Limnogeology Division Newsletter
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Limnogeology Division
THE GEOLOGICAL SOCIETY OF AMERICA

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Welcome: Welcome to the second issue of the second volume of the Limnogeology Division of the Geological Society of America (GSA).

With this issue, we have our largest newsletter to date!

It is the best of times and the worst of times for limnogeology as we celebrate the awarding of the Herzberg Gold Medal (Canada's top science prize) to Dr John Smol

from Queen's University and we mourn the loss of Geoff Seltzer who recently died of cancer. We also have a feature article on the initial results of the Lake Bosumtwi drilling project by John Peck and others that provides some spectacular visuals of fossil fish and varved sediments. The winners of the first **Kerry Kelts Award** for student research, presented at GSA in November 2004 are also highlighted in this issue with a brief description of their projects. Congratulations to the new Division management board (see above). The new committee (of which your humble newsletter editor is also a member) will endeavor to improve the division as a scientific outlet for limnogeologists and they hope that they will provide some insight and leadership for our division. In this vein, we have comments from our new Chair on his thoughts for his two year term. We also have the usual meeting and book information that is also available on our GSA website (http://rock.geosociety.org/limno/index.html). I hope you enjoy this issue. Any comments or questions would be most welcome.

Michael Rosen, *Carson City*

Message from the Chair - Tom Johnson, Chair (2004-2006)

[Editor's note, Tom is away actually doing limnogeology while this newsletter needs to go press, so I have added information about proposed sessions for the 2005 GSA in Salt Lake City that are being sponsored by the Limnogeology Division.]

2005 GSA Proposed Sessions sponsored by the Limnogeology Division

Holocene Climate Change in Western North America: Spatial-Temporal Phasing of Climate Modes, Events, and Transitions – Contacts: Matthew E. Kirby, mkirby@fullerton.edu, Steve P. Lund, slund@earth.usc.edu, Larry V. Benson, lbenson@usgs.gov, and Rob Negrini, rnegrini@csub.edu

Paleoenvironmental Records in and Around the Bonneville Basin: From Glacial/Interglacial Cycles to Anthropogenic Impacts – Contacts: Joseph G. Rosenbaum, jrosenbaum@usgs.gov and Katrina A. Moser, katrina.moser@geog.utah.edu

Advances and Applications with the Fossil Record of Non-Marine Arthropods (Paleogeoarthropods: Insecta, Chelicerata, Myriapoda, some Crustacea), for Geoscientists and Biologists: Contacts: Cary R. Easterday, ceaste2@uic.edu and Sara H. Lubkin, shl24@cornell.edu

Causes and Effects of the Paleocene-Eocene Thermal Maximum and Other Paleogene Hyperthermal Events. Contact: Scott L. Wing, wings@si.edu

Glacial Geology and Lake Sedimentology: In Memory of Geoffrey O. Seltzer. Donald T. Rodbell, rodbelld@union.edu and Jacqueline A. Smith, jasmit10@syr.edu

Chemistry, Ecology and Groundwater Hydrology of Lakes, Streams, Playas and Springs: Observations at the Interface. Contacts: Alison J. Smith, alisonjs@kent.edu, Emi Ito, eito@umn.edu, and Donald Rosenberry, rosenber@usgs.gov

Please submit abstracts to these sessions so that we will have a good representation of limnogeology at the meeting.

Feature Article

THE LAKE BOSUMTWI DRILLING PROJECT: INITIAL REPORT

John Peck[1], Christian Koeberl[2], John King[3], Bernd Milkereit[4], Jonathan Overpeck[5], and Christopher Scholz[6].

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[2]Dept. Geological Sciences, Univ. Vienna, Althanstrasse 14, Vienna, A-1090, Austria;
[3]Grad. School Oceanography, Univ. Rhode Island, Narragansett, RI 02882, USA;
[4]Dept. Physics, Univ. Toronto, Toronto, ON M5S 1A7, Canada;
[5]ISPE, Univ. of Arizona, 715 N Park Ave Fl 2, Tucson, AZ 85719-5037, USA;
[6]Dept. Earth. Sci., Syracuse Univ., Syracuse, NY 13244-1070, USA.

INTRODUCTION

Lake Bosumtwi occupies a 1.07 Ma impact crater located in Ghana, West Africa centered at 06°32'N and 01°25'W. Because of its great age and location with respect to the North African monsoon, Lake Bosumtwi is ideally situated to provide a long record of tropical climate change. As the largest young impact structure on Earth and one of only four craters with tektites, the Bosumtwi crater can provide important new insight on impact events. To take full advantage of the geologic information contained in the Bosumtwi crater, a combined sediment and rock drilling program was undertaken in summer 2004. With funding from the International Continental Drilling Program (ICDP), the U.S. NSF-Earth System History Program (ATM-0402010), Austrian National Science Foundation (project P17194-N10), the Austrian Academy of Sciences, and the Canadian National Science Foundation, DOSECC was contracted to recover both sediment and rock cores utilizing the GLAD800 lake drilling system (Figure 1). The success of the drilling effort was the result of the hard work of a dedicated group of DOSECC drillers, the Kilindi captain and a group of international scientists (Table 1).

