The Geochemical News

Newsletter of The Geochemical Society

in cooperation with The European Association of Geochemistry

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In This Issue...

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 with 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 affiliated 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.

The Geochemical News
April 2004

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From President Tim Drever

As I write this I am checking my reservations for Copenhagen—it promises to be a great meeting. The organizers are doing a wonderful job—check out the website (www.goldschmidt2004.dk) for details. I look forward to seeing many of you there. Plans are also moving forward for the 2005 meeting in Idaho, which will be the 50th anniversary of the Geochemical Society, and for the 2006 meeting in Australia.

The Goldschmidt Conference is also where we present awards to honor outstanding members of our community. I would like to congratulate personally Jim O'Neil, the Goldschmidt medal winner, George Luther, who will receive the Patterson Award, Claude Allegre, who will receive the Distinguished Service Award, Andrea Grottoli, who will receive the Clarke Medal, Eric Galimov, who will receive the Treibs Award of the Organic Geochemistry Division, and Peggy O'Day, who will deliver the Gast Lecture. I would also like to congratulate Cindy Lee, Steven Macko, and B.L.K. Somayajulu on their election as GS/EUG Fellows.

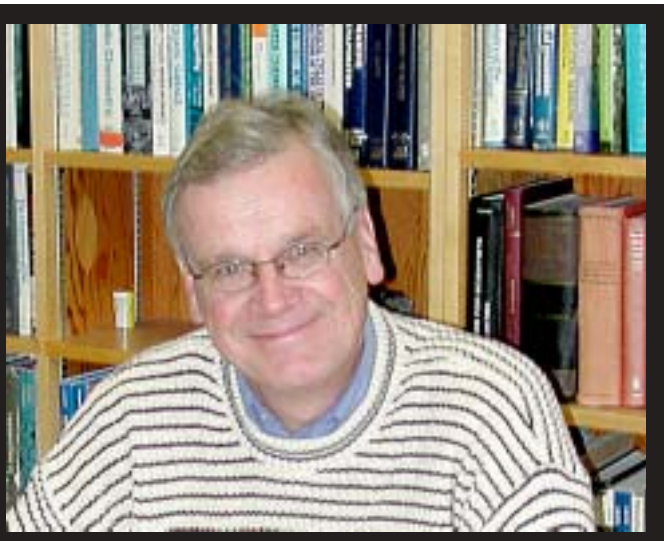
The middle of the year is when the membership of most of our committees turns over. It is these committees that do the hard work that keeps our Society functioning. I would like to thank the departing members, welcome the newcomers and urge you all to get involved. We're always looking for enthusiastic volunteers. Let's face it, without enthusiastic volunteers this society would not exist.

The GS Board of Directors will also be meeting in Copenhagen. Some of the issues we'll be talking about are the role of the Society and the role of its business office. What can we do for you, the members? What services do you think the Society should provide? What information would you like to see on our web site? Let us know what you think: we need your ideas.

You will see in this issue an update on the new magazine to be published by various mineralogical societies and ourselves. I think it's a great project and I look forward to seeing the first issue.

See you in Copenhagen!

Tim Drever, GS President



Tim Drever

Editors' Corner

The Geochemical Society continues to grow and evolve. On page 4 the GS announces the inception of a new magazine of geochemistry and mineralogy. This new magazine, based on the idea of collaboration and joint effort with several other international earth chemistry societies, and intended to showcase a range of topics from our widely interdisciplinary field, will begin to publish issues sometime next year. But already the plans are underway, and your input is needed to condense and crystallize the details of what this new magazine will cover, how it will be organized, and even what it will be called! Please contribute your ideas; let the editorial board know if you want to participate. This promises to be an exciting new venture, and will no doubt help to publicize and promote the geochemical sciences not only amongst ourselves, but to the public at large.

Johnson R. Haas
Carla Koretsky

Editors

V. M. Goldschmidt Conference
5-11 June, 2004
Copenhagen, Denmark

www.goldschmidt2004.dk

The Geochemical Society

is proud to announce its

2004 Geochemical Society Award Winners

2004 V.M. Goldschmidt Medal
James R. O'Neil

2004 F.W. Clarke Medal
Andrea G. Grottoli

2004 C.C. Patterson Medal
George W. Luther, III

2004 Distinguished Service Award
Claude Allegre

2004 GS/EAG Geochemical Fellows
Cindy Lee
Steven A. Macko
Bhamidipati L.K. Somayajulu

Cover: A Netherlands windmill. Photo credit Carla Koretsky.

A NEW MAGAZINE OF MINERALOGY, PETROLOGY, AND GEOCHEMISTRY

The Mineralogical Society of America (MSA), the Mineralogical Society of Great Britain and Ireland (Min Soc), the Mineralogical Association of Canada (MAC), the Geochemical Society (GS), and the Clay Minerals Society (CMS) announce the launch of an international magazine of mineralogy, geochemistry and petrology. The first issue will be published in January 2005.

During the past twenty years, there has been an impressive expansion of the scientific areas in which mineralogy and geochemistry play an important role. This international magazine will provide a forum to integrate the scientific content and activities of these disciplines and to reach out to other fields of geosciences, environmental science, materials science, and chemical science.

The most important aspect of this magazine will be that every 48-page issue - there will be four a year initially - will be thematic. The thematic issues will be built around major topics of broad and current interest. Each issue will provide the general reader with a broad overview of the field and an introduction to the prominent and active members in that field. It will also offer four to six review papers written for a broader scientific audience. The articles will be educational and interdisciplinary, appealing to students, and providing material that may be appropriate to complement lectures in mineralogy or geochemistry courses.

These technical papers will be complemented by several regular features, including Societies news, book reviews, profiles of scientists, short course announcements, calendar of events, media watch, and conference reports, that will keep members informed on what is happening in their science.

An Executive Committee is now in place, composed of:

- Jim Blencoe (Mineralogical Society of America, blencoejg@ornl.gov)
- Jeremy Fein (Geochemical Society, fein@nd.edu)
- Norman Halden (Mineralogical Association of Canada, Nm_halden@umanitoba.ca)
- Kathryn Nagy (Clay Minerals Society, klnagy@uic.edu) and,
- Peter Treloar (Mineralogical Society of Great Britain and Ireland, P.Treloar@kingston.ac.uk)

As its first task, the Executive Committee has appointed the principal scientific editors:

- Rod Ewing (mineralogy, rodewing@umich.edu)
- Ian Parsons (petrology, Ian.Parsons@ed.ac.uk) and,
- Michael Hochella (geochemistry, hochella@vt.edu).

Pierrette Tremblay (Mineralogical Association of Canada, pierrette_tremblay@inrs-ete.uquebec.ca) will act as managing editor.

The magazine is still without a name. Suggestions are welcome on themes for future thematic issues, features, and a name for the magazine. Please forward suggestions to pierrette_tremblay@inrs-ete.uquebec.ca or to any of the scientific editors. A Power Point presentation will shortly be posted on the participating societies web site and will be updated on a regular basis (http://www.minsocam.org/; http://www.minersoc.org/; www.mineralogicalassociation.ca; http://gs.wustl.edu; http://cms.lanl.gov)

In closing, all mineralogical and geochemical societies worldwide are invited to join in this venture by offering this magazine as a member benefit to their members.

NASA Seeks Input: Jupiter Icy Moons Orbiter (JIMO) Mission

Recently the Science Definition Team (SDT) for the Jupiter Icy Moons Orbiter (JIMO) mission submitted their final report to NASA. This report is available on the JIMO website at http://ossim.hq.nasa.gov/jimo. The report describes the SDT's science recommendations for the proposed mission.

The SDT was chartered by NASA in February 2003 immediately after the JIMO mission was announced. The primary responsibility of the SDT has been to provide guidance to NASA that can be used to optimize the scientific return from the JIMO mission within programmatic constraints. The SDT was also charged with ensuring that this guidance reflects the current state of understanding of the Jupiter system and the needs of the science community.

The SDT met these responsibilities by composing a prioritized set of science objectives, investigations, and measurements for the mission. In addition, the SDT and the JIMO Project Office at the Jet Propulsion Laboratory worked closely together to begin deriving the requirements necessary to ensure that the spacecraft and mission design can accomplish these recommendations. These requirements form the Payload Accommodation Envelope, and it is also described in the SDT Report.

The proposed JIMO mission will enable a new class of scientific instruments never before possible on a planetary mission. These high capability instruments will utilize the unique aspects of the JIMO mission to accomplish the defined scientific objectives. NASA commissioned a study by the Aerospace Corporation on this new class of instruments in Spring 2003. The results of this study are contained in the High Capability Instrument Feasibility Study Final Report and are also available on the website.

The Jupiter Icy Moons Orbiter is one of the most ambitious robotic missions NASA has ever undertaken. NASA recognizes input from the scientific community is vital to the program's success and looks forward to the continued participation of the science community as a whole and the SDT in particular as the Outer Planets Program and JIMO continue. If you have any questions or comments, please do not hesitate to contact Dr. Curt Niebur, JIMO Program Scientist, at Curt.Niebur@nasa.gov.

Measuring gases: links between cows, volcanoes and fighting terrorism

by Angelina Souren

Contrary to popular belief among many university scientists, science does not only take place within academia. Instead, it is a matter of give and take on both sides, like most good things. Many impulses for developments within academia - including funding - actually come from the "rest of the world". Herb Dempsey, who works there (at the Durham, North Carolina, office of ARCADIS), provided the inspiration for this article. Herb is very enthusiastic about open-path optics. In these techniques, the path runs through part of the atmosphere when, for instance, a beam is sent through a contaminant plume. The atmosphere thus usually replaces the (multiple-pass) cell or cuvette. It may sound easy, but involves a great deal of calculating and modeling.

One area where Herb sees possibilities for these open-path technologies is the BioWatch program, in which Herb and his colleagues are involved. Research related to biological and other terrorist attacks has been going on for many years, but was accelerated by the tragic events of September 2001. The "BioWatch" program is one of the results. It will become a warning system that samples the air in major metropolitan areas for pathogens and other substances, such as traces of explosives. daily. It will protect 80% of the population of the United States. Pilots were set up in twenty metropolitan areas in the United States last year, based on prototype equipment that was tested during the 2002 Winter Olympics. This equipment, called BASIS, almost literally "sniffs the air" (see Fitch et al., 2003). Open-path optics would allow real-time monitoring for some substances.


COWS

Let us take a quick look at some of these open path techniques. They are currently mainly used to study pollutants, meteorology and atmospheric chemistry. The latter is also a form of geochemistry, of course, and a few papers have already been published in which these techniques were applied to (bio)geochemistry closer to the earth's surface. In the future, it may be possible to track down ores (mercury fumes) and other gas or particle sources this way.

OP-FTIR: Open-path Fourier-transform Infrared

Herb and his Durham colleagues are already applying open-path optical technologies to environmental problems. One of these colleagues is Ram Hashmonay. As a post-doc at the Department of Environmental Health of the University of Washington, he and Michael Yost developed a method based on Open-Path Fourier Transform Infra-Red (OP-FTIR) spectroscopy for mapping air pollution by, for instance by hog farms. It uses a radial plume mapping (RPM) approach: non-overlapping multiple beams from a single-beam instrument. In combination with the use of a tomography algorithm, it enables them to map concentrations across a much larger area than was traditionally possible. It works from a distance (a few hundred meters) as well and is relatively easy and cheap. The instrument sends out a beam of IR light to reflectors at a distance of up to a kilometer (light from the sun is also suitable). In FTIR, the incoming signal is split in two and the length of one of the beams' pathways is slowly changed. This produces a slowly changing interferogram; a Fourier transform is used to extract the spectral distribution. From this, compounds can be identified (either through their emission or through their absorption characteristics, depending on the background) and their concentrations calculated.

DOAS: differential optical absorption spectroscopy

DOAS appears to be the most popular open-path method at the moment and is quite similar to traditional spectrophotometry. DOAS is based on differences in absorption at different wavelengths. Weibring et al. (2002) wrote one of the still relatively few geochemistry papers in which open-path optical methods were applied. These authors investigated the sulfur dioxide emissions of St. Etna and Stromboli by letting a ship pass under the volcanic plumes and using DOAS to determine the concentration. Both the sun and sky radiation can act as the light source; the latter tends to be more difficult to interpret. In such a study, it is necessary to model the atmosphere to account for scattering. DOAS is


Tampo Lake crater

relatively cheap and can use UV/Vis but also IR.

DIAL: differential absorption lidar

In addition to DOAS, Weibring et al. (2002) also employed DIAL, which is faster but also more expensive. The instrument emits a laser beam and uses the beam's reflection by a reflector or backscattering by the atmosphere (clouds). The difference in absorption between two different wavelengths is then used to calculate the concentration. Initially, mainly the thickness of clouds and other atmospheric layers was measured with lidar (light detection and ranging). DIAL is now often used for ozone measurements.

