The Geochemical News

Newsletter of The Geochemical Society
in cooperation with The European Association of Geochemistry

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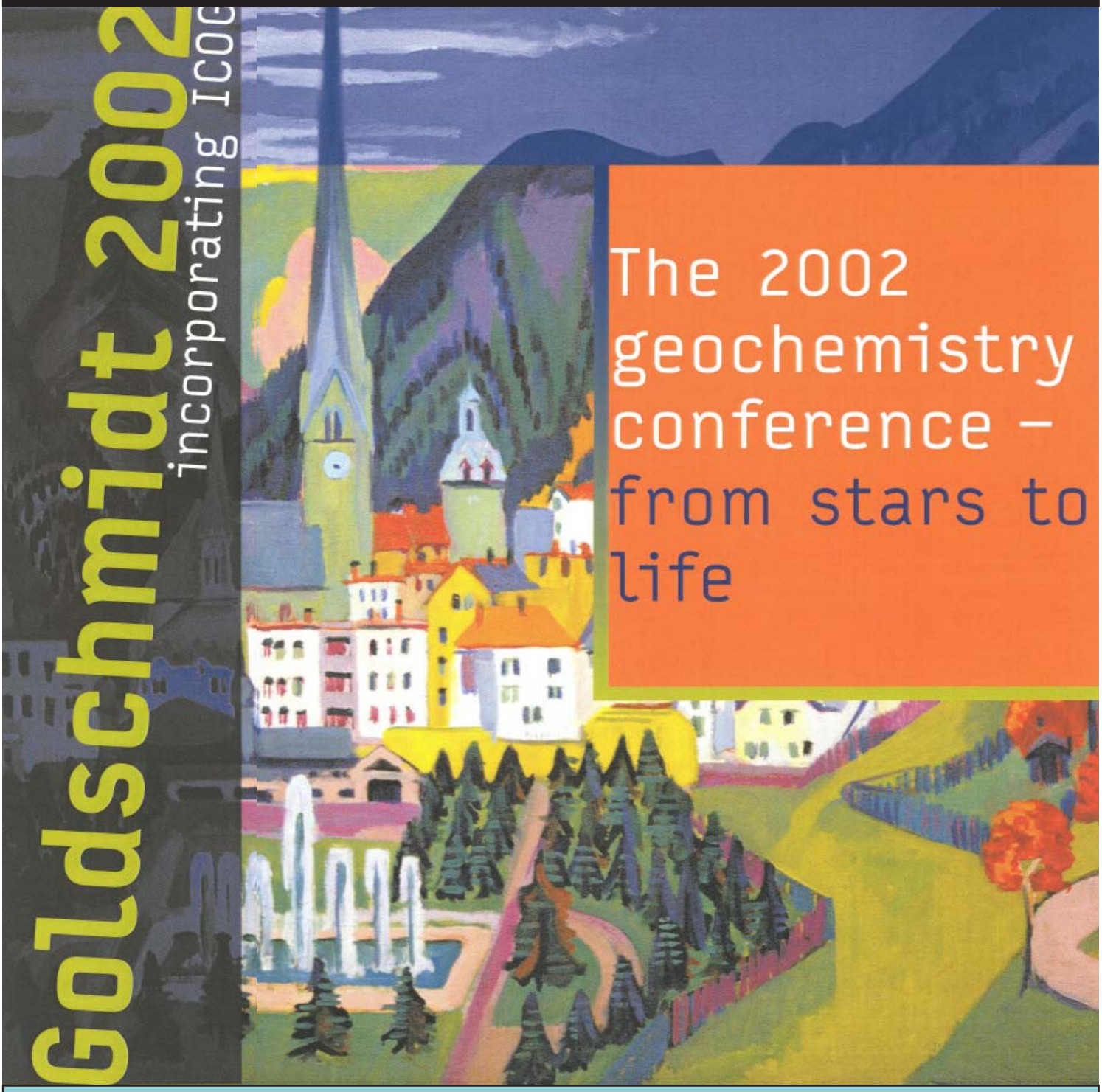

V. M. Goldschmidt Conference: 18 - 23 August, 2002 Davos, Switzerland
Abstract Deadlines: 24 March 2002 (hardcopy) 1 May 2002 (electronic)

THE GEOCHEMICAL SOCIETY

The **Geochemical Society** is a nonprofit scientific society founded to encourage the application of chemistry to the solution of geological and cosmological problems. Membership is international and diverse in background, encompassing such fields as organic geochemistry, high- and low-temperature geochemistry, petrology, meteoritics, fluid-rock interaction, and isotope geochemistry. The Society produces a ***Special Publications Series***, ***The Geochemical News*** (this quarterly newsletter), the ***Reviews in Mineralogy and Geochemistry Series*** (jointly with the Mineralogical Society of America), the journal ***Geochimica et Cosmochimica Acta*** (jointly with the Meteoritical Society), and co-publishes the electronic journal ***G³*** (jointly with the American Geophysical Union: AGU); grants the ***V.M. Goldschmidt***, ***F.W. Clarke*** and ***Clair C. Patterson Awards***, and, jointly with the European Association of Geochemistry (EAG), the Geochemistry Fellows title; sponsors the V.M. Goldschmidt Conference, held in North America in odd years and elsewhere in even years, jointly with the EAG; and co-sponsors the Geological Society of America annual meeting and the AGU spring meeting.The Society honors our first President, F. Earl Ingerson, and our first Goldschmidt Medalist, Paul W. Gast, with the ***Ingerson*** and ***Gast Lectures***, held annually at the GSA Meeting and the V.M. Goldschmidt Conference, respectively. The Geochemical Society is affiliated wi the American Association for the Advancement of Science and the International Union of Geological Sciences.

Members of the Organic Geochemistry Division are individuals with interests in studies on the origin, nature, geochemical significance, and behavior during diagenesis and catagenesis of naturally occurring organic substances in the Earth, and of extraterrestrial organic matter. GS members may choose to be affilitated with the OGD without any additional dues. The OGD presents the **Alfred E. Treibs Award** for major achievements in organic geochemistry, and **Best Paper** awards (student and professional) in organic geochemistry.

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THE GEOCHEMICAL NEWS
JANUARY 2002

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CONTENTS

POSTMASTER: Send address changes to The Geochemical Society, Dept of Earth and Planetary Sciences, Washington University, One Brookings Drive, St.Louis, MO 63130-4899, USA.

From the President...

As the new President of The Geochemical Society, I am pleased to be addressing my first letter to you in this issue of *The Geochemical News*. I hope that your New Year 2002 began well with a productive start, which will continue throughout the year. It promises to be a challenging and exciting year for me, as I take up the reins of the presidency. Before proceeding further, however, I would like to take this opportunity to formally thank our outgoing President, Mike Hochella, for a job well done. Having served as Vice President for the past two years, I have had the opportunity to observe first hand Mike's competent management style, which I plan to use it as a guideline for my presidency. I am thankful that Mike will continue to serve on the Executive Committee as Past President, remaining as a source of information and advice for all of us. To complete the cycle of leadership rotation, Tim Drever of the University of Wyoming will also be joining the Executive Committee as our incoming Vice President. With the addition of our new Society Secretary, Jeremy Fein of Notre Dame University of Indiana, the current team is now in place to lead The Geochemical Society through the coming years.

From my location in Central Europe, I find it a particularly exciting time to lead The Geochemical Society. We are truly an international society with our membership coming from around the globe. During my presidency, I would like to see the ties that bind geochemists worldwide strengthened with the aim of providing a broader platform to represent us on the international geoscience stage. In my opinion, several important steps have already been made in this direction. Notably, *The Geochemical News* is now published in co-operation with The European Association of Geochemistry. In reality, our newsletter provides a medium for the exchange of information and ideas among geochemists worldwide because our society membership already extends beyond the countries situated on either side of the Atlantic Ocean. For the future, I propose that we need to expand our membership reaching out more to geochemists on every continent. One way we can accomplish this is through our Goldschmidt Conferences. With the scheduling of the 2003 Goldschmidt Conference to be held in Kurashiki, Japan (7-12 September 2003), we have acknowledged the especially large and outstanding geochemical community in Japan. In the longer term, we need to consider whether, or rather where, future Goldschmidt Conferences should be held outside of the North American/European theatre. As geochemists are actively conducting research in most of the subdisciplines within Earth Sciences, we are in an ideal situation to build new links between disparate geoscience communities. Regardless of the directions the Society takes, communication and exchange will be the key to our success in an ever-changing geochemical landscape.

But, looking towards the near future, the upcoming 2002 Goldschmidt Conference to be held in Davos, Switzerland from 18-23 August has particular significance to me as it will offer me the opportunity to welcome and personally meet many of you in this mountain town with its picture-postcard scenery. The Conference organisers, headed by Alex Halliday, are anticipating an unprecedented number of attendees. Advertised as "The 2002 geochemistry conference"– from stars to life", the Conference offers a wide selection of proposed symposia with keynote and invited speakers, something for everyone. The proposed program is now available on the web site at www.goldschmidt-conference.com/gold 2002. Check it out and plan to join us in Davos! I am sure you will find many sessions of interest to you. And, don't forget the deadline for abstract submittal, which is 24 March 2002 for hard copy and 1 May 2002 for electronic submissions!

During my tenure as the Vice President of The Geochemical Society, I was responsible for the nomination of new members and chairs for the various committees. This effort introduced me to the invaluable service these committees give to our Society. They help us to honour worthy geochemists within our community by selecting new awardees for our Society medals. Additionally, they nominate new members to serve as officers of the Society, as well as organising special sessions at the annual meeting of the Geological Society of America and the spring meeting of the American Geophysical Union. I believe it is important to have a broad representation of involved Society members serving on these committees. Have you ever wondered how you might contribute your time and energy to The Geochemical Society? I contacted many of you directly in my search for new committee members, but certainly did not reach out to all of you who might wish to serve a three-year term. Now is your chance to get involved, to volunteer. Our new Vice President will be looking to fill a number of vacancies as of 1 July 2002. Contact Tim Drever and express your interest. From my own experience, I know he will welcome your input.

And, while you are thinking about how you might become more involved in the activities of The Geochemical Society, check out our web site at http://gs.wustl.edu. It contains lots of valuable information about who we are and what we do. Please refer the web site to others, along with sharing your copy of *The Geochemical News*. And, don't forget to renew your membership and enlist new members for The Geochemical Society from among your colleagues and students. We need to expand our membership and extend our reach as an international society dedicated to the advancement of geochemistry. We, as earth scientists with a broader international experience, are in an ideal position to build bridges between diverse cultures and nations throughout our global community.

And, finally, I am interested in knowing about your thoughts on The Geochemical Society, whether observations, ideas or complaints. I look forward to hearing from you and will do my best to respond to all that write. Please send your thoughts to me at the following e-mail address: GeoChem.Soc@erdw.ethz.ch.

With best wishes,

Judith A. McKenzie
GS President

LETTERS TO THE EDITORS:

No Fragmentation

Proposals have been made for renaming the Organic Geochemistry Division (Geochemical News #108), or forming a parallel Biogeochemical Division (Geochemical News #109). One proposal (Organic Geoscience Division) broadens the scope of the division in a manner consistent with the growing importance of interdisciplinary studies. The other proposal (Biogeochemical Division) narrows the scope and suggests desirability of subdivision based on concatenation of currently popular prefixes. The Geochemical Society should resist further fragmentation, and OGD should continue to be the natural affiliation for those pursuing biogeochemical studies.

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Split Would Be Counterproductive

The purpose of my article "What's in a Name" (The Geochemical News, No. 108) was to encourage discussion concerning the name of the Organic Geochemistry Division; hence, Hal Helgeson's response (The Geochemical News, No. 109) is greatly appreciated. In his response, Helgeson takes issue with my suggestion that consideration be given to renaming the Organic Geochemistry Division as the Organic Geoscience Division in order to try to broaden its perceived scope. He calls my suggestion ambiguous and cosmetic. To this charge I agree, but I totally disagree with his assertions concerning the content of the discipline of Organic Geochemistry and his proposed solutions which, I believe, are counterproductive at this time.

Helgeson does not seem to understand what organic geochemistry is really all about even though some of his and his students' research with organic molecules falls in the realm of organic geochemistry. As in any interdisciplinary field, the practitioners of organic geochemistry have diverse scientific interests fundamentally based on the chemistry of biological and geological molecules (i.e., organic molecules) in a variety of geological and theoretical contexts. The Aims and Scope of the journal Organic Geochemistry offer some examples of the breadth of the subject matter covered. "Contributions covering a wide spectrum of subjects in the geosciences broadly based on organic chemistry (including molecular and isotopic geochemistry) in involving geology, biogeochemistry, environmental geochemistry, chemical oceanography and hydrology are welcome. . . .We welcome newer applications and extensions of molecular organic geochemistry which might include archaeological chemistry, biogeochemical ecology, biomolecular paleontology and molecular stratigraphy." In addition, "the scope of the journal includes research involving petroleum (including natural gas), coal, organic matter in marine and non-marine sediments, organic-rich rocks and soils, and the role of organics in geochemical cycling of the elements." Helgeson's view of organic geochemistry is focused only on the items of the last statement. Unfortunately for the discipline his view is not unique.