Figure 1. *The GLAD800 deployed on the R/V Kerry Kelts in Lake Bosumtwi, summer 2004.*

PALEOCLIMATE RESEARCH through SEDIMENT DRILLING

Owing to its impact crater origin, Lake Bosumtwi possesses several important characteristics that make it well suited to provide a record of tropical climate change. First, because of the great age of the crater (1.07 Ma) and location in West Africa, the lake sediments

can provide a long record of change in North African monsoon strength. Lake Bosumtwi lies in the path of the seasonal migration of the Intertropical Convergence Zone (ITCZ), the atmospheric boundary between NE continental trade winds and onshore SE trade winds (Figure 2). During summer months, the ITCZ migrates to the north of Lake Bosumtwi and moisture-laden winds bring heavy, monsoonal precipitation to western Africa. The reverse occurs during winter months, as the ITCZ is displaced southward of Lake Bosumtwi and dry, aerosol-rich NE continental trade winds (Harmattan) dominate over southern Ghana. Second, the high crater rim surrounding the lake results in a hydrologically-closed lake with a water budget extremely sensitive to the precipitation/evapotranspiration balance. Third, the steep crater wall and deep lake basin limit wind wave mixing of the water column. As a result, the deep water is anoxic, thereby limiting bioturbation and allowing for the preservation of laminated sediment varves and the potential for high resolution (annual) paleoclimate reconstruction.

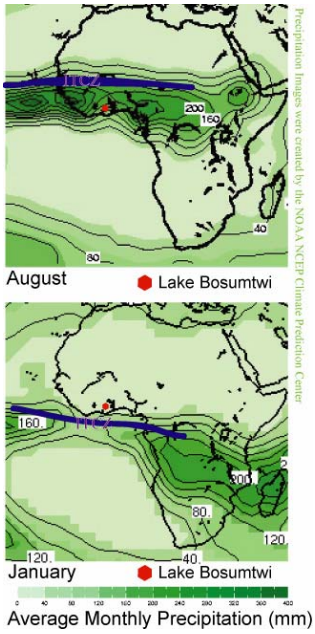


Figure 2. *Map showing the location of Lake Bosumtwi, Ghana, the August and January monthly rainfall over Africa and the seasonal march of the ITCZ (heavy line). Figure from NOAA-NCEP Climate Prediction Center.*

In July and August 2004, a sediment drilling program was undertaken in order to gain greater insight into the role of the tropics in triggering, intensifying and propagating climate changes, as well as in responding to global and high-latitude changes. Five drill sites were occupied along a water-depth transect in order to facilitate the reconstruction of the lake level history. At these five drill sites, a total of 14 separate holes were drilled. Total sediment recovery was 1,833 m. For the first time the GLAD lake drilling system cored an entire lacustrine sediment fill from lake floor to bedrock. Although detailed sedimentologic study is just beginning, examination of the core catchers and core section breaks during drilling provided glimpses of the paleolimnologic record recovered in the cores (Figures 3 and 4). The complete 1 Ma lacustrine sediment fill was recovered from the crater ending in impact-glass bearing, accretionary lapilli fallout representing the initial days of sedimentation. The lowermost lacustrine sediment is a bioturbated, light-gray mud with abundant gastropod shells suggesting that a shallow-water oxic lake environment was established in the crater. Future study of the earliest lacustrine sediment will address important questions related to the formation of the lake and the establishment of biologic communities following the impact. Much of the overlying 294 m of mud is laminated (Figure 5) thus these sediment cores will provide a unique 1 million year

record of tropical climate change in continental Africa at extremely high resolution. The shallow water drill sites consist of alternating laminated lacustrine mud (deepwater environment), moderately-sorted sand (nearshore beach environment) and sandy gravel (fluvial or lake marginal environments). These sediments preserve a record of major lake level variability that will extend the present Bosumtwi lake level histories obtained from highstand terraces and short piston cores further back in time.

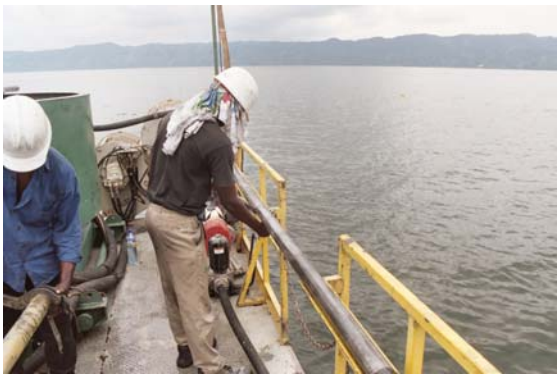
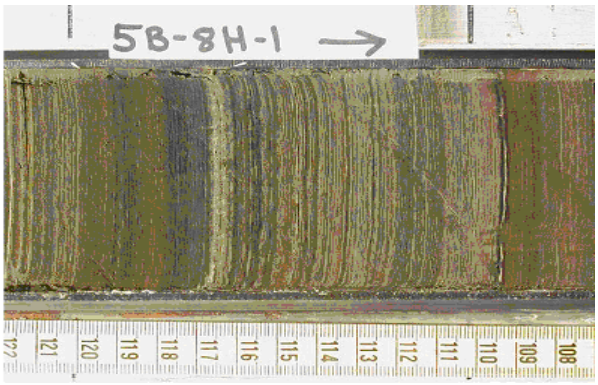