TDL(A)S: tunable laser diode (absorption) spectroscopy

In The Netherlands, TDLAS recently made the news on TV. The "sniffing van" of the Energy Centre of The Netherlands (ECN) drives past farms and measures, for instance, methane production by cows. It uses a TDLAS method developed by Arjan Hensen of ECN. The Netherlands is trying to assess the effects of measures taken to reduce greenhouse gas emissions (Kyoto protocol). Eighteen other European institutes and ECN are now mapping greenhouse gas emissions associated with dairy production (MID-AIR project). ECN also studies methane emissions at landfills and NO_2 at, for instance, fertilizer plants. In TDL, the wavelength can be adjusted. ECN's TDLAS method actually is not an open-path technique: air is sucked into the van's instrument (Aerodyne Research Inc., Billerica, MA).

In TDLS, a laser beam is sent out and reflected and the absorption is measured. Like DIAL, TDLS tends to be limited to the determination of one or two compounds, but new developments are making it more suitable for measuring more compounds simultaneously. TDLS is costly, but fast. Open-path TDLS does not appear to be very common yet (relatively few papers). In regular TDLS, the pressure is reduced in the cell so that the absorption lines become narrower and there is less interference (it also means that the laser can be adjusted across a small range, which diminishes noise effects). In open-path measurements at ambient pressure, the absorption line becomes a broad band. Brassington (1995), however, already gave examples in which OP-TDLS was used to measure gases like carbon monoxide, methane, ethane and ethylene and produced useful results. Brassington also mentioned stratospheric measurements (at 30 km), of which the results are good because of the low pressure at that altitude.


Mt. Vesuvius, Italy

Biogeochemical cycles

Open-path optical methods may help determine the magnitude of all sorts of fluxes in biogeochemical cycles (such as organic volatiles released by plants). Undoubtedly, many interesting applications will follow.

This article is mainly based on a brief look at a few papers and web pages, and is not an exhaustive review. The author is a geologist and marine biogeochemist. She is the owner of SmarterScience (a consultancy and service business specialized in marine, earth and environmental sciences), board member of the Environmental Chemistry Section of KNCV (the Dutch version of ACS) and associate editor for The Geochemical News. She has not personally worked with these open-path optical methods and any errors in this article are solely hers. She can be contacted at Angie-at-smarterscience.com.

For more information:

Brassington D.J. (1995) Tunable diode laser absorption spectroscopy for the measurement of atmospheric species. 65 pages.
http://www.huxley.ic.ac.uk/research/AIRPOLL/TDL/adins/ADINS51.htm

Edner H., Ragnarson P., Svanberg S., Wallinder E., Ferrara R., Cioni R., Raco B. and Tadeucci G. (1994) Total fluxes of sulphur dioxide from the Italian volcanoes Etna, Stromboli and Vulcano measured by differential absorption lidar and passive differential optical absorption spectroscopy. *J. Geophys. Res.*, **99**, 18827-18838.

Edner H., Ragnarson P., Svanberg S., Wallinder E., Ferrara R., Maserti B.E. and Bargagli R. (1993) Atmospheric mercury mapping in a cinnabar area. *The Science of The Total Environment*, **133**(1-2), 1-15.

Edner H., Ragnarson P., Svanberg S., Wallinder E., Ferrara R., Cioni R. Raco B. and Tadeucci G. (1994) Volcanic gas emission studies using optical remote sensing techniques. In: Askne J, ed. *Sensors and environmental applications of remote sensing*. Balkema, Rotterdam, The Netherlands., p 357-362.

EPA (2001) EPA Workshop on Optical remote sensing technologies - Executive summary
http://www.epa.gov/ttn/emc/meetnw/wsram2.doc

Fitch J.P., Raber E. and Imbro D.R. (2003) Technology challenges in responding to biological or chemical attacks in the civilian sector. Science, **302** (5649), 1350-1361.

Galle B., Oppenheimer C., Geyer A., McGonigle A.J.S., Edmonds M. and Horrocks L. (2003) A miniaturised ultraviolet spectrometer for remote sensing of SO2 fluxes: a new tool for volcano surveillance. *Journal of Volcanology and Geothermal Research*, **119**(1), 241□254.

Gondal M.S. and Mastromarino J. (2000) Lidar system for remote environmental studies. *Talanta*, **53**, 147-154.

Hashmonay R.A., Yost M.G., Mamane Y. and Benayahu Y. (1999) Emission rate apportionment from fugitive sources using open-path FTIR and mathematical inversion. *Atmospheric Environment*, **33**, 735-743.

Hensen A. (2003) Snuffelbus meet lachgas en methaan. http://www.ecn.nl/nwsbrf/article/0215.html

Hensen A. (1998) Validatie van de methaan-emissie-reductie op stortplaats Nauerna. See http://www.ecn.nl/library/reports/1998e/c98052.html (English abstract)

MIDAIR project: http://www.ie-leipzig.de/midair.html

Svanberg S. (2002) Geophysical gas monitoring using optical techniques: volcanoes, geothermal fields and mine. *Optics and Lasers in Engineering*, **37**, 245-266.

Weibring P., Edner H., Svanberg S., Cecchi G., Pantani L., Ferrara R. and Caltabiano T. (1998) Monitoring of volcanic sulphur dioxide emissions using differential absorption lidar (DIAL), differential absorption spectroscopy (DOAS) and correlation spectroscopy (COSPEC). *Appl. Phys. B*, **67**(4), 419-426.

P. Weibring, H. Edner, S. Svanberg, G. Cecchi, L. Pantani, R. Ferrara, and T. Caltabiano, "Monitoring of volcanic sulphur dioxide emissions using differential absorption lidar (DIAL), differential optical absorption spectroscopy (DOAS) and correlation spectroscopy (COSPEC)", Applied Physics B 67, 419-426 (1998).

Weibring P., Swartling J., Edner H., Svanberg S., Caltabiano T., Condarelli T., Cecchi G. and Pantani L. (2002) Optical monitoring of volcanic sulphur dioxide emissions - comparison between four different remote-sensing spectroscopic techniques. *Optics and Lasers in Engineering*, **37**, 267-284.

Wu C.-F., Yost M.G., Hashmonay R.A. and Park D.Y. (1999) Experimental evaluation of a radial beam geometry for mapping air pollutants using optical remote sensing and computer tomography. *Atmospheric Environment*, **33**, 4709-4716.

Wu C.-F., Yost M.G., Hashmonay R.A. and Tsai M.-Y. (2003) Path concentration profile reconstruction of optical remote sensing measurements using polynomial curve fitting procedures. *Atmospheric Environment*, **37**, 1879-1888.

Tengger caldera, Java

How Geochemical Knowledge is Disseminated

by Yoko Furukawa

There are many venues for a geochemist to choose from to disseminate her/his work. If she/he believes that the work has a profound impact on the scientific community, or at least adds an interesting insight to the existing collective knowledge, she/he would like to choose a venue that has a high visibility within the community(ies) the work represents. She/he would most likely consider how long it would take from the initial manuscript submission to the actual publication. It is also advantageous if the articles can be widely available on line or at libraries so that they can be easily accessed by anyone who is interested.

Table 1 compares some of the popular venues geochemists have chosen in recent years for their "2002 impact factors", publication speed, and availability. This is not an exhaustive list, and any journal with fewer than 50 articles in 2002 is excluded. The "2002 impact factors" were taken from ISI 2002 Journal Citation Report and are the measure of the frequency with which the "average article" in a journal has been cited in 2002. Specifically, 2002 impact factor is calculated by dividing the number of 2002 citations in all ISI-indexed journals to articles published in 2000-2001 by the total number of articles published in 2000-2001. The average publication speed is measured by the time between initial submission date (as noted on the published articles) and the date the article became available, either electronically or as a printed article. The average was determined using all articles published in the last issue of 2002 for each journal. If such an issue is a special volume, then a previous issue was used to determine the average. The electronic availability column is self explanatory, whereas the "number of library subscriptions" column indicates the number of Online Computer Library Center (OCLC)-participating institutional libraries that subscribe the journal. This includes both electronic and paper subscriptions.

The impact factors and library subscriptions are graphically represented in Figure 1. It is readily seen that there is little correlation between a journal's impact and its availability. Most notably, Global Biogeochemical Cycles, a highly cited journal, is available in very few libraries. Another significant point one can make is the relative unavailability of geochemical journals. Two of the most available journals in the list are Environmental Science & Technology and Limnology & Oceanography, both of which are multi-disciplinary. For a comparison, a major multidisciplinary journal, Nature is available at 2,598 libraries, whereas 4,840 institutional libraries make Science Magazine available. Single-disciplinary Geology is available at 759 libraries, and Microbiology and Molecular Biology Reviews is available at 921 libraries. This may mean that geochemists tend to concentrate in certain institutions which in turn make geochemical resources available. A geochemist should be encouraged to take multi-disciplinary approaches and publish in multi-disciplinary journals. However, at the same time, the geochemical community needs to take steps to ensure that the single-disciplinary geochemical journals remain viable. (e.g., Writing to your librarians to make sure the current subscriptions continue; fair and prompt refereeing when asked to review a manuscript; submission of high quality contributions.)

Good news is that authors can expect their original manuscripts to be published in less than one year in most cases. The waiting time is expected to become even less as more journals are handling manuscripts electronically.

In summary, a geochemist can now choose from a variety of venues many of which have high scientific reputations as well as relatively rapid publication time. As a community, geochemists need to strive to increase visibility of their work in the larger scientific community, not only by publishing in multi-disciplinary journals but also by taking steps to make geochemical journals and articles available and attractive to more scientists in other disciplines.

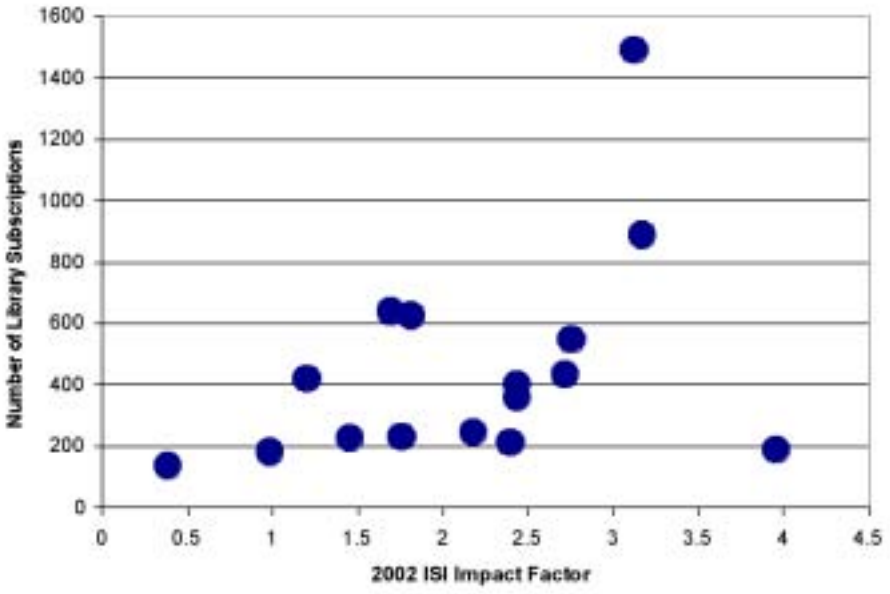


Figure 1. Journal impact factors v. number of library subscriptions.

Table 1. Comparison of geochemically-oriented journals

Journal	Impact factors for 2002 (1)	Publication Speed (months) (2)	Electronic Availability (3)	Library Subscriptions(4)
Global Biogeochemical Cycles	3.957	9 – 12	A	189
Limnology And Oceanography	3.169	9 – 12	B	890
Environmental Science & Technology	3.123	6 – 9	A	1491
Geochimica et Cosmochimica Acta	2.756	12 – 15	A	548
Earth And Planetary Science Letters	2.716	6 – 9	A	434
Chemical Geology	2.437	9 – 12	A	402
Biogeochemistry	2.397	18 – 24	A	212
Marine Chemistry	2.179	9 – 12	A	247
American Mineralogist	1.811	12 – 15	C	626
Organic Geochemistry	1.756	6 – 9	A	233
Water Resources Research	1.692	9 – 12	D	639
Applied Geochemistry	1.454	12 – 15	A	226
Estuarine, Coastal, and Shelf Science	1.201	15 – 18	A	420
Marine and Petroleum Geology	0.984	6 – 9	A	183
Environmental Geochemistry And Health	0.383	18 – 24	A	138

(1) Data from Journal Citation Report, ISI.
(2) Average taken from the last issues of 2002.
(3) Legend as follows:
A — On-line access available to subscribers only.
B — Authors may elect to make their articles available on line by paying a one-time fee.
Articles by authors who do not elect the free on-line access are available to subscribers only.
C — All “recent” articles that have been published for 15 months or longer are available on publisher’s web site.
D — Current (2004) articles are available to subscribers only. Previous articles are available to society members.
(4) Data from OCLC.