Helgeson's main contention seems to be that there is not enough biology in organic geochemistry even though the word "organic" has strong biological overtones in that most organic matter on earth is biologically derived. Because of his current perceptions and his correct recognition of the growing importance of Biogeochemistry in geosciences, he recommends the formation of a Biogeochemistry Division of the Geochemical Society to complement the Organic Geochemistry Division. I disagree with his recommendation mainly because Organic Geochemistry already includes Biogeochemistry in its portfolio and his proposed solution is divisive. A Biogeochemistry Division and an Organic Geochemistry Division would not complement, but rather compete, given the similar nature of the envisioned content of both. I do not believe that The Geochemical Society would be well-served at this time by such competition.

Helgeson also makes the point that "failure to form a Biogeochemistry Division of The Geochemical Society will result in a rival Biogeochemical Society." It is my opinion that a new Biogeochemical Society competing with The Geochemical Society is even more counterproductive than the suggestion of a Biogeochemistry Division and Organic Geochemistry Division within The Geochemical Society. I would argue that at the present time it is better to unify rather than diversify. A possible compromise, which could be considered and discussed, is to change the name of the Organic Geochemistry Division to the Biogeochemistry Division, a name that seems to be inclusive but does overshadow the rich heritage of the Organic Geochemistry Division developed over more than 40 years. Such a compromise would require adjustments, but at least The Geochemical Society would have a single division with integrated interests in biology, microbiology, biochemistry, organic chemistry, and geology.

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Organic and Biogeoscience

Recent letters by Kvenvolden (Geochemical News #108) and Helgeson (Geochemical News #109) have initiated a debate on names. Kvenvolden's proposal to consider changing the name of the Organic Geochemistry Division to Organic Geoscience Division attempts to broaden the perception of scope of the Division and the discipline of organic geochemistry. Helgeson's proposal to create a Biogeochemical Division, while intending to recognize the scope, depth, breadth and potential of present and future research in biogeochemistry, also has the potential to narrow focus. While Helgeson makes many good points about biogeochemistry and its impact, to this reader much of this is lost by the calls for a rival society and another journal. The fact that the Geological Society of America and the American Geophysical Union have established new Divisions that may be of interest to those engaged in organic geochemistry and biogeochemistry research should spur the Geochemical Society to examine the necessity to broaden the scope of the Organic Geochemistry Division. For me Kvenvolden's suggested name mostly takes care of this.

An alternate name to consider is Organic and Biogeoscience Division. Though a bit more awkward, perhaps less so than some others, including organic and bio- in the name recognizes past contributions and involvement as well as potential future contributions and involvement. The areas of research under discussion cover such a wide range of temperature, pressure, and other environmental factors and involve a range of processes, disciplines, and subdisciplines that it may be difficult to obtain agreement from the practitioners in a short period. But, I am sure that all of us would welcome additional funding for organic and bio- geoscience whether from NSF or elsewhere!

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EDITOR'S CORNER...

It's a new year, and we have a new GS President! Along with welcoming Judith McKenzie to the president's chair, we'd like to extend a welcome on behalf of the GS membership to our new Vice-President Tim Drever, our new Secretary Jeremy Fein, and new directors Erwin Suess and Eric Oelkers. We'd also like to express our thanks, for outstanding leadership and service to the world geochemical community, to outgoing President Mike Hochella, outgoing Secretary Dave Wesolowski, and outgoing directors Vala Ragnarsdottir and Everett Shock. Further in this issue our new officers and directors tell us a little about themselves, and give us faces to attach to the names (for those who don't know them already!).

Other highlights of this issue include another installment in our *European Research Facilities* series, showcasing synchrotron applications to the earth and environmental sciences in the UK, a research snapshot focusing on the occurrence of brominated flame retardents in the environment, and funding announcements from NSF and ACS.

Our cover should remind all of you that the abstract deadlines for **Goldschmidt 2002**, in alpine Davos, Switzerland, rapidly approach! Incorporating not only the EAG membership but also the 10th ICOG (International Conference on Geochronology), Davos Goldschmidt will have something for everyone! And don't forget to register your interest online for the **2003 Goldschmidt meeting** in historic Kurashiki, Japan.

Finally, we'd like to remind everyone that we at *GN* are always on the lookout for first-rate review articles, research snapshots, science news, and informative interviews with leaders and innovators in all realms of geochemistry. If you have a good idea for an article just drop us an email. And don't forget to include interesting color photography (field sites, analytical imagery, etc.) for our cover! We'd like to remind ***students*** (undergraduate and graduate) that publication of their articles or cover photos comes with a one-year membership to GS, including GCA.

Regards,

Johnson R. Haas
Carla Koretsky
Editors

REPORT FROM THE AAAS

Many of us find ourselves looking for "seed" money to develop or expand upon international collaborations. AAAS has the following available:

The AAAS Directorate for International Programs announces the Women's International Science Collaboration (WISC) Program for 2001-2003.

Supported by the U.S. National Science Foundation (NSF), this program aims to increase the participation of women in international scientific research through travel awards to locations around the world. The awards are to foster new research partnerships between U.S. scientists and colleagues overseas.

Men and women scientists who have their Ph.D. or equivalent research experience are eligible to apply. Graduate students (Ph.D. candidates) are also eligible, if they will be conducting research in an established Ph.D. program in the U.S. and will be traveling with their Ph.D. advisor and will serve as co-PI on future proposals.

For further information on fields eligible for funding, please visit the NSF website at http://www.nsf.gov or contact one of the AAAS administrators listed below.

Application deadlines are January 15 and July 15, 2002.

For further application information and region-specific guidelines, please visit http://www.aaas.org/international/wiscnew.shtml or contact the appropriate AAAS administrator:

Central and Eastern Europe, Newly Independent States (NIS) of the former Soviet Union: Karen Grill, kgrill@aaas.org, (202) 326-7027

East Asia and Pacific: Suteera Nagavajara, snagavaj@aaas.org, (202) 326-6496

Africa, Middle East, Near East, and South Asia: Alan Bornbusch, abornbus@aaas.org, (202) 326-6651

Americas and Caribbean: Marina Ratchford, mratchfo@aaas.org, (202) 326-6490

Robyn Hannigan
GS co-representative to the AAAS

YOUR OPINIONS COUNT: VISIT THE ONLINE GOLDSCHMIDT SURVEY

Have you attended a Goldschmidt meeting in recent years? Do you plan to attend one in future? Visit our survey and register your opinions at:

http://unix.cc.wmich.edu/~jhaas/survey.html

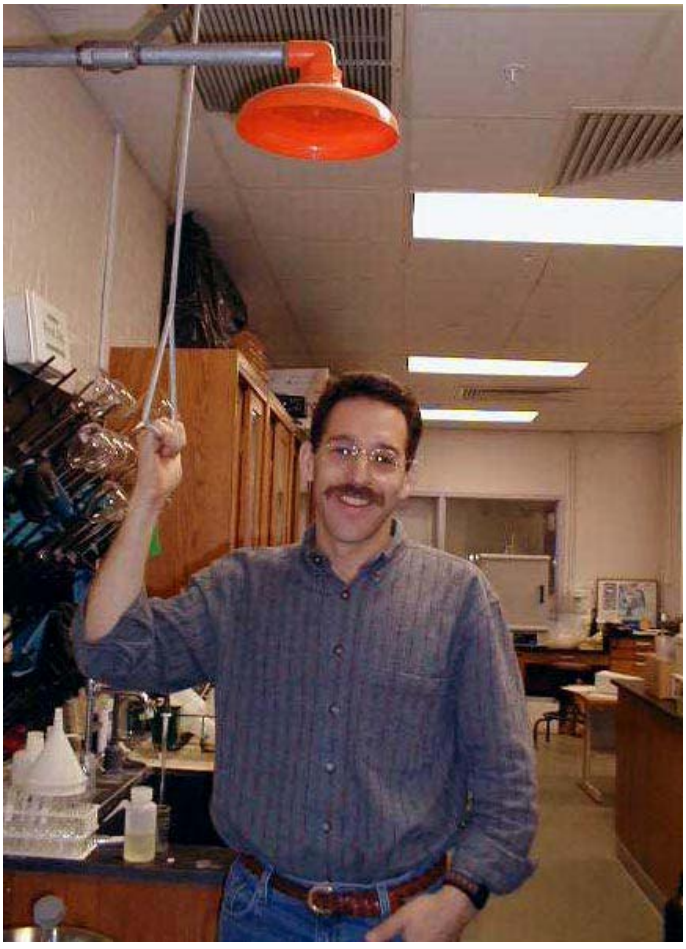
Help the volunteers who organize these meetings take your needs into account. Results will be compiled and published in a future issue of *GN*.

WHO WANTS TO HOST A GOLDSCHMIDT CONFERENCE?

Proposals are now being accepted for the 2005 conference (USA location). Contact the GS office with your ideas (office@gs.wustl.edu). The proposed venue must allow for modern technical presentations and accomodations for 1000+ attendees, ideally in a scenic location.

MEET YOUR NEW GS OFFICERS!

James I. (Tim) Drever comes originally from Scotland. After obtaining his PhD at Princeton (1968) he spent 3 years at Scripps Institution of Oceanography then moved to the University of Wyoming, where he has been ever since with the exception of sabbaticals in Switzerland, France, and Germany. His main research interest is the chemistry of ground and surface waters, with a particular emphasis on weathering processes and contaminant migration. He has a strong interest in the interaction between biotic and abiotic processes in controlling the composition of natural waters. He is author of the textbook *The Geochemistry of Natural Waters* and served as an Editor-in-Chief of *Chemical Geology* from 1995 to 2001.



Jeremy Fein: I received my Ph.D. from Northwestern University in 1989. My general research area can best be described as geomicrobiology and aqueous geochemistry. In particular, I am interested in applying chemical thermodynamics and kinetics to model processes in which bacteria affect water-rock interactions, such as adsorption, precipitation, and dissolution reactions in bacteria-bearing systems. My background is in experimental aqueous geochemistry, with experience in both high and low temperature water-rock interactions, especially the study of aqueous and surface complexation and their effects on mass transport in systems such as contaminated groundwater aquifers, deep sedimentary basins, and metamorphic fluid-rock systems.

I am looking forward to my duties as Secretary, but I am also a bit nervous following in the footsteps of Dave Wesolowski. Dave has done such a fantastic job as Secretary over the past 6 years, that he's a hard act to follow! I'll try to maintain the excellence that he has continuously exhibited.

Erwin Suess is professor of Marine Environmental Geology at GEOMAR, Research Center for Marine Geosciences, Kiel, Germany. He holds advanced degrees from American and German institutions: M.Sc., Kansas State University (1966), Ph.D., Lehigh University (1968), and Dr. rer.nat.habil., Christian-Albrechts-Universität (1976). He was professor of Oceanography at the Oregon State University from 1976 until appointed by GEOMAR Kiel in 1988, to chair the Department of Marine Environmental Geology, a post which he still holds today. He was the managing director of GEOMAR from 1995-1999.

His research interests include: Production, decomposition, and burial of organic material in the ocean; early diagenesis; reconstruction of productivity and ocean margin processes. Among these dewatering of accretionary wedges, volatile recycling through subduction zones, evaluation of mud volcanoes and marine gas hydrates as transient reservoirs, have all been developed into major research initiatives at GEOMAR. Most recently he has been elected to chair an interdisciplinary research project **"Volatiles and fluids in subduction zones"** funded by the Deutsche Forschungsgemeinschaft. In 2001 Erwin Suess and his team were awarded the Research Prize of the Philip Morris Foundation for their work on marine gas hydrates.

Erwin Suess was visiting professor at the Hawaii Institute of Geophysics (1968-1969), the P&M Curie Universitế VI, Paris (1986), the Geological Survey of Japan, Tsukuba (2000). He has served on advisory and review boards in Europe and overseas and is a member of numerous societies.

Eric Oelkers is currently a Research Director of the Centre Nationale de la Recherche Scientifique (CNRS) working at the Laboratoire de Géochimie of the Universitế Paul Sabatier in Toulouse, France. Eric was born in the Bronx, grew up in New York City, and spent his undergraduate years at MIT earning a bachelors degree in Chemistry and in Earth and Planetary Science in 1981. Hoping to see outcrops bigger than road cuts, he moved out to California and enrolled at UC Berkeley where he stayed for nearly ten years as both graduate student and post doc. During his Berkeley years, Eric worked and studied with Harold Helgeson learning about both the mysteries of aqueous solution chemistry and how to live life to it fullest. Eric moved to Toulouse France in 1992 working first as an NATO/NFS post-doctoral scholar under the supervision of Jacques Schott and entering the CNRS in 1994.

Over the past few years Eric has been extremely active in both research and service to the geochemical community. The bulk of his research focuses on quantifying water-rock processes through both experimental and theoretical studies. He is currently serving as co-editor of *Chemical Geology* and has served as an associate editor of *Geochimica et Cosmochimica Acta* since 1995. Eric has co-run or co-organized numerous meetings including a European Research Network meeting at a castle in the Dordogne, southwest France (with Stephan Kolner); European Research Conferences at a beach front resort in Crete, Greece and on the

continued on Page 10.

Geochemical Society Business Office News

Membership

2001 closed with 1,571 members, the second highest membership total in the last 16 years.

The annual membership drive started on November 14, 2001. If you haven't renewed yet, please, please take a moment to do so. A membership form is included in this issue of GN. You may mail, fax, phone, or e-mail your renewal information to the business office (contact information is at the end of this report).

