Limnogeology Division Newsletter
Volume 2. Number 2. June 2004.

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THE GEOLOGICAL SOCIETY OF AMERICA

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Welcome: Welcome to the latest newsletter of the Limnogeology Division of the Geological Society of America (GSA).

In this issue, we feature an article from Pete Van Metre about the US Geological Survey National Water Quality Assessment Program (NAWQA) Reconstructed Trends project. This project has been coring lakes and reservoirs throughout the US to identify chemical trends in sediments over time and relate these changes to anthropogenic and natural processes. I thought this project didn't have much exposure within the Limnogeology community so I convinced Pete to write this

The Limnogeology Division
The purpose of the Division is to promote (1) the research on both ancient and modern lakes around the world, (2) the collaboration of scientists from all disciplines on lake research, (3) the presentation and publication of lake research, and (4) students in performing research or wishing a career in lake studies. Any GSA Member, Fellow, Honorary Fellow, Associate, or Affiliate who is in good standing may affiliate with the Limnogeology Division. To effect such affiliation, an applicant must express his/her desire in writing to either the Secretary of the Division or to the Executive Director of the Society. All Division members, except GSA Affiliates and Associates, may vote and hold office in the Division. GSA Affiliates and Associates may serve on committees as conferees.

article. Pete and I are currently working on short cores from Pyramid Lake and Baker Lake (Great Basin National Park) to see how anthropogenic contaminants from river inputs (Pyramid Lake) and atmospheric inputs (Baker Lake) vary. Look for a report on this in a future issue of the newsletter. In addition, this newsletter includes comments from our Chair on the accomplishments of the Limnogeology Division in the first two years of our existence. I think you will agree that we have achieved some pretty impressive results for a young division. Finally, we have more announcements of meetings (including the GSA Annual Meeting that features six Limnogeology sessions), an extensive report on the Hedberg Conference held in Baku, Azerbaijan, in May 2004, and a new book honoring Kerry Kelts that I'm sure you will all want to buy.

I hope you enjoy this issue. Any comments or questions, as well as news items for the next newsletter, would be most welcome.

Michael Rosen
Carson City

GSA Professional Development Courses:

A listing of professional development short courses available at the Denver Annual Meeting is available from the Geological Society of America. Please see pages 16-17 of the June 2004 *GSA Today* to find out what courses are available. Of most interest to Limnogeologists is a course on evaporates, entitled: *Evaporites: a Practical Approach* taught by Dr. John Warren, University of Brunei Darussalam.

Have a look and suggest some courses to students!

Message from the Chair

By Elizabeth H. Gierlowski-Kordesch
Chair (2002-2004)

State of the Limnogeology Division

It has been two years since the Division was born. My role in running things as chair is coming to an end this November (though I will remain on the executive board for two more years to help things along). I just wanted to tell you about our accomplishments in getting the Division onto its feet, so that you know where your money goes.

(A) We have put lakes into the limelight at GSA annual meetings by sponsoring a total of twelve theme sessions (if all the proposed sessions run in November this year) and one field trip to the Green River Formation. Most people now know what "limnogeology" means and how important lakes are in the big scheme of things.

Sessions include:

(1) The Green River Formation Revisited: Crucible for New Concepts and Advances in Paleoclimatology, Tectonics, Chronostratigraphy, Sequence Stratigraphy, Isotope Geochemistry, and Paleontology.
Conveners: H. Paul Buchheim, Alan R. Carroll and Arvid Aase.

(2) Geochemical and Mineralogical Records from Ancient Lake Sediments.
Conveners: Daniel M. Deocampo and Robin W. Renaut.

