



# THE GEOCHEMICAL NEWS

Newsletter of The Geochemical Society

NUMBER 91

FALL 1996

## What's New

- 1997 Goldschmidt Conference (16, 17)
- Gunter Faure retires as Executive Editor of *GCA* (3, 5), Karl Turekian is new Editor-designate (3, 7)
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GSA, Denver, Colorado



October 27-31, 1996

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## 8th V.M. Goldschmidt Conference

Toulouse, France  
August 30-September 3, 1998

### Organizing Committee

L. Charlet (Grenoble), R. Delmas (Toulouse), B. Dupré (Toulouse), C. Fouillac (Orléans), A. Huc (Rueil Malmaison), J. Lancelot (Montpellier), J. Ludden (Nancy), J.-F. Minster (Toulouse), E. H. Oelkers (Toulouse), M. Polvé (Toulouse), J. Schott (Chairman, Toulouse)

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### OFFICERS - 1996

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### EDITORS

#### GEOCHIMICA ET

#### COSMOCHIMICA ACTA

*Gunter Faure, Ohio State University*

#### SPECIAL PUBLICATIONS

*Scott McLennan, SUNY Stony Brook*

#### GEOCHEMICAL NEWS

*David J. Wesolowski, Oak Ridge National Laboratory*

#### WWW HOMEPAGE

*Steven B. Shirey, Carnegie Institution of Washington*

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#### CHAIR

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## 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**, this biannual **Newsletter**, and (jointly with the Meteoritical Society) the journal **Geochimica et Cosmochimica Acta**; grants the **V.M. Goldschmidt** and **F.W. Clarke Awards**, and, jointly with the European Association of Geochemistry, the **Geochemistry Fellows** title; sponsors the **V.M. Goldschmidt Conferences**, held in North America in odd years and elsewhere in even years, jointly with the European Association of Geochemistry; and co-sponsors the Geological Society of America annual meeting (also the Geochemical Society's annual meeting) and the spring meeting of the American Geophysical Union. The Society honors the memory of our first President, F. Earl Ingerson, and our first Goldschmidt Medalist, Paul W. Gast, with the Ingerson and Gast Lectures. 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 charge to their dues. The OGD presents the **Alfred E. Treibs Award** for major achievements in organic geochemistry, and a **"Best Paper"** award in organic geochemistry.

### Editor's Corner

Lori and I are very grateful for the many kind words from members regarding the spring 1996 issue of *Geochemical News*, our "baptism of fire". We will continue to experiment with materials, formats, and reproduction methods until we achieve a satisfactory balance of quality and economy. Due to our large international membership and the timely nature of many of the announcements, printing and mailing costs are quite high. Because of this, and the fact that Editorial and Secretarial duties are voluntary, I will continue to limit the scope of the *News*, for the foreseeable future, to a biannual publication focused primarily on reporting the activities, events and deadlines of the Geochemical Society and its affiliates.

Depending upon the membership to submit ideas and copy material, and as space permits, I will continue to include partial or full-page ads for meetings of broad interest to the membership, tributes to prominent geochemists who have received major awards, or whose memory is honored, and the Calendar of Meetings. Your help is desperately needed to make these valuable additions interesting, timely, and comprehensive. Please contact me (preferably by email or fax) whenever you have an item that might be suitable for inclusion, and by all means send electronic or hard-copy photos to liven up the issues. Thanks, and drop us a line with suggestions or contributions!

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**Geochemical Society Homepage address on the WWW:**

**[http://www.ciw.edu/geochemical\\_society/](http://www.ciw.edu/geochemical_society/)**

## Greetings from the President

Dear Colleagues,

This letter contains five reasonably straightforward messages. I'll start with the abstract for those of you who are too busy for the full text.

- 1) We are delighted to announce that Karl Turekian is the new Editor-designate of *Geochimica et Cosmochimica Acta*.
- 2) The European Association for Geochemistry and the Geochemical Society (the Goldschmidt Forum) are going to introduce a new honorary lecture, the Gast Lecture.
- 3) It is important that you attend the Goldschmidt Conference in Arizona next year.
- 4) We are currently discussing new ways of interfacing the Geochemical Society with the efforts of other societies, particularly when it comes to meetings. Let us know your views.
- 5) Please make a big effort to encourage more of your colleagues and students to become members of the Geochemical Society and subscribe to the top geochemistry journal, *Geochimica et Cosmochimica Acta*. This is terribly important and the price is a steal.