If you have renewed, thank you! Your support is greatly appreciated.

Subscription

Members of the sponsoring societies (the Geochemical Society, and the Meteoritical Society) who subscribe to Geochimica et Cosmochimica Acta for 2002 will receive paper copies as in the past. In 2002, however, individual member subscribers will also have free access to an electronic version posted at a special internet site, compliments of Elsevier. This site will contain all full-text items published year-to-date; new items will be posted as they are published.

Member-subscriber access will be through a special page of Elsevier's GCA site, www.elsevier.com/locate/gca. There will be a special link designated "registration", through which subscribers can complete a one-time registration procedure. Registration and subsequent access will require a username and password. This functionality on the Elsevier website will be implemented prior to January 1, 2002, and subscribers will receive notification of their usernames and passwords prior to January 1, 2002.

Publication

The Geochemical Society Special Publication Volume 7: A Tribute to David A Crerar has been rescheduled for release in March 2002. To complement this, the six volume special publication offer has been extended to March 31, 2002.

Conferences

Information about ***Goldschmidt 2002*** can be found from the conference website (www.goldschmidt-conference.com/2002/gold2002/), which will be regularly updated as the conference approaches. If would like to receive circulars (informing you of abstract deadlines, arrangements for registration, etc,Ö) please send your email address to Cambridge Publications (goldschmidt2002@the-conference.com) who will ensure that your name is added to the mailing list.

Conference listings are regularly updated on our website (http://gs.wustl.edu/conferences/), if you know of a relevant conference that you'd like to add, please email me, and I will get it listed.

Cheers,

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Now Royal NIOZ celebrates 125th anniversary

NIOZ is the abbreviation of the Dutch for "Dutch Marine Research Institute". As The Netherlands is basically a large delta on the North Sea shore, several institutes in this tiny country are involved in marine and estuarine research. NIOZ can perhaps be described as the Dutch version of WHOI, with two major differences: it is on the island, not still across from it, and it does not yet have a DSV or ROV.

In a way, the meteorological observation station, set up in the town of Den Helder in 1843, was the precursor for the Dutch Marine Zoological Station, which was officially established on July 8, 1876. Den Helder is also the Dutch navy's base, which made and makes it a logical location for marine research organizations. The station was initially housed in a temporary wooden structure, which could be moved around and stored. Its nickname was "de Keet" (the shack) and most of the time it stood adjacent to the older meteorological station. In 1889, the Marine Zoological Station moved into a permanent brick building. Around 1875, several European countries, such as France and Italy, established coastal research institutes. There was a second bloom of marine biology stations at the end of that century and after the establishment of the International Council for Exploration of the Sea (ICES) in 1902.

NIOZ relocated to the island of Texel in 1969. Den Helder is just across from it: it's where the ferry for Texel departs. When UNESCO set up the Scientific Committee for Oceanic Research (SCOR) in 1957, NIOZ made a switch from coastal to oceanic research. Most of the current research focuses on four themes:

- Transfer and transport of matter and energy in the sea
- Transfer of matter in sediments
- Marine ecology, community dynamics and biodiversity
- Temporal variability in marine systems and climate change

NIOZ now employs 250 people, 160 of whom in permanent positions. The institute celebrated its anniversary on November 28 (followed by a two-day conference). On that day, NIOZ learned that Beatrix, Queen of The Netherlands, has honored the institute by allowing it to call itself "Royal" (*Koninklijk*). No more NIOZ. It's KNIOZ now!

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NIOZ web page: http://www.nioz.nl/nioz125/knioz.pdf

Research snapshot: Brominated Flame Retardants

On December 13, 2002, the Environmental Chemistry Section of the Royal Dutch Chemical Society (KNCV) held its annual meeting. The theme was "brominated flame retardants (BFRs)". On my way to the meeting venue I wondered about the difference between geochemistry and environmental chemistry. Some say there is none. Surely everyone will agree that there clearly is substantial overlap between the two subdisciplines.

BFRs are everywhere, certainly in The Netherlands*. Examples are the materials of most chairs and sofas, the plastics of TV sets, computers and other consumer electronics, and some fabrics**. BFRs can occur in sediments and as such constitute part of its organic carbon content. Legislation will probably ban the use of BFRs completely in a number of years. How long will they continue to show up in sediments? Where will they show up and how will they affect ecosystems, if at all? Questions like these, discussed by speakers from not only research institutions but also Greenpeace, the industry and the government, led to a lively meeting.

One talk of potential interest to marine geochemists was by Bart Zegers of NIOZ. Zegers presented an investigation carried out by himself and Jan Boon, also of NIOZ, into the distribution of BFRs. The focus was on specifically brominated diphenylethers (BDEs) in North Sea sediments and marine animals.

Sediment samples were collected from for instance a branch of the Oslo Fjord in Norway and from a sanded channel in the Dutch Wadden Sea. For comparison, NIOZ also looked at the Kimmeridge Clay Formation in the UK and at a freshwater lake in Northern Germany.

The sediment in this study needed to meet three criteria:

1. It needed to be laminated (in order to be dated).
2. There needed to have been fast organic sedimentation, because BFRs bind to organics.
3. No bioturbation should have occurred.

There are basically three commercial BFR products: the penta mix, the octa mix and the deca mix. The penta mix became available around 1967, the deca mix around 1975. This is reflected in the concentrations found in the sediments, while remnants of the octa mix were not found at all (reason unclear to me, AS). The distribution of BDEs in North Sea sediments was found to be related to point sources of BFRs (production plants in the UK and The Netherlands) and currents. No BDEs were

found in the Kimmeridge Clay, while the German lake sediments contained penta and deca mix compounds.

NIOZ also looked at concentrations in marine animals. Fish species and invertebrates such as the common whelk contained relatively small amounts of BDEs. The contamination is concentrated in certain parts of the fish in species such as whiting, the fillets of which were clean, while the fillets of herring and similar fish species were also contaminated. Seals and porpoises contained much higher concentrations.

No octa mix compounds were found in marine animals. Deca mix compounds were only found associated with ingested sediment (not bioaccumulated). It appears that hexa BDEs and larger molecules are not bioaccumulated. How this fits in with the recent discovery of deca BDEs in falcon eggs is, however, a mystery that still needs to be unraveled.

A few years ago, the North Sea Directorate asked the Dutch Department for Coastal and Marine Management (RIKZ) to conduct a "study on unknown chemicals". Within this framework, a study on brominated flame retardants was started on 15 September, 1999. The report was published earlier in 2001. There are clearly gaps in our knowledge of the behavior and distribution of these compounds. All brominated compounds tend to adsorb strongly to sediment particles in water. At the same time, the volatility of BFRs decreases with increasing bromine contents, which is likely to enhance their tendency to adsorb. Some BFR compounds decompose - either under the influence of visible light, UV light, or microorganisms. Others appear to be fairly stable, while little or no information is still known about a number of BFRs. A brief web search quickly confirms that, indeed, the last word has not yet been said about BFRs.

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Notes:

* The regulations vary by country. TV sets in the U.S. do, for instance, not contain flame retardants. From 2008 onward, European consumer electronics are no longer allowed to contain BFRs.
** Penta BDEs have also been used in trials in the offshore industry (well fluids). Natural sources of BDEs are not known.
*** I based this item solely on information gathered at the above-mentioned meeting. Any errors are mine.

References:

Groshart C.P. and Wassenberg W.B.A. (2000) Chemical Study on Brominated Flame-retardants. Rapport RIKZ-2000-017. Ministerie van Verkeer en Waterstaat, Directoraat-Generaal Rijkswaterstaat, Rijksinstituut voor Kust en Zee/RIKZ, Den Haag, The Netherlands

http://ehpnet1.niehs.nih.gov/docs/2001/109p903-908eriksson/abstract.html

http://www.es.lancs.ac.uk/kcjgroup/8.html

http://www.nature.com/nsu/980709/980709-1.html (From Nature 7 July 1998.)

http://www.seagrant.wisc.edu/communications/news_releases/2001/PBDE.html

http://ens.lycos.com/ens/sep2001/2001L-09-06-02.html

Eric Oelkers, continued:
ski slopes near Innsbruck, Austria (with Vala Ragnarsdottir and Siggi Gislason), and a Mineralogical Society of America Short Course downwind from the Coors brewery in Golden, Colorado (with Carl Steefel and Peter Lichtner). While not at the lab, Eric does his best to spend as many weekends as possible with his family at their 12th to 16th century castle/country house in the Pyrenees splitting time among restoration projects, manuscript editing/rewriting, recreational hiking, and admiring the mountains while drinking the local wines.

GEOMICROBIOLOGY NEWS

A NEW REPORT IS NOW AVAILABLE FROM THE AMERICAN ACADEMY OF MICROBIOLOGY'S CRITICAL ISSUES COLLOQUIA PROGRAM.

"Geobiology: Exploring the Interface Between the Biosphere and the Geosphere," discusses the possibilities and the challenges facing this relatively new area of scientific inquiry. While recent collaborative research efforts and technological developments like genome sequencing are making discovery possible, much more can and should be done to unravel the processes and functions that link life and its surroundings.

The report presents the conclusions reached by an interdisciplinary panel of scientists who spent several days deliberating the issues at the colloquium held December 1-3, 2000, in Tucson, Arizona. The document examines the current status and scope of geomicrobiology and analyzes key issues of technology, education, and research priorities. "Geobiology: Exploring the Interface Between the Biosphere and the Geosphere," makes specific recommendations for the future.

Academy reports provide scientifically well-founded, objective analysis presented in clear, readable language for a broad audience. "Geobiology: Exploring the Interface Between the Biosphere and the Geosphere," and previously released reports are available in PDF format on the World Wide Web:

http://www.asmusa.org/acasrc/aca1.htm

For a copy in print, please contact Academy staff by e-mail: colloquia@asmusa.org or fax: (202) 942-9353.

Visit the GS website: gs.wustl.edu

FUNDING OPPORTUNITIES

From the National Science Foundation: A New Funding Opportunity in Carbon Cycle Research

The NSF Directorate for Geosciences announces a new competition in FY 2002 to support cutting-edge basic research in carbon cycle science. The Announcement for the "Integrated Carbon Cycle Research Program" can be found at the following internet address: http://www.nsf.gov/cgi-bin/getpub?nsf02106. This solicitation reflects NSF's commitment to a national effort to increase significantly our understanding of the processes that regulate the transport and transformation of carbon within and among the terrestrial, oceanic, and atmospheric environments of the Earth.

The purpose of this Program Announcement is to solicit innovative proposals from U.S. academic institutions to conduct basic research into the scientific aspects of the global carbon cycle. Studies of the chemical, biological, ecological, and physical processes driving carbon distribution, transformation and transport within and between terrestrial, atmospheric, and oceanic environments are appropriate for this competition. The five topical foci of this Announcement include (1) focused process studies, (2) drainage basin and ocean margin studies, (3) global modeling and empirical studies, (4) effects of climatic change and variability on the carbon cycle, and (5) data management and development of standards and methods.

This program focuses on research that contributes to the goals of the U.S. Carbon Cycle Science Plan (CCSP), broadly considered. The research community supported by NSF has a special role to play in advancing current knowledge of the global carbon cycle. Federal agencies other than NSF bear primary responsibility for developing and maintaining the national environmental observational infrastructure required for assessing the spatial and temporal distribution of carbon in its various forms in the United States. With this Program Announcement, NSF invites the U.S. scientific community to submit proposals to conduct innovative research into the fundamental bio-ecological, geochemical, and geophysical processes underlying this distribution.

For the FY 2002 competition, research proposals with a vision for laying the groundwork for the next decade of carbon cycle research are solicited. In keeping with the goals of the CCSP, some projects might be most profitably directed toward the geographic region of North America (Canada, United States, Mexico, and adjacent ocean basins). In other cases, scientific expediency may require that investigations be conducted at sites outside North America and adjacent marine environments.

Proposals addressing the following five areas of carbon biogeochemistry and carbon cycling are of special interest:

1. Focused Process Studies

Process studies improve our knowledge of poorly understood chemical, biological, and physical processes operating at a variety of spatial and temporal scales within the carbon cycle by helping to define and quantify key mechanisms responsible for carbon transformations and exchanges between land, sea, and air. Coupled with a program of empirical observations and modeling, process studies may be directed to identify and quantify the major phenomena regulating carbon cycling at the level of continents, ocean basins, or in critically important ecological, geological, or hydrographic provinces within them. Recent process studies of the carbon cycle have included, among others, interdisciplinary synoptic field studies in priority terrestrial and marine regions, experimental manipulation of mesocosms and other whole-ecosystem field sites, and ocean biological pump and solubility pump studies. For both terrestrial and marine systems, process studies of innovative design may provide the most important path for understanding the fundamental interactions between micronutrients, biological communities, and the physical regime.

Some key questions are:

• What are the fundamental chemical, biological, ecological, and physical processes regulating the transformations of carbon in terrestrial, atmospheric, and marine environments?

• What are the major mechanisms regulating the distributions and cycling of carbon in North America and adjacent ocean basins?

• What are the major mechanisms and associated rates of carbon transfer within and among land, sea, and air reservoirs?