CALL FOR PROPOSALS FOR SYMPOSIA 2005 V. M. GOLDSCHMIDT CONFERENCE

Moscow, Idaho, USA
Hosted by the University of Idaho, Moscow

Proposals for symposia/special sessions for the 2005 Goldschmidt Meeting in Moscow, Idaho, U.S.A. are now being soliciting. A number of broad themes for the meeting has been identified and an International Program Committee (IPC) has been appointed (see the website http://www.uidaho.edu/gold2005 for details). The IPC consists of a chairperson (Peter Larson; plarson@wsu.edu) and at least two international representatives for each theme. The IPC will evaluate each proposed symposium to minimize overlap and insure broad coverage of the themes. To propose a symposium, please contact either the IPC Chair or one of the appropriate thematic representatives (again, see the conference website for contact information). The proposal can be as simple as an e-mail giving the title of the proposed symposium, a brief statement of the relevance and expected interest level, and the names of potential organizers/session chairs of the symposium (who will solicit papers from appropriate contributors). We will entertain proposals even if they do not appear to fit under any of the highlighted themes. Proposals for symposia/special sessions will be accepted for consideration up until September 1, 2004. However, submission of proposals as soon as possible is advised.

Geochemistry at Utrecht University, Netherlands

Biogeochemistry, from Melt Inclusions to Ground Water Salinization

The sun brilliantly illuminated R.V. Navicula as Dr. Thilo Behrends drove up to the ship. It was the last day of April, and the 35-foot Navicula – part of the fleet of the Royal Netherlands Institute for Sea Research (NIOZ) – was in the Haringvliet Lake for three days of sediment sampling. The sampling was part of the ongoing collaborative research project RESIN (Restoration of Estuarine Systems in the Netherlands) between Utrecht University's Geochemistry Department and the Netherlands Institute for Inland Water Management and Waste Water Treatment (RIZA). Thilo, an Assistant Professor in Geochemistry, was lending a hand to his colleague Dr. Caroline Slomp, a Research Fellow of the Royal Academy of Arts and Sciences (KNAW), and one of the Department's Ph.D. students, Rick Canavan.

Originally, the Haringvliet was a major outlet to the sea for the Meuse and Rhine rivers. In 1970, the mouth of the Haringvliet was closed by a dam, as part of the Dutch Delta Plan. The Delta Plan was designed to protect the low-lying areas of the Netherlands from tidal flooding. As a result, the Haringvliet turned from a tidal estuary into a semi-stagnant freshwater lake. During the 1970s and 1980s, fairly contaminated sediments accumulated in the Haringvliet. In particular, fine-grained sediments in the lake exhibit elevated concentrations of Zn, Cu, Cr, Pb and Cd.

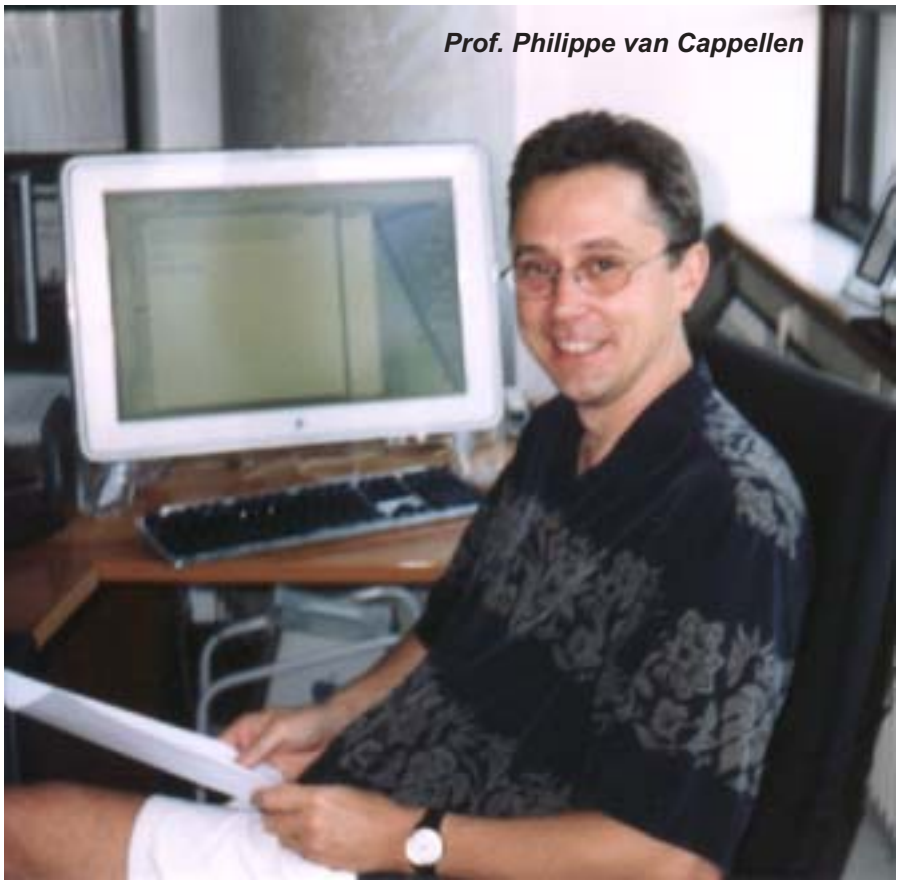
Current Dutch environmental policy emphasizes the ecological health and biodiversity of aquatic ecosystems. In line with this policy, it has been proposed to recreate estuarine conditions in the Haringvliet, by opening the sluices of the dam. This restoration would take place in successive steps, with the ultimate goal of establishing a salinity gradient extending 30 km inland of the dam. A major concern, however, is that salinization would mobilize metals currently locked in the sediments, with subsequent transfer to the food chain.

In order to address this concern, a research project was developed, which involves a detailed chemical characterization of fine-grained sediments and their pore waters, a quantification of the rates of the major biogeochemical processes, and experiments where sediments are subjected to a series of environmental perturbations. The analytical and experimental results are then used as the basis for building an early diagenetic model, capable of simulating the response of the benthic environment to the anticipated chemical changes in the water column.

Although the RESIN project aims at contributing scientific knowledge that is directly relevant to the environmental management of the Haringvliet, the researchers involved are quick to point out that their results have worldwide significance. For example, in Vietnam, floodgates are under consideration to keep seawater out of the Mekong Delta, while surface and subsurface waters in coastal areas are increasingly undergoing salinization, as a result of river damming and excessive pumping of groundwater. The biogeochemical consequences of these human interventions in the hydrological cycle are still poorly understood.

With the field component of RESIN nearly completed, Rick Canavan and Caroline Slomp are now focussing on incorporating trace metal dynamics into an existing early diagenetic model, as well as setting up reactor experiments in the laboratory. RESIN is a typical example of the type of research conducted in the Biogeochemistry group of Professor Philippe Van Cappellen in Utrecht. Research projects usually integrate controlled laboratory experimentation with modeling and fieldwork. For example, Postdoctoral Fellow Anniet Laverman, together with former Ph.D. student Christof Meile, have combined microelectrode measurements in sediment cores, reactive transport modeling and reactor experiments, in order to derive kinetic expressions that allow them to pre-

***Royal NIOZ research vessel* Navicula**



Prof. Philippe van Cappellen

dict rates of denitrification across the range of environmental conditions encountered along estuarine salinity gradients. Denitrification is a crucial process in many aquatic environments, because it removes nutrient nitrogen by transforming it into dinitrogen gas, which escapes to the atmosphere.

The major research thrust of the Biogeochemistry group is to understand and quantify the functioning of natural biogeochemical reaction systems. Not only do experimentalists and modelers work closely together, but members of the group also have diverse backgrounds. For instance, before joining the Biogeochemistry group in Utrecht, Ph. D. students Parisa Jourabchi, Steeve Bonneville and Claudette Spiteri studied geophysics, biology and chemistry, respectively. Parisa, who is from Canada, is now looking at ways to incorporate uncertainty analysis in reactive transport modeling, in order to objectively compare observational data and model simulations, and to address the thorny issue of parameter identifiability in geochemical models. Claudette, who comes from Malta, focuses on geomicrobial and geochemical processes in the mixing zone between fresh and salt water in coastal aquifers, while Steeve, from France, studies the effects of mineralogy and surface chemical properties on the microbial reduction of ferric iron minerals.

Philippe Van Cappellen took over from Professor Kees van der Weijden as Chair of Geochemistry in Fall of 1999. Philippe is originally from Belgium, although he is also a Canadian citizen via his mother. He has worked in Belgium, Morocco, Switzerland and, predominantly, in the United States where he obtained his Ph.D. (Yale, 1991). Prior to his appointment in Utrecht, he was an Associate Professor at Georgia Institute of Technology in Atlanta. Utrecht University dates back from 1636 and has a long tradition of research in the earth sciences. The Faculty of Earth Sciences has a permanent academic staff of about 35, and about 65 Ph.D. students and Postdoctoral Fellows.

Pushing the envelope

At the moment, there are 13 Ph.D. students and 15 Postdoctoral Fellows in the Geochemistry Department, with about ten different nationalities represented. The Department is subdivided in four units: Biogeochemistry, Marine Geochemistry, Organic Geochemistry and Environmental Geochemistry. Of these, the Biogeochemistry group is by far the largest. Its permanent staff, besides Philippe, comprises two Assistant Professors, Dr. Thilo Behrends, who oversees the Laboratory of Experimental Biogeochemistry, and Dr. Pierre Regnier, who directs a growing group of students and postdocs in reactive transport modeling.

From a Dutch perspective, Philippe is a phenomenon; one of his colleagues calls him “an institution within an institution”. It is probably the result of American-style work ethics, combined with a driven personality and an enthusiasm for science. Despite some inevitable clashes with local traditions and entrenched interests, he keeps pushing the envelope of Dutch geochemistry, by continuously exploring new research avenues and crossing traditional disciplinary boundaries.

One of the hallmarks of Philippe’s arrival in Utrecht has been the revival of a weekly seminar series, with speakers from around the world. The Geochemistry Department also stays in touch with the Dutch geochemical community though its extensive e-mail list – something other Dutch groups in the earth sciences seem to have difficulty to accomplish. Philippe chairs the Dutch counterpart of the Geochemical Society, which meets twice a year in Utrecht for a series of

Dental fluorosis

Shipboard research on the Navicula

lectures. The last meeting, for example, explored the reactivity of organic and mineral substances in soils and aquifers.

A few years ago, Philippe received a prestigious "Pioneer" grant from the Netherlands Organisation for Scientific Research (NWO) to investigate global effects of biogeochemical processes at redox interfaces. This funding signaled the beginning of a strong biogeochemistry program at Utrecht. Since then, Philippe has also become involved in several European-wide research projects and networks. Among his various functions, it is worth mentioning that he is a Board member of the *International Symposia on Environmental Biogeochemistry*, and that he serves on the F. W. Clarke Award Committee of our Society. He is currently co-Editor-in-Chief of *Journal of Hydrology* and Associate Editor of *Geomicrobiology Journal*.

Since Philippe's arrival, some say, the emphasis has shifted from applied to pure geochemistry. Professor Olaf Schuiling, who retired two years before Philippe's arrival, used to be almost synonymous with applied and engineering geochemistry in the Netherlands. While his scientific interests certainly deviate from those of his predecessors, Philippe points out that almost all the research in the Biogeochemistry group has implications for environmental issues. This is also true for the modeling work carried out under the supervision of Dr. Pierre Regnier. Recently, a student working with Pierre, Ms. Inge Folmer, was awarded the 2003 Escher Price from the Dutch Geological Society (KNGMG) for the best Master's thesis in applied earth sciences, proving that in the geochemistry department fundamental and applied research go hand in hand.

Besides the Biogeochemistry and Environmental Geochemistry groups, research in low-temperature processes is also conducted within the Marine Geochemistry group of Prof. Gert de Lange and the Organic Geochemistry group, headed by Prof. Jan de Leeuw. Marine research focuses on the Mediterranean Sea, where scientists from Utrecht have for many years been investigating the nature and paleoenvironmental significance of organic-rich sediment layers, known as sapropels. Research in organic geochemistry deals with the diagenetic processes responsible for the preservation of organic matter in the geosphere, as well as with the development and validation of molecular proxies – biomarkers or molecular fossils.

Melt inclusions and volcanic pollution

The Utrecht campus harbors at least two other geochemistry groups. High-temperature geochemistry is the research domain of the petrologists. Professor Bernard de Jong's Petrology group conducts research in material sciences, thermodynamics and volcanic and magmatic systems. Dr. Paul Mason, who is responsible for the daily operation of the Laser Ablation ICP-MS, is involved in numerous interdisciplinary projects. Studies of melt inclusions at the Free University of Amsterdam, for example, are conducted in close collaboration with Paul.

An interesting example of research at the interface between high- and low-temperature geochemistry is carried out by Ph.D. student Sri Sumarti,

Sampling from a shuttle core

under the supervision of Dr. Manfred van Bergen. Sri, who is from Indonesia, is investigating a remarkable situation in her homeland. The Ijen crater lake in East Java severely contaminates its environment. From this reservoir – about 35 million cubic meters of highly acid (pH<0.5) sulphate- and chloride-rich water – springs a long acid river that transports large amounts of dissolved chemicals, including arsenic, selenium, fluoride and other potentially toxic elements. Long term geochemical monitoring has shown that downstream concentration and pH trends are regulated by influxes of pH-neutral tributaries and that seasonal variations in rainfall play a role as well.