Perhaps one of the more common complaints I hear these days is that there are too many meetings. For geochemists this is inevitable. Geochemistry has become so broad in influence and so inexorably linked with many other kinds of study that it would be a bad thing if there were not close integration with other areas of the earth, oceanic, space and environmental sciences. The Geochemical Society needs to encourage joint initiatives with other Societies such as the Geological Society of America, the American Geophysical Union, the Mineralogical Society of America, the Meteorological Society, the Society for Economic Geologists and the European Union of Geosciences.

In the midst of such interfacing with other disciplines and societies, geochemistry has become so broad that it really needs to engage in greater internal communication and liaison. Geochemists have to work together. It is the inevitable intertwining of different kinds of geochemical thinking and data, involved in sorting out problems as different as ALH84001, the transport of elements in the oceans, or the k-T boundary, to name a few, that give geochemistry its strength. Furthermore geochemists as a very large group need to be more actively engaged, collectively, in political decisions about science, society, research funding, the environment and education. To this end, the Geochemical Society is actively promoting its, now well established, relationship with the European Association for Geochemistry, through the Goldschmidt Conferences and the

Geochemistry Fellows. These have now been formalized with the establishing of the Goldschmidt Forum.

We are therefore faced with a tricky balancing act, effort-wise. We want improvements to the Goldschmidt Conference to be our major focus. So please make it a priority to attend the conference next year in Arizona. Details are to be found elsewhere in this issue. How to prioritize involvement with other societies that in essence compete with our own society and its meetings, is an important issue. This will be discussed by the Board of Directors when they meet at the GSA meeting in Denver at the end of October. Please feel free to let us know your carefully considered views.

Perhaps the most successful example of integrated geochemistry is our outstanding journal, *Geochimica et Cosmochimica Acta*. This journal guarantees, as far as one can, that a paper will be seen by the complete readership in geochemistry. Gunter Faure is stepping down as Editor. We are very grateful to him for his phenomenal efforts over the years. Under his leadership the journal has grown considerably and we have continued to see many truly marvelous papers published. I am very pleased to announce that we have appointed a new Executive Editor of *GCA*, Karl Turekian. Karl already has considerable experience as an editor and an impressive breadth of first class scientific experience. Karl was formerly an editor of *Earth and Planetary Science Letters* and *Global Biogeochemical Cycles*. An article by Karl describing his plans can be found on page 7 of this issue. We owe particular thanks to Frank Podosek and the Joint Publications Committee for their efforts in searching for a new editor. We are also especially grateful to Brian Skinner and Denis Shaw who agreed to be co-opted as additional members for the purposes of the search.

Hap McSween, my counterpart in the Meteoritical Society, and I, are both delighted by the outcome of the editor search and we look forward to many more years of joint publishing in close cooperation with Elsevier. We have agreed to continue with our current contract with the modification added, that, should we decide to do so, the journal could be divided into two separate issues. This was in direct response to our poll of the memberships earlier this year. Whether we enact such a measure depends in part on the way the new editor will want to run things and the response that is seen to the increased



price of the journal. As I said earlier this year, *GCA* is amazingly good value by any standard, and the price increases are fully justifiable. So don't cancel your subscription, get more people to subscribe.

Finally, Paul W. Gast was one of the most influential scientists in geochemistry in the 60's and 70's. His passion for the science and his realization of the potential of isotope and trace element geochemistry in particular, had a major effect on the development of mantle geochemistry and the lunar science program. He died in 1973 at the age of 43. The European Association for Geochemistry and the Geochemical Society are jointly introducing a new honorary lecture, the Gast Lecture,

which will be given at the Goldschmidt Conference each year by a notable geochemist, of approximately the same age that Paul Gast was when he died. The first lecture will be given at the Arizona Goldschmidt Conference.

I look forward to seeing you all there.