Figure 3. *Processing sediment cores.*

Figure 4. *Fish fossil at section break located at 240 m blf.*

Figure 5. *Laminated (and most likely varved) lake sediments from Bosumtwi core.*



IMPACT RESEARCH through ROCK DRILLING and GEOPHYSICS

Bosumtwi is one of 170 meteorite impact craters known on Earth and one of only four known impact craters associated with a tektite strewn field. It is a well-preserved complex impact structure that displays a pronounced rim and is excavated in 2 Ga metamorphosed and crystalline rocks of the Birimian System. Prior petrographic studies have been limited to rocks found along the crater rim and of ejecta (suevitic breccias). The goal of the integrated rock drilling and geophysical study is to study the three-dimensional building blocks of the impact crater (delineate key lithological units, image fault patterns, and define alteration zones). Results from the Lake Bosumtwi scientific drilling project are important for comparative studies and re-evaluation of existing geophysical data from large terrestrial impact sites (for example, Sudbury, Vredeford, Chicxulub and Ries).

The hard rock drilling phase, as well as borehole logging and zero-offset and multi-offset VSP geophysical studies, were undertaken in September, 2004. Two boreholes, to depths of 540 and

450 m, respectively, were drilled in the deep crater moat, and on the outer flank of the central uplift as identified in seismic profiles. At both sites casing was set through the lake sediment part of the section, and drilling, using diamond coring tools, started at the sediment/impactite (fallback suevite) interface. Drilling progressed through the melt rock / impact breccia layer into fractured bedrock, filling 122 core boxes (Figures 6 and 7). Slim-hole borehole geophysical studies help to locate discontinuous melt units in the proximity of the scientific drill holes and provide information that will lead to an improved three-dimensional model for the Bosumtwi crater and its thermal history. The offset VSP experiments are well suited for the integration of core/laboratory data, logs, and conversion of existing reflection seismic images from time to depth thereby leading to enhanced 3D modeling of the crater.

Figure 6. *Impactite breccia.*

Figure 7. *Close-up of breccia, showing impact glass inclusions.*

Table 1. Individuals who participated in the Lake Bosumtwi Drilling program.

Science Co-Managers and Co-PIs

Christian Koeberl (Impactite)	Univ. of Vienna, Austria
John Peck (Sediment)	Univ. of Akron, USA

Co-PIs

Bob Hecky	University of Waterloo
John King	University of R.I.
Bernd Milkereit	University of Toronto
Jonathan Overpeck	University of Arizona
Chris Scholz	Syracuse University

Drilling Operations

Dave Altman, Head Driller	DOSECC
Donald Bagley	DOSECC
Sylvester Blay	DOSECC
Sylvester Danuor	University of Kumasi
Chris Delahunty	DOSECC
Mario Dobertin, Driller	DOSECC
Bruce Howell	DOSECC
Kwako Atta-Ntim	Ghana Geological Survey
Kevin Loveland, Driller	DOSECC
Ailwasi Opoku	DOSECC
Dennis Nielson	DOSECC
Marshall Purdey	DOSECC
Chris Walters	DOSECC
Egon Zech, Driller	DOSECC

Sediment Scientists

Kwame Ahumah	Ghana Geological Survey
Mohammed Baba	Ghana Geological Survey
Eric Boahen	Ghana Geological Survey
Adam Carey	Syracuse University
Bernard Dzirasah	University of Kumasi
Phil Fox	University of Akron
Chip Heil	University of R.I.
Anna Henderson	University of R.I.
Brad Hubeny	University of R.I.
James Kamuah	University of Kumasi
Doug Schnurrenberger	LacCore, Univ. of MN
Tim Shanahan	University of Arizona
Daniel Somuah	Ghana Geological Survey
Mike Talbot	University of Bergen

Impactite Scientists

Eric Boahen	Ghana Geological Survey
Daniel Boamah	Ghana Geological Survey
Paul Buchanan	Rhodes Univ., S. Africa
Christian Carnein	ICDP OSG Potsdam
Philippe Claeys	Free University Brussels
Alex Deutsch	University of Muenster
Ralf Gelfort	ICDP OSG Potsdam
Elizabeth L'Heureux	University of Toronto
Dona Jalufka	University of Vienna

Forson Karikari

Ghana Geological Survey

Kilindi Support Boat

Tobias Karp

University of Syracuse

Jack Greenberg	Syracuse University
Jannadi Lapukenu	Syracuse University

Jochem Kueck	ICDP OSG Potsdam
Horton Newsom	University of New Mexico
Wolf Uwe Reimold	Univ of the Witwatersrand

Local Laborers

Doug Schmitt

University of Alberta

Africa	Abono
Anthony	Abono
David	Abono
George	Abono
Kofi	Abono
Kwame	Abono
Kwame	Abono
Sammy	Abono

Refilwe Shelembe	Univ of the Witwatersrand
Len Tober	University of Alberta
Martin Toepfer	ICDP OSG Potsdam
Hernan Ugalde	University of Toronto
Marek Welz	University of Alberta

Awards to Limnogeologists

Modified from the NSERC web page (all due credit to NSERC for this material)

Queen's University Biologist Wins Top Canadian Science Prize

The Natural Sciences and Engineering Research Council (NSERC) of Canada awards limnogeologist/ecologist Dr. John Smol $1 million in research funding

Herzberg Gold Medal awarded to Dr Smol in Ottawa

Ottawa, Ontario, December 6, 2004 – One of the world's foremost ecologists is the winner of this year's Gerhard Herzberg Canada Gold Medal for Science and Engineering.