The quality of river water remains poor until the coastal plain at about 40 km from the source. There, virtually all of the water is used for irrigating rice fields and other cropland. The pH records show that since the early 1990s, the pH has decreased from about 4.5 to (occasionally) 2.5 at this site. This has had dramatic effects on crop yields. Continuous irrigation during more than a century has brought large quantities of metals onto the land and has led to soil acidification.

Ijen crater lake, East Java

Locally, the groundwater contains fluorine concentrations that exceed the WHO guideline for safe drinking water. Dental fluorosis is, indeed, widespread. The geochemical signatures of local well waters suggest that the fluorine originates from the Ijen crater lake.

Netherlands Institute of Applied Geoscience

Another player in geochemistry in Utrecht is the Dutch Geological Survey, now renamed the Netherlands Institute of Applied Geoscience (TNO-NITG). At the end of last year, its research facilities and entire staff moved into a new building on the Utrecht campus. After a series of reorganizations and the realization of the new building, the staff moved to Utrecht from various parts of the country – 150 years after the Dutch government commissioned the first geological map of The Netherlands. An example of what it does is the Nabron project. The soils of the Dutch coastal provinces often contain elevated concentrations of arsenic, occasionally at great depths. The Nabron project intends to determine the extent and cause of these naturally high arsenic levels, and to look at the implications for environmental policy makers.

Future plans

What has Utrecht's geochemical 'phenomenon' in store for his Department? 'We've just started a new international Master's program in Biogeochemistry', Philippe says. 'The challenge will be to attract the best students from Europe and beyond. The Master's reflects our research strengths. In the first year, the students take theoretical courses in aquatic chemistry, biogeochemistry, organic geochemistry, geochemical kinetics and geochemical modeling. The first year finishes with a hands-on fieldwork on the Lee estuary, near Cork, Ireland. The second year is devoted to individual research projects and advanced courses. For example, we have just finished putting together a specialized MSc. course in geomicrobiology with colleagues from the Faculty of Biology'.

'Another of my goals is to convince my fellow earth scientists in Utrecht that geochemists do more than just perform chemical analyses. The last three years, Pierre Regnier, Caroline Slomp and I have worked hard to build a strong modeling research group. We have been fortunate to be able to hire some superb young Ph.D. students and Postdoctoral Fellows. Thanks to the constant interactions with experimentalists, we are building models that reflect as closely as possible the reality from the lab or field."

Not all is rosy in Utrecht, however. 'Universities in the Netherlands are top-heavy structures, where administrators spend their time inventing one reorganization after another. North American visitors sometimes marvel at the number of support staff in Utrecht. Yet, the potential benefits for the scientists are pretty much offset by all the layers of bureaucracy.'

Utrecht geochemistry information on the web:

- TNO-NITG:
www.nitg.tno.nl/eng/

- Haringvliet:
www.haringvlietsluizen.nl/

- Petrology in Utrecht:
www.geo.uu.nl/Research/Petrology/

- Low-temperature geochemistry in Utrecht:
www.geo.uu.nl/Research/Geochemistry/

Book Review:

Fluid Inclusions – Analysis and Interpretation

Short Course Series, Volume 32. I. Samson, A. Anderson, and D, Marshall, eds., 374 pp.
Mineralogical Association of Canada, 2003.
Price: US$45 outside Canada; CAN$45 in Canada; member price, US$36/CAN$36.

Review by Scott A. Wood

More than twenty years have passed since the Mineralogical Association of Canada's Volume 6 (Fluid Inclusions: Applications to Petrology) was published in 1981. Three years after that, the Mineralogical Society of America published Reviews in Mineralogy Volume 12 (Fluid Inclusions) by Ed Roedder. In 1994, the Society for Sedimentary Geology published a short course volume by Goldstein and Reynolds titled "Systematics of Fluid Inclusions in Diagenetic Minerals". These three volumes have been indispensible guides for novices in the study of fluid inclusions, and can be considered "classics". Given that the study of fluid inclusions is often considered a relatively mature science, what is the need for a new introductory text on fluid inclusions? Aside from the fact that at least some of the older texts are no longer in print (e.g., MAC Short Course Volume 6), the fact is that much has changed in the field in the last 5-10 years. Of course, the basic methods of fluid inclusion petrography and microthermometry have not changed much in the last 20 years or so. Moreover, although there have been some advances, experimentally-determined data on phase equilibria in systems of relevance to the fluid inclusionist are still scarce. However, a panoply of new analytical techniques, not discussed in the earlier texts, such laser-ablation inductively coupled plasma-mass spectrometry (LA-ICP-MS), synchrotron X-ray fluorescence (SXRF), and proton-induced X-ray emission (PIXE) have revolutionized the determination of the chemical composition of fluid inclusions. In recent years, the study of silicate melt inclusions also has blossomed; such inclusions are not discussed in most existing fluid inclusion guides. Finally, there has been an evolution in thought about how to treat fluid inclusions during initial petrographic examination. In earlier times, emphasis was on determining whether inclusions were "primary", "secondary" or "pseudosecondary" in origin. The more recent approach is to assign generations of fluid inclusions to "fluid inclusion assemblages" in order to better tie sets of fluid inclusions to specific geologic events. There is also now much more data available on the post-entrapment behavior of fluid inclusions owing to experimental studies of synthetic fluid inclusions. Thus, a volume covering these new subjects, together with more traditional topics, is needed. Volume 32 fills this need.

The book is divided into 14 chapters by a total of 15 authors, all experts in their subject areas. Chapter 1 by Bob Bodnar is a brief introduction to fluid inclusions which presents the temporal classification of fluid inclusions as primary, secondary or pseudosecondary, and introduces the concept of fluid inclusion assemblages. This is followed by a chapter on fluid inclusion petrography by Robert Goldstein, who discusses the philosophy of sample selection, the nuts and bolts of sample preparation, various methods of imaging (light microscope, back-scattered electrons, cathodoluminescence, etc.), and the description and classification of fluid inclusions. On the latter subject there is some overlap with the first chapter, but Goldstein goes into more detail, and provides a plethora of sketches and photographs that are very helpful to the novice.

Larryn Diamond authors the third chapter, which deals with the systematics of pure H_2O fluid inclusions. This chapter places phase relations in the one-component H_2O system in the context of observations to be made in fluid inclusions. This chapter goes into great detail, and forms an important foundation for later chapters. A unique feature, and one I would have liked to have seen in more of the chapters in the volume, is a number of questions posed in the captions to the figures, the answers to which are given at the end of the chapter. These questions and answers greatly aid the understanding of the material in the chapter. In Chapter 4, Bob Bodnar extends the discussion to fluid inclusions containing water and various electrolytes, with most attention paid to the H_2O-NaCl system. Similarly, Diamond covers systematics of gas-bearing aqueous fluid inclusions in Chapter 5. Petroleum fluid inclusions are introduced in a very brief Chapter 6 by Bob Burruss.

After the four chapters dealing with the systematics of various types of fluid inclusions, Chapter 7, by Ronald Bakker and Philip Brown, deals with computer modeling of fluid inclusions. These authors give fairly detailed descriptions of some specific computer programs that are included on the CD-ROM accompanying the volume.

One of the assumptions of fluid inclusion research is that the inclusions under study have remained closed, isochoric systems between original fluid entrapment and subsequent examination by the inclusionist. In Chapter 8, Bodnar tells the reader that re-equilibration can and does occur. However, he gives the reader a firm basis for recognizing the conditions under which such re-equilibration may occur.

Chapters 9 through 13 deal with the direct (as opposed to inferred from phase behavior) chemical analysis of fluid inclusions. All of

these chapters contain a reasonable amount of detail and are excellent places for the beginner to start. However, as would be expected owing to space limitations, the rank novice would need to consult additional references (many of which are given in the chapters) or "do an apprenticeship" in the laboratory of an experienced practicioner (a course of action suggested by the editors and authors themselves) before attempting any of these methods for the first time. Sarah Gleeson (Chapter 9) and Stefano Salvi and Anthony Williams-Jones (Chapter 10) cover bulk analytical methods for electrolytes and volatiles, respectively, in fluid inclusions. Raman spectroscopy, a relatively mature analytical technique for single inclusions (or even single phases in individual inclusions), is reviewed briefly by Bob Burruss. LA-ICP-MS analysis of individual fluid inclusions is emerging as one of the techniques most readily available to the inclusionist for individual inclusion analysis, and this topic is covered well by Joel Gagnon, Iain Samson and Brian Fryer in Chapter 12. It should be noted that additional information on the LA-ICP-MS technique in general can be found in the recent MAC Short Course Volume 29 (Laser ICP-MS in the Earth Sciences) edited by P. Sylvester. Alan Anderson and Robert Mayanovic review electron, nuclear and X-ray microprobe analyses of fluid inclusions in Chapter 13.

Chapter 14 on melt inclusions by Alfred Anderson rounds out the volume. In my opinion, more space could have been devoted to melt inclusions in this volume. However, I expect that the growth that this field is experiencing will make an entire volume of its own required in a couple of years.

The volume is well-edited. I found very few typographical errors. The quality of the photos and line drawings are also generally excellent. The only complaint, a minor one, that I have about the production is that there seems to have been a consistent problem with the conversion of the electronic files to the print version. The spacing between letters is annoyingly irregular in numerous places throughout the text. However, this volume is an excellent value. In addition to 374 pages of text, there is also a CD-ROM that contains: 1) modeling software discussed in the text; 2) electronic versions of the figures that instructors may use in teaching; and 3) archival PDF files of the chapters from MAC Short Course volume 6. There is also a very useful glossary of terms at the end of the book. Neither novice nor experienced fluid inclusionists can afford not to purchase Volume 32 for their personal libraries.

Employment Opportunities

Student Intern Opportunity – Geochemistry and Computational Chemistry

Sandia National Laboratories is seeking an upper-level undergraduate or graduate student to work in the Geochemistry Department for the Summer of 2004. This position involves the application of molecular mechanics to the study of metal adsorption at the mineral-water interface. Metals under investigation are significant contaminants at DOE hazardous waste and repository sites. Candidates with a background in mineralogy, aqueous geochemistry, or surface chemistry are preferred. Strong computer skills would be beneficial. If interested, please e:mail a letter of interest and resume to Louise Criscenti at ljcrisc@sandia.gov or call her at (505) 284-4357.

The Yellow Springs Instruments Environmental Ph.D. Fellowship

Wright State University is pleased to announce a new YSI Environmental Sciences PhD Fellowship. The Research Fellowship is for $25,000 with tuition and fee waivers. This prestigious award will be given to a highly qualified applicant accepted into the Environmental Sciences PhD Program at WSU. Students may apply with either a BS or MS degree from a relevant major (e.g., biology, chemistry, geology, physics, toxicology, environmental health sciences). The program provides a strong interdisciplinary focus both in the course work and dissertation research, with a focus on contaminant fate and effects in three areas of faculty expertise: environmental toxicology and chemistry, environmental stressors, and environmental geophysics and hydrogeology. Review of applications for the 2004-2005 Academic Year will begin in January, 2004, and continue until the position is filled. For more information on the curriculum, faculty research areas and application materials see http://www.wright.edu/academics/envsci.

The Sheffield Cell-Mineral Interface Research Programme

This new interdisciplinary programme links strengths in Environmental Engineering Science to those in Surface Chemistry, Nanotechnology, Biological imaging and Molecular Biology. Funding is primarily from the UK Engineering and Physical Sciences Research Council (EPSRC), with additional support from the Biotechnology and Biological Sciences Research Council (BBSRC) and The University of Sheffield.

Post-Doctoral Research Associate in Environmental Microbiology

The programme seeks to recruit a proven Post-Doctoral Researcher to a 5 year post with a significant experimental budget and a number of related PhD studentships. This is a great international opportunity for an early career scientist to develop research leadership within a leading European groundwater research group. Further details and application information can be found at http://www.shef.ac.uk/c-mi

Postdoctoral Position in Transmission Electron Microscopy and Aqueous Geochemistry

A postdoc position is immediately available in the areas of high-resolution transmission electron microscopy and aqueous geochemistry. We are particularly interested in individuals who are interested in extrapolating TEM results to large-scale geological problems via aqueous and isotope geochemistry and geochemical modeling. Experience is less important than motivation and education of the individual. The successful applicant will be working on collaborative projects funded to Professors David Veblen at Johns Hopkins University and Chen Zhu at Indiana University. The position is hired through Indiana University. Depending on research emphasis, the appointee may spend her/his time in Baltimore to use TEM and in Bloomington to use the aqueous geochemistry, scanning electron microscopy, stable isotope, and X-ray diffraction facilities. Appointment is initially for one year, with subsequent years possible pending availability of funds and performance. Salary is competitive and includes fringe benefits. Applicants should send a letter outlining their background in electron microscopy and geochemistry, along with vitae and names of 3 references to Ms. DeAnn Reinhart (Department of Geological Sciences, Indiana University, 1001 East 10th Street, Bloomington, IN 47405-1405) or contact Professors Veblen (dveblen@jhu.edu) or Chen Zhu (hzu_09@yahoo.com). Indiana University is an Equal Opportunity/Affirmative Action employer. Women and minorities are especially encouraged to apply

Meetings Announcements

SPECIAL SESSION

Microbial Impacts on Clay Transformation and Reactivity
41st Annual Meeting of the Clay Minerals Society
June 19-24, 2004 in Richland, WA, USA
www.pnl.gov/cms/program/symposia.stm#microbial

Abstract deadline for electronic submission: April 7th

Featured Speakers:
Gill Geesey, Center for Biofilm Engineering, Montana State University
Grant Ferris, University of Toronto
Yuri Gorby, Pacific Northwest National Laboratory
Thomas DiChristina, Georgia Tech

This session will bring together experts working on biogeochemistry at the clay-fluid interface to discuss microbial-mineral tranformations and their effects on speciation, distribution, and transport of nutrients. We invite participants to present spectroscopic and microscopic studies, as well as new modeling approaches that aim to elucidate microbial and (physico)chemical processes that result from interactions between microorganisms or microbial metabolites/exudates and clay-sized minerals.