With best wishes



Alex N. Halliday

### From the Business Manager



If you have a problem with your membership, subscription to *GCA*, or need to change your address, please contact me:

TinaGayle Osborn	phone: 614-292-6919
287 Scott Hall	fax: 614-292-7273
Ohio State University	email: geochsoc@magnus.acs.ohio-state.edu (preferred)
1090 Carmack Rd.	
Columbus, OH 43210 USA	

#### New Members

Thank you for joining the Geochemical Society. We hope your association with the society is long-lived and profitable. If you have subscribed to *GCA* and are still not receiving the journal, need back issues of the journal, or have any questions or suggestions, please let me know.

#### Back Issues

Sometimes there are isolated problems with the mail delivery of *GCA*. If this happens to you, please contact me and I will make sure that you eventually receive all your issues. I have a very limited supply in the office and I can order issues from Elsevier for paid (on time) subscribers of the Geochemical Society and the Meteoritical Society. I can get issues for the current year and can usually get issues for the previous year. If you have been a new member for longer than three months and you still do not have your back issues, please contact me.

#### Renewal Process

This is by far the most confusing time for the business office. Please remember that a large number of documents (renewals, memberships, checks, letters of explanation) arrive within a short time period. This makes it very easy for mistakes to be made and for things to be overlooked. For 1997, we will be sending the first notice renewals out in late September/early October. This is almost a full month earlier than usual and we hope that this will alleviate some conflict with an overloaded holiday mail system. Second notices will no longer be mailed with the journal to avoid further confusion. A letter of final notice to all those who have not renewed will be mailed in February. If you do not renew in a timely fashion, you will not be considered a member for 1997 and *GCA* will not be mailed. However, as always you can change this status by paying late, as long as you do so for August 1, 1997.

#### 1996 Membership Directory

The membership directory for the Geochemical Society is prepared every two years and 1996 is a membership directory year. Please look for your copy by the end of 1996 (for subscribers it will be mailed with issue 24 of *GCA*).

(See membership application, page 31, and please encourage your colleagues to consider joining!)

### Gunter Faure Retiring as Editor of GCA

After nine years of enormous dedication and sacrifice, Gunter Faure is retiring as Executive Editor of *Geochimica et Cosmochimica Acta*, the premier journal of geochemistry produced by the Geochemical and Meteoritical Societies. Author of over one hundred articles and three major text books on isotope geology and geochemistry, Gunter will return to full-time teaching and research in the Department of Geological Sciences at Ohio State University, where he has been a professor since graduating from MIT in 1961. We all owe him an enormous debt of gratitude. Herewith is an article prepared by Gunter summarizing his tenure:

#### GCA IN RETROSPECT Gunter Faure

When Denis Shaw announced at a Council Meeting of the Geochemical Society in 1987 that he wished to step down, I did not take much notice. At the time, I was Editor-in-Chief of ISOTOPE GEOSCIENCE which I had started in 1983 with Henk van der Rijst of Elsevier. However, when Denis called me a few weeks later to ask if I wanted to be considered for the job of Executive Editor of GCA, I agreed to accept the position if it were offered.

After being informed of my selection by Mike Drake (Chair of the Joint Publications Committee) in the early spring of 1988, I visited Denis Shaw on two occasions to find out how he handled the job. During these visits I realized that being the Executive Editor of GCA is far more demanding than editing ISOTOPE GEOSCIENCE. Therefore, I persuaded John King, the Editorial Manager working with Denis, to move with the journal to Columbus, Ohio.

John had started to adapt a data-base program for use in the editorial office at McMaster University and expanded that work into a computer network in our office in Columbus. He basically taught me the procedures Denis had used to handle the reviewing and revising of manuscripts and to prepare the accepted papers for publication. In due time, John was married and moved to the University of Calgary where his wife had accepted a tenure-track position. He is now working at the University of Calgary Press.

We continued with Ken Cherry as Managing Editor until his resignation in June in 1991 in the aftermath of the "Fax War." His place was taken by Lee Mobley who has not only kept our journal afloat, but who deserves much credit for its timely publication and for its flawless appearance.

When my term as Executive Editor ends on December 31 of this year, Lee will continue to edit and produce GCA in Columbus under contract with Elsevier.