John P. Smol, a Canada Research Chair at Queen's University and pioneer in the reconstruction of past environments, will receive the medal honoring the late Canadian Nobel laureate Gerhard Herzberg in a ceremony tonight at the National Gallery of Canada.

The award comes with a guarantee of $1 million in research funding over the next five years from NSERC.

"The global science community knows Dr. Smol through his groundbreaking papers in top international science journals, and for creating powerful new knowledge and tools for environmental research," said the Honourable David L. Emerson, Minister of Industry. "But many Canadians also know him from his tireless efforts to inform the public about the impact of his lake studies. At home and abroad, he is an ambassador for the very best of what Canadian research offers to the world, and his work underscores the vital importance of fundamental research."

Dr. Smol's studies of ancient lakes have generated new knowledge about past and present environments, and about what climate change may mean for our future.

"Each year our jury is charged with selecting a winner who best exemplifies Herzberg's two great qualities as a researcher and leader: his *excellence* and *influence*. By both measures, John Smol is an outstanding choice. In transforming his field into an interdisciplinary powerhouse with huge potential, Dr. Smol has energized a whole new generation of environmental scientists," added NSERC President Tom Brzustowski.

The Medal selection process involved both international peer review of the nominees and adjudication by a distinguished NSERC jury. This year's panel was chaired by Dr. Max Blouw, a member of NSERC's Council and Vice-President (Research) at the University of Northern British Columbia.

NSERC is a key federal agency investing in people, discovery and innovation. It supports both basic university research through research grants, and project research through partnerships among postsecondary institutions, government and the private sector, as well as the advanced training of highly qualified people.

Dr. John P. Smol
Canada Research Chair in Environmental Change
Queen's University

Summer on a lake; it sounds like the classic Canadian holiday experience. But Dr. John Smol does it a little differently than most. Every summer for the past 22 years Dr. Smol has headed for a lake in the Arctic, chipped through any remaining ice and collected a beautiful core of sediment from the bottom. His groundbreaking scientific detective work in Canada's frigid arctic lake waters is showing that microscopic creatures in ancient mud can tell a powerful contemporary tale.

"The Arctic regions are considered to be the Earth's equivalent of the miner's canary – they're expected to be the first to show signs of environmental change and to the greatest degree," says Dr. Smol, winner of the prestigious 2004 Gerhard Herzberg Canada Gold Medal for Science and Engineering. "And what we're showing is that since the 1800s there have been dramatic changes in the Arctic, and we think they're related to climate change."

During the past 20 years, Dr. Smol has been a leader in the international rise of paleolimnology from a backwater discipline to a dynamic, scientific mini-powerhouse. Paleolimnology is the reconstruction of lake histories based on sediment cores taken from their bottoms.

Along with groundbreaking research that includes pioneering the study of arctic lakes, Dr. Smol has been instrumental in creating a rigorous educational, institutional and policy framework for the science. He's the founder and co-director of Queen's University's Paleoecological Environmental Assessment and Research Lab (PEARL), considered to be one of the world's premier paleolimnology training grounds. Dr. Smol has written or co-authored a literal library of articles and books on the subject, and along with colleagues has developed numerous now-standard paleolimnology

techniques.

Lake sediments are an "ecosystem's memory," says Dr. Smol. The sediment is full of telltale dead organisms, especially two groups of single-celled algae called diatoms and chrysophytes, which form a layered archive of a lake's past. The top 15 centimetres of a lakebed in Ontario's Algonquin Park, for example, catalogue about 200 years of lake life. Core down five metres and you gain a detailed record of the past 12,000 years.

Dr. Smol and his numerous graduate and postdoctoral students and colleagues have shown that these microscopic algae in lake sediments can be used as sensitive historical bioindicators to study almost any environmental issue.

They've used paleolimnology to explore issues ranging from population changes in Pacific sockeye salmon during the past 2000 years, to the frequency of drought in central and western Canada, to the history of water quality in Ontario's cottage-country lakes. This information is critical to decision makers such as fisheries managers and land-use planners, and increasingly to other scientists as well.

"Most environmental assessments today are based on three years or less of information. That's not an appropriate time scale for issues such as acid rain or global warming," says Dr. Smol.

In the 1980s, Dr. Smol's research in Adirondack and Sudbury-area lakes used the 200-year record of diatoms and chrysophytes to reconstruct the changes in lake ecology due to increasing levels of acidity, thereby sealing the case that sulphur-spewing industrial smoke stacks were indeed the lake killers.

"Acid rain pushed paleolimnology into the headlines. I think paleolimnology is an excellent example of how artificial or temporary the boundary is between basic or 'curiosity-based research' and applied research," says Dr. Smol.

"When I was hired at Queen's in the mid-1980s, a major criticism of paleolimnology was that it was totally esoteric. Then, all of a sudden, people realized they needed historical perspectives to answer questions such as 'Have lakes changed as a result of human activities?' Suddenly, in the blink of an eye, my research program switched from being classified as totally esoteric to being a rigorous science with day-to-day application by watershed managers, and seen as key to research on issues such as climate change."