Topics of specific interest include the use of 1) molecular methods for identifying microbial species involved in mineral transformations (e.g., biofilm formations), 2) electron microscopy to demonstrate interactions between microbes and minerals, 3) optical spectroscopies for determining mineral phases and redox conditions, and 4) lipid biomarkers and stable isotopes to monitor carbon cycling coupled to mineral transformations. Taken together, these approaches will contribute to our understanding of mineral transformation and reactivity on Earth and may shed light on biological signatures of biomineralization processes on other planets. Conveners also welcome contributions devoted to studying how surface-chemical phenomena (reactions at colloidal interfaces, agglomeration of colloidal material in natural waters, etc.) influence chemical fate and transport in natural and contaminated porous media with implications for nutrient cycling.

Publication of papers in Clays and Clay Minerals: Papers from this symposium (Microbial Impacts on Clay Transformation and Reactivity) will be published either as a special thematic issue of Clays and Clay Minerals or together as a group in the same issue. All papers submitted for possible publication will be subject to the normal review. For manuscript preparation, please visit (http://cms.lanl.gov/journal_.html) Expertise presented in this symposium will amplify that from the CMS Workshop held before the meeting and focused on Methods for Investigating Microbial-Mineral Interactions.

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WORKSHOP

Review of Methodologies for Investigating Microbial Mineral Interactions
41st Annual Meeting of the Clay Minerals Society
June 19th-24th, 2004, in Richland, Washington, USA.

Environmental Molecular Sciences Laboratory (EMSL) auditorium at Pacific Northwest National Laboratories (PNNL).

Workshop information: www.pnl.gov/cms/program/workshop.stm
Clay Minerals Society Meetings page: www.pnl.gov/cms/program/

The aim of the workshop is to provide a practical understanding of the methods available to study microbial interactions with clays and clay minerals. We hope to foster cross disciplinary education in how to combine microbial and geochemical techniques in both field and laboratory research, as well as new interdisciplinary research collaborations. We have an outstanding roster of experts speaking in this workshop and expect the workshop proceedings to become an invaluable tool for those working in this rapidly developing research area. The workshop will emphasize "how to and what to avoid" rather than a simple summary of research findings. As such, the workshop will also be of great benefit to graduate students and post doctoral fellows.

Workshop Topics and Contributors:

1. Patricia Maurice (Notre Dame) and Lesley Warren (McMaster) Overview of microbial-mineral interactions.
2. Jim Fredrickson, (PNNL), Characterization of in situ microbial activity.
3. Phil Bennett, (U. of Texas) Characterization of microbial-mineral interactions
4. Steven Lower (Virginia Polytechnic) Application of atomic force microscopy to microbial-mineral interactions.
5. Satish Myneni (Lawrence Berkeley) Application of x-ray absorption spectroscopy to microbial-mineral interactions.
6. Everett Shock, (Arizona State) Energetics of microbial-mineral interactions
7. John Zachara (PNNL) Experimental design for investigation of microbial-mineral processes.
8. Sue Brantley (Penn State) Bioreactors in microbial-mineral interactions.

We hope to see many of you at the workshop and would encourage you to consider bringing your graduate students and postdoctoral fellows as well. Please note that there are limited funds to help assist students attend the workshop (see the website above for further details).

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Meetings Anouncements

Mineralogical Society of America Short Course
Geochemistry of Non-Traditional Stable Isotopes

May 15-16, 2004

Preceding the AGU/CGU Meeting, Montreal, Canada

Studies of the stable isotope variations of elements such as H, C, N, O, and S have been pursued for several decades, and have provided important constraints on the sources of these elements in natural rocks, minerals, and fluids. The range of problems that these studies have focused on include planetary geology, the origin and evolution of life, crust and mantle evolution, and the genesis of natural resources. Much less attention, however, has been paid to stable isotope variations of other elements that are also geochemically important such as the metals and halogens. In part this has been due to analytical challenges, although the first-order variations for several systems have been constrained using long-standing analytical methods such as gas- and solid-source mass spectrometry. With the advent of breakthrough analytical instrumentation such as multi-collector ICP-MS, large portions of the Periodic Table are now accessible to stable isotope studies, and this Short Course, and its associated Reviews in Mineralogy and Geochemistry volume, provide insight into these new or "non-traditional" stable isotope systems, as reviewed by the current leaders in the field.

We begin with several broad topics, including an overview of stable isotope variations in the cosmos, which forms the baseline with which to view terrestrial systems. Calculation of stable isotope fractionation factors for these new isotope systems is critical for providing a framework for interpreting measurements of natural materials, particularly where experimental studies are few, and the second topic reviews different theoretical approaches for predicting isotopic fractionations. Next we discuss the variety of analytical approaches that may be taken in measuring stable isotope variations of "non-traditional" elements in natural materials, highlighting issues that are important in producing the highest quality data.

The later part of the Course summarizes what is known about stable isotope variations for specific "non-traditional" elements that have received the most intensive study, working up the mass range from Li to Mo. These elements cover a wide range of chemical behavior, and include alkali (Group I) and alkaline-earth (Group II) metals, the Group VI elements, the halogens (Group VII), and several examples from the first and second transition elements. In addition to participation in a variety of bonding environments, many of the elements discussed are involved in redox reactions, and are therefore involved in a wide variety of geochemical and biological processes that are sensitive to redox conditions.

Overview, theory, and analytical methods

- An overview of isotopic variations and their nucleosynthetic heritage - *Jean Louis Birck (Institut de Physique du Globe de Paris)*
- Applying stable isotope fractionation theory to new systems - *Edwin Schauble (University of California, Los Angeles)*
- Analytical methods for measurement of non-traditional stable isotope systems - *Francis Albarede (Ecole Normale Superieure de Lyon) and Brian Beard (University of Wisconsin, Madison)*

Specific isotope systems

- Developments in the understanding and application of Lithium isotopes in the Earth and Planetary Sciences - *Paul Tomascak (University of Maryland, College Park)*
- The isotope geochemistry and cosmochemistry of Magnesium - *Edward Young (University of California, Los Angeles) and Albert Galy (University of Cambridge)*
- The stable-Chlorine isotope composition of natural and anthropogenic materials - *Michael Stewart (University of Illinois, Urbana-Champaign) and Arthur Spivack (University of Rhode Island, Narragansett)*
- Calcium isotopic variations produced by biological, kinetic, radiogenic and nucleosynthetic processes - *Donald DePaolo (University of California, Berkeley)*
- Selenium and Chromium isotopes - *Thomas Johnson (University of Illinois, Urbana-Champaign) and Thomas Bullen (United States Geological Survey, Menlo Park)*
- Iron isotope variations in the modern and ancient Earth and other planetary bodies - *Brian Beard (University of Wisconsin, Madison) and Clark Johnson (University of Wisconsin, Madison)*
- Isotopic constraints on biogeochemical cycling of Iron - *Clark Johnson (University of Wisconsin, Madison), Brian Beard (University of Wisconsin, Madison), Eric Roden (University of Alabama, Tuscaloosa), Dianne Newman (California Institute of Technology), and Ken Nealson (University of Southern California)*
- The stable isotope geochemistry of Copper and Zinc - *Francis Albar de (Ecole Normale Sup rieure de Lyon)*
- Molybdenum stable isotopes: observations, interpretations and directions - *Ariel Anbar (University of Rochester)*

Conveners: *Clark Johnson*, University of Wisconsin - Madison, USA; *Brian Beard*, University of Wisconsin - Madison, USA; *Francis Albarede*, Ecole Normale Superieure de Lyon, France.

Fees & Registration: Registration fee covers short course sessions (including lunches) and *Reviews in Mineralogy and Geochemistry* volume. Professional Registration on or before March 1, 2004: MSA or GS Members $160; Non-member $200; Student Registration: MSA or GS Member $40; Non-member $60. You can register online at the MSA Home Page (http://www.minsocam.org). Forms are are available from the MSA Business Office, 1015 Eighteenth Street NW Suite 601, Washington, DC, 20036-5212, USA. Tel: 202-775-4344, Fax: 202-775-0018, e-mail: business@minsocam.org.

The course is partially supported by the U.S. Department of Energy.

Meetings Anouncements

Reviews in Mineralogy and Geochemistry Short Course

EPIDOTE GROUP MINERALS

June 3-4, 2004
Geocenter Copenhagen, DK-1350 Copenhagen K, Denmark

Our understanding of rock forming geological processes and thereby of geodynamic processes depends largely on a sound basis of knowledge of minerals. Due to the application of new analytical techniques the number of newly discovered minerals increases steadily, and what used to be a simple mineral may have turned into a complex group. Therefore a continuous update is necessary. The epidote mineral group consists of important rock-forming minerals as zoisite, clinozoisite and epidote, geochemically important accessory minerals such as allanite, and minerals typical for rare bulk compositions such as piemontite. Epidotes and zoisite occur in a wide variety of rocks, from near-surface conditions up to high- and ultrahigh-pressure metamorphic rocks and as liquidus phases in magmatic systems. They can incorporate the geochemically relevant minor and trace elements Sr, Pb, REE, V, and Mn. The epidote group is undoubtedly very important from a petrogenetic and geochemical point of view, and has received a lot of attention in recent years from several working groups in the field of experimental studies and spectroscopic work, and the thermodynamic database of epidote minerals has been significantly enlarged during the last decade. Recent studies have revealed the importance of zoisite in subduction zone processes as a carrier of H_2O and suggested zoisite to be the main H_2O source in the pressure interval between about 2.0 and 3.0 GPa. A lot of studies showed that an understanding of trace element geochemical processes in high-pressure rocks is impossible without understanding the geochemical influence of the epidote minerals. Recent advances in microanalytical techniques showed that epidote group minerals record detailed information on their geological environment.

This short course will present the many diverse aspects of epidote group mineralogy and aims to establish the state of the various fields and to show new avenues for research. It is equally suitable for scientists who already work on epidote group minerals as for newcomers in the fascinating epidote universe. Especially for undergraduates and graduates this short course provides a unique opportunity to get a comprehensive and profound overview over the different techniques and subdisciplines in modern petrology and we strongly encourage them to participate.

Topics and Speakers/Authors

General Aspects of Epidote Minerals
- Nomenclature, crystallography, and mineral chemistry of the epidote group – *G. Franz (TU Berlin) and A. Liebscher (GeoForschungsZentrum Potsdam)*
- Thermodynamic properties of epidote minerals – *M. Gottschalk (GeoForschungsZentrum Potsdam)*
- Spectroscopy of epidote minerals – *A. Liebscher (GeoForschungsZentrum Potsdam)*
- Experimental studies on epidote minerals – *S. Poli University of Milan) and M.W. Schmidt (ETH Zürich)*
- Isotope geochemistry of epidote minerals (stable and radiogenic) – *J. Morrison (University of Southern California)*
- Trace element geochemistry of epidote minerals – *D. Frei (GEUS), G. Franz (TU Berlin), and A. Liebscher (GeoForschungsZentrum Potsdam)*
- Fluid inclusion studies in epidote group minerals – *R. Klemd (University of Würzburg)*

Epidote Minerals in Natural Rocks
- Epidote minerals in hydrothermal systems – *D. Bird and A. R. Spieler (Stanford University)*
- Epidote Minerals in low- to medium pressure rocks – *R. Grapes and P. Hoskin (University of Freiburg)*
- Epidote Minerals in high- to ultra high pressure rocks – *M. Enami (Nagoya University) and J. G. Liou and C. Mattinson (Stanford University)*
- Epidote Minerals in partial melting processes and as magmatic phase – *M.W.Schmidt (ETH Zürich), K. Skjerlie (University of Tromso), and S. Poli (University of Milan)*

Special Epidote Minerals
Piemontite – *P. Bonazzi and S. Menchetti (University of Firenze)*
Allanite – *R. Giere (Purdue University) and S. Sorensen (Smithonian Institution)*

This short course is supported by the GeoForschungsZentrum Potsdam

Registration Form

Reviews in Mineralogy and Geochemistry Short Course

EPIDOTE GROUP MINERALS

Geocenter Copenhagen, DK-1350 Copenhagen K, Denmark
June 3-4, 2004

Complete and return this registration form to:

MSA Business Office
1015 Eighteenth Street NW, Suite 601
Washington, DC 20036-5274, USA

Voice: 202-775-4344
Fax: 202-775-0018

Please type or print. Use one form per registrant. Registration is limited to 100 people on a first-come, first-served basis. Payment must accompany this form, which will be fully refunded if cancellation is received in writing prior to May 1, 2004.