When I took over the reins from Denis, GCA was the leading journal in geochemistry meteoritics, and lunar science. Consequently, I continued on the course Denis had set and

made only a few minor changes that were intended to make the journal more attractive to readers and authors. These modifications included:

1. Organization of the content of the journal based on ten subject categories.
2. Rapid handling of Letters selected on the basis of high quality and relevance.
3. Transformation of "Critical Comments" and "Replies" into "Discussions" of scientific matters for the benefit of the readers.

Since GCA is a society journal, I adopted a conciliatory attitude towards our authors and readers. For example, I allowed inexperienced authors a second chance to revise their papers if the Associate Editor recommended it. However, in the end I accepted only those revised manuscripts that made a significant contribution to the advancement of the principles of geochemistry, meteoritics, and cosmochemistry.

The geochemists and cosmochemists of the world responded by submitting their manuscripts to GCA in preference to other journals. They did so not only because of the prestige associated with publication in GCA, but also because of the wide scope of the journal. A paper published in GCA comes to the attention of the leading geochemists in all of the many subject areas represented by the members of the Geochemical Society and the Meteoritical Society.

I also tried to serve the members of the sponsoring societies by publishing selected sets of papers honoring one of our outstanding colleagues or treating a particular subject area in depth. The resulting popularity of GCA caused the journal to grow until I had to impose a ceiling of 6000 pages per year. This became necessary not only to contain the rapidly rising production costs, but also because I believe that an annual page budget between 5000 and 6000 pages is sufficient to accommodate all of the high-quality papers being submitted for publication in GCA.

The comprehensive scope of our journal and the need for a thorough evaluation of manuscripts by expert reviewers requires the assistance of Associate Editors who are not only among the leaders in their subject areas, but who are also willing to devote their time to the evaluation and improvement of manuscripts. The Associate Editors of GCA deserve your greatest admiration and respect for



their unselfish service to our science. In recognition, of their valuable contribution of GCA, I received permission from Elsevier to recognize annually the most meritorious Associate Editor by an award of \$1,000. We also identified the five most productive reviewers each year and paid their subscriptions to GCA and their dues to the societies.

The record of my editorial administration is contained in the issues of our journal starting in 1989 to the end of 1996 and is summarized in the Table below. I have tried not only to publish the best papers in all aspects of geochemistry and meteoritics, but also to serve the members of our societies. The societies will prosper if they have the support of their members. As our football coach Woody Hayes used to say: "You win with people."

**The vital statistics of GCA from 1988 to 1996 for the editorial office in Columbus, Ohio.**

Item	1988 <sup>a</sup>	1989	1990	1991	1992	1993	1994	1995	1996
Articles	263	268	261	272	284	333	396	324	(314) <sup>f</sup>
Letters	15	31	30	29	34	38	27 <sup>b</sup>	14	(16)
Sci. Comm.	0	0	0	9	5	13	11	17	(19)
Discussion	4	9	12	7	7	7	4	13	(6)
Book rev.	46	48	69	37	33	59	32	29	(26)
Spec. sets	2	2	2	2	4	3	3	1	1
Pages	3031	3348	3559	3912	4364	5120	5647	5240	(5400)
No. of issues	12	12	12	12	12	22	24	24	24
No. of Assoc. Editors	37	36	46	45	48	52	52	59	55
Ed. expense	131,064 <sup>d</sup>	126,726	137,425	157,936	176,053	189,015	215,440	212,138	(210,000)
Cost/page	43.24	37.85	38.61	40.37	40.34	36.91	38.15	40.48	(38.89)

a. Edited by Denis Shaw

b. Edited by J. Douglas Macdougall starting in 1994

c. Projection based on 15 issues

d. Estimated from budget of Denis Shaw in US currency (\$1.00 US = \$ 0.75 Canada) plus \$32,439 spent by editorial office in Columbus.