(3) Lakes and Holocene Environmental Change: The Use of Multiproxy Lake Records for Paleoclimate Reconstructions I and II.
Conveners: Mark Abbott and Andrea Lini,

(3) General: Limnogeology: Carbon in Lake Systems
Conveners: Kevin Bohacs and Thomas C. Johnson

(4) Bridging the Gap: Ostracodes in the Earth Sciences
Conveners: Gene Hunt and Lisa E. Park

(5) Biogeochemical and Physical Processes in Mine Pit Lakes
Conveners: Laurie Balistrieri, Gina Tempel, and John Crusius

(6) McMurdo Dry Valleys, Antarctica, 1903–2003: Celebration of a Century of Science
Conveners: W. Berry Lyons and Andrew G. Fountain

(7) Authigenic Minerals in Modern and Ancient Terrestrial Aquatic Environments
Conveners: Daniel Larsen and Daniel M. Deocampo

(8) Hydrologic and Paleoclimatic Significance of Nonmarine Microbial Carbonates
Conveners: Michael R. Rosen and Robin W. Renaut

(9) Lacustrine Records of Landscape Evolution
Conveners: Jeffrey T. Pietras, Eric C. Carson, and Alan R. Carroll

(10) Alkaline Evaporative Lakes and Playas: Insights into Microbial Physiology and Mineral Facies in Semi-arid Settings
Conveners: David Finkelstein, Thomas R. Kulp, and Lisa M. Pratt

(11) Paleontology and Stratigraphy of the Late Eocene Florissant Formation (Colorado)
Conveners: Hebert W. Meyer and Dena Smith

(12) Frontier in Understanding the Geologic Record of Climate Change: Session in Honor of William W. Hay
Conveners: Eric J. Barron and Robert DeConto

(B) We have established a webpage full of information on meetings, research updates, jobs, as well as K-12 educational aids. We are still pushing the idea of the Lake of the Month so send information on your favorite lake. Our listserver sends you all the latest announcements about meetings, books, etc. Our newsletter is sent to you twice a year.

(C) We have established the Kerry Kelts Student Research Awards this year. Though the monetary awards are still not impressive ($250 each), we hope to increase it over the long term with donations. Please consider a donation to support student research on lakes.

(D) And finally, I feel that scientists who study all different aspects of lakes are starting to take notice of each other (and of what they have to offer each other) in order to solve scientific problems.

I am optimistic that the Limnogeology Division will prosper in the coming years. I encourage you to get involved in its governance and scientific programs so as to keep the dream alive of a united lake community. We are calling for nominations for vice-chair, secretary, and treasurer with elections in the Fall (email me at gierlows@ohio.edu). The new chair for the next two years is Tom Johnson of the Large Lake Observatory in Duluth.

Wishing you continued success in your research endeavors.

Respectfully submitted on June 29, 2004.

Feature Article

A National Assessment of Water-Quality Trends Using Paleolimnology

By Peter Van Metre (e-mail: pcvanmet@usgs.gov)

A major shift in public policy in the United States toward environmental protection began about 1970, with the establishment of the U.S. Environmental Protection Agency and passage of key environmental legislation. However, over the same three decades, urban land use, population, and vehicle use have increased greatly. To assess the effects of these and other actions on the quality of streams and lakes, the USGS National Water-Quality Assessment (NAWQA) program is collecting and analyzing sediment cores from reservoirs and lakes across the United States http://tx.usgs.gov/coring/index.htm. The NAWQA Reconstructed Trends study has sampled more than 70 lakes since 1993 in watersheds ranging from pristine forest to dense urban land use and at scales ranging from small (about 0.1 km^2 area) mountain lakes to Lakes Mead and Washington (figure 1). The study focuses primarily on recent trends (the past 50 to 100 years) in

Figure 1. Locations of lakes sampled by the USGS NAWQA program from 1993 to 2003.

anthropogenic contaminants in response to urbanization. Sediment cores are collected from boats using piston, gravity, and box corers, depending on sedimentation rate and length of core desired (figure 2). The cores are age-dated using radioactive tracers and physical markers in the cores such as the pre-reservoir soil boundary in the reservoirs. Contaminants analyzed include major and trace elements (including arsenic, lead, mercury, and zinc), organochlorine pesticides (including DDT, chlordane, and dieldrin), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). These elements, pesticides, PCBs, and PAHs have sediment quality guidelines established

Figure 2. Clockwise from upper left: 24-foot pontoon boat used for coring large lakes; zodiac inflatable raft used on small lakes; undisturbed box core in liner; gravity core suspended from the A-frame on pontoon boat; and light-weight cataraft at Baker Lake in Great Basin National Park, Nevada.

because of their toxicity to aquatic life (MacDonald and others, 2000) and many are of concern because they accumulate in fish and other wildlife (U.S. Environmental Protection Agency, USEPA, 1997).