Although process studies coordinated with current or forthcoming observational studies in North America and adjacent ocean basins would be particularly appropriate for FY 2002, there may be compelling scientific reasons to begin comparative studies in other regions as well. Ideally, small laboratory and field projects addressing these questions should be related to or coordinated with larger regional- and global-scale investigations or research at time-series stations.

For both terrestrial and ocean-based process studies, coordination with research teams involved in other types of carbon cycle research is strongly encouraged. Investigators seeking support under this Announcement are also encouraged to seek out and take advantage of opportunities to collaborate with researchers associated with other domestic and international research programs such as CLIVAR, the Ameriflux Program, and the HOT and BATS (and other) ocean time-series stations.

2. Drainage Basin and Ocean Margin Studies

Continental margins are the active interface between terrestrial and marine environments. Because the contributions of drainage basin and continental margin processes to global carbon dynamics on climate-relevant time scales are still poorly constrained, there is a need for field and modeling studies to resolve this issue. In FY 2002, there is a special need to initiate research directed toward the following questions:

• What are the major drainage basin and fluvial patterns and mechanisms regulating the distribution and redistribution of

carbon in terrestrial environments (including soils), its delivery to the ocean margins, and its exchange with the atmosphere?
• What is the size and character of the riverine carbon pool and the timing of its mobilization?
• On ocean margins, what are the mechanisms and rates of carbon (including methane hydrates) transformations, transport, and burial, and exchange with the open ocean?
• What factors control the efficiency of the solubility and biological pumps in coastal environments, and how do biogeochemical processes on the ocean margins influence the chemistry and biology of open ocean surface waters?

3. Global Modeling and Empirical Studies

One of the important lessons learned from two decades of global carbon cycle and climate research is that the utility of focused process studies can be maximized by including global data synthesis and modeling activities as integral components of the research initiative at the outset. The following are a few of the many opportunities for incorporating a vigorous modeling and data synthesis effort into the next decade of carbon cycle research:
• Studies to model carbon and nutrient dynamics in soils and terrestrial ecosystems over broad continental regions.
• Studies that contribute to a global hydrographic and tracer re-survey aimed at determining how the distribution of carbon dioxide, including that generated by human activities, vary in space and time in the surface and deep waters of the world ocean.
• Studies to optimize the design of observational networks.
• Studies to identify and develop proxy records that could be used to model the historical and contemporary carbon cycle, understand its history, and predict its future behavior.
• Studies to improve the representation of interactive physical and biogeochemical processes in carbon cycling and climate models.

4. Effects of Climatic Change and Variability on the Carbon Cycle

Proposals advocating innovative approaches to predict the effects of climatic change and climate variations (rainfall, length of growing season, soil moisture, etc.) are encouraged. In addition to prospective studies, retrospective (paleoclimate and paleoenvironment) investigations of the geologic record of the last 2000 years are appropriate. Research foci include but are not limited to:
• Studies that integrate physical, biogeochemical, and biological measurement, experimentation and modeling approaches over relevant time and space scales in order to determine probable response of marine and terrestrial systems to climatic change and variability, and to identify feedbacks to the climate system.
• Studies that address factors and processes that contribute significantly to system stability and resilience are appropriate in the context of understanding system behavior in the future.

5. Data Management and Development of Standards and Methods

To support a fully integrated global effort to understand carbon biogeochemistry and its relation to climate, a system for data management and quality control is essential. To build the necessary infrastructure, innovative approaches to efficient management of large databases generated from multiple sources are required. Priority areas of research include:
• Development of innovative approaches to data collection, assimilation, storage, sharing, retrieval, and archiving.
• Development of standard reference materials (SRM) and/or standard methods (SM) relevant to the determination of carbon and associated nutrients in priority matrices for which SRMs or SMs currently do not exist.
• Development of lower-cost sensors and improved methods for determining concentrations and fluxes of atmospheric greenhouse gases.
• Development and intercomparison of methods for estimating fluxes of gases between the atmosphere and the earth's surface.

Proposals with any level of organizational complexity — from single-investigator to multi-investigator, multi-institutional — will be considered. The total funding under this announcement in FY 2002 is expected to be approximately $11M, from which 20-35 awards will be made with durations up to five years. Roughly one-half of the total funding will be directed to support projects with a primarily oceanographic (including sea-air) focus, and roughly one-half will be directed to support projects with a primarily terrestrial and/or atmospheric focus. The deadline for full proposal submission is **March 5, 2002**. For additional information, please contact the cognizant program officers listed in the announcement.

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National Science Foundation Carbon Cycle Research Program Information and Announcement at:

www.nsf.gov/cgi-bin/getpub?nsf02106

PROGRAMS OF THE AMERICAN CHEMICAL SOCIETY

PETROLEUM RESEARCH FUND

The Petroleum Research Fund was established as a trust in 1944 by seven major oil companies. ACS must use the available funds "for advanced scientific education and fundamental research in the 'petroleum field', which may include any field of pure science which Ö may afford a basis for subsequent research directly connected with the petroleum field". Grants are made to nonprofit academic institutions in the US and other countries in response to proposals. Fundamental research is currently supported in chemistry, the earth sciences, chemical engineering, and in related fields such as polymers, materials science, and the chemistry/biology interface.

Since the first ACS PRF grants were approved in 1954, several grant programs have evolved to serve segments of the scientific community. PRF funding commitments in 2001 totalled $18.0 million. For 2002, commitments are expected to total about $25 million. No overhead costs may be charged to any ACS PRF grant. Travel may be reimbursed up to $2,000 per year (this limit does not apply to field research). Effective 2002, principal investigators may receive no more than $7,500 per year in summer salary and benefits from a PRF grant. PRF prefers to support people rather than purchase capital equipment; limited budget requests for capital equipment should be matched with institutional funds.

Most grants begin September 1, but an earlier start can be negotiated. Applications for research grants may be submitted throughout the year with no deadlines. The PRF Advisory Board normally meets to review proposals three times a year, in February, May, and October. Applications should be received at least four months before the meeting at which consideration is desired. Prospective applicants should call the PRF office for current information on dates of submission and consideration.

ACS PRF TYPE AC GRANTS. This largest of the PRF grant programs usually funds proposals from graduate departments, but undergraduate faculty may apply. For grants beginning in 2002, the maximum amount is $120,000 over three years. While most AC grants will provide $80,000 over two years, it is expected that 15-25% will be for three years. No competitive advantage is gained by applying for less than the maximum allowable amount or time period. Budget may include stipends for graduate students, undergraduates, or postdoctoral fellows, summer salary for the principal investigator, research supplies, travel costs, and a $500 annual departmental allocation. In 2001, 636 applications resulted in 203 grants totaling $12,908,930. Approximately 15% of these grants were for a three-year period.

ACS PRF TYPE B GRANTS. Type B grants are restricted to departments which do not award the doctoral degree. The fundamental research proposed must include participation by undergraduate students. Graduate students and Postdoctoral Fellows may **not** be supported with Type B funds. For grants beginning in 2002, the maximum amount is $50,000 for **three** years. It is expected that all Type B grants will be awarded for three years unless a shorter period and proportionately smaller amount is requested. No competitive advantage is gained by applying for less than the maximum allowable amount or time period. Budget should include undergraduate student stipends, and may include summer salary for the principal investigator, supplies, equipment, travel costs, and a $500 annual departmental allocation. In 2001, 98 applications resulted in 41 Type B grants with a total value of $1,215,425.

ACS PRF Type G "Starter" Grants. Intended for new faculty within the first three years of a regular appointment as an Assistant Professor or the equivalent. Beginning in 2002, the award amount is $35,000 over two years. A detailed budget is not required. A Type G grant may fund student stipends, summer faculty salary, supplies and equipment, and travel. Upon receipt, Type G applications are sub-divided based upon the highest degree granted in the applicant's department. Type G applications from faculty holding positions in non-doctoral departments are considered in competition only with applications from faculty in similar departments. Only faculty at U.S. institutions may apply. In 2001, 386 applications from faculty in graduate and undergraduate departments resulted in 138 grants totalling $3,450,000.

Summer Research Fellowships. Awarded as supplements to active ACS PRF grants. These fellowships are intended to support faculty guest researchers from non-doctoral departments. A Fellowship of $8,000 is provided to support a faculty visitor. Application is made by the host ACS PRF grantholder. The deadline for applications is December 1, for fellowships which are to be effective the following summer.

ACS PRF Type SE Grants. A variety of projects designed to enhance "...advanced scientific education and fundamental research in the 'petroleum field'..." may be considered. Most awards provide partial funding for foreign speakers at major symposia in the U.S. or Canada (limit of $1,200 per speaker and $3,600 per symposium). **Applications must be received one month before the PRF Advisory Board meeting at which consideration is required.** Type SE grants must be approved by the ACS Committee on Grants and Awards, acting on recommendation of the Advisory Board, before the symposium for which support is requested. For example, the May PRF Advisory Board meeting in any year is the last at which requests for support of symposia at the Fall ACS National Meeting in the same year can be considered.

The American Chemical Society, Petroleum Research Fund
1155 Sixteenth Street, NW Washington, DC 20036
(202) 872-4083
Email: **prfinfo@acs.org**
Website: **chemistry.org/prf**

Please direct any questions to the geochemistry/geology Program Officer: Dr. Barbara Ransom,
b_ransom@acs.org, (202) 872-4083

EUROPEAN RESEARCH FACILITIES:

Earth and Environmental Sciences Synchrotron Research in the UK: Ongoing Work and Future Prospects.

A review on behalf of the community by C.M.B. Henderson, Department of Earth Sciences, University of Manchester, M13 9PL and Daresbury Laboratory, WA4 4AD. (chenderson@fs1.ge.man.ac.uk)

See also: http://www.srs.dl.ac.uk/enviro

Introduction

Major advances in our understanding of processes occurring in the natural environment, on scales varying from molecular to tectonic, are being achieved worldwide using the unique properties of Synchrotron Radiation (SR). SR is particularly valuable because analytical and structural techniques are available for all types of materials (amorphous and crystalline solids; solutions; gases; inorganic, organic and biological samples). Many reactions can be studied *in situ* at controlled temperature (T), pressure (P), and chemical environment. The Daresbury Laboratory near Warrington houses the UK Synchrotron Radiation Source (SRS); this '2nd generation' source was the first accelerator in the world to be dedicated to SR research. The mineralogical and geo-bio-chemical SR research programme is now well established with researchers based in about 15 Universities and Research Institutes and the multidisciplinary facilities of the SRS are being applied to topics ranging from the cycling of toxic metals to the stabilities of minerals at deep Earth conditions.

Synchrotron Radiation (SR)

Electrons accelerated at close to the speed of light in a 'storage ring' emit SR tangentially to the ring and this is extracted along 'beamlines'. This SR is orders of magnitude more intense than laboratory sources, is naturally polarized, can be focussed, and consists of 'white' electromagnetic radiation with wavelengths varying continuously from the infrared to hard X-rays. Gratings and single crystals are used to select monochromatic radiation of a chosen wavelength. A unique series of experimental 'probes' ideally suited for Earth sciences and environmental research includes:

- X-ray Absorption Spectroscopy (XAS) provides element-specific, structural (short range order) and speciation information for solids, liquids and gases in concentrated (transmission) and dilute (fluorescence detection) systems;
- Monochromatic powder and single crystal X-ray diffraction (XRD) for structure determination under ambient or high-P/-T conditions;
- Polychromatic energy-dispersive X-ray powder diffraction (ED-XRD) for kinetic studies carried out in furnaces, hydrothermal bombs, and large volume presses;
- Small Angle X-ray Scattering (SAXS) to characterise particle sizes (10≈-1mm) in physically heterogeneous systems;
- Vacuum-Ultraviolet (VUV) and Infrared (IR) spectroscopies;
- Time-resolved, fluorescence lifetime spectroscopy of photochemical reactions.

Representative examples of how most of these techniques have been applied in the Earth and environmental sciences research programme are given below.

Highlights

Water in the Earth's upper mantle. The breakdown of dense hydrous minerals in the upper mantle releases water but our understanding of the stabilities of these phases has been limited by the inability to characterise them *in situ* at high P and T. A dense hydrous magnesium silicate, structurally similar to talc but with higher water contents (the '10-angstrom phase'), has been studied by Chinnery et al. (1999) using *in situ* ED-XRD experiments at 65 kbars in a large-volume, 'Walker' cell (Figure 1). By varying the temperature it was possible to cycle between talc and '10-angstrom phase' proving conclusively that the latter is a possible high-P phase in the upper mantle, rather than a quench phase as some researchers had suggested.

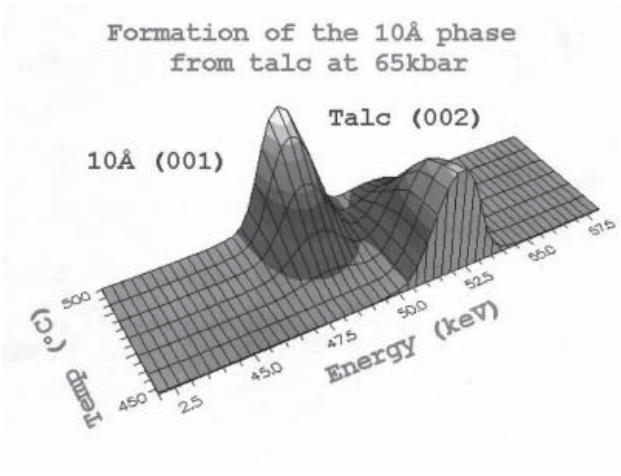

Figure 1. A dynamic experiment shows that the basal XRD peaks confirm that talc can be transformed into the water-rich '10-angstrom phase'.