Name _____
(first) (middle) (last)

Address _____

_____
(city) (state/province) (zip/postal code) (country)

Telephone: (voice) _____ (fax) _____ E-mail: _____

Registration fee covers Short Course session costs and the RiM&G volume. Accommodation, meals, and refreshments are NOT included in the registration fee. Adjacent to the lecture room is a cantina that offers meals and refreshments. All Short Course sessions will be held at the Geocenter Copenhagen, Öster Voldage 10, DK-1350 Copenhagen K, Denmark. Information on the Short Course location and course updates are on the MSA Home Page (http://www.minsocam.org)

Registration. Mark the appropriate registration category [X] and write the appropriate fee on the cost line.

Professional Registration:	*on or before 1 May 2004*	*after 1 May 2004*	Cost
[ ] Member	$100	$130	$_____
[ ] Non-Member	$165*	$195*	$_____
[ ] Speaker	no cost	no cost	$_____

Student Registration:	*on or before 1 May 2004*	*after 1 May 2004*	Cost
[ ] Member	$65	$85	$_____
[ ] Non-Member	$80*	$100	$_____

*includes 2004 MSA membership dues/electronic access to *American Mineralogist*

Total Due $_____

Amount Enclosed. Indicate the payment method and amount of payment enclosed.

[ ] Enclosed is a check (in US$ drawn on a US bank) or money order $_____
[ ] Charge my: ___Visa ___Mastercard ___Discover ___American Express Card
(Charged when the registration form is received) in the amount of $_____

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(card number) (name on card – please print)

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**Visa/MC: last 3 digits above signature panel on the back of card. AMEX: 4 digits upper right of number on front

Registration Form

Reviews in Mineralogy and Geochemistry Short Course

GEOCHEMISTRY OF NON-TRADITIONAL STABLE ISOTOPES

Preceding the AGU/CGU Meeting in Montreal, Canada
May 15-16, 2004

Complete and return this registration form to:

MSA Business Office
1015 Eighteenth Street NW, Suite 601
Washington, DC 20036-5274, USA

Voice: 202-775-4344
Fax: 202-775-0018

Please type or print. Use one form per registrant. Registration is limited to 110 people on a first-come, first-served basis. Payment must accompany this form, which will be fully refunded if cancellation is received in writing prior to April 1, 2004.

Name _____
(first) (middle) (last)

Address _____

_____
(city) (state/province) (zip/postal code) (country)

Telephone: (voice) _____ (fax) _____ E-mail: _____

Registration fee covers Short Course session costs and the RiM&G volume as well as lunch for both days and light snacks and beverages at breaks during the course. Accommodation, breakfast, and dinner during the short course are NOT included in the registration fee. All Short Course sessions will be held at the Delta Centre-Ville Hotel (AGU/CGU headquarters hotel) May 15-16, 2004; these dates precede the AGU/CGU Meeting in Montreal, Canada. Information on the Short Course location and course updates are on the MSA Home Page (http://www.minsocam.org)

Registration. Mark the appropriate registration category [X] and write the appropriate fee on the cost line.

Professional Registration:	*on or before 1 March 2004*	*after 1 March 2004*	Cost
[ ] Member	$160	$190	$_____
[ ] Non-Member	$225*	$255*	$_____
[ ] Speaker	no cost	no cost	$_____

Student Registration:	*on or before 1 March 2004*	*after 1 March 2004*	Cost
[ ] Member	$40	$60	$_____
[ ] Non-Member	$55*	$75*	$_____

*includes 2004 MSA membership dues/electronic access to *American Mineralogist*

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[ ] Charge my: ___Visa ___Mastercard ___Discover ___American Express Card
(Charged when the registration form is received) in the amount of $_____

_____ _____
(card number) (name on card – please print)

_____ _____ _____
(exp. Date) (Card Verification Value**) (signature)

**Visa/MC: last 3 digits above signature panel on the back of card. AMEX: 4 digits upper right of number on front

MEETINGS CALENDAR

March 25 - 26, 2004: SOPRO 2004 - International Workshop on Sorption processes at oxide and carbonate mineral water interfaces. Karlsruhe, Germany. Web site: http://www.fzk.de/sopro

March 28-Apr 1, 2004: 227th ACS National Meeting, Anaheim, CA. Will include: Arsenic Geochemistry, Fate and Transport of Colloids, Environmental Chemistry of Bacterial Mn(II) oxidation, Scaling issues: Application of molecular geochemistry to field scale transport, and Chemistry of metals in terrestrial and aquatic systems. Web site: http://membership.acs.org/g/geoc/upcoming.html

March 28 - Apr 4, 2004: Second ISPET Seminar: "High Temperature Metamorphism and Crustal Melting", Granada, Spain. Web site: ISPET web: http://www.dmp.unipd.it/ISPET/index.html

March 29-31, 2004: Euradwaste '04, Sixth European Commission Conference on the Management and Disposal of Radioactive Waste, European Commission, Jean Monnet building, Luxembourg - Kirchberg. Web site: http://www.cordis.lu/fp6-euratom/events.htm

Mar 29-Apr 01, 2004: Modelling Permeable Rocks IV, Southampton University, Southampton, UK. Contact: Lucy Nye, Catherine Richards House, 16 Nelson Street, Southend-on-Sea, Essex, UK; Phone: +44 (0) 1702 354020; Fax: +44 (0) 1702 354111; E-mail: lucy.nye@ima.org.uk; Web site: http://www.ima.org.uk/mathematics/confmodelling.htm

Apr 5-6, 2004: Seventh Nederlands Aardwetenschappelijk Congres (NAC VII). Web site: http://www.nac7.nl/

Apr 5-7, 2004: 22nd European Conference of Society for Environmental Geochemistry and Health (SEGH 2004), University of Sussex, UK. Web site: more at website http://www.sussex.ac.uk/conferences/segh/

Apr 6-7, 2004: The 8th international conference of Jordanian Geologist Association, Faculty of Engineering, University of Jordan, Amman, Amman, Jordan. Contact: Dr. Ahmad Al-Malabeh, Jordanian Geologist Association; Phone: +962 6 5652310; Fax: +962 6 5652312; E-mail: jga@joinnet.com.jo; Web site: http://www.jo-geologists.com

Apr 12-16, 2004: MRS 2004 Scientific Basis for Radioactive Waste Management XXVIII, San Francisco, CA, U.S.A. Web site: http://www.mrs.org/meetings/spring2004/

Apr 14-19, 2004: 5th International Symposium on Eastern Mediterranean Geology, Thessaloniki, Greece. A conference covering all earth science topics related to the broader eastern Mediterranean region. Contact: Alexandros Chatzipetros; Phone: +30 (231) 0998512; Web site: http://www.geo.auth.gr/5thISEMG

Apr 22-23, 2004: Symposium on Silica: Sampling and Analysis, Salt Lake City, Utah, U.S.A. Contact: Dorothy A Fitzpatrick, Symposia Operations, ASTM International, 100 Barr Harbor Drive, PO Box C700, West Consholhocken, PA 19428 2959, U.S.A.; E-mail: mharper@cdc.gov

April 25 - 30, 2004: Minerals of the Ocean - Integrated Strategies. St. Petersburg, Russia. Web site: http://www.vniio.nw.ru/announce/main.htm

Apr 26-30, 2004: European Geophysical Society XXIX General Assembly, Nice, France. Contact: EGS Office, Max-Planck-Str. 13, 37191 Katlenburg-Lindau, Germany; Phone: +49 5556 1440, Fax: +49 5556 4709; E-mail: EGS@COPERNICUS.ORG; Web site: http://www.copernicus.org/EGS/EGS.html

May 2-7, 2004: 40th Forum on the Geology of Industrial Minerals, Indiana Memorial Union Building, Indiana University, Bloomington, IN, USA , by the Indiana Geological Survey and Department of Geological Sciences Indiana University. Contact: Nelson R. Shaffer, 611 N. Walnut Grove, Bloomington, IN 47405; Phone: +1 812 855 2687; Fax: +1 812 855 2862; E-mail: shaffern@indiana.edu; Web site: http://igs.indiana.edu/imforum

May 4-7, 2004: Sixth International Gold Symposium, Lima, Peru. Contact: Phone: +51-1-460-1600: E-mail: cmendoza@org.pe.

May 4-9, 2004: 50th Annual Institute on Lake Superior Geology, Radisson Hotel Harborview, Duluth, $59 night, Duluth, MN, USA , by the Natural Resources Research Institute-University of Minnesota Duluth. Contact: Richard Patelke, NRRI, 5013 Miller Trunk Highway, Duluth, MN, 55803; Phone: +1 218 720 4242; Fax: +1 218 720 4329; E-mail: rpatelke@nrri.umn.edu; Web site: http://www.ilsg2004.org

May 15 - 16, 2004: [RIM&G SHORTCOURSE]Geochemistry of Non-Traditional Stable Isotopes. Montreal, Canada. Web site: http://www.minsocam.org/MSA/SC/

May 15-16, 2004: Short course Stable Isotopes of Intermediate to Heavy Elements, Montr al, Canada. Organizers: Clark Johnson (Univ. of Wisconsin - Madison) (E-mail: clarkj@geology.wisc.edu), Francis Albar de (Univof Lyon), Brian Beard (Univ. of Wisconsin - Madison). Sponsor: Mineralogical Society of America

May 17-21, 2004: joint meeting - 2004 AGU Spring meeting and the Canadian Geophysical Union annual meeting, Montr al, Canada. Contact: meetinginfo@agu.org; Web site: http://www.agu.org/meetings/

May 23-27, 2004: 104th General Meeting American Society for Microbiology, Ernest N. Morial Convention Center, New Orleans, LA. Web site: http://www.asm.org/Meetings/index.asp?bid=697

May 24-26, 2004: Arctic Geology, Energy resources and Environmental Challenges, Polar Environmental Centre, Troms¿, Norway. Contact: Marianne BliksŒs, Norwegian Geological Society, c/o NGU, N-7491 Trondheim, Norway; Phone: + 47 73 90 44 68; Fax: + 47 73 92 16 20; E-mail: Marianne@geologi.no; Web site: http://www.geologi.no/cgi-bin/geologi/imaker?id=1658

May 26-June 6, 2004: Polymorphism: Solvates and Phase Relationships, Erice, Italy. Contact: E-mail: Yoel@bgumail.bgu.ac.il; Web site: http://www.geomin.unibo.it/orgv/erice/olderice/bernstei.htm

Summer 2004: The 2nd International Symposium on Volcanic Ash and Aviation Safety, Washington, DC. Contact: Mary Cairns or Donald Carver, Office of the Federal Coordinator for Meteorology, 8455 Colesville Road Silver Spring, MD 20910, U.S.A.; Phone: +1 301-427-2002; Fax: +1 301-427-2007; Web site: http://www.ofcm.gov/homepage/text/spc_proj/volcanic_ash/volash2.html

June 3-4, 2004: [RIM&G SHORTCOURSE] Epidote Group Minerals. In connection with the Copenhagen Goldschmidt. Web site: http://www.minsocam.org/MSA/SC/

June 2-7, 2004: 20th Colloquium of African Geology - Geoscientific Infrastructure in Africa for Sustainable Development, Orl ans, France. Bureau de recherches g ologiques et mini res (BRGM). Contact: Secretariat of CAG 20, BRGM 3, Avenue Claude Guillemin, B.P. 6009 - 45060 Orl ans cedex 2, France; Phone: +33 2 38 64 38 **1**; Fax: +33 2 38 64 38 61 - +33 2 38 64 37 29; E-mail: cag20@brgm.fr; Web site: http://cag20.brgm.fr

June 6-11, 2004: 12th International Peat Congress: Wise Use of Peatlands, Tampere, Finland. Contact: Congress Secretariat, Congreszon Ltd / IPS 2004, It lahdenkatu 22A, FIN-00210 Helsinki, Finland; Phone: +358 (9) 5840 9350; Fax: +358 (9) 5840 9555; E-mail: ips2004@congreszon.fi; Web site: http://www.ips2004.com

June 6-12, 2004: 14th V.M. Goldschmidt Conference, Copenhagen, Denmark. Web site: http://www.goldschmidt2004.dk/

June, 2004: Short Course Epidote Group Minerals. At XIVth Goldschmidt Conference in Copenhagen (Denmark). Sponsor: Mineralogical Society of America. Organizer: Axel Liebscher; E-mail: alieb@pop-server.gfz-potsdam.de

June 7-9, 2004: 1st International Conference "Advances in Mineral Resources Management and Environmental Geotechnology", Chania, Crete. Web site: http://heliotopos.conferences.gr/?amireg2004

June 9 - 20, 2004: Polymorphism: Solvates and Phase Relationships. Erice, Italy. Web site: http://www.geomin.unibo.it/orgv/erice/olderice/bernstei.htm