A national assessment of trends in numerous metals and organic compounds is underway using more than 40 urban and reference lakes across the country. Results from selected lakes and on several topical issues have been published (for example, Callender and Van Metre, 1997; Van Metre and others, 1998; Van Metre and others, 2000; Van Metre and Mahler, 2004). One urban lake with contaminant trends that are typical of urban lakes across the country is White Rock Lake in Dallas, Texas (Van Metre and Callender, 1997). White Rock Lake was formed by a dam on White Rock Creek built in 1912, when the 259-km^2 watershed was mostly farmland north of Dallas. Each year sediment was deposited in the lake, carrying with it whatever it picked up from the land it flowed across. By the 1950s, Dallas had expanded to the shores of White Rock Lake, DDT and PCBs were in heavy use, traffic growing exponentially, and automobiles used leaded gasoline. Today almost a half-million people live in the White Rock Lake watershed and eight-lane highways cross White Rock Creek. Sediment washing off the land into the lake contains a complex mixture of pollutants, including traces of the banned compounds DDT, PCBs, chlordane, and gasoline lead, as well as PAHs found in urban air pollution, used motor oil, asphalt, and tar. For almost 90 years sediments have been settling to the lake bottom, forming thick layers. Those layers contain a water-quality history -- a chronicle of chemical changes in nonpoint-source pollution as a watershed urbanizes, as pesticides are introduced and then banned, as the American style of urban development and urban living changes. Three pollutants with consistent national trends are highlighted here.

Lead concentrations in a White Rock Lake sediment core track well with national atmospheric trends in lead (figure 3). Lead in gasoline caused large increases in lead concentrations in urban lakes and streams in the 1960s and early 1970s. Lead concentrations peaked in the mid-1970s and then decreased sharply with the introduction of unleaded gasoline. Concentrations in the White Rock Lake core have dropped to about

a third of their peak concentration, yet are still about double pre-urban levels. The change is a direct response to the elimination of lead in gasoline. Similar trends are observed in most U.S. lake sediment cores analyzed (Callender, 1997 #102). The only lake cores in which decreasing trends in lead are less common are in remote, undeveloped areas, and in a few western settings, such as Elephant Butte Reservoir on the Rio Grande, where high levels of erosion and sedimentation overwhelm (dilute) most human contaminant effects.

DDT use was ubiquitous in the United States in the 1950s and 1960s, and sediment cores from many lakes show a large DDT peak in the early 1960s followed by an exponential decrease to the present (Van Metre and others, 1998). Trends in total DDT (the sum of DDT and its chemical daughters, DDD and DDE) closely follow historical use of DDT. The initial occurrence of the DDT in cores is usually in the 1940s, when widespread use began. Peak concentrations are from the late 1950s to the mid 1960s, when use peaked. DDT use declined during the 1960s, following publication of *Silent Spring* by Rachel Carson, and DDT use was banned in 1972. DDT concentrations have been decreasing by about half every 10 to 15 years since the 1960s, although concentrations are still at detectable levels in all but the most pristine lakes.