In related work ED-XRD and the Walker cell have been used to determine the equations of state of hydrated silicates at up to 70 kbars and 1073 K (e.g., zoisite: Pawley et al., 1998), and monochromatic (angle dispersive) powder XRD in a heated diamond anvil cell, together with Rietveld refinement methods,

have been used to determine the structure of a high-P polymorph of lawsonite at Ps up to 165 kbar (Pawley and Allen, 2001).

Toxic metal cycling

Important processes in the cycling of toxic metals are their transport mechanisms and their 'fixation' as precipitates or adsorbates on mineral surfaces, so affecting their bioavailability. Iron oxy-hydroxides are common in soils and the hydrosphere as colloids and as surface coatings on mineral substrates. XAS experiments on dilute systems have been carried out on how these oxide 'gels' adsorb metals such as Cd, Hg and U (Parkman et al., 1999; Randall et al., 1999; Collins et al., 1999; Moyes et al., 2000). Figure 2 shows an XAS spectrum for Cd adsorbed on goethite. The adsorbed complex can be deduced from the bond lengths from Cd to the first shell of oxygens and from Cd to an outer shell of Fe atoms.

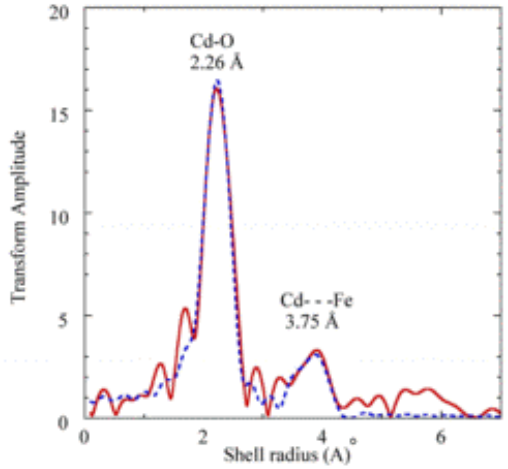

Figure 2. The K-edge for Cd adsorbed on goethite shows that Cd is adsorbed as an octahedral 'inner-sphere' complex with six oxygens at 2.26≈. The Cd-Fe bond length of 3.75≈ confirms that the Cd-O_6 complex shares two oxygens ('bi-dentate') with the goethite Fe^{3+}-O_6 chain structure.

XAS is also being used to study the speciation of toxic trace metals in aqueous fluids (e.g., Sb: Mosselmans et al., 2000; Sherman et al., 2000; In: Seward et al., 2000; U: Mosselmans et al., 2001), hyperaccumulator plants (e.g., Ni, Pb: Kr‰mer et al., 1996; Cotter-Howells et al., 1999), and complexed with sulphides (e.g., Tc, Re: Wharton et al., 2000). Such fundamental information on the mechanisms of toxic metal cycling impacts on the development of improved strategies for reducing pollution and remediating contaminated land.

Dynamics of mineral reactions

Precipitation and recrystallization reactions that occur on timescales of minutes to a few hours can be studied dynamically using SR providing new information on reaction mechanisms and thermochemical properties. Hydrothermal

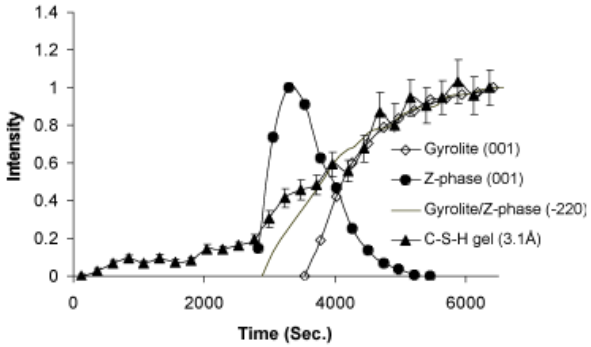

Figure 3. Changes in peak areas of diffraction peaks in the ED-XRD pattern for the hydrothermal crystallization of an amorphous CSH starting material as a function of time show the stepwise nature of the reaction.

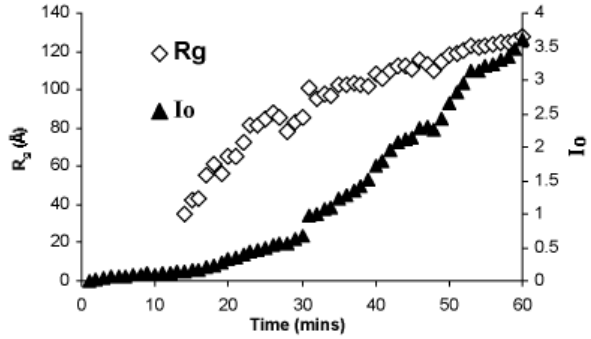

Figure 4. Changes in the intensity of the SAXS invariant (I_o) and of the radius of gyration (R_G) provide information on the precipitation and coarsening of chromium oxide colloids.

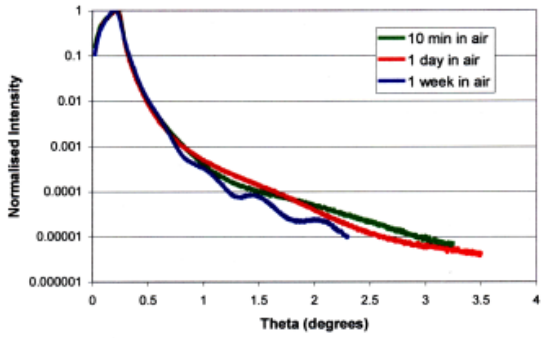

Figure 5. Reflectivity profiles from pyrite samples exposed to air for different times. Oscillations for the sample exposed to air for 1 week suggest formation of an oxidised layer 50 to 70 angstroms thick

crystallization of calcium silicate gels in PTFE-lined steel 'bombs' has been studied by ED-XRD (e.g., Shaw et al., 2000) and provides information on the stability of these phases in

concrete-encapsulated waste repositories. Figure 3 shows that the crystallization of the calcium silicate hydrate (CSH) mineral gyrolite can be divided into three stages: formation of a poorly ordered 'CSH-gel' is followed by nucleation of the 'Z-phase' which in turn is replaced by gyrolite (Shaw et al., 2002). Analysis of the data obtained at different Ts provides incubation times, rate constants, and ultimately activation energies of both nucleation and growth. The ED-XRD method has also been used to study the recystallization kinetics of mackinawite to hexagonal pyrrhotite under rigorously anoxic conditions (Benning, unpublished work).

SAXS combined with XRD can also be used to study mineral reactions (e.g., Shaw et al., 2000). In figure 4, transmission SAXS results for Cr-oxyhydroxides at room temperature provide information on the precipitation and coarsening of colloids; these studies impact on treatment of high-level, radioactive waste (Shaw and Ritherdon, unpublished work).

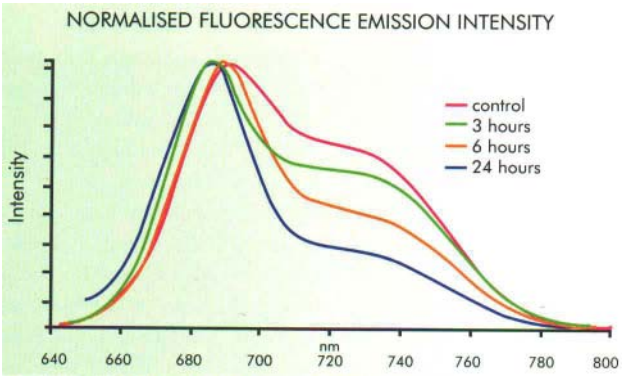

Figure 6. Fluorescence emission spectra, excited at 430nm, of apple leaves exposed to the fungal toxin cytochalasin E show marked changes in the fluorescence intensities of peaks at 680 and 730nm.

Surface reactions of sulphide minerals

Glancing angle, monochromatic X-ray reflectivity experiments can be used to probe the uppermost layers of flat mineral surfaces, the lower the angle the shallower the penetration depths. *In situ* surface oxidation experiments in the presence of aqueous fluids have been carried out on pyrite under electrochemical control in order to deduce the conditions under which thin oxidized surface layers form (Figure 5; Wogelius and Farquhar, unpublished work). In other research, glancing angle, reflection XAS techniques on sulphide surfaces treated with xanthates have provided information on the mechanisms of the froth flotation processes used for mineral beneficiation (Pattrick et al., 1999).

Pollution damage to plants

It is clear that environmental conditions affect the health of trees in forests and orchards. The time structure of a 'single-bunch' SR beam allows study of leaves from plants exposed to ozone and fungal toxins (Figure 6) and changes in chlorophyll fluorescence lifetimes reflect the extent of pollution damage (Kshirsagar et al., 2001). These changes in fluorescence provide an 'early warning' method for monitoring damage to the photosynthetic apparatus well in advance of any visible deterioration of the leaves.

Chemical state imaging

The combination of photoelectron microscopy with soft X-ray spectroscopy (X-ray photoemission electron microscopy, X-PEEM) provides a unique method for producing 2-D images for displaying valency state variation for the 3*d*-transition elements in geological samples. Early work at the SRS (Smith et al., 1998) was limited by beam intensity and source size and the project has now evolved to include research at the ALS, Berkeley as part of the 'Envirosynch' programme (see below). Figure 7 shows an Fe^{3+}-image (resolution about 30nm) obtained at ALS for an oxidised synthetic magnesio-w¸stite (Smith and Schofield, unpublished work). This technique for studying redox systems is equally applicable to petrology (e.g., Fe^{2+}/Fe^{3+}) or environmental geochemistry (e.g., Cr^{3+}/Cr^{6+}).

New users and recently started projects on the SRS.

- Sr speciation in coral aragonite (EXAFS; Finch and Allison)
- *In situ* silicification of cyanobacteria (IR imaging; Benning)
- Density/viscosity of Fe-Ni alloy melts (white beam XRD; Dobson)
- Immobilisation of toxic metals in soils using phosphates (EXAFS; Hodson)
- Identification of pigments in a 19th century paintbox (XRD; Martin)

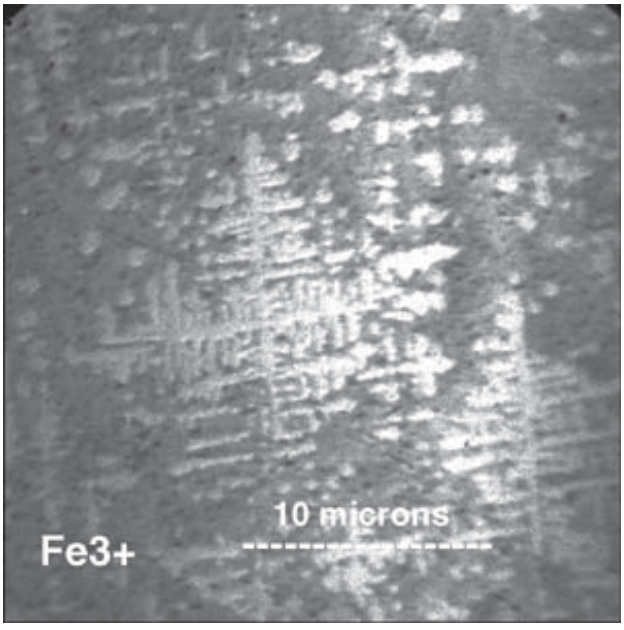

Figure 7. X-PEEM map of the distribution of Fe^{3+} in an Fe^{2+}-rich, oxidised magnesiowustite host. The skeletal Fe^{3+} rich zones mark the site of exsolved magnetite.

Future prospects

New facilities are continually being developed on the SRS. Those of interest to Earth and environmental sciences researchers include: fast dynamic ED-XAS; a new IR microprobe (spot size 5mm); both white and monochromatic options for high-P multi-anvil research; combined XRD, SAXS, XAS for dynamic materials research at elevated T and P.

A new synchrotron (DIAMOND) has now been funded and will be built at the Rutherford-Appleton Laboratory, near Oxford, on the same site as the neutron source ISIS. This 3rd-generation source, with its very bright beams and excellent microprobe resolution (<1mm spot size), will provide superb facilities for Earth and environmental sciences research.