June 9-11, 2004: GeoMod2004 - From Mountains to Sedimentary Basins, Emmetten, Switzerland. Web site: http://www.ogs.trieste.it/GeoMod/

June 13-18, 2004: ASLO Summer Meeting, Savannah Convention Center, Savannah, Georgia, U.S.A. Contact: Amy Parker, University of Georgia; E-mail: aparker@smokey.forestry.uga.edu; Alan Decho, University of South Carolina; E-mail: Awdecho@gwm.sc.edu

June 14-18, 2004: 4th International Conference Modern Management of Mine Producing, Geology and Environmental Protection (SGEM), Albena, Varna, Bulgaria. Web site: http://www.sgem.org/

June 19-24, 2004: 41st Clay Minerals Society annual meeting, Richland, WA, U.S.A., by the Clay Minerals Society and Pacific Northwest National Laboratory. Contact: Jim Amonette; Phone: +1 509-376-5565; Fax: +1 509-376-7972; E-mail: jim.amonette@pnl.gov; Web site: http://www.pnl.gov/cms/

June 20-24, 2004: The East African Rift System: Development, Evolution and Resources, Addis Ababa, Ethiopia. Web site: http://www.gl.rhul.ac.uk/ear_conference/EAR1_circular.pdf

June 26-July 1, 2005: 7th Workshop of the European Society for Isotope Research (ESIR), Seggauberg, Styria, Austria. Web site: http://www.kfunigraz.ac.at/geopal/aktuelles/veranstaltungen/viiisotopenworkshop/main/

June 27 - July 2, 2004: 11th International Symposium on Water-Rock Interaction. Saratoga Springs, NY, USA. Web site: http://www.outreach.psu.edu/C&I/WRI/

June 27-July 2, 2004: XIth International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin and Lead, Santa Fe, New Mexico. Contact: Prof. Keith Pannell, Department of Chemistry, University of Texas at El Paso, El Paso, TX 79968-0513, U.S.A.; Phone: +1 915-747-5796; Fax: +1 915-747-5748; E-mail: kpannell@utep.edu

June 27-July 1, 2004: International Basement Tectonics Association (IBTA) Conference on the Four-D Evolution of Continental Crust, Oakridge, TN, U.S.A. Sponsors: IBTA, AGU, Geological Society of America, others. Contact: R.D. Hatcher, Jr., Department of Geological Sciences, University of Tennessee, 305 Geological Sciences Building, Knoxville, TN 37996-1410 U.S.A.; E-mail: bobmap@utk.edu

June 27-July 2, 2004: 11th International Symposium on Water-Rock Interaction, Saratoga Springs, New York, U.S.A. Contact: Cheryl Corman, Phone: +1 814-863-1738; Susan Brantley, Secretary General, Dept. of Geosciences, The Pennsylvania State University, 239 Deike Building, University Park, PA 16802, U.S.A.; Phone: +1 814-863-1739; Fax: +1 814-863-8724; Web sites: http://www.outreach.psu.edu/C&I/WRI/ and http://wwwrcamnl.wr.usgs.gov/wri/future_meetings.htm

June 28-30, 2004: 4th BGA Geoenvironmental Engineering Conference, Stratford-upon-Avon, U.K. The main conference theme is "Integrated Management of Groundwater and Contaminated Land". Organized by the Geoenvironmental Research Centre (Cardiff School of Engineering, Cardiff University) and the National Groundwater & Contaminated Land Centre (Environment Agency) on behalf of the British Geotechnical Association. Web site: http://www.grc.cf.ac.uk/4bga/

July 4-9, 2004: 16th International Conference on Phosphorus Chemistry (ICPC 16), Birmingham, England. Contact: Prof. Pascal Metivier, Rhodia, R&D for Phosphorous and Performance Derivatives Oak House, reeds Crescent Watford, WD24 4QP, U.K.; Phone: +44 1923 485609; E-mail: pascal.metivier@eu.rhodia.com; Web site: http://www.icpc2004.com

July 5 - 9, 2004: Joint AOGS 1st Annual Meeting & APHW 2nd Conference. Suntec Singapore, Singapore. Web sites: http://www.asiaoceania.org and http://www.secondaphw.org respectfully

July 5-7, 2004: Geo-Environment 2004, International Conference on Monitoring, Simulation and Remediation of the Geological Environment, Segovia, Spain. Contact: Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton,SO40 7AA, UK; E-mail: gmckeogh@wessex.ac.uk; Web site: http://www.wessex.ac.uk/conferences/2004/geoenvironment04

July 6, 2004: MORE-SGEG: Tectonics to Mineral Discovery, Orange, Australia.
Web site: http://www.earth.monash.edu.au/seminars/MORE-Conference-2004.html

July 12, 2004: BHS International Conference on Hydrology: Science and Practice for the 21st Century, London, United Kingdom. Website: http://www.hydrology.org.uk/bhs2004/welcome.htm

July 12-16, 2004: GEOSCIENCE AFRICA, International Conference, University of the Witwatersrand, Johannesburg, South Africa. Web site: http://www.wits.ac.za/geoscienceafrica

July 19-22, 2004: Groundwater Quality 2004, University of Waterloo, Ontario, Canada.
Web site: http://gq2004.uwaterloo.ca/.

July 25-29, 2004: 11th International Symposium on Solubility Phenomena, Including Related Equilibrium Processes (11th ISSP), Aveiro, Portugal. Contact: Prof. Clara Magalhaes, Department of Chemistry, University of Aveiro, P-3810-193 Aveiro, Portugal; Phone: +351 234 401518; Fax: +351 234 370084; E-mail: mclara@dq.ua.pt; Web site: http://www.dq.ua.pt/11th_issp

July 25-30, 2004: 7th INTECOL International Wetlands Conference, Utrecht University, Utrecht, The Netherlands. Web site: http://www.bio.uu.nl/INTECOL

July 26-30, 2004: International Symposium on Ice-Water-Ice: Processes Across the Phase Boundary, Portland, Oregon, USA. Contact: S. Ommanney, International Glaciological Society, Scott Polar Research Institute, Lensfield, Road, Cambridge CB2 1ER, UK; Phone: +44 1223 355974; Fax: +44 1223 336543; E-mail: Int_Glaciol_Soc@compuserve.com; Web site: http://www.igsoc.org/

Aug 1-6, 2004: Gordon Research Conference "Water & Aqueous Solutions". Holderness School. Web site: http://www.grc.uri.edu/04sched.htm

Aug 2-6 2004: 67th Annual Meeting of The Meteoritical Society, Rio de Janeiro, Rio de Janeiro, Brazil. Website: http://www.metsoc2004.org

Aug 2-7, 2004: 9th International Chemistry Conference in Africa (ICCA), Arusha, Tanzania. Web site: http://www.udsm.ac.tz/News_events/9icca.html

Aug 8-13, 2004: Gordon Research Conference "The Role of Water in Rock Deformation", Mount Holyoke College, South Hadley, MA, U.S.A. This conference will emphasize the chemical and physical roles of aqueous fluids in deformation, the sources and transport of fluids in deforming rock bodies and faults of the crust and mantle, and the importance of fluid-rock interactions to tectonics. Contact: Andreas Kronenberg, Chair, or Mark Jessell, Vice-chair; E-mail: a-kronenberg@tamu.edu or mjessell@lmtg.ups-tlse.fr; Web site: http://www.tectonique.net/grc/

Aug 8-13, 2004: Gordon Research Conference Organic Geochemistry, Holderness School. Web site: http://www.grc.uri.edu/04sched.htm

August 12 - 15, 2004: MYRES-I - 'Heat, Helium, Hotspots, and Whole Mantle Convection. La Jolla, CA, USA. Web site: http://www.myres.org/myres1/

Aug 12-15, 2004: MYRES-I: Heat, Helium, Hotspots, and Whole Mantle Convection, UCSD campus, La Jolla, CA, USA. Contact: Thorsten Becker, IGPP-0225, UCSD, 9500 Gilman Drive; Phone: +1 858 534 4643; Fax: +1 858 534 5332; E-mail: tbecker@igpp.ucsd.deu; Web site: http://www.myres.org/myres1/

Meetings Calendar

Aug 16-20, 2004: Western Pacific Geophysics Meeting, Honolulu, Hawaii, U.S.A. Sponsor: AGU. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7333; Fax: +1-202-328-0566; E-mail: meetingsinfo@agu.org; Web site: www.agu.org/meetings

Aug 20-28, 2004: 32nd International Geological Congress (IGC), Florence, Italy. Geochemical Society/IUGS. Also: 6-day post-congress field trip to the blueschists, eclogites and tectonics of northwest Turkey (modified version of the successful 1998 Metamorphic Studies Group field trip). See second circular. In addition: post-congress field workshop n¡ PWO 01: "Low-angle normal faulting . twenty years after". This workshop will be a 6-day excursion from Corsica (France) to Elba Island, Tuscany and western Umbria (Italy). Conveners PWO0-1: Giusy Lavecchia, Dipartimento di Scienze della Terra - Chieti University, Italy (glavecchia@unich.it), Gordon S. Lister, Department of Earth Science - Monash University, Australia (gordon@mail.earth.monash.edu.au), and Laurent Jolivet, Lab. de Tectonique - P.& M. Curie University - Paris, France (laurent.jolivet@lgs.jussieu.fr). Web site: http://www.32igc.org/

Aug 20-28, 2004: symposium G-04.04 Kinetics and geochemical reactions, part of the 32nd International Geological Congress (IGC), Florence, Italy (see above). Web site: http://www.32igc.org/default1.htm

Aug 22-26, 2004: 228th ACS National Meeting, Philadelphia, PA, U.S.A. Web site: http://membership.acs.org/g/geoc/upcoming.html and http://oasys.acs.org/acs/228nm/geoc/papers/index.cgi

Aug 30-Sept 3, 2004: 2nd International Conference on Recrystallization and Grain Growth, Annecy, France. Primarily for and by metallurgists. The themes of the conference include: fundamentals of recrystallization and grain growth, dynamic recrystallization and elevated temperature deformation, computer simulation and modeling, microstructure and texture, structure, thermodynamics and kinetics of interfaces, and new experimental methods and techniques. Chairpersons of the Organizing Committee: Julian Driver and Brigitte Bacroix; Web site: http://www.rex-gg-2004.org/

Aug, 2004: 67th annual meeting of the Meteoritical Society, Rio de Janeiro, Brazil. Contact: E-mail: congrex@congrex.com.br

Sept 3-5, 2004: 4th International Symposium on Chemistry and Biological Chemistry of Vanadium, Szeged, Hungary. Contact: Prof. Tamas Kiss, University of Szeged, Department of Inorganic and Analytical Chemistry, PO Box 440, H-6701 Szeged, Hungary; Phone: +36 62 544337; Fax: +36 62 420505; E-mail: tkiss@chem.u-szeged.hu; Web site: http://www.staff.u-szeged.hu/~vanadium/

Sep 4-9, 2004: 8th International Global Atmospheric Chemistry Conference, Christchurch, New Zealand. Contact: Kim Gerard, PO Box 13 494, Christchurch, New Zealand; E-mail: kim@conference.co.nz; Web site: http://www.IGAConference2004.co.nz

Sept 6-10, 2004: ECORAD 2004, Aix en Provence, France. Web site: http://www.irsn-dpre.com/ecorad/

Sept 6-12, 2004: EUROSOIL 2004, Freiburg, Germany. Web site: http://www.forst.uni-freiburg.de/eurosoil/

Sept 8-10, 2004: International Symposium of Earth System Science (ISES 2004), Istanbul, Turkey. Contact: Symposium Secretariat, ODS Congress Management, Yildiz Cicegi 12/1, 34337 Etiler, Istanbul, Turkey; Phone: +90 212 287 5800; Fax: +90 212 3522660; E-mail: secretariat@earthsystem2004.org; Web site: http://www.earthsystem2004.org/

Sept 11, 2004: Tectonics, Magmatism and Metallogeny of Active Continental Margins, Vladivostock, Russia. Contact: E-mail: iagodconf@fegi.ru; Web site: http://www.fegi.ru/IAGOD/

Sept 19-22, 2004: 8th International Congress on Applied Mineralogy (ICAM 2004), Aguas de Lindoia, Aguas de Lindoia, Sao Paolo, Brazil. Contact: Dogan Paktunc, Phone: +1 613 947 7061; Fax: +1 613 996 9673; E-mail: dpaktunc@nrcan.gc.ca; Web site: http://www.icam2004.org

Sept 20-24, 2004: 2nd Mid-European Clay Conference, Miskolc, Hungary. Contact: Dr I. Viczian; E-mail: viczian@ludens.elte.hu or Dr T.G. Weisburg; E-mail: weiszburg@ludens.elte.hu

Sep 26-Oct 1, 2004: The Society for Organic Petrology (TSOP), 21st Annual Meeting, Crowne Plaza Hotel, Coogee Beach, Sydney, Australia. Contact: Neil Sherwood, CSIRO Petroleum Resources, PO Box 136, North Ryde NSW 1670 Australia; Phone: +61 2 9490 8666; Fax: +61 2 9490 8197; E-mail: Neil.Sherwood@csiro.au; Web site: http://www.tsop.org/mtgsyd.htm