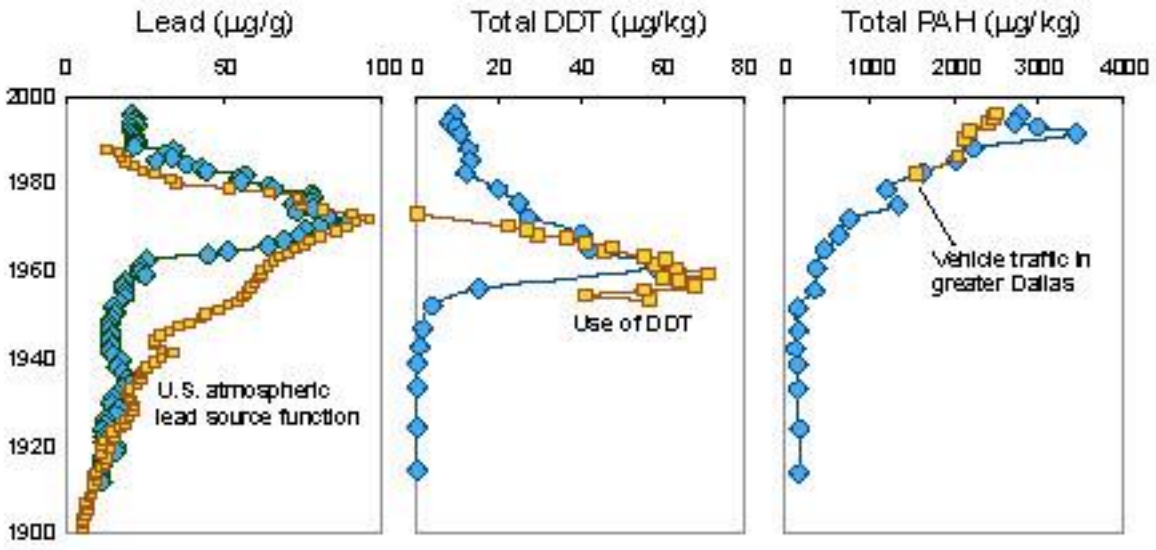

Figure 3. Trends in a sediment core from White Rock Lake in Dallas (blue diamonds) versus source-strength indicators (orange squares).

PAHs, in contrast to lead and DDT, show a dramatic increase in White Rock Lake since urbanization of the watershed began in the 1950s. This pattern is repeated in lakes with urbanizing watersheds across the United States (Van Metre and others, 2000). PAHs are produced by combustion of fossil fuels (oil, coal, gasoline, diesel fuel, and wood). They have many urban sources including: industrial and power plant emissions, car and truck exhaust, tires, asphalt roads, and tar from roofs, roads, and parking lots. These sources are reflected in the relation between historical traffic data for greater Dallas and PAHs in the White Rock Lake core. PAHs are an environmental concern because they are toxic to aquatic life and because several are known carcinogens (Björseth and Ramdahl, 1985, MacDonald and others, 2000).

Implications for Water Quality

The chemical quality of streams and lakes is the result of many natural and human factors. Two anthropogenic factors that affect the occurrence of contaminants are use and regulation. Intensive use of naturally occurring elements or synthetic chemicals leads to their release to the environment. Control of the entry of these contaminants into the environment through regulation or voluntary reductions in their use can result in improving trends and, over time, could eliminate their occurrence altogether. Unfortunately, releases of some contaminants are not easily controlled. PAHs are an example. Released as a byproduct of fossil fuel burning, tire and road wear, and leaking motor oil, PAH concentrations in urban lake sediments are increasing coincident with urban development and increasing traffic.

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Limnogeology Meeting Report

Hedberg Conference, Baku, Azerbaijan, May 2004

By Kevin Bohacs, EMURC, Co-convener

Summary:

More than 60 researchers from 17 countries who are actively working on lacustrine sandstones and hydrocarbon systems attended the Hedburg Conference in Baku, Azerbaijan in May 2004. This was the first conference to our knowledge that has focused on sandstone deposition and stratigraphy in lacustrine basins (most paleolimnologists and climate researchers consciously avoid sandy intervals/areas and focus on the muds). Like any good research conference, there were as many questions raised as answered, but all participants thought that they acquired a greater appreciation of the complexity of lake systems, of what is the general state of the art, and what are some important and fruitful avenues for further work.