Accomplishments

Founded by Dr. Smol in 1991, Queen's University's Paleoecological Environmental Assessment and Research Lab (PEARL) is one of the world's premier paleolimnology training grounds. As co-director, Dr. Smol leads a group of about 30 graduate and postgraduate students and visiting researchers drawn to the lab from around the world. They are presently studying aquatic issues that include the impact of sewage and fertilizer run-off on lakes and rivers, ecological changes related to acidification and

recovery, factors affecting fishing stocks, environmental shifts in arctic regions, and the study of the patterns and effects of climate change.

Dr. Smol is an ardent popularizer, able to equally engage high school students and senior policy makers with his contagious enthusiasm for the environmental insights paleolimnology provides. In 2002-2003, he gave the inaugural Miroslaw Romanowski Environmental Science Lecture Tour, a cross-country series of public lectures sponsored by the Royal Society of Canada. Dr. Smol also works closely with federal and provincial policy makers, advising and lobbying on issues ranging from climate change legislation to the importance of arctic research.

With his down-to-earth personal style and talent for communicating clearly, Dr. Smol is one of Queen's University's most respected teachers. In 2001 he won Queen's top undergraduate teaching prize – the W.J. Barnes Teaching Excellence Award. For the past two years he's been listed in *Maclean's* Magazine's Guide to Canadian Universities as one of Queen's "popular professors." He has mentored more than 60 graduate students and postdoctoral fellows, many of whom are now professors at Canada's leading research universities.

Dr. Smol's yen for communicating his science extends to his prolific authoring and editing of books and articles that have helped lay the global foundation for the study and application of paleolimnology. In 1987, he was the founding editor of the international *Journal of Paleolimnology*. After more than 100 issues, and growing success, he remains as co-editor-in-chief. He is also editor-in-chief of the journal *Environmental Reviews*. His 13 books (with two more in press) include detailed taxonomic volumes, a textbook entitled *Pollution of Lakes and Rivers: A Paleoenvironmental Perspective*, a series of handbooks on methodology, and his upcoming co-edited book *Long-term Environmental Change in Arctic and Antarctic Lakes*.

Background

Dr. Smol was born in Montreal on October 10, 1955. He initially studied aquatic ecology, receiving a Bachelor of Science degree in marine biology from McGill University in 1977. Thinking that the present was too close a focus for understanding patterns of ecosystem change, Smol turned his attention to the past, receiving a Master of Science degree, with a focus on paleolimnology, from Brock University in 1979. In 1982, he received his Ph.D. from Queen's University for a thesis entitled: *Postglacial Changes in Fossil Algal Assemblages from Three Canadian Lakes*. Since 1990, he has been awarded more than 20 research and teaching awards and fellowships. In 1996, he was elected a Fellow (the youngest at the time) of the Royal Society of Canada (RSC), Academy of Science. In 2003, he received an honorary LL.D. degree from St. Francis Xavier University.

Learn more about the Paleoecology Environmental Assessment and Research Lab (PEARL) at http://biology.queensu.ca/~pearl/.

WINNERS OF THE KERRY KELTS RESEARCH AWARDS

The Kerry Kelts Research Awards are given each year to students for excellence in research for creative cutting-edge projects in three lake science categories: limnology, paleolimnology, and limnogeology.

This year these prestigious awards are accompanied by a $250 stipend. These awards are named in honor of Dr. Kerry Kelts, a visionary limnogeologist and inspiring teacher who believed that his students were his colleagues.

Susan Zimmerman, Columbia University

Correlating proxies for Late Pleistocene glacial activity and lake chemistry in the Mono basin to global climate events

To compare climate change events and their feedbacks in marine and ice core archives to terrestrial records, high resolution and well-dated lake archives are needed. This study on the Wilson Creek Formation in the Mono Lake basin in California will attempt to use proxies such as rock flour input measuring glacial activity and Li concentrations dependent on contributions of authigenic Mg-silicates and lake salinity to more precisely correlate this ancient lake record with that in nearby Owens Lake and with global climate change events.

Broxton Bird, California State University at Fullerton

Assessing the paleoclimate record of Dry Lake, southern California, using three-dimensional ground-penetrating radar image profiling

There are currently few records of Holocene climate variability for the US coastal southwest depicting the regional terrestrial response to climate change. Some natural lakes in southern California may contain the necessary high-resolution terrestrial records required to recognize abrupt climatic changes. This study involves a complete three-dimensional survey of the sediments of Dry Lake to assess facies distribution, thickness, and geometry in addition to the analysis of cores at one-cm intervals for magnetic susceptibility, organic matter, carbonate, microfossils, and grain size.

Brandy Anglen, Indiana University

Sulfur isotopic analyses of sulfate and sulfide in a perennially ice-covered lake, Taylor Valley, Antarctica

The specific objective of this study is to evaluate the isotopic effect of sulfate-reducing bacteria at low temperature in the relatively pristine system of Lake Fryxell, a perennially ice-covered lake located in Taylor Valley of the McMurdo Dry Valleys in Antarctica. This will involve an assessment of the sulfur cycle through a systematic isotopic study of dissolved sulfate in the water column and mineral sulfides in lake-bottom sediments.

