



Colorado Scientific Society

*In pursuit of the promotion of knowledge,
understanding of science,
and its application to human needs.*

1999 S.F. Emmons Lecture

“A Threat from the Bipolar Seesaw”

Wallace Broecker

**Newberry Professor
Lamont-Doherty Earth Observatory
Columbia University**

Tuesday, January 12, 1999

**Green Center
Colorado School of Mines
Golden, Colorado**

8:00 p.m.

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"A THREAT FROM THE BIPOLAR SEESAW"

Wallace Broecker

Summary: During the last glacial period, Earth's climate underwent frequent large and abrupt global changes. This behavior appears to reflect the ability of the ocean's thermohaline circulation to assume more than one mode of operation. The record in ancient sedimentary rocks suggests that similar abrupt changes plagued the Earth at other times. The trigger mechanism for these reorganizations may have been the antiphasing of polar insolation associated with orbital cycles. Were the ongoing increase in atmospheric CO₂ levels to trigger another such reorganization, it would be bad news for a world striving to feed 10 billion people. Major climate changes can occur abruptly in a few years. The oceans likely hold the secrets to these abrupt changes. For the stability of the earth's climate system, the oceans play a critical role, as illustrated by the recent El Nino events.

Wallace S. Broecker, Newberry Professor of Geology at Columbia's Lamont-Doherty Earth Observatory in Palisades, N.Y., received the National Medal of Science in a ceremony at the White House July 26th. Broecker, one of eight scientists selected for the medal, was cited for "his pioneering contributions in understanding chemical changes in the ocean and atmosphere," as well as for his research on global climate change. He is the 13th Columbia scientist to receive the medal, the nation's highest scientific award, since it was first presented in 1962.

In early June, Broecker was named to receive the 1996 Blue Planet Prize for achievements in global environmental research. This international award is presented annually to two individuals, groups or organizations "whose achievements have contributed to the resolution of global environmental problems."

The Columbia geochemist recognized a decade ago the presence of a "great conveyor belt" of ocean currents that girdles the globe and plays a critical role in earth's climate. His research has shown that the earth's climate has shifted abruptly many times in the past, and he has been a leading voice warning of the potential danger of increased greenhouse gases in earth's atmosphere. In recent years, he has spearheaded efforts to use Biosphere 2, now managed by Columbia, as a laboratory to test the potential effects of greenhouse gases on ecosystems.

He has pioneered a number of new approaches to studying the earth's climate, including the use of carbon and other isotopes to date marine sediments. Broecker has examined ocean circulation patterns over time, studied gas exchanges between the ocean and the atmosphere, and traced carbon as it cycles through the earth's chemical, physical and biological systems.

Dr. Broecker was elected to the National Academy of Sciences in 1979. He earned his B.A. and Ph.D. at Columbia in the 1950's and has held professorships at the University throughout his career.



1999 Field Trips

We are in the process of planning the field trips for 1999 and would like some input from Society members. We would like to hear from you if you have a suggestion for a **good** field trip that would appeal to our members, **which have diverse backgrounds in geoscience**. It could be a trip you went on sometime back and would like to see repeated or it could be an entirely new trip. Our field trips commonly are from 1 to 2 days **long, but** we could entertain the idea of a longer “geo-vacation” **during our traditional summer break**. Please give us your **input**; we want to make these trips as entertaining and appealing (as well as educational) as possible.

Sherman Marsh, Field Trip Chairman

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1998 Student Night

At Student Night, which took place during the November meeting of the Colorado Scientific Society, **the first place finalist was David Winterbourne of Colorado School of Mines for his talk on “Geology, Alteration, and Mineralization of the Cerro San Pedro Gold-Silver Deposit, San Luis Potosi, Mexico”**. **David received \$125 and a one-year complimentary membership to the Society as his first place award**. The Runners-up were *Nick K. Starkey*, Colorado State University, who spoke about “Secondary Hematite: Evidence for Molybdenum Transport under Oxidizing Conditions, Bergslagen District, Sweden; and *S. Chereé Stover*, University of Colorado, who presented “Integrated Approach to Three-phase Fluid Flow Modeling: Application to Northern Walker Ridge/Southern Green Canyon, Northern Gulf of Mexico Basin.” **Nick and Chereé each received \$75 and one-year complimentary membership to the Society as their runners-up awards**. The audience was fortunate to hear these excellent presentations.