The conference included 3 days of presentations and structured and informal discussions as well as a day on the outcrops in Kirmaky Valley and a day looking at core from equivalent units in the AGC Megastructure fields. Twenty-one talks and twenty-two posters presented examples ranging from the Paleozoic of north Texas to modern Lake Eyre, Lake Michigan, and the Caspian Sea/Volga River delta (see attached list). The presentations covered a broad spectrum, from basin-forming tectonics, through lake stratigraphy, physical, chemical, and biological sedimentary processes, interaction of climate and tectonics, modern analogs, to petrography and detailed reservoir modeling.

We captured key issues raised during the presentations and focused the structured discussions around five "big" questions (elaborated in the attached list):

A. What exactly about reservoirs are we trying to predict?;
B. Lake Classifications for Prediction-- are there other/better parameters to use for reservoir prediction?;
C. How to use updip character to predict downdip reservoirs?;
D. What **exactly** do we need to know about tectonics and climate to make reservoir predictions?;
E. What are the key tools for integrated sequence stratigraphic analyses?: Hints and Traps in their use.

The attendees self-organized into various groups during the discussion periods and reported back to all at the end of the conference. The main points are summarized below.

There was considerable interest in compiling a volume on lacustrine sandstones for publication by AAPG, and about 15 papers were tentatively volunteered. The convenors, along with Penny Patterson, will serve as editors-- we plan to firm up existing commitments and solicit submissions from selected workers who could not attend the Hedberg Conference.

Key lessons and issues:

- Lake-basin type shows a strong influence not only on the source potential of the mudrocks and hydrocarbon quality, but also on the type, distribution, and ultimate reservoir quality of the sandstones. Overfilled lake basins have the highest porosity and permeability and the largest overall reserves, mostly associated with fluvial channels on the lake plain; their challenges include the lowest Kv and lowest average net:gross ratio. Balanced-filled lake basins have good Kv & Kh in highstand & transgressive systems tracts and the best Kv overall; on the downside, they have the smallest lateral extents and lowest average recovery factor (due to both reservoir & fluid properties). Underfilled lake basin reservoirs tend to have the best Kh (lateral drainage/connectivity) and the thickest net pay (as they tend to occur at high rates of potential accommodation); their drawbacks include the common occurrence of early cements (carbonates, evaporites) and a typically wide lateral displacement of Highstand from Lowstand systems tract that diminishes resource density.
- The key to unraveling much of a lake's depositional history is to study the mudstones interbedded with the sandstones. Mudstones are much more continuous and sensitive recorders of depositional conditions, especially in systems whose lake level can vary over 100s of meters in thousands of years.
- The character of depositional sequences in lakes is controlled not only by accommodation and sediment supply, but also by pre-existing topography/bathymetry and the timing of peak clastic influx relative to lake level.
- The tectonic setting of a basin is important not only in affecting the temporal but also the lateral distribution of accommodation. It also influences the development of drainage networks in the hinterland as well as the climate in the drainage basin (through rain shadows/traps). Tectonic factors also have "far-field" effects on fluvial systems and sediment supply through large-scale drainage evolution

(different provenances, across different climate zones) and through climatic effects of tectonics in far upstream watersheds (rain shadows/traps)