The first seven beamlines on DIAMOND should be available from late 2006 and include stations specialising in high-P/T research and micro-XAS. Before then, the Natural Environment Research Council (NERC) and the Daresbury Laboratory are jointly funding the Envirosynch programme which involves research visits to leading 3rd-generation synchrotrons to carry out demanding experiments and to help plan for DIAMOND. Up till now visits have been made to ESRF, Grenoble (micro-XAS, SAXS), APS, Argonne (micro-EXAFS, multi-anvil high-P, surface diffraction/XAS), and ALS, Berkeley (DAC high-P, X-PEEM, IR). Further details on Envirosynch and reports on the research carried out can be seen on http://www.srs.dl.ac.uk/envirosynch

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MEETINGS ANNOUNCEMENTS

GOLDSCHMIDT 2003

13TH ANNUAL
V. M. GOLDSCHMIDT CONFERENCE
SEPTEMBER 7-12, 2003
KURASHIKI, JAPAN

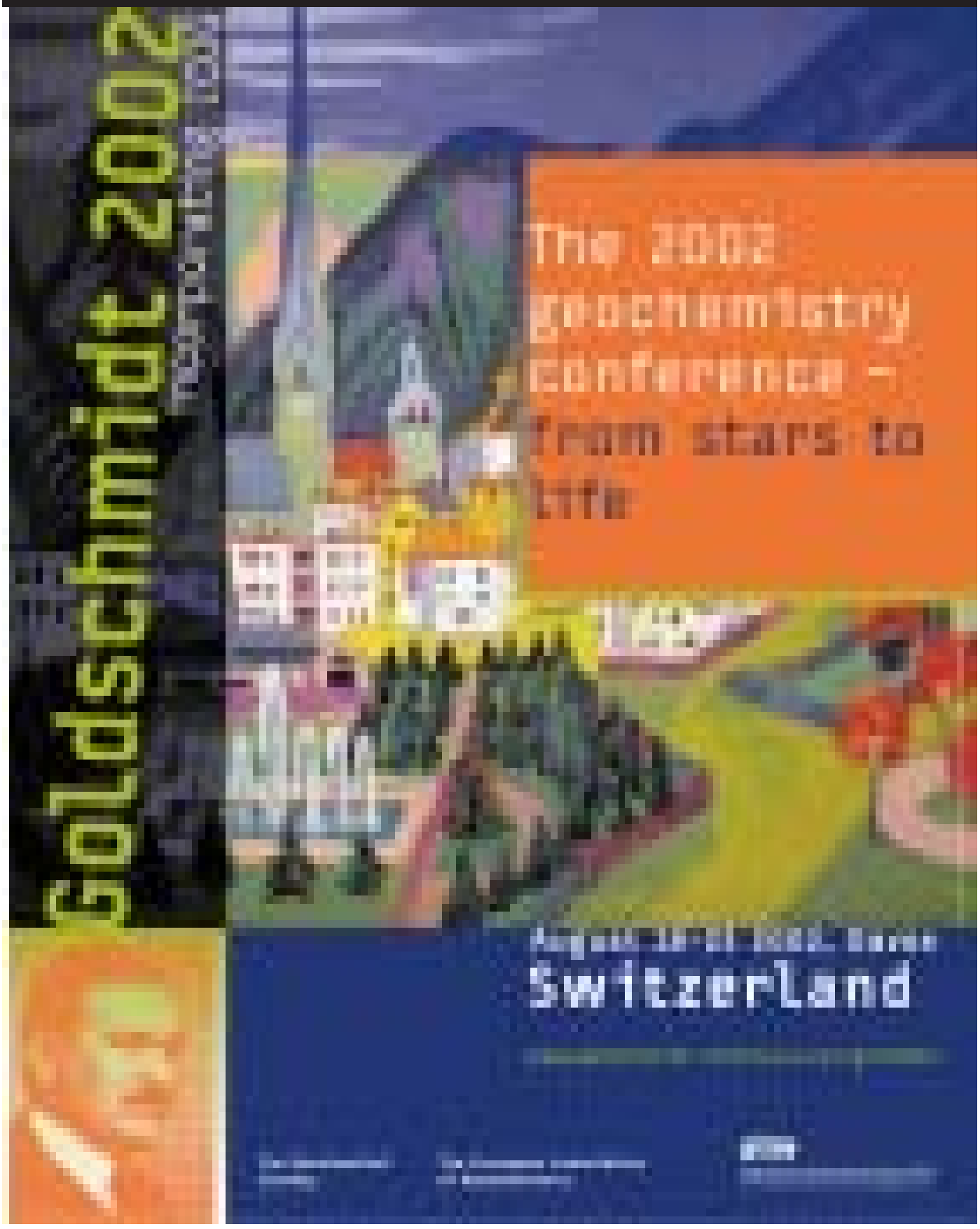
To register your interest in Goldschmidt 2003 and receive any further announcements regarding the conference, please send the following information by e-mail to gold2003@ics-inc.co.jp :

- Your name (LAST, First)
- Institution
- Mailing Address
- Phone Number
- Fax Number
- e-mail address

For further inquiries, please contact:
Organizing Committee of Goldschmidt 2003
c/o International Communications Specialists, Inc.
Sabo Kaikan-bekkan, 2-7-4 Hirakawa-cho,
Chiyoda-ku, Tokyo 102-8646, Japan
gold2003@ics-inc.co.jp

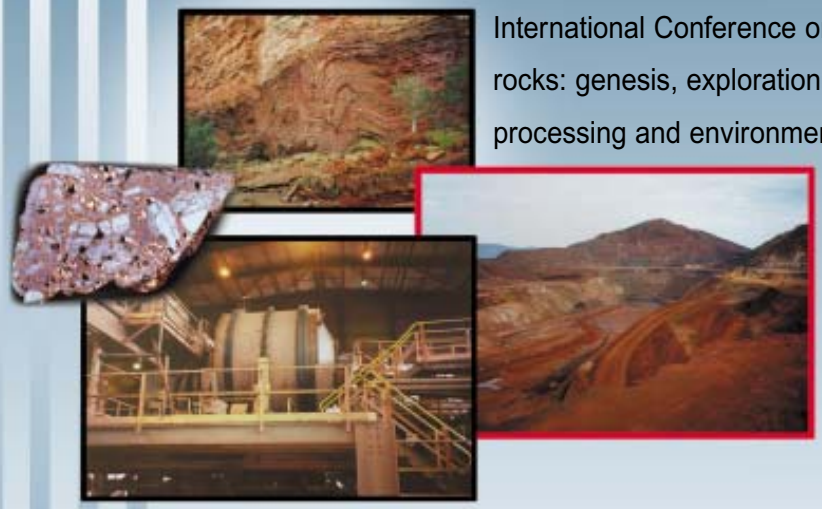
http://www.ics-inc.co.jp/gold2003/

MEETINGS ANNOUNCEMENTS



MEETINGS ANNOUNCEMENTS

Call for Papers and Expressions of Interes



International Conference on Iron Ores and their host rocks: genesis, exploration, mining, mineralogy, processing and environment in the new millennium.

CSIRO

THE AUSTRALASIAN INSTITUTE OF MINING & METALLURGY FOUNDED 1893

IRON ORE 2002

9 – 11 September 2002

Perth, Australia

THE CONFERENCE

Iron Ore 2002 is a major international Conference organised to bring together scientists and operators involved in all aspects of the industry from the host rocks to iron ore production. This is a unique opportunity to learn about the latest developments in the genesis, geology, exploration, mineralogy, mining and processing of iron ores, including the environmental impact.

The Conference is sponsored by The Australasian Institute of Mining and Metallurgy, CSIRO Minerals and CSIRO Exploration and Mining.

WORKSHOPS

Workshop programs to be held in conjunction with this event are welcome, please advise us of your interest.

THE THEMES

The theme of Iron Ore 2002 is the integration of iron ore operations from geology and exploration through to beneficiation and agglomeration. The main areas that will be covered include:

- Geology and ore genesis , which will include a wide range of topics such as geological setting from regional to mine scale, geochemistry, geochronology, petrology, mineralogy (both ores and oxides) and paleoclimatology.
- Geophysics and remote sensing , which will cover geophysical techniques suitable for exploration, mining, environmental monitoring and rehabilitation at regional, mine and ore body scale.
- Mining , which will include all aspects from pit design and optimisation to blasting, ore haulage, ore classification and ore characterisation.
- Processing , which will include beneficiation and agglomeration.

SUBMISSION OF PAPERS

We invite Authors wishing to present papers atIron Ore 2002 to submit an Abstract not exceeding 300 words of each paper in English. You may use email for submission of your Abstracts and to indicate your interest in attending.

Papers which are accepted by the Conference will be subject to peer review. Authors are expected to attend the Conference to present their papers.

The schedule for the preparation of the papers is:

- 14 January 2002
  Closing date for receipt of Abstracts
- 21 January 2002
  Authors notified of acceptance of Abstracts
- 22 April 2002
  Closing date for receipt of papers

Submit your abstract to: Angie Spry, Publications Co-ordinator, on facsimile (03) 9662 3662 or email: publications@ausimm.com.au

Express your interest via: www.ausimm.com

MEETINGS ANNOUNCEMENTS

THE 20TH ANNIVERSARY CONFERENCE OF THE INTERNATIONAL HUMIC SUBSTANCES SOCIETY (IHSS11) TO BE HELD AT NORTHEASTERN UNIVERSITY, BOSTON, USA JULY 21 TO JULY 26, 2002

WE ARE PLEASED TO TELL YOU THAT ON-LINE REGISTRATION AND
NORTHEASTERN ACCOMMODATION RESERVATION IS NOW AVAILABLE TO YOU AT:

http://www.hagroup.neu.edu/IHSS11.htm

Please note that Early Registration ends on November 30, 2001 and that the Extended Abstract deadline is December 31, 2001.

Also note that Humic Substances Seminar VI will be held on Saturday, July 27, 2002 at Northeastern, immediately following IHSS11. Seminar details, the Seminar VI Registration Form and the Advertiser Registration Form may also be found at our web site <www.hagroup.neu.edu>. The Seminar abstract deadline is December 31, 2001.

For further information, contact:

Elham A. Ghabbour, Ph.D., CChem., MRSC, Staff Scientist
The Barnett Institute of Chemical and Biological Analysis, 341 Mugar Hall
Northeastern University, Boston, MA 02115-5000
Phone: (617)373-7988 Fax: (617)373-2855
E-mail: e.ghabbour@neu.edu

CALL FOR PAPERS

Contributions are invited for oral and poster presentation at 'Emerging Concepts in Organic Petrology & Geochemistry' - the 2002 Joint Meeting of The Canadian Society for Coal Science and Organic Petrology and The Society for Organic Petrology.

The conference will take place **August 31 - September 2, 2002** at the Banff Conference Centre, Banff, Alberta, Canada and will cover the following themes: Shallow thinking; Solid bitumen and pyrobitumen; Sources (and sinks) of natural gas; Novel analytical approaches; Petroleum systems; Coal and environment.

Papers are invited on the above themes for presentation as oral and poster papers at the conference. The deadline for submission is December 1, 2001.

For full details, including preliminary details on a number of pre and post-meeting field trips, please visit:

www.cscop-tsop2002.com

or contact *t.collier@elsevier.co.uk*

Emerging Concepts in Organic Petrology & Geochemistry is sponsored by Elsevier Science and the European Association of Organic Geochemists.

MEETINGS CALENDAR

Jan. 21-25, 2002: Chapman Conference: Explosive Subaqueous Volcanism,"Dunedin, New Zealand. Contact: J.D.L. White, University of Otago, Dunedin, New Zealand (E-mail: james.white@stonebow.otago.ac.nz) and Bruce F. Houghton, University of Hawaii, Honolulu (E-mail: bhought@soest.hawaii.edu).

Jan. 27-30, 2002: Tailings and Mine Waste '02, Colorado State University, Fort Collins, Colorado, USA. Contact: Linda Hinshaw, Department of Civil Engineering, Colorado State University, Fort Collins, CO 80523-1372, USA; Phone: +1 970 491 6081; Fax: +1 970 491 3584/7727; E-mail: lhinshaw@engr.colostate.edu.

Jan. 28-31, 2002: WG/IGCP 433 and 2nd Italian-LatinAmerican Meeting and field trip on the Motagua Suture Zone of Guatemala, Guatemala. Web site: http://www.ig.utexas.edu/CaribPlate/news/guat_announce1.htm and http://www.ig.utexas.edu/CaribPlate/news/guat_circ1.htm

Feb. 11-15, 2002: AGU Ocean Sciences Meeting, Honolulu, Hawaii, USA. Web site: http://www.agu.org.

Feb 13-15, 2002: Bi-annual Australian Organic Geochemistry Conference, Hobart, Tasmania, Australia. Web site: http://www.marine.csiro.au/conf/aogc/index.htm

Feb. 25-27, 2002: 2002 SME Annual Meeting and Exhibit: Minerals for the future, Phoenix, Arizona, USA. Web site: http://www.smenet.org/meetings/2002_Call.html

March 3-6, 2002: The Society for Organic Petrology (TSOP) 18th Annual Meeting, Westchase Hilton and Towers Meeting and Convention Center, Houston, TX, USA Contact: Coleman Robison, ChevronTexaco, Energy Research Tech. Co., 4800 Fournace Place, Bellaire, TX 77401-2324; Phone: +1 713 432 6828; Fax: +1 713 838 4628; E-mail: ColeRobison@chevrontexaco.com Web: http://www.tsop.org). NEW DATE! (Postponed from September 2001)

March 4-7, 2002: GeoProc2002, Bremen, Germany. Topic: Geochemical processes with long-term effects in anthropogenically affected seepage and groundwater. Contact: Fachbereich 5 - Geowissenschaften, Universit‰t Bremen, Postfach 330 440, D-28 334 Bremen, Germany; Prof. Dr. Horst D. Schulz; Phone / Fax: +49 421 218 3393 / 432; E-mail: hdschulz@uni-bremen.de; Dr. Astrid Hadeler; Phone / Fax: +49 421 218 3950 / 4321; E-mail: ahadeler@uni-bremen.de; Web site: http://www.geochemie.uni-bremen.de/index.html?/projects/spp/geoproc/geoproc.html

March 6-9, 2002: Karst Frontiers: Florida and Related Environments, Gainesville, Florida, USA. Contact: J. Mylroie, Department of Geosciences, P.O. Box 5448, Mississippi State University, Mississippi State, MS 39762, USA; Phone: +1 662 325 8774; Fax: +1 662 325 9423; E-mail: mylroie@msstate.edu; Web site: http://www.karstwaters.org/.

