic context.

3. Petrographer/Petrologist Houston Texas

Focus: Sedimentology, diagenesis and stratigraphy of carbonate and siliciclastic rocks.

0–15 years industry experience with M.S./Ph.D. in Sedimentology/Stratigraphy required.

Knowledge of thin-section petrography, UV and cathodoluminescent microscopy, XRD, SEM, electron probe microanalysis, fluid inclusion analysis, stable isotope analysis and trace element analysis.

Familiarity with core description and diagenetic software modeling packages a plus; willingness to learn these techniques required.

Attractive salary and full-scale benefits program. Agency need not apply. An equal opportunity employer. Submit resumes via: Open Positions on <http://www.conocophillips.com/careers>.

FACULTY POSITION IN ENERGY EXPLORATION WEST VIRGINIA UNIVERSITY

The Department of Geology and Geography at West Virginia University invites applications for the Marshall S. Miller Energy Professorship in Geology. Appointment will be at the rank of Associate or Full Professor based on qualifications and experience. A Ph.D. degree is required. The successful candidate will focus on energy exploration and development of fossil fuels (oil, gas, coal, coal-bed methane) in both research and teaching. We seek an individual with substantial energy industry experience. Responsibilities will include the recruitment of qualified graduate students, and outreach to energy producers in the Appalachian Basin and beyond in the form of research projects and student placement. The successful applicant will contribute to current Departmental strengths and teaching at both the undergraduate and graduate levels, and will develop a vigorous externally-funded research program. Department strengths include geophysics, structure/tectonics, remote sensing, GIS, sedimentation, stratigraphy, paleontology, petrology, hydrogeology, surficial processes, and environmental geology. The department is scheduled to move into a renovated building in 2007. Collaborations are encouraged with the National Energy Technology Lab (DOE-NETL), the National Research Center for Coal and Energy (NRCC), and the West Virginia Geological and Economic Survey, all in Morgantown.

Candidates should send: (1) letter of application detailing teaching area interests, industry and research experience, and research program; (2) curriculum vitae; and (3) names, phone numbers, e-mail, and mail addresses of three references to: Energy Professor Search Committee, Department of Geology and Geography, West Virginia University, Morgantown, WV 26506-6300. Questions may be directed to energy@geo.wvu.edu or 304-293-5603. Review of applications will begin August 15, 2005, and continue until the position is filled. The preferred start date is January 1, 2006. Please see www.geo.wvu.edu, and www.morgantown.com. West Virginia University is an Equal Opportunity/Affirmative Action employer. Women and minority candidates are encouraged to apply.

PRESIDENT'S PROFESSOR OF MINERAL AND ENERGY RESOURCES, ENGINEERING COLLEGE OF ENGINEERING & MINES UNIVERSITY OF ALASKA FAIRBANKS

The College of Engineering and Mines (CEM) at the University of Alaska Fairbanks (UAF), acting on an initiative from University of Alaska President Mark Hamilton, seeks applications for a Professor of Mineral and Energy Resources Engineering to lead the development of the Geological, Mining, and Petroleum Engineering Programs and related research activities within CEM. This position will assume the leading role in research and education within the general area of Mineral and

Energy Resources Engineering and its applications to the issues of resource identification, evaluation, and development in the arctic and sub-arctic environments of Alaska and elsewhere. The successful applicant will enjoy freedom to pursue his or her own research in addition to fulfillment of the leadership role. The title of President's Professor of Mineral and Energy Resources Engineering will be given to the appointee.

University of Alaska-Fairbanks: Established as the original site of the University of Alaska in 1917, the University of Alaska-Fairbanks (UAF) is a multicampus university based in Fairbanks, the state's second largest city, with seven extended campuses spanning two-thirds of the state. Fairbanks is a vibrant community offering a wide range of cultural as well as outdoor activities and amenities typically found only in much larger cities. The UAF campus is located on a scenic hill on the edge of Fairbanks that offers a majestic view of the Alaska Range and access to ski and hiking trails through miles of boreal forest. UAF is the doctoral degree-granting unit of the University of Alaska statewide higher education system and includes over 10,000 students with an annual operating budget of \$340 million including \$113 million in FY04 research expenditures.