- In upstream reaches of fluvial systems, erosion on sequence boundary is interpreted to record increased water discharge-- how does this tie to expression of sequence boundary downstream and in lake (where lake level might be rising due to increased water discharge)? Need to define sequence stratigraphy by geometric recognition criteria and keep separate from inferred changes of lake/base level!
- Not only can lake level and the flux of sediment and water be out of phase, but so also can water discharge and sediment flux be variously linked (there can be a lag between increasing water discharge and increased sediment delivery to the basin). Our work in Chad, by Penny Patterson, Dave Reynolds, and Clive Jones provided an excellent example of this and its effects on reservoir distribution.
- Aeolian reworking can have a significant impact on reservoir quality (by winnowing the fines, armoring surfaces with coarse lags); Could there be potential for developing significant aeolian-dune sandstones? (preservation potential?) Lake Chad, Michigan, Caspian examples...
- What is the potential importance of lake density underflows (long lived, = flood hydrograph) vs episodic turbidity currents? How to identify/differentiate in vertical section? Does it make a big difference in reservoir potential?
- Several examples (mostly Pleistocene to Recent) highlighted the potential importance of downstepping parasequences & ravinement in open-hydrology (overfilled) lake systems. There was much discussion about the preservation potential of such downstepping parasequences. How about in closed hydrology lakes (underfilled)?
- How characteristic is the modern Volga River delta with its poorly developed stream mouth bars and well developed subaqueous levees? Is the lack of stream mouth bars due to the strong influence of pre-existing bathymetry in the present-day delta? (where pre-existing subaqueous channels continue to confine river discharge well beyond the river mouth).
- Evolution of lakes and rivers with respect to tectonics: if most drainage nets evolve from isolated to integrated in divergent settings, do they evolve from integrated to isolated in convergent settings? (or, more probably, from integrated to isolated to integrated?)
- Does dominance of terminal splays downdip means lots of sandstone trapped updip at highstand shorelines? (underfilled lake basin type model would predict this). How to differentiate sandstone deposition into relatively permanent standing water vs floodwaters (sub-aqueous vs sub-aerial)?) Has significant impact on reservoir distribution & connectivity, bedding style, stacking patterns.

Big Questions:

A. What exactly about reservoirs are we trying to predict?

- 3D architecture: High net:gross- Shales, Vertical trends in Sandstones; Low net:gross- Geobody shape, distribution
- Lateral extent of mudstones
- Parameters by which to select appropriate analogues

- Shoreline reservoirs: river vs wave dominated? Relative development by lake type, highstand? Ultimate preservation potential of each?
- Fluid interactions with reservoir properties?

B. Lake Classifications for Prediction-- are there other/better parameters to use for reservoir prediction?

- Consider proximate vs ultimate causes (Potential Accommodation/Sediment+Water Supply vs. Tectonics/Climate)
- Geomorphology vs Stacking/Aggradation

C. How to use updip character to predict downdip reservoirs?

- 3-D sequence stratigraphic models: how many do we need?
- Relative development of systems tracts by lake type
- Do fluvial systems that debouch into oceans differ from lakes?
- How far upstream does base level have influence?

D. What **exactly** do we need to know about tectonics and climate to make reservoir predictions?

- Spatial, Temporal scales
- Inherent time scales of lake systems (quasi periodicity)
- Link of structural evolution to reservoir prediction- Chad, Caspian
- "Hard" vs "soft" response to tectonics (onlap vs thinning)
- Rift dynamics (plume locations, crust strength, etc.)
- History of uplift relative to provenance
- Rate of forcing mechanisms vs. rate, mode of response (non-linear, threshold effects)

E. Key tools for integrated sequence stratigraphic analyses: Hints and Traps

- Seismic
- Sedimentology
- Paleontology
- Palynology/Organic petrography
- Paleo-ichnology
- Geochemistry: Inorganic, Organic-- composition, isotopes
- Paleopedology
- Forward modeling

There were 41 key issues delineated at the conference; due to space limitations they are not listed here. For a complete listing, please contact Kevin Bohacs (contact details on page 1 of this newsletter).

New Limnogeology Book

Limnogeology in Spain: a Tribute to Kerry Kelts. 2003. Edited by Blas L. Valero-Garcés. Biblioteca de Ciencias, 14, Consejo Superior de Investigacioens Científicas, Madrid. 438 p.

All but two of the chapters are in English, for those of you who can't read Spanish.

The Book "Limnogeology in Spain: a Tribute to Kerry Kelts" is a scientific homage of the Spanish limnogeological community to one of its members. Kerry Kelts passed away on February 8, 2001 at the age of 54, after a long and courageous battle with Hodgkins Disease. During the 1980's Kerry initiated what was to be one of his scientific passions: the global study of modern and ancient lake basins. He defined and coordinated the International Geological Correlation Program Project 219 (Comparative Lacustrine Sedimentology in Space and Time) and was very active in the next Project IGCP 324 GLOPALS (Global Paleoenvironmental Archives in Lacustrine Systems) coordinated in Spain by Lluis Cabrera and Pere Anadón. His global vision led to the term "limnogeology" and he can be considered the father of this new and thriving field in the geosciences.