### American Geophysical Union 1996 Fall Meeting

Among the many exciting events and sessions at the AGU Fall Meeting in San Francisco, California, December 15-19, 1996, will be the following special symposia:

#### Metamorphism and Geodynamics of High- and Ultrahigh-pressure Metamorphism

J.G. Liou, Stanford University, (T: 1-415-732-2716; E: liou@pangea.stanford.edu)

B.R. Hacker, UC Santa Barbara (T: 1-415-725-0045; E: hacker@pangea.stanford.edu)

#### Geochemical Earth Reference Model (GERM)

Francis Albarede, Lyon, France, (T 33-72-72-84-14; E: albarede@geologie.ens-lyon.fr)

Bill White, Cornell, USA, (T: 1-607-255-5267; E: white@geology.geo.cornell.edu)

Hubert Staudigel, Vrije, Netherlands (T: 31-20-444-7358; E: stau@geo.vu.nl)

For general information on the meeting, visit the AGU web site <http://www.agu.org>

### Karl Turekian is Editor-designate of *GCA*

Karl K. Turekian, Benjamin Silliman Professor of Geology and Geophysics at Yale University, has been recommended by the Joint Technical Publications Committee and approved by the Boards of the Geochemical and Meteoritical Societies to assume the Editorship of *Geochimica et Cosmochimica Acta* upon the retirement of Gunter Faure. Dr. Turekian served as President of the Geochemical Society in 1975-76 and Vice President 1974-75, as well as Associate Editor of *GCA* and a director of the Society in 1967-70. He brings enormous experience to this position, having served as Editor-in-chief of *JGR(Oceans & Atmospheres)*, 1969-75, *Earth and Planetary Science Letters*, 1975-89, and *Global Biogeochemical Cycles*, 1990-95. He is currently Director of the Center for the Study of Global Change at Yale, where he has been a professor of geology and geophysics since 1956. His many accomplishments and honors include membership in the US National Academy of Sciences and the American Academy of Arts and Sciences, service on numerous US National Research Council committees, and receipt of the V.M. Goldschmidt Award of the Geochemical Society in 1989. Herewith is an article prepared by Dr. Turekian:

#### Editor-designate's Statement

In 1957 in the last issue of Volume 11 of *Geochimica et Cosmochimica Acta*, the announcement was made that the journal henceforth would be the "official Journal of the Geochemical Society" and continued "... with neither [the publisher nor the Society] abrogating or usurping any of the functions or rights of the other". With that statement the coupling of the interests of the Geochemical Society (and later the Meteoritical Society as well) with Pergamon Press (now a part of Elsevier) was made. Prior to that time many of the seminal papers in geochemistry were published by the journal even without the existence of the Society, and for this fact geochemists will ever be grateful to Pergamon Press. After ten years a fundamental change in editorial style was made by the Geochemical Society. An Executive Editor was put in place (Al Levinson) with a strong board of Associate Editors. That revolutionary board was composed of E. Anders, J. R. Butler, P. W. Gast, H. J. Greenwood, I. R. Kaplan, S. R. Nockolds, D. M. Shaw, R. S. Silverman, S. R. Taylor, K. K. Turekian and E. A. Vincent. Their charge was to assist the Executive Editor in revitalizing *Geochimica et Cosmochimica Acta*. That was my first direct involvement with the journal. Subsequent Executive Editors, Denis Shaw and Gunter Faure, have continued to maintain the high standards set by that early board and the journal has flourished.

Since then many new journals have appeared, some of a general nature and others matching the specialized needs of a growing field. Yet *Geochimica et Cosmochimica Acta* can

claim to be the premier general geochemical journal. I hope to maintain that role for the journal. We have all published papers in high quality journals focused on different aspects of Earth and planetary sciences, but the special place of *Geochimica* for the publication of seminal, broad interest papers remains. In order to maintain this special role the journal must identify the best papers in the broad field of geochemistry and publish them quickly. This

aim will result in some changes in the way the journal will function and these changes will be evident over time. Let me say that I'm enough of an old-timer to remember that geochemists had the unique quality of being generalists in a world of growing specialization. I would hope that that tradition will remain with geochemists forever. I, therefore, do not see an immediate need to split up our journal into separate specialty publications under one aegis. We are not as large as the *Journal of Geophysical Research* to go that route (incidentally, one that I helped pave but ever with a sense of loss. I cannot help but relate this process to C. S. Lewis's vision of Hell in his book "The Great Divorce".)