Minimum qualifications for the position are an earned doctorate in engineering or a related field at the time of appointment (at least one academic degree in engineering), qualifications for the rank of Professor, advanced background and demonstrated leadership in mineral and energy resources engineering, teaching experience at the undergraduate and graduate levels, and knowledge of issues related to mineral and energy resources engineering in Alaska. A strong candidate will possess, in addition to the qualifications above, strong interpersonal and communication skills, experience working with private and public external constituencies, and the ability to advocate for the College and to acquire funding from external sources.

APPLICATION: A complete vacancy announcement can be downloaded from our Web site at <http://www.uaf.edu/uafhr/employment>. We do not accept application materials via email. Please follow specific instructions provided on each vacancy announcement.

The University of Alaska-Fairbanks is an equal employment opportunity/affirmative action employer and educational institution. Your application for employment with the University of Alaska is subject to public disclosure under the Alaska Public Records Act. Women and minorities are encouraged to apply.

The U.S. Nuclear Regulatory Commission (NRC), which is responsible for safeguarding the civilian use of nuclear power and materials, has the following opportunities in Rockville, Maryland.

Administrative Judges (Technical) Part-Time (\$62.29 per hour) - Annual Renewable Appointment

The NRC is seeking outstanding senior scientists and engineers to serve in part-time technical positions as Administrative Judges with the Atomic Safety and Licensing Board Panel (ASLBP). These assignments will be associated with the expected upcoming hearings for the Department of Energy's application to construct and operate a High Level Nuclear Waste Repository at Yucca Mountain, NV, as well as hearings on licenses related to other uses of nuclear materials.

Qualifications Required:

Minimally-qualified applicant must have at least 7-10 years of work experience in a field or fields directly related to the ASLBP's work; however, a preferred candidate would have a Ph.D. (or equivalent experience/education) with at least 7-10 years of recent specialized experience beyond the Ph.D. in one of the following fields: nuclear engineering; criticality; physics; geophysics; geohydrology; hydrology; hydrogeology; geochemistry; volcanology; radiochemistry; materials science; corrosion science; environmental engineering; environmental science; meteorology; climatology; health physics; chemical engineering. This experience should be both extensive and focused on the particular field for which the applicant believes he/she is qualified, and should be evidenced by publication, teaching, and/or research indicating that the applicant is a recognized expert in that field. A successful applicant should have excellent written and oral communication skills and have a demonstrated ability to make fair and impartial decisions in a timely manner based upon the materials presented to them by the parties involved. Because the Panel works as a team, applicants should be accustomed to, and skilled at, working in a collegial environment.

How to Apply:

Interested individuals should send a detailed resume describing their educational and professional background as it relates to the above qualification requirements and a short writing sample (no more than 20 pages in length) to: **Johanna Gallagher, Office of Human Resources, Mail Stop O-3 E17A, Washington, DC 20555-0001 or E-mail jpg2@nrc.gov**. Please reference **Department A-2632** when responding. Interested individuals are strongly encouraged to submit their application material as soon as possible. For a detailed description, please visit our web site at: www.nrc.gov/who-we-are/employment.html.



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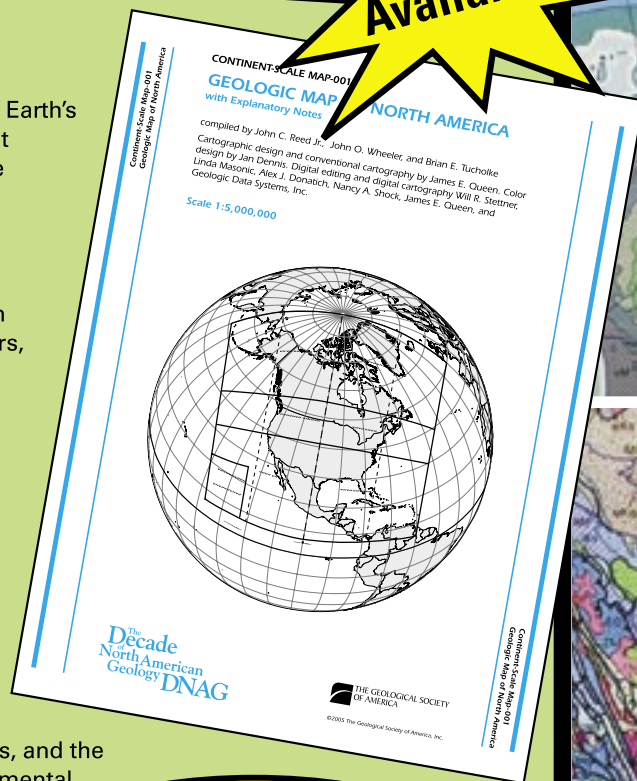
Geologic Map of North America