The book describes the significant role Kerry Kelts played in the development of limnogeological studies in Spain during the last two decades. It also includes a piece of Kerry´s writings on the use of smear slides and microscopic analyses to describe and classify lacustrine sediments. The book contains thirteen chapters (ten in English, three in Spanish) dealing with different aspects of lacustrine research in Spain. Two chapters describe the sedimentology of lacustrine formations from two classic continental Basins (Duero and Guadix-Baza). Several papers deal with multiproxy studies of Late Quaternary and Holocene records from saline lakes, peatbogs, and karstic lakes in the Iberian Range, La Mancha and Andalucia. Other contributions focus on particular lacustrine facies (palustrine carbonates, microbialites, seismites, and lacustrine dolomites) and their environmental and depositional interpretations. Two papers describe the use of mineralogy and biomarkers to reconstruct past lake levels and depositional environments. The final chapter introduces the sedimentology of human-made lakes (reservoirs), with some examples from Spanish reservoirs.

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Sedimentología de embalses. Aplicación a casos españoles

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Upcoming Limnogeology Meetings

The following meeting includes at least some sessions on limnogeology. *The entire meeting may not be focused only on limnogeology.*

Sunday August 8th - Saturday August 14th 2004 - Finnish Limnological Society

The Organising Committee, the Finnish Limnological Society, the University of Helsinki, the City of Lahti and the Finnish members of SIL invite you to participate in the 29th Congress of the International Association of Limnology in Finland. The International Association of Theoretical and Applied Limnology (Societas Internationalis Limnologiae, SIL) is the key scientific organization concerned with the understanding and management of inland aquatic ecosystems worldwide. Finland, the country of thousands of lakes, is also rich in rivers and ground waters and is partly surrounded by the Baltic Sea, a large brackish water system. The City of Lahti, gateway to the Finnish Lake District, will provide an inspiring congress venue for discussion, debate and evaluation of the scientific progress of limnology as well as the environmental issues raised by the use or abuse of fresh waters.

While there will be numerous sessions of interest to salt lake researchers, please consider the following special session dedicated to conservation, biodiversity and management issues of saline lakes.

INLAND SALINE LAKES: BIODIVERSITY, CONSERVATION, AND MANAGEMENT Inland saline lakes are widespread throughout the arid and sub-arid regions of the world and constitute ~45% of the volume of inland waters. They include a diverse array of aquatic ecosystems of considerable ecological importance, especially to migrating and breeding birds and endemic species. They are also threatened throughout the world by an array of impacts. While the limnology of saline lakes shares much with their freshwater counterparts, this session will address biodiversity, conservation, and management issues specific to saline lakes.

For more information on this session contact: ROBERT JELLISON, Marine Science Institute, University of California, Santa Barbara, CA 93106, U.S.A. jellison@lifesci.ucsb.edu

For more information on the meeting in general go to the following web site: http://www.palmenia.helsinki.fi/congress/sil2004/home/welcome.asp

Abstracts for the meeting are due **February 29, 2004,** so you've missed this if you haven't submitted already!

November 7-10, 2004 - Geological Society of America Annual Meeting, Denver, CO

Important dates for this meeting in 2004:

July 13th: Abstracts due by midnight, MST.
Aug. 2nd: Technical Program schedule finalized
Sept. 1st: Accepted abstracts posted (with links to speakers)

More information about the meeting is available online at:
http://www.geosociety.org/meetings/2004/

Six proposed sessions will be sponsored or cosponsored by the Limnogeology Division if enough abstracts are accepted. They are (Session 2 looks good!):

1. Authigenic Minerals in Modern and Ancient Terrestrial Aquatic Environments. (Topical Session Number 42) [Dan Larsen and Dan Deocampo, organizers]