### Broecker Wins National Medal of Science!

Wallace S. Broecker, Newberry Professor of Geology at Columbia University's Lamont-Doherty Earth Observatory, was among 13 recipients this year of the US's highest scientific honor, the National Medal of Science, for his outstanding contributions to our understanding of chemical changes in the ocean-atmosphere system. President of the Geochemical Society from 1978 to 1980, Wally was also the 1987 recipient of the Society's V.M. Goldschmidt Award and our 1988 Ingerson Lecturer. His many awards and honors include membership in the National Academy of Sciences, the 1995 Roger Revelle Medal of the American Geophysical Union, and the 1990 Urey Medal of the European Association for Geochemistry.

## THE GEOCHEMICAL SOCIETY 1997 AWARDS, NOMINATION PROCEDURES

### V. M. Goldschmidt Award

The V. M. Goldschmidt Award, consisting of a gold medal and a certificate, shall be made for major achievements in geochemistry or cosmochemistry. Such achievements may consist of either a single outstanding contribution, or a series of publications that have had great influence on the field.

1972 P. W. Gass	1984 A. O. Nier
1973 R. M. Garrels	1985 J. B. Thompson
1974 H. E. Suess	1986 C. J. Allègre
1975 H. C. Urey	1987 W. S. Broecker
1976 H. P. Eugster	1988 H. C. Helgeson
1977 S. Epstein	1989 K. K. Turekian
1978 G. J. Wasserburg	1990 E. Anders
1979 H. Craig	1991 A. E. Ringwood
1980 C. C. Paterson	1992 S. R. Hart
1981 R. N. Clayton	1993 S. R. Taylor
1982 K. B. Krauskopf	1994 H. D. Holland
1983 S. S. Goldich	1995 R. Berner
	1996 A.W. Hofmann

Nominations for the 1997 V. M. Goldschmidt Award should be submitted before October 1, 1996, to:

Dr. Claude J. Allègre  
Géochimie et Cosmochimie  
Institut de Physique du Globe  
4 Place Jussieu Tour 14-24  
Paris Cédex 05 F-75005  
France  
Tel: 33-1-44274915  
Fax: 33-1-44273752  
E-mail: [allegre@ipgg.jussieu.fr](mailto:allegre@ipgg.jussieu.fr)

### F. W. Clarke Award

The F. W. Clarke Award, consisting of a silver medal and a certificate, shall be made to a young scientist for a single outstanding contribution to geochemistry or cosmochemistry, published as either a paper or a series of papers on a single topic. Candidates must have held a recognized doctorate or its equivalent for no more than six (6) years, or be not more than thirty-five (35) years of age, whichever anniversary date is later on December 31st of the year in which the award is approved by the Board of Directors. Independence and originality shall be important factors.

1972 D. A. Papanastassiou	1984 A. Mackenzie
1973 H. Ohmoto	1985 E. M. Stolper
1974 L. Grossman	1986 M. D. Kurz
1975 D. Walker	1987 E. Takahashi
1976 J. R. Wood	1988 F. M. Phillips
1977 B. Mysen	1989 no award
1978 D. J. DePaolo	1990 R. J. Walker
1979 A. C. Lasaga	1991 D. Sherman
1980 R. W. Potter	1992 E. Klein
1981 J. F. Minster	1993 Y. Zhang
1982 P. J. Patchett	1994 C. Agee
1983 E. B. Watson	1995 R. Lange
	1996 P.M. Dove

Nominations for the 1997 F. W. Clarke Award should be submitted before October 1, 1996, to:

Dr. Barb Dutrow  
Dept. Geology and Geophysics  
Louisiana State University  
Baton Rouge, LA 70803-4101 USA

Tel: 504-388-2525  
Fax: 504-388-2302  
E-mail: [dutrow@hermes.geol.lsu.edu](mailto:dutrow@hermes.geol.lsu.edu)

The Goldschmidt and Clarke awards will normally be given annually at the V.M. Goldschmidt Conference, but may be reserved at the discretion of the Board of Directors. Neither award is normally shared, except in highly unusual cases, such as independent discoveries or joint work where the contributions of the co-workers are essentially equal. Members of the Board are ineligible for the duration of their terms. Past medalists are permanently ineligible.

Nominations should specify the name, address, citizenship, and chief fields of specialization of the nominee, and be accompanied by a curriculum vitae and bibliography of the nominee, limited to two pages each, and up to three supporting letters. Nominations should also be accompanied by a letter from the nominator giving name, address, phone number, signature, and a few paragraphs summarizing why the candidate is suitable for the award.