March 10-13, 2002: 2002 AAPG National meeting, Houston, Texas, with poster session on Geochemical Indicators of Depositional Environments. Web site: http://www.aapg.org/indexaapg.html

March 11-13, 2002: Geo 2002: The 5th Middle East Geosciences Exhibition and Conference, Bahrain. Contact: Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, UK; Phone: +44 207 8622000; Fax: +44 202 862 2078; E-mail: pmckean@montnet.com.

March 18-19, 2002: TSG meeting: transport and flow processes within shear zones, Burlington House, Piccadilly, London, UK. Convenors: Ian Alsop, Crustal Geodynamics Group, School of Geography & Geosciences, University of St. Andrews, Fife, Scotland, KY16 9AL UK, gia@st-andrews.ac.uk; Ken McCaffrey & Bob Holdsworth, Reactivation Research Group, Dept of Geological Sciences, University of Durham, Durham DH1 3LE, UK; E-mail: k.j.w.mccaffrey@durham.ac.uk, R.E.Holdsworth@durham.ac.uk; Martin Hand, Geology & Geophysics, University of Adelaide, Adelaide SA 5005, Australia; E-mail: martin.hand@adelaide.edu.au; Web site: http://www.st-and.ac.uk/~www_sgg/tsg2001.html

March 19-22, 2002: 19th Colloquium of African Geology, El Jadida, Morocco. Organized by ChouaÔb Doukkali University, Faculty of Sciences, El Jadida, Morocco and the Geological Society of Africa. Field trips start on March 23. Contact: Secretariat du 19Ëme CIGA, UniversitÈ ChouaÔb Doukkali, FacultÈ des Sciences, DÈpartement de GÈologie, B.P.20, 24000, El Jadida, Morocco; Phone: + 212 23 34 23 25 / 23 34 30 03; Fax: +212 23 34 21 87; E-mail: cag19@ucd.ac.ma. Web site: http://www.ucd.ac.ma/geologie/cag19.html.

March 20-27, 2002: Annual Meeting National Earth Science Teachers Association, San Diego, CA, USA. Contact: NESTA Meetings, 2000 Florida Avenue, N.W., Washington, D.C. 20009, USA; Phone: +1 202 462 6910: Fax: +1 202 328 0566; E -mail: fireton@kosmos.agu.org.

March 24-27, 2002: EMPG IX - Ninth International Symposium on Experimental Mineralogy, Petrology and Geochemistry, Z¸rich, Switzerland. Contact: EMPG IX Organizing Committee, Institute for Mineralogy and Petrography, Department of Earth Sciences, ETH Zentrum, Sonneggstrasse 5, CH-8092 Z¸rich, Switzerland; Phone: +41 1 632 3779 (or 3955); Fax: +41 1 632 1294; E-mail: empg@erdw.ethz.ch; Web site: http://eurasia.ethz.ch/empg/

March 25-27, 2002: 17th Himalaya-Karakoram-Tibet Workshop, Gantok, Sikkim, India. Contact: Chandra Shekhar Dubey; E-mail: csdubey@vsnl.com, chandrasdubey@vsnl.net, csdubey@yahoo.com. Web site: http://csdubey.topcities.com/fpexp/index.htm

April 7-11, 2002: Geochemistry Division, American Chemical Society 223rd National Meeting, Orlando, Florida, USA. Includes for instance symposium on Stable Isotope Signatures for Establishing Palaeoenvironmental Change and on Complexity at the Water-Solid Interface: Mineral Surfaces and Nanoparticles. Symposia web site: http://membership.acs.org/G/GEOC/. Abstract submission at: http://oasys.acs.org/.

April 10-12, 2002: 4th European ODP Forum - towards, Troms¯, Norway. E-mail: kairm@ibg.uit. Web site: http://www.ibg.uit.no/geologi/konferanser/odpforum/index.htm

April 24-26, 2002: 15th Argentine Geological Congress, El Calafate, Santa Cruz Province, Southern Patagonia, Argentina. (Contact: President Dr. Miguel Haller, or Secretary Dr. Roberto Page, Asociacion Geologica Argentina, Maipu 645, 1er Piso, Buenos Aires, Argentina; Phone: + 54 11 4325 3104; E-mail: haller@cenpat.edu.ar or fomicruz@internet.siscotel.com.

April 29-May 1, 2002: 3rd International Conference on Applications of Stable Isotope Techniques to Ecological Studies, Flagstaff, Arizona, USA. Contact: Dr. Joseph Shannon, Northern Arizona University, Department of Biological Sciences, P.O. Box 5640, Beaver St. Building 21, Flagstaff, AZ 86011, USA; Phone: +1 928 523 1740; Fax: +1 928 523 7500; E-mail: joseph.shannon@nau.edu; Web site: 207.195.94.13/isoecol/

May 6-10, 2002: 345th International LiËge Colloquium on Ocean Dynamics: Tracer Methods in Geophysical Fluid Dynamics, LiËge, Belgium. Web site: http://modb.oce.ulg.ac.be/Colloquium

May 8, 2002: 100th Anniversary of the eruption of Mt. Pelee. International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) workshop, Martinique. Web site: http://www.iavcei.org.

May 12-17, 2002: 48th Annual Meeting Institute on Lake Superior Geology, Kenora, Ontario, Canada. Contact: Peter Hinz, 104-810 Robertson Street, Kenora, Ontario, Canada P9N 4J2; Phone: +1 807 468 2822; Fax: +1 807 468 2930; E-mail: peter.hinz@ndm.gov.on.ca. Web site: http://www.ilsgeology.org/2002Mtg.html

May 14-18, 2002: AAPG Hedberg Research Conference 'Deformation, Fluid flow and reservoir appraisal in Foreland Fold- and Thrust Belts', Palermo - Mondello, Sicily, Italy. E-mail: Rudy.Swennen@ifp.fr. Web site: http://www.aapg.org/education/hedberg/index.shtml

May 19-23: 2002: 102nd General Meeting. American Society for Microbiology, Salt Lake City, Utah, USA. Contact: ASM 102nd General Meeting, c/o ExpoExchange, 108 Wilmot Road, Suite 400, P.O. Box 825, Deerfield, IL 60015-825, USA; Phone: 1-800-974-3621 or +1 847 940 2155; Fax: 1-800-521-6017 or +1 847 940 2386; E-mail: meetingsinfo@asmusa.org. Web site: www.asmusa.org.

May 20 - 24, 2002: The Sixth International Symposium on the Geochemistry of the Earth's Surface (GES-6), Honolulu, Hawaii, USA. Sponsors: The School of Ocean & Earth Science & Technology of the University of Hawaii, and The International Association of Geochemistry and

MEETINGS CALENDAR

Cosmochemistry (IAGC). Web site: http://imina.soest.hawaii.edu/oceanography/ges-6/

May 28-June 1, 2002: AGU Spring Meeting, Washington, DC, USA. Web site: www.agu.org.

June 3-7, 2002: Zeolite 2002, Aristotle University, Thessaloniki, Greece. Under the auspices of the International Committee on Natural Zeolites (ICNZ), by the Aristotle University of Thessaloniki and the Institute of Geology and Mineral Exploration (IGME). Contact: Prof. Panagiotis Misaelidis, Aristotle University, Department of Chemistry, P.O. Box 1547, GR-540 06 Thessaloniki, Greece; Phone: +30 31 997789; Fax: +30 31 997753; E-mail: misailid@chem.auth.gr. Web site: http://www.chem.auth.gr/activities/zeo2002/.

June 4–7, 2002: Fission-Track Analysis: Theory and Applications, C·diz, Spain. Contact: Luis Barbero; E-mail: ftcadiz2002@uca.es

June 8-13, 2002: 39th Annual Clay Minerals Society Meeting, Boulder, Colorado, USA. Web site: http://cms.lanl.gov/ or http://www.colorado.edu/geolsci/cms/

June 10-14, 2002: ASLO 2002 Summer Meeting: Inter-disciplinary Linkages in Aquatic Sciences and Beyond, Victoria, British Columbia, Canada. Web site: www.aslo.org /victoria2002

June 12-15, 2002: GEORAMAN 2002 - 5th International Conference on Raman Spectroscopy Applied to the Earth Sciences, Prague, Czech Republic. Contact: E-mail: georaman@natur.cuni.cz; Web site: www.natur.cuni.cz/~georaman

June 16-22, 2002: 16th Caribbean Geological Conference, Bridgetown, Barbados. Contact: 16th Caribbean Geological Conference, Energy and Natural Resources Division, c/o National Petroleum Corporation Building, Wildey, St. Michael Barbados; E-mail: cgc16th@hotmail.com; Web site: www.fiu.edu/orgs/caribgeol/.

June 17-21, 2002: Volcanism and the Earth's Atmosphere, 10th Anniversary Chapman Conference, Thera, Greece. Web site: www.agu.org/meetings/chapman.html

June 22-27, 2003 8th International Kimberlite Conference, Victoria, BC, Canada. Contact: Dr. Roger H. Mitchell, Geology Department, Lakehead University, Thunder Bay, Ontario, Canada. e-mail: rmitchel@gale.lakeheadu.ca. Website: www.venuewest.com/8IKC

June 24-25, 2002: 6th European Workshop on Laser Ablation ICP-MS, Utrecht, The Netherlands Web site: http://laicpms.geo.uu.nl/

July 14-17, 2002: Fifth International Conference on arsenic exposure and health effects, San Diego, California, USA. Society for Environmental Geochemistry and Health. Web site: http://www.cudenver.edu/as2000/

July 21-25, 2002: 9th International Platinum Symposium, Holiday Inn - Grand Montana, Billings, MT, USA. By the IGCP 427/SEG/SGA. Contact: Roger Cooper, Dept. of Geology, Lamar University, P.O. Box 10031, Beaumont, TX 77710, USA; Phone: +1 409 880 8239; E-mail: cooperrw@hal.lamar.edu. Web site: http://www.platinumsymposium.org/.

July 22-26, 2002: The Earth System and Metallogenesis - 11th Quadrennial IAGOD Symposium and GEOCONGRESS 2002, Windhoek, Namibia. Main theme: Sedimentary and magmatic responses to compressional and extensional tectonics and the associated ore-forming processes. Hosted by: The Geological Society of Namibia, the Geological Society of South Africa, The Geological Society. Contact: IAGOD / Geocongress 2002 Conference Secretariat, P.O. Box 9870, Windhoek, Namibia; Phone: + 264 61 251014; Fax: + 264 61 272032; E-mail (Alice Kaukuetu-Hue): geoconference2002@conferencelink.com.na. Web site: www.geoconference2002.com.

July 22-26, 2002: 65th Annual Meeting of the Meteoritical Society, UCLA DeNeve Plaza Conference Center, Los Angeles, CA, USA, the Meteoritical Society, Lunar and Planetary Institute. Contact: Paul H. Warren, Institute of Geophysics, UCLA, Los Angeles, CA 90095-1567, USA; Phone: +1 3108253202; E-mail: pwarren@ucla.edu; Web site: http://www.lpi.usra.edu/meetings/upcomingmeetings.html/

Aug. 12-15, 2002: 12th Stockholm Water Symposium - Balancing Competing Water Uses - Present Status and New Prospects, Stockholm City Conference Centre, Stockholm, Sweden. Contact: David Trouba, SIWI, Sveav-gen 59, 113 59 Stockholm, Sweden; Phone: +46 8 522 139 89; Fax: +46 8 522 139 61; E-mail: sympos@siwi.org. Web site: http://www.siwi.org

Aug. 14–21, 2002: World Congress of Soil Science, Bangkok, Thailand. For info: Contact o.sfst@nontri.ku.ac.th Web site: http://www.17wcss.ku.ac.th

Aug. 17-21, 2002: Biogeomon 2002, University of Reading, Reading, UK. Main Themes: Catchment monitoring /manipulations /models - Stable and radiogenic isotopes in the environment - Nutrient and metal cycling in natural and restored ecosystems - Archives of global change on the continents - Scaling of biogeochemical processes Web site: http://www.rdg.ac.uk/biogeomon/

Aug. 18-23, 2002: Twelfth Annual V.M. Goldschmidt Conference, incorporating ICOG X, Davos, Switzerland. Contact: Cambridge Publications, P.O. Box 27, Cambridge CB1 8TR, U.K; E-mail: Gold2002@campublic.co.uk. Web site: http://www.goldschmidt-conference.com/2002/gold2002/.