Memorial

In lieu of flowers contributions can be made to: Geoffrey Seltzer Fund, YMCA Camp Widjiwagan, 2125 East Hennepin Avenue, Suite 150, Minneapolis MN 55413

Geoffrey Owen Seltzer 1959-2005

By
Donald Rodbell, Union College, Schenectady NY USA, Bryan Mark, Ohio State University, Columbus, OH USA, Julie Brigham-Grette, University of Massachusetts, USA, Jacqueline Smith, Syracuse University, Syracuse, NY USA, Donald Siegel, Syracuse University, Syracuse, NY USA

The Quaternary science/paleolimnology community lost one of its leaders, and most influential and enthusiastic participants with the passing of Geoffrey Owen Seltzer on January 15, 2005. Geoff, 45, was at the prime of his career, and died after a brave 18-month battle with cancer. He is survived by his wife, Katie Reed; father, George Seltzer of Minneapolis; brothers Jonathan and Matthew of Minneapolis and Ethan of

Portland, Oregon, and their families. Geoff touched the lives and careers of numerous students and colleagues through his powerful intellect and insight, his genuine kindness, and his deep concern for advancing the fields of Quaternary science and limnogeology. He was a valued member of every community he was a part of and will be missed.

Born in Minneapolis, Minnesota in 1959, Geoff earned his B.A. at Carlton College (1982), and his M.S. (1987), and Ph.D. (1991) at the University of Minnesota. Geoff was a post-doctoral fellow and senior research associate at the Byrd Polar Research Center at Ohio State University, and has served on the faculty of the Earth Sciences Department at Syracuse University since 1994. His numerous awards include being named a fellow of the Geological Society of America in 2004. Geoff's major contributions to the field of Quaternary science include his careful analysis of the climatic significance of paleosnowlines in the Andes, his novel use of stable isotopes from Lake Junin, Peru to develop a record of regional moisture balance, his leadership in compiling multi-proxy evidence from Lake Titicaca sediments to substantiate early warming of tropical South America at the Last Glacial-Interglacial transition, and his galvanizing efforts to apply surface exposure dating methods to date moraines in Peru and Bolivia. Results of Geoff's research are published in more than 42 papers, all in top journals including *Science*, *Nature*, *Geology*, *Quaternary Research*, and *GSA Bulletin*.

Geoff was blessed with a combination of keen intellectual insight into many of the key questions that face the Quaternary sciences and an ideal personality for fostering collaborative research efforts with scientists with diverse areas of specialization. He was also very successful at organizing and coordinating large research programs, and at obtaining consistent funding for these ventures. In the mid-1990s he spearheaded efforts to obtain the first long sediment cores from Lake Titicaca and other lakes on the Altiplano of Bolivia and Peru. Permission to drill Lake Titicaca required negotiations with officials in both the Peruvian and Bolivian governments, and Geoff's calm and unflappable nature, his patience, and his knowledge of and interest in Andean culture proved indispensable in navigating these labyrinthine bureaucracies.

These and similar efforts catapulted Geoff into the international limelight and likewise resulted in further collaborative leadership roles. In 1998 he was named Project Leader of the International Geosphere Biosphere Project PEP 1, which is focused on compiling climate records along a N-S transect through the Americas. In January 2000, Geoff co-convened a workshop on 'Paleoclimates of the central Andes' held at the University of Arizona, sponsored by US NSF Earth System History and the InterAmerican Institute for Global Change Research. This resulted in a special issue of the journal *Palaeogeography, Palaeoclimatology, and Palaeoecology*, which Geoff edited. Geoff was an active partner with PAGES, the Past Global Changes Project of the International Geosphere-Biosphere Programme. The key to this activism was his scientific contributions to workshops and conferences, with a special emphasis on the PEP 1. Geoff recognized that future progress in paleoclimate research must involve a better understanding of atmospheric and oceanic circulation systems. Following on from a PAGES workshop on Hadley Cell dynamics in November 2002, Geoff took on a major leadership role authoring a successful proposal to hold an AGU Chapman Conference on "Tropical-Extratropical Climatic Teleconnections – a Long Term Perspective". Moreover, working with the PAGES Scientific Steering Committee (an

international body representing 15 different countries) in Banff in June of 2003, he helped craft the text for an initiative within PAGES on this very topic. The Chapman conference Geoff so carefully planned is scheduled for Feb. 8-11, 2005 at the International Pacific Research Center of the University of Hawaii.

The reconstruction and climatic interpretation of snowlines were a lifelong interest for Geoff, beginning with his M.S. thesis at the University of Minnesota. He followed in the footsteps of his advisor H.E. Wright, Jr., eminent pioneer of the Quaternary throughout the Americas, and took an active role in compiling the geomorphologic evidence and chronological data on glacier activity and paleosnowlines in the Andes of Bolivia and Peru. Geoff took on the challenging scope of terrain and paucity of data in the Central Andes with enthusiasm, always with a critical eye on the implications of his field evidence for understanding tropical and global climate. His graduate work produced a valuable dataset of Central Andean snowlines based largely on intensive mapping of glacial geomorphological features (cirque floor elevation, valley form, and moraines) from topographic maps and aerial photos. This work gave him an early appreciation for the spatial gradients in climate and glacier response over the profound topographical barrier of the Andes.