Museums and News

Friends of Dinosaur Ridge For information call 697-DINO. Visitors' Center is located at 16831 West Alameda Parkway (north side of Alameda, just west of the C-470 overpass). Open 9 a.m. to 4 p.m. weekdays and weekends. Fireside chats are held at the Morrison Town Hall, 110 Stone Street in Morrison starting at 7 p.m.

Earth Science Meetings and Talks

Colorado Scientific Society's regular meetings are held the 2nd Tuesday of the month (unless otherwise advertised). Social time begins at 7:00 p.m. and presentations start at 7:30 p.m. For information, contact Ken Pierce at (303) 236-1244 or kpierce@usgs.gov.

Denver International Petroleum Society (DIPS) meets the 2nd Friday of each month at the Wynkoop Brewing Co., 18th and Wynkoop Streets. Reception begins at 11:30 a.m., luncheon at 12 p.m., program at 12:30 p.m. Make reservations (required) by calling or leaving message with Dan Spencers (303) 446-5701. Reservations accepted after 8 a.m. on Friday until 10:30 a.m. on Wednesday prior to the meeting. Cancellations accepted until 11:00 am Wednesday prior to the meeting. Cost: \$15 for lunches; talk only is available for \$2 (make checks payable to "D.I.P.S."). Contact Keith Murray at (303) 986-8554 for information.

Denver Region Exploration Geologists' Society (DREGS) meets in the Mutual Consolidated Water Building, 12700 West 27th Avenue, Lakewood. Social hour 6:00-7:00 p.m. Technical presentation at 7:00 p.m. The next meeting is Monday, January 11 (Meetings are normally scheduled for the first Monday of each month, so future meetings are on Feb. 1, and March 1). For information contact Don Bryant, (303) 733-2358.

Colorado School of Mines Lectures For Heiland Lectures at 4:00 p.m. on Fridays, contact Michelle Szobody (303) 273-3451. For information on Van Tuyl Lectures, call the Dept. of Geology at (303) 273-3800.

Colorado State University Geology Lectures Mondays, 4:10 p.m. in room 109 or 316 of the Natural Resources Building. Call the Dept. of Earth Resources at (970) 491-5661 for further details.

University of Colorado at Boulder, Geological Sciences Colloquium
Wednesdays, 4:00-5:30 p.m., Rm. 180. For schedule, contact Kathy Madsen 303-492-8141



Invitation to Join the Colorado Scientific Society

The Society is dedicated to the advancement of science through open forums and activities. We sponsor lectures, field trips, student scholarship grants, and discussions of scientific matters of public concern. Please help us enlist new members.

I hereby apply for _____ membership in the Colorado Scientific Society.
 (Regular, Corresponding, Student)

 (Last Name) (First Name) (Middle)

 (Address) (Telephone, with area code) (e-mail)

 (City) (State) (Zip)

 (Company/Agency/University)

 (Mailing address if different than above)

 School Degree Year Major

Main Scientific Interests

DUES—Your dues are for the calendar year and help support the newsletter, monthly meetings, two field trips each year, family night, and the Emmons Lecture.

Regular Member (\$15) _____
 Corresponding (outside Denver metro area) Member (\$10) _____
 Student Member (\$5) _____

Please make your dues payable to Colorado Scientific Society. Thank you!!

The success of certain Colorado Scientific activities depend on your volunteer help. Please circle those activities for which you can provide assistance. We will pass your name on to the appropriate Committee Chairperson.

- | | | | |
|-------------------------|---------------------|-------------------|----------------------|
| <i>Arrangements</i> | <i>Fund Raising</i> | <i>Newsletter</i> | <i>Publicity</i> |
| <i>Best Paper Award</i> | <i>History</i> | <i>Outreach</i> | <i>Science Fairs</i> |
| <i>Field Trips</i> | <i>Membership</i> | <i>Program</i> | <i>Web Site</i> |

I certify that all statements in this application are correct and, I agree to promote the objectives of the Society and to abide by its Constitution, Bylaws, and Rules.

Applicant's signature

Date

Colorado Scientific Society, P.O. Box 150495, Lakewood, CO 80215-0495

Visit CSS at <http://rainbow.rmi.net/~css/>



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