Sep 27-Oct 1, 2004: SEG 2004: Predictive Mineral Discovery Under Cover, University of Western Australia, Perth, WA, Australia. Organization: Society of Economic Geologists (SEG), Geoconferences WA, and Society for Geology Applied to Mineral Deposits (SGA). Contact: Susan Ho, P.O. Box 80, Bullcreek WA 6149, Australia; Phone: +61 8 9332 7350; Fax: +61 8 9310 6694; E-mail: susanho@geol.uwa.edu.au; Web site: http://www.cgm.uwa.edu.au/geoconferences/index.asp

Oct 13-16, 2004: SOLAS Science 2004. Halifax, Nova Scotia, Canada. Web site: http://www.uea.ac.uk/env/solas/ss04.html

Oct 18-20, 2004: Deep-Water Sedimentary Systems of Arctic and North Atlantic Margins, Statoil Conference Center, Stavanger, Norway. Organization: Norwegian Geological Society. Contact: Ole J. Martinsen, Norsk Hydro Research Center, N-5020 Bergen, Norway; Phone: +47 5599 6937; Fax: +47 5599 5704; E-mail: ole.martinsen@hydro.com; Web site: http://www.geologi.no/cgi-bin/geologi/imaker?id=1657

Nov 7-10, 2004: GSA 2004 Annual Meeting & Exposition, Denver, Colorado. Web site: http://www.geosociety.org/

Nov 14-19, 2004: IAVCEI 2004 General Assembly Volcanism and its Impact on Society, Puc—n, Chile. Contact: Jos A. Naranjo or Jorge Clavero, General Secretariat IAVCEI 2004 GA, Av. Santa Maria 0104, Providencia, Santiago, Chile; Phone: +56-2-737 50 50; Fax: +56-2-777 19 06; E-mail: iavcei@sernageomin.cl; Web site: www.sernageomin.cl/iavcei

Nov 22-23, 2004: GeoSur 2004 - International Symposium on the Geology and the Geophysics of the Southernmost Andes, the Scotia Arc and the Antarctic Peninsula, Hilton Buenos Aires Hotel, Buenos Aires, Argentina. Contact: Angela Marchetto, OGS, Borgo Grotta Gigante 42c - 34010 SGONICO TS Italy; Phone: +39 040 2140339; Fax: +39 040 327040; E-mail: amarchetto@ogs.trieste.it; Web site: http://www.ogs.trieste.it/GeoSur2004/index.html

Dec, 2004: ACE 2004 - 5th European meeting on environmental chemistry, Bari, Italy. Contact: Dr. Michele Aresta, METEA Research Center, University of Bari, via Celso Ulpiani 27, 70126 Bari, Italy; E-mail: resta@metea.uniba.it; Web site: http://www.science.plym.ac.uk/ace/Meetings.html

Dec 5-8, 2004: Salt-Sediment Interactions and Hydrocarbon Prospectivity: Concepts, Applications, and Case Studies for the 21st Century, Adam's Mark Hotel, Houston, TX U.S.A. GCSSEPM Foundation. Contact: Paul J. Post; Phone: +1 504-736-2954; Fax: +1 504-736-2905; E-mail: paul.post@mms.gov: Web site: http://www.geolsoc.org.uk/template.cfm?name=GCSSEPM1

Dec 6-7, 2004: Channel Flow, Ductile Extrusion and Exhumation of lower-mid crust in Continental Collision Zones, The Geological Society of London, Burlington House, London, U.K. Contact: Helen Wilson, Geological Society of London, Burlington House, Piccadilly, London W1J 0BG; Phone: +44 (0)20 7434 9944: Fax: +44 (0)20 7494 0579; E-mail: helen.wilson@geolsoc.org.uk; Web site: http://www.geolsoc.org.uk/template.cfm?name=channel_flow

Dec 13-17, 2004: AGU Fall Meeting, San Francisco, California, U.S.A. Contact: E. Terry, AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7335; Fax: +1-202-328-0566; E-mail: eterry@agu.org; meetinginfo@agu.org; Web site: www.agu.org/meetings

Jan 18-20, 2005: 4th Asia Pacific Symposium on Environmental Geochemistry, Perth, Western Australia. Organization: APSEG4, EIGG, Brodie Hall Building, 1 Turner Park, Bentley, WA 6102, Australia; Phone: +61 8 9266 3577/7824; Fax: +61 8 9266 7824; E-mail: apseg4@curtin.edu.au; Web site: http://www.apseg4.curtin.edu.au/

Feb 10-11, 2005: seismic geomorphology, Westchase Hilton Hotel, Houston, Texas, US. Contact: Jessica Canfor, Geological Society of London, Burlington House, Piccadilly, London W1J 0BG, UK; Phone: +44 (0)20 7434 9944; Fax: +44 (0)20 7494 0579; E-mail: jessica.canfor@geolsoc.org.uk; Web site: http://www.geolsoc.org.uk/seismicgeomorphology

February 26 - March 2, 2005: Sixth Keele Meeting on Aluminium - Aluminium: Lithosphere to Biosphere (and Back). Bucaco, Portugal. Web site: http://www.keele.ac.uk/depts/ch/groups/aluminium/

Apr 3-7, 2005: International Conference on the Biogeochemistry of Trace Elements (ICOBTE), Adelaide, Australia. E-mail: 8thICOBTE@csiro.au,; Web site: http://www.clw.csiro.au/conferences/8thicobte/

Apr 14-20, 2005: 5th International Symposium on Eastern Mediterranean Geology, Thessaloniki, Greece. Web site: http://geonet.geo.auth.gr/5thISEMG/

Apr 24-29, 2005: World Geothermal Congress - 2005, Antalya, Turkey. Web site: http://www.wgc2005.org/

Apr 25-29, 2005: European Geosciences Union (EGU) XXX General Assembly, Nice, France. Sponsors: EGU, AGU. Contact: EGU Office, Max-Planck-Str. 13, 37191 Katlenburg-Lindau, Germany; Phone: +49-5556-1440; Fax: +49-5556-4709; E-mail: egu@copernicus.org; Web site: www.copernicus.org/EGU/EGU.html

May 15-18, 2005: Window to the World, John Ascuaga's Nugget, Sparks, Nevada, USA. Contact: Geological Society of Nevada, P.O. Box 13375 Reno, NV 89507, USA; Phone: +1 775 3234569; Fax: +1 775 323 3599; E-mail: gsnsymp@unr.edu; Web site: http://www.gsn2005.org/

May 20-24, 2005: Fifteenth Annual V.M. Goldschmidt Conference, Moscow, Idaho, USA; Web site: http://www.uidaho.edu/gold2005

May 23-27, 2005: AGU Joint Assembly, New Orleans, Louisiana, U.S.A. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7333; Fax: +1-202-328-0566; E-mail: meetinginfo@agu.org; Web site: www.agu.org

June 5-9, 2005: 105th General Meeting American Society for Microbiology, Atlanta, GA, U.S.A. Web site: http://www.asm.org/Meetings/index.asp?bid=470

July 17-22, 2005: 14th International Symposium on Carotenoids. Edinburgh, U.K. Contact: Prof. Andrew J. Young, School of Biological and Earth Sciences, John Moores University, Byrom St. Liverpool L3 3AF, U.K. Phone: +44 151 231 2173; Fax: +44 151 207 3224; E-mail: a.j.young@livjm.ac.uk

July 31-Aug 8, 2005: Fifth International Dyke Conference IDC5, Pohtimolampi Wilderness Hotel, Polar Circle, Rovaniemi, Finland. Contact: Rovaniemi-Lapland Congresses, University of Lapland, PO BOX 122, FIN-96101 Rovaniemi, Finland; Phone: +358 (0)16 341 2799; Fax: +358 (0)16 317 843; E-mail: congres@ulapland.fi; Web site: http://idc5.gsf.fi/

Aug, 2005: IUCr-20 - XX Meeting and General Assembly of the International Union of Crystallography, Florence, Italy.

Aug 7-11, 2005 10th International Platinum Symposium: "Platinum-Group Element - from Genesis to Beneficiation and Environmental Impact", Oulu, Finland. Contact: Congress Oulu, P.O. Box 56, Fin-90015 Oulun kaupunki, Finland; E-mail: congressoulu@ouka.fi; Web sites: http://www.congressoulu.fi/ and http://platinumsymposium.oulu.fi/

Aug 8-11, 2005: Earth System Processes II, Calgary, Alberta, Canada. Ancient earth systems, modern earth system processes, and earth system futures. An interdisciplinary, integrative scientific meeting exploring the interactions among Earth's lithosphere, atmosphere, hydrosphere, cryosphere, and biota. Organization: Geological Society of America and Geological Association of Canada. Web site; http://www.geosociety.org/meetings/esp2/

Sep 07-11, 2005: 6th International Conference on Geomorphology, Congress Hall-Auditorium of Zaragoza, Zaragoza, Spain. (Organizing Secretariat Geomorfologia, Facultad de Ciencias, Universidad de Zaragoza, C/Pedro Cerbuna 12, Zaragoza 50009, Spain; Fax: +34 976 761106; E-mail: iag2005@posta.unizar.es; Web site: http://wzar.unizar.es/actos/SEG/index.html

Sept 11-15, 2005: 12th International Meeting on Boron Chemistry. Sendai, Japan. Contact: Prof. Xibai Qiu, IUPAC-2005 Secretariat c/o Chinese Chemical Society, P.O. Box 2709, Bejing 10080, China; Phone: +86 (10) 6256 8157; Fax: +86 (10) 6256 8157; E-mail: qiuxb@iccas.ac.cn.

Sept 20-24, 2005: 2nd International Congress of Seas and Oceans, Szczecin - Swinoujscie, Poland. E-mail: icso@wsm.szczecin.pl; Web site: http://www.wsm.szczecin.pl/iirm/kongres/

Sept 26-29, 2005: MRS 2005 Scientific Basis for Radioactive Waste Management XXIX, Gent, Belgium.

Oct 16-19, 2005: GSA 2005 Annual Meeting & Exposition, Salt Lake City, Utah. Web site: http://www.geosociety.org/

Nov 6-11, 2005: International Gondwana 12 Conference, Mendoza, Argentina; Web site: http://cig.museo.unlp.edu.ar/gondwana

Dec, 2005: 6th European Meeting on Environmental Chemistry, Belgrade, Yugoslavia. Contact: Dr. Branimir Jovancicevic, Department of Chemistry, University of Belgrade, Akademski trg 12-16, POB 158, 11001 Beograd, Yugoslavia; E-mail: bjovanci@chem.bg.ac.yu; Web site: http://www.science.plym.ac.uk/ace/Meetings.html

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Dec 16-22, 2005: 13th International Conference of the Geological Society of Africa, Cairo, Egypt, 16-22. Contact: Dr Mahmoud Abdeen, GSAf Vice-President (North Africa); E-mail: m_m_abdeen@hotmail.com; Web site: http://gsaf.narss.org/

Feb 20-24, 2006: AGU Ocean Sciences Meeting, Honolulu, Hawaii.

July, 2006: IMA-2006 - XIX General Meeting of the International Mineralogical Association, Kobe, Japan.

July 16-23, 2006: 7th International Conference on the Occurrence, Properties, and Utilization of Natural Zeolites (Zeolite '06), Socorro, New Mexico, USA. Contact: Dr. Bowman: E-mail bowman@nmt.edu.

August 27 - September 1, 2006: 17th International Mass Spectrometry Conference (IMSC). Prague, Czech Republic. Web site: http://www.imsc2006.org/

Oct 22-25, 2006: GSA 2006 Annual Meeting & Exposition, Philadelphia, Pennsylvania. Web site: http://www.geosociety.org/

Dec, 2006 - 7th European Meeting on Environmental Chemistry, Brno, Czech Republic. Contact: Dr. Josef Caslavsky, Institute of Analytical Chemistry, Czech Academy of Science, Veveri 97, 61142 Brno, Czech Republic; E-mail: caslav@iach.cz: Web site: http://www.science.plym.ac.uk/ace/Meetings.html

Dec 11-15, 2006: AGU Fall Meeting, San Francisco, California, U.S.A. Contact: E. Terry, AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7335; Fax: +1-202-328-0566; E-mail: eterry@agu.org; meetinginfo@agu.org; Web site: www.agu.org/meetings

Oct 28-31, 2007: GSA 2007 Annual Meeting & Exposition, Denver, Colorado. Web site: http://www.geosociety.org/

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Ã (B) Yes, I would consider being an officer, committee chair, or committee member of the Geochemical Society.

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` To qualify for Student Membership, members must provide proof of enrollment at a college or university.
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Memberships are entered and renewed on a calendar-year basis. Applications received after October 1 will be made effective January 1 of the following year unless otherwise requested. All Members will receive the newsletter, *The Geochemical News*, (4 issues a year). As an additional benefit, members may purchase a calendar-year subscription to *Geochimica et Cosmochimica Acta* (GCA) (24 issues a year plus a special Goldschmidt Conference Abstract issue). Subscribers to GCA will also receive complimentary electronic access in addition to the paper copy (see http://gca.wustl.edu/new)

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