2. Hydrologic and paleoclimatic significance of non-marine microbial carbonates (tufas, microbialites, stromatolites and thrombolites). (Topical Session Number 43) [Michael Rosen and Robin Renaut, organizers]

3. Lacustrine Records of Landscape Evolution. (Topical Session Number 44) [Jeff Pietras, Eric Carson and Alan Carroll organizers]

4. Alkaline Evaporative Lakes and Playas: Insights into Microbial Physiology and Mineral Facies in Semi-Arid Settings. (Topical Session Number 45) [David Finkelstein, Tom Kulp and Lisa Pratt, organizers]

5. Paleontology and Stratigraphy of the Late Eocene Florissant Formation, Colorado. (Topical Session Number 56) [Herb Meyer and Dena Smith, organizers]

6. Frontier in Understanding the Geologic Record of Climate Change: A Session in Honor of William Hay. (Topical Session Number 61) [Eric Barron and Bob DeConto, organizers]

For these topical sessions to be run, 12-16 papers must be submitted to the session. Therefore, it is up to you as limnogeologists to prepare abstracts for these sessions if you want to see them at GSA. Please contact the session organizers if you would like more information about a particular session.

Look in the April 2004 *GSA Today* for the email addresses of the conveners and their addresses.

November, 20-23, 2004: Workshop on Volcanic Lakes, Caviahue, Argentina

A workshop on volcanic lakes in Argentina is being organized by Johan Varekamp jvarekamp@wesleyan.edu and Alain Bernard (Bruxelles). The meeting location is at the Caviahue ski resort at Copahue volcano on the Chile-Argentina border. Caviahue is nestled at the beach of the large, acid (pH=2.4) Lake Caviahue in the megacaldera of Caviahue, and is fed by a river with a pH~0.5-1.0.

This workshop is held directly following the IAVCEI meeting in Pucon, which is mainly for volcanologists/geochemists. We will have 1.5 days of talks and posters on volcanic lakes (water contamination from natural sources, eutrophication through volcanic inputs, volcanic gas inputs in lakes, volcano monitoring, microbiology of volcanic lakes, acid lakes and rivers and their microbiology, use of volcanic lake sediments for global change records, etc). The Copahue crater lake carries hyperacid fluids, and a variety of geothermal pools and lakes occurs in the region. One of the acid river sites is a potential analog to the Opportunity landing site on Mars, so we are also inviting scientists from the planetary science community. There will be an afternoon of instruction/discussion on modelling of energy budgets of volcanic lakes, stable isotope evolution models and water rock interaction modelling. NSF is sponsoring this event with financial support for graduate students. Overall costs of participation are low, local transport is taken care of, so participants mainly have to find funding for their flight (about $700.- RT from NY to nearest airport).

Website: http://www.ulb.ac.be/sciences.cvl/index.htm

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

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. Based on the current fee structure, we anticipate this cost will not exceed $250 (exclusive of your travel and the cost of vehicle rental for the field trip).

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, Canadian Association of Canada, Halifax, Nova Scotia.

Limnogeology sessions:

SS-3 Stratigraphic Successions and Petroleum Systems of Lacustrine Basins
David Keighley (New Brunswick Department of Natural Resources)
dave.keighley@gnb.ca

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

June 5-9, 2005 - CANQUA 2005

IMPORTANT CHANGE IN VENUE: The next biennial meeting of CANQUA (Canadian Quaternary Association) will be **June 5-9, 2005**, in Winnipeg, Manitoba, Canada, *This is a change from the information in the last newsletter.*

The meeting will include fieldtrips in the Lake Agassiz basin and across the Prairies, a river boat cruise, and three special sessions

(1) "Paleoenvironmental change in glaciated North America: A special session in honor of Vic Prest"
(2) "Lakes in transition"
(3) "Climate at the edge"

For more details see the CANQUA web site www.mun.ca/canqua/index.html
or contact chair Jim Teller tellerjt@ms.umanitoba.caT