Geoff's 1990 review paper is still widely cited as a comprehensive synthesis of Quaternary glaciations in the central Andes. The paper reviewed the nature, extent and chronology of glaciations, including a tabulation of all radiogenic dates with sample descriptions and significance of each site. Yet it was more than a simple chronologic summary, and provided valuable information on modern climate, snowlines and glaciology to give a context for evaluating snowline variations spatially with respect to climatic gradients. He also discussed critically the paleoclimate implications of the Quaternary glacial sequence, in the context of other proxy evidence. This early work illustrates well Geoff's powerful ability to assimilate a wide array of data into a clear and insightful narrative, and served to chart forth the direction of the succeeding 15 years of Andean glacial geologic research. Interestingly, his preliminary synthesis of the LGM in Peru and Bolivia implied asynchrony in the timing of glaciation with northern hemisphere. While extensive subsequent work by Geoff and his colleagues and students would refine the details, this active interest in the hemispheric asynchroneity of glaciations provided formative motivation for the entire Andean Quaternary community.

Geoff's work on Lake Junin, Peru began in the early 1980s and exemplifies his ability to integrate data from a variety of sources to contribute to a deeper understanding of Andean paleoclimates. Geoff, with his students and colleagues, cored many dozens of lakes in the glacial valleys of the tropical Andes, and these records were used to develop records of upvalley deglaciation and vegetation change. He recognized early the potential in Lake Junin to develop a detailed record of hydrologic balance spanning the last deglacial hemicycle. Geoff appreciated how the oxygen isotope record from the carbonate sediments of Lake Junin would complement similar data from the nearby Huascaran ice core, which he helped to acquire in 1993. This enabled him along with colleagues to derive an independent and quantitative measure of regional moisture balance over the late Quaternary, the first such record of it kind to be developed for the region.

While coring Andean lakes, Geoff often wondered about the temporal relationship between the lake sediment records and the age of the numerous moraines

that descend nearly to the shores of these large lakes. This led to his developing a collaborative effort involving numerous investigators at various institutions to apply cosmogenic radionuclides to date glacial advances in the Peruvian and Bolivian Andes. Results of this work coupled with data on glacial flour input into Andean lakes led Geoff to assert that the culmination of the last glacial maximum in the tropical Andes occurred earlier than that at higher latitudes of both hemispheres. This finding, in turn, has challenged the Quaternary community to reexamine the driving mechanism of tropical climate change on glacial-interglacial time scales.

One of Geoff's lasting legacies to Quaternary research has been his interpersonal care and mentoring of graduate and undergraduate students. His style was never too overbearing, and he expected his students to work very independently. But his encouragement was always sincere, as he was. Geoff always made time for people, and truly respected others. One of the features most widely associated with Geoff is his broad smile. He was a true gentleman, and loved to participate in the communal discovery.

It is with genuine sorrow we bid farewell to our colleague, friend and mentor. Responses from many others who knew Geoff over the years in various capacities echo the profound sense of loss. Geoff deeply valued his community, and perhaps his greatest legacy to us is the priority he placed on how and with whom he worked. We are reminded in Geoff that life is very short, and adhering to quality over quantity of work is important to success.

Examples of 1st Authored Publications by G.O.Seltzer

2002 Early Warming of Tropical South America at the Last Glacial-Interglacial Transition. *Science*, 296: 1685-1686.

2001 Late-Quaternary Glaciation in the Tropics: Future Research Directions: *Quaternary Science Reviews*, 20: 1063-1066.

2000 Isotopic evidence for Late Glacial and Holocene climatic change in the tropical Andes. *Geology*, 28:35-38.

1998 High-resolution seismic reflection profiles from Lake Titicaca, Peru/Bolivia. *Geology*, 26:167-170.

1994 Climatic interpretation of alpine snowline variations on millennial time scales. *Quaternary Research*, 41, 154-159.

1994 A lacustrine record of late-Pleistocene climatic change in the subtropical Andes. *Boreas*, 23, 105-111.

1992 Late Quaternary glaciation of the Cordillera Real, Bolivia. *Journal of Quaternary Science*, 7, 87-98.

1990 Recent glacial history and paleoclimate of the Peruvian-Bolivian Andes. *Quaternary Science Reviews*, 9:137-152.

1990 Climatic change and its effect on prehispanic agriculture in the central Peruvian Andes. *Journal of Field Archaeology*, 17, 397-414.

Meetings

April 12-14, 2005 - **Late Cenozoic Drainage History of the Southwestern Great Basin and Lower Colorado River Region: Geologic and Biotic Perspectives**.

(Abstract deadline has passed, but registration is still open until February 28, 2005 so hurry if you want to attend!).

The workshop will be held, with an optional one-day field trip on the 15th, at the Desert Studies Center at Zzyzx, California, about 10 miles from Baker on Interstate 15, halfway between Los Angeles and Las Vegas. All housing and meals will be provided on-site as part of the registration fee. Cost: $200 (exclusive of your travel and the cost of vehicle rental for the field trip). One day field trip cost is an additional $75.