Aug. 26-31, 2002: MPMPS-6 High Pressure Mineral Physics Seminar, Verbania, Italy. Web site: http://www.hpmps.bgi.uni-bayreuth.de/

Aug. 26-Sept. 3, 2002: 4th International Workshop on Orogenic Lherzolites and Mantle Processes, Samani, Hokkaido, Japan. Web site: http://earth.s.kanazawa-u.ac.jp/LherzoliteWorkshop2002/

Aug. 29–31, 2002: Natural glasses 4, Lyon, France. For info: Contact Prof. Bernard Champagnon E-mail: natglasses@univ-lyon1.fr; Web site: http://natglasses.univ-lyon1.fr/

Aug. 31-Sept. 4, 2002: 8th FECS Conference on Chemistry and the Environment, Athens, Greece. Contact: Cambridge Publications, P.O. Box 27, Cambridge CB1 8TR, U.K; E-mail: Gold2002@campublic.co.uk. Web site: http://www.scientificjournals.com/espr/fecs/8thConf.2002

Aug. 31-Sep 4, 2002: CSCOP-TSOP meeting - "Emerging Concepts in Organic Petrology and Geochemistry", Banff, Alberta, Canada. Abstract deadline: January 31, 2002. Web site: www.cscop-tsop2002.com

Sept. 1-6, 2002: Mineralogy for the new millenium (IMA 2002), 18th General Meeting of the International Mineralogical Association, Edinburgh, United Kingdom. Contact: Mr K. Murphy, Executive Secretary, Mineralogical Society of Great Britain and Ireland, 41 Queen's Gate, London SW7 5HR, United Kingdom: Phone: +44 171 584 7516; E-mail: IMA@minersoc.demon.co.uk; Web site: http://www.minersoc.org/IMA2002

Sept. 2-7, 2002: Holocene environmental catastrophes and recovery, Brunel University, West London, UK. Co-sponsored by Brunel University, INQUA and PAGES. Contact: Contact: Prof. Suzanne A. G. Leroy, Department of Geography and Earth Sciences, Brunel University, Uxbridge, Middlesex UB8 3PH, (West London), UK; Phone: +44 1895 20 31 78; Fax: +44 1895 20 32 17; Phone secr: +44-1895-20 3215; E-mail: suzanne.leroy@brunel.ac.uk. Web site: http://www.brunel.ac.uk/depts/geo/Catastrophes/.

Sept. 4-6, 2002: 20th European Conference - SEGH 2002 - Heavy Metal Contamination and the Quality of Life. Debrecen, Hungary. The Society for Environmental Geochemistry and Health. Web site: www.date.hu/rendez/segh2002

Sept. 8-11, 2002: Hedberg Research Conference - The Hydrocarbon Habitat of Volcanic Rifted Passive Margins, Stavanger, Norway. Contact: Debbi Boonstra, AAPG Education Department, Post Office Box 979, Tulsa, OK 74101-0979, USA; Phone: +1 918 560 2630; Fax: +1 918 560 2678; E-mail: debbi@aapg.org; Web site: http://www.aapg.org/education/hedberg/index.shtml

Sep. 8-12, 2002: 21st IMOG Meeting (EAOG), Krakow, Poland. Web site: http://www.eaog.org/meetings/imog2003.html

Sept. 8-13, 2002: Fifth International Conference on Subsurface Microbiology (ISSM02), Copenhagen, Denmark. Deadline abstracts: 15 March 2002. Contact: ISSM02, Helsingevej 23, DK-2830 Virum, Denmark; Fax: +45 4583 9727; E-mail: issm02@er.dtu.dk, Web site: http://www.er.dtu.dk/.

MEETINGS CALENDAR

Sept. 9–10, 2002: Geochemical speciation: determination, controls, significance - Mineralogical Society - Geochemistry Group Meeting, Salford University, UK. Mineralogical Society - Geochemistry Group Meeting. Contact: Dr Linda S. Campbell (Salford) and Dr Steven A. Banwart (Sheffield); E-mail: L.S.Campbell@salford.ac.uk or S.A.Banwart@sheffield.ac.uk. Web site: http://www.geolsoc.org.uk/template.cfm?name=Meeting_1

Sept. 11-14, 2002: Geologica Belgica International Meeting "On the crossroads…", Leuven/Louvain, Belgium. Web site: http://www.kuleuven.ac.be/geology/leuven2002/

Sept. 16-20, 2002: Uranium Mining and Hydrogeology III - International Mine Water Association. Symposium - Mine Water and The Environment, Freiberg, Germany. Contact: Prof. Dr. B. Merkel, Dr. Christian Wolkersdorfer, Lehrstuhl f¸r Hydrogeologie; Gustav-Zeuner-Str. 12; D-09596 Freiberg/Sachsen, Germany; Phone: +49 3731 39 3309; Fax: +49 3731 39 2720; E-mail: UMH@IMWA.de. Web site: http://www.IMWA.de.

Sept. 18-25, 2002: Atmospheric Chemistry in the Earth System, Crete, Greece. Contact: IGAC, E-mail: igac2002@chemistry.uoc.gr. Web site: http://atlas.chemistry.uoc.gr/IGAC2002

Sept. 26 - 30, 2002: Workshop/Short course Geochemical And Geophysical Monitoring Of Volcanic Systems: Melt Inclusion Techniques And Applications, Seiano di Vico Equense (Sorrento Peninsula, near Napoli) Italy. With a field trip to Vesuvius. Contact: Dr A. Sava, info@ersambiente.com.

Sept. 30-Oct. 3, 2002: Third Mediterranean Clay Meeting, Jerusalem, Israel. Web site: www.agri.huji.ac.il/clay_meeting/

Oct 21-25, 2002: IAG International Symposium on Recent Crustal Deformations in South America and Surrounding Areas**,** Santiago de Chile, Chili. Web site: http://www.igm.cl/Espanol/Informacion%20congreso/ProgramaIgles.htm

Oct. 22-23: The 2002 William Smith Meeting - Life in earth: Energy, minerals, Mars and the deep biosphere, Geological Society, Burlington House, Piccadilly, London, UK. Convened by Steve Larter, Ian Head (University of Newcastle U Tyne, UK) and Heinz Wilkes (GeoForschungsZentrum Potsdam, Germany). Abstract deadline: May 1, 2002. Contact: steve.larter@ncl.ac.uk. Web site: http://nrg.ncl.ac.uk/news/news44.html

Oct 24-26, 2002: Synchrotrons, Low Temperature Geochemistry, and Environmental Science, Estes Park, Colorado, U.S.A.

Oct. 27-30, 2002: Geological Society of America Annual Meeting, Denver, Colorado, USA. Contact: GSA Meetings, Box 9140, Boulder, CO 80301-9140, USA. Phone: +1 303 447 2020, ext. 164; Fax: +1 303 447 1133. Web site: http://www.geosociety.org/meetings/2002/

Dec. 6-10, 2002: AGU Fall Meeting, San Francisco, California, USA. Web site: www.agu.org.

Mar 29-Apr 2, 2003: 3rd International Limnogeology Congress, Presidio Plaza Hotel, Tucson, AZ, USA. Contact: Andrew Cohen, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721, USA; Phone: +1 520 621 4691; E-mail: acohen@geo.arizona.edu.

April 24-26, 2003: 15th Argentine Geological Congress, El Calafate, Santa Cruz Province, Southern Patagonia, Argentina. Contact: President Dr. Miguel Haller or Secretary Dr. Roberto Page, Asociacion Geologica Argentina, Maipu 645, 1 er Piso, Buenos Aires, Argentina; Phone: +54 11 4325 3104; Fax: +54 11 4325 3104; E-mail: haller@cenpat.edu.ar or fomicruz@internet.siscotel.com.

May 5-8, 2003: 3rd JGOFS Open Science Conference, Washington DC, USA. Contacts: Roger Hanson, JGOFS International Project Office, SMR, University of Bergen, PO Box 7800, 5020 Bergen, Norway; Phone: +47 555 84244; Fax: +47 555 89687 or Ken Buesseler, Department of Marine Chemistry and Geochemistry, WHOI, MS 25 Woods Hole, MA 02543, USA; Phone: +1 508 289 2309; Fax: +1 508 457 2193.

May 12-17, 2003: GEOFLUIDS IV - on fluid evolution, migration and interaction in sedimentary basins and orogenic belts, University of Utrecht, Utrecht, The Netherlands. (Special Issue of Netherlands Journal of Geosciences: 'Geofluids in the Netherlands', early 2003. Deadline for manuscripts: January 15, 2002.) Contact: Mrs. Drs. J.M. Verweij, Scientific Organizing Committee (chair), Netherlands Institute of Applied Geoscience TNO -National Geological Survey, Department of Geo-Energy, PO Box 80015, 3508 TA Utrecht, The Netherlands; Phone: +31 30 256 46 00; Fax: +31 30 256 46 05; E-mail: j.verweij@nitg.tno.nl; Web site: http://www.nitg.tno.nl/eng/geofluid2.pdf

May 20-23, 2003: GERM 4, Lyon, France. Contact: Janne Blichert-Toft, Laboratoire de Sciences de la Terre (CNRS UMR 5570), …cole Normale SupÈrieure de Lyon, 46, AllÈe d'Italie, 69364 Lyon Cedex 7, France; Phone: +33 (0)472 72 84 88; Fax: +33 (0)472 72 86 77; E-mail: jblicher@ens-lyon.fr.

June 7–1, 2003: The Clay Minerals Society 40th Annual Meeting, Athens, Georgia, USA. Jointly held with the Mineralogical Society of America. Web site: http://cms.lanl.gov

June 16-18, 2003: 5th International Conference on the Analysis of Geological and Environmental Materials, Rovaniemi, Finland. Web site: http://www.gsf.fi/geoanalysis2003

June 22–26, 2003: Euroclay 2003, Modena, Italy. Web site: www.unimo.it/euroclay2003/

June 22–27, 2003: 8th International Kimberlite Conference, Victoria, British Columbia, Canada. Contact: Dr. Roger H. Mitchell, Geology Department, Lakehead University, Thunder Bay, Ontario, Canada P7B 5E1; Phone: +1 807343 8287; Fax: +1 807-623-7526; E-mail: Roger.Mitchell@lakeheadu.ca. Web site: www.venuewest.com/8IKC.

Aug. 10-15, 2003: Chemistry at the interfaces, 39th IUPAC Congress and 86th Conference of The Canadian Society for Chemistry, Ottawa, Canada. Web site: www.nrc.ca/confserv/iupac2003

Sept. 7-11, 2003: 6th International Symposium on Environmental Geochemistry (ISEG), Edinburgh, UK. Contact: Dr. John G. Farmer, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, UK; E-mail: J.G.Farmer@ed.ac.uk.

Sept. 7-12, 2003: 13th V.M. Goldschmidt Conference, Kurashiki, Japan. Web site: http://www.ics-inc.co.jp/gold2003/

Nov. 2–5, 2003: Annual meeting GSA, Seattle, Washington. Web site: http://www.geosociety.org/meetings/index.htm.

Dec. 8-12, 2003: AGU Fall Meeting, San Francisco, California, USA. Web site: www.agu.org.

Aug. 20-28, 2004: 32nd International Geological Congress (IGC), Florence, Italy. Geochemical Society/IUGS. Web site: http://www.32igc.org/

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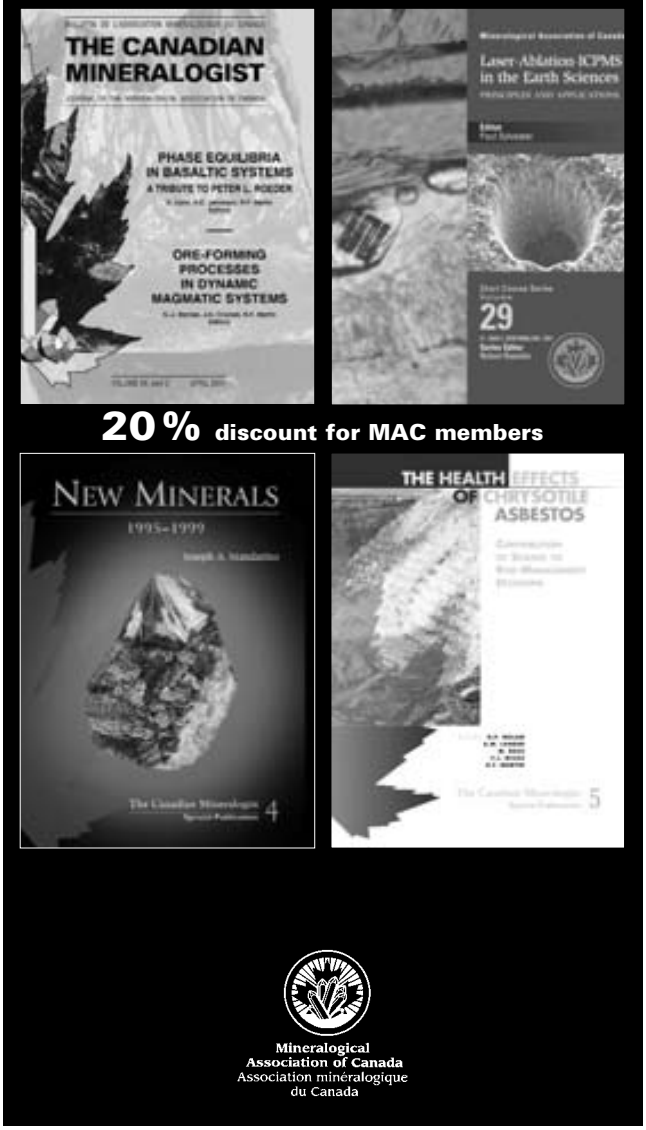

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