Compiled by John C. Reed Jr., John O. Wheeler, and Brian E. Tucholke

The new *Geologic Map of North America* covers ~15% of Earth's surface and differs from previous maps in several important respects: It is the *first* such map to depict the geology of the seafloor, the first compiled since the general acceptance of plate-tectonic theory, and the first since radiometric dates for plutonic and volcanic rocks became widely available. It also reflects enormous advances in conventional geologic mapping, advances that have led to a significant increase in the complexity of the map. The new map, printed in 11 colors, distinguishes more than 900 rock units, 110 of which are offshore. It depicts more than seven times the number of on-land units as are shown on its immediate predecessor, as well as many more faults and additional features such as volcanoes, calderas, impact structures, small bodies of unusual igneous rocks, and diapirs.

When displayed at earth science institutions and libraries, this map is sure to impress viewers with the grand design of the continent and may inspire some to pursue the science of geology. The new *Geologic Map of North America* is also a "thinking map," a source for new interpretations of the geology of North America, insights into the evolution of the continent, new exploration strategies for the discovery of mineral and energy resources, and the development of better ways to assess and mitigate environmental risks and geologic hazards.

3 sheets (74" x 39"), scale 1:5,000,000, 28 p. text



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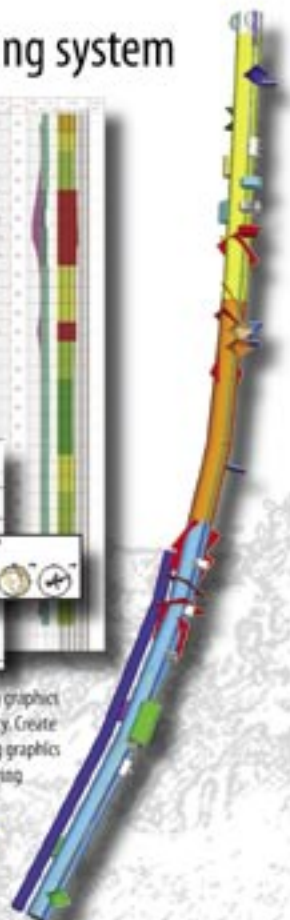
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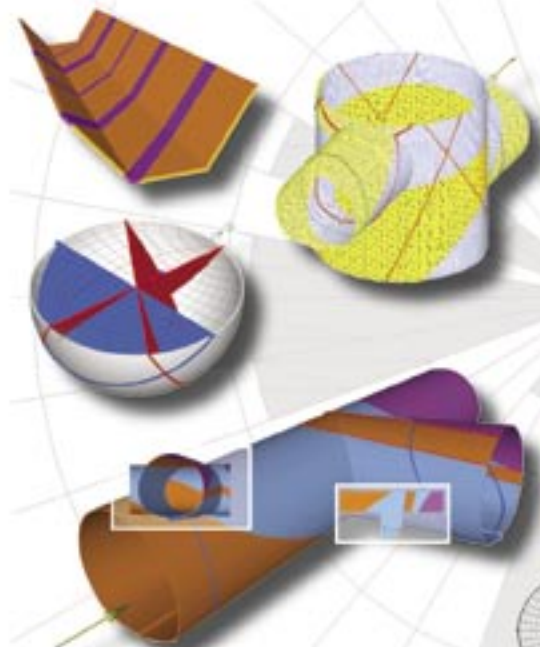
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