The workshop will be carefully structured to cover the drainage basins of interest. We plan to focus on three geographic areas: (1) Lower Colorado River, (2) Mojave River / Transverse Ranges (down to Lake Mojave), and (3) basins which had a pluvial lake connection with Death Valley (Owens River chain, Amargosa-Tecopa). Sessions will consist of two invited talks that review pertinent geologic-hydrographic history and biologic evidence for each geographic area, followed by selected talks on current research, followed by a roundtable discussion on the area (and links to the adjacent areas). We do encourage people to propose talks in their areas of interest, but note that we will carefully select those that focus closely on the biologic/geologic theme so that there is plenty of time for discussion and interaction. Other research contributions can be accommodated as poster sessions. Finally, we propose to have breakout sessions to identify promising avenues of future research. We would like everyone to stay for the duration of the workshop (not leave early or come late) in order to maximize the synergy among participants.

Organizers: Bob Hershler (email: Hershler.Robert@NMNH.SI.EDU), Marith Reheis (mreheis@usgs.gov), and Dave Miller (dmiller@usgs.gov)

More information is now available on the meeting website:

http://climchange.cr.usgs.gov/info/biogeo2005/

May 15-18, 2005, Geological Association of Canada, Halifax, Nova Scotia.

Possible limnogeology related sessions:

SS-12 Records of Environmental Change from the North Atlantic Region: Climate, Archaeology and Human Activity
Ian Spooner (Acadia University), Trevor Bell (Memorial University of Newfoundland) and Priscilla Renouf (Memorial University of Newfoundland)
ian.spooner@acadiau.ca

Sponsored by: C-CAIRN

SS-28 Climate Change over Recent and Geological Timescales
Hugo Beltrami (St. Francis Xavier University)
hbeltram@stfx.ca
Sponsored by: Canadian Society of Soil Science

Limnogeology Fieldtrip:

FT- A5 Facies heterogeneity in lacustrine basins: the transtensional Moncton Basin (Mississippian) and extensional Fundy Basin (Triassic-Jurassic), New Brunswick and Nova Scotia
David Keighley (New Brunswick Department of Natural Resources) and David E. Brown (Canada–Nova Scotia Offshore Petroleum Board)
dave.keighley@gnb.ca

More information at the GAC website:

http://www.esd.mun.ca/~gac/ANNMEET/annmeet.html

June 5-8 2005, CANQUA meeting, Winnipeg, Canada

The CANQUA meeting now has a full web site up and running:

http://www.umanitoba.ca/canqua

There will be many talks on lakes, as well as other special sessions, plus fieldtrips and social events. These are capsulated below:

Special themes of the Winnipeg CANQUA 2005 conference include:

1) Vic Prest Symposium: Glacial history and paleo-environmental change in glaciated North America

2) Lakes in transition (including Lake Agassiz)

3) Climate at the edge

4) Drought in western Canada

Fieldtrips:

Pre-meeting: "Environmental geoscience and geomorphic systems in the Red River valley, Manitoba"

Post-meeting: "Glacial and lacustrine sediments and history of the

Lake Agassiz basin"

Social events:

Welcoming mixer

Cruise and dinner on Paddle Wheel Queen Riverboat on Red River

CANQUA Awards Banquet dinner

September 26-30 2005, International Society for Salt Lake Research, 9th Conference, Perth, Western Australia

See http://www.isslr.org for details

Registration deadline is April 30 2005
Abstract submission deadline is May 30 2005
Final circular and program August 15, 2005

Contact (head of local organizing committee) Dr Jacob John, Curtin University of Technology, j.john@curtin.edu.au

Registration is $600 AUD
Student registration is $350 AUD

Conference brochure: http://muresk.curtin.edu.au/conference/ISSLRBrochure.pdf

Books

VOLS 6-8 OF DEVELOPMENTS IN PALEOENVIRONMENTAL RESEARCH BOOKS; VOL. 9 ALREADY PUBLISHED

We are very pleased to announce PUBLICATION of the next three volumes of the DPER (Developments in Paleoenvironmental Research) Series.

Volumes 6 through 8, scheduled to be published in 2004, are NOW available for order. Please see details of this offer at the DPER Web site (http://home.cc.umanitoba.ca/~mlast/paleolim/dper.html)

The titles/editors of these three volumes

Volume 8: Long-Term Environmental Change in Arctic and Antarctic Lakes
Edited by R. Pienitz, M. S. V. Douglas and J. P. Smol Hardbound, ISBN 1-4020-2125-9, ~500 pages

Volume 7: Image Analysis, Sediments and Paleoenvironments Edited by P. Francus, Hardbound, ISBN 1-4020-2061-9, 338 pages

Volume 6: Past Climate Variability through Europe and Africa Edited by R. W. Battarbee, F. Gasse and C. E. Stickley Hardbound, ISBN 1-4020-2120-8, ~600 pages

The detailed table of contents for these books is available at the web site above.

Volume 9 in this DPER series ("Earth Paleoenvironments: Records Preserved in Mid-and Low-Latitude Glaciers", edited by L. DeWayne Cecil et al) is available for order ($88USD) from Kluwer.

Please contact us (WM_Last@UManitoba.ca; SmolJ@BIOLOGY.QueensU.Ca) or Ms.Judith Terpos (e-mail: Judith.Terpos@springer-sbm.com) if you have any questions.