Nominations for the Clarke Award should be accompanied by a copy of the paper(s) for which the nominee is to be considered for the award, together with a statement explaining the significance of the work. Nominators should also specify the nominee's final degree, the degree advisor's name, the year granted, and the name of the granting institution.

All nominations will be considered by the Award Committees and will remain active for three years, unless the candidate becomes ineligible due to time limitations (Clarke), or on grounds of membership on the Board or on one of the Award Committees. Such nominations will then be tabled for the duration of this nominee's term, then reactivated for the balance of the three year period after expiration of the term.

Award winners are chosen by the Board of Directors, normally from between a nominee and an alternate recommended by each Award Committee. The awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

### Alfred E. Treibs Award

This award, consisting of a gold-filled medal and a certificate, shall be awarded for major achievements, over a period of years, in organic geochemistry. Such achievements shall consist of pioneering and innovative investigations which have made highly significant contributions to the understanding of the origin and fate of organic materials in the geosphere and/or in extra-terrestrial environments.

1979 G. T. Philippi	1985 P. Albrecht
1980 B. Tissot	1987 T. C. Hoering
1981 G. Eglington	1989 J. R. Maxwell
1982 J. M. Hunt	1991 J. W. de Leeuw
1983 D. H. Welte	1993 I. R. Kaplan
1984 W. K. Seifert	1995 K.A. Kvenvolden
	1996 P. L. Parker

The Alfred E. Treibs Award is now given every two years at the Gordon Research Conference on Organic Geochemistry. This award is subject to approval by the Board of Directors of the Geochemical Society. For the 1998 Alfred E. Treibs Award, nominations information may be obtained from, and the completed package should be sent by November 15, 1997, to:

Dr. Richard M. Mitterer  
Department of Geosciences  
University of Texas at Dallas  
Richardson, TX 75083-0688 USA  
Tel: 214-883-2462  
Fax: 214-883-2537  
E-mail: [mitterer@utdallas.edu](mailto:mitterer@utdallas.edu)



## THE GEOCHEMICAL SOCIETY

### Call for Nominations for 1997 Joint EAG-GS Geochemistry Fellows



The European Association of Geochemistry (EAG) and the Geochemical Society (GS) established in 1996 the honorary title of Geochemistry Fellow, to be bestowed upon outstanding scientists who have, over some years, made a major contribution to the field of geochemistry. Existing and new Urey, Goldschmidt and Treibs Medal winners become Fellows automatically. In addition, up to 0.5% of the total combined membership of the two societies should be elected as Fellows each year. This corresponds to approximately 15 honorees per year at current enrollment levels, and allows for growth in the societies. Nominations will be sought and recommendations for election made by a committee (Fellows Selection Committee) of 8 persons, 4 from GS, and 4 from EAG.

Any member of either society may nominate Fellows by right. No individual may be elected a Fellow, except as a result of having previously won the Urey, Goldschmidt or Treibs Medal, while they are serving either on the Fellows Selection Committee or as a Council / Board member of EAG / GS. The Selection Committee may not themselves nominate individuals, but may actively solicit nominations from others. Members of the Selection Committee and Council / Board may not vote on any nomination where there is a clear conflict of interest. Final approval of all nominees will be made by the EAG Council and the GS Board of Directors. In the event that the EAG Council and the GS Board differ over the ratification of a nomination, the Executive Committee of the Goldschmidt Forum (the Presidents and Vice Presidents of EAG and GS) will resolve the issue. Fellows will be inaugurated at the 7<sup>th</sup> V.M. Goldschmidt Conference in 1997.

Nominations should include the name, address, and telephone number of the nominee, a citation of no more than two pages describing the contributions the individual has made to geochemistry, and up to three letters of support from members of either society. The nomination should also include the nominator's name, address, telephone number, and signature.

Nominations should be sent no later than October 1, 1996 to:

Dr. Albrecht W. Hofmann (Chair, Fellows Selection Committee)  
Max Planck Institut für Chemie  
Postfach 3060  
55020 Mainz, Germany

T: 49-6131-305280  
F: 49-6131-371051  
E: hofmann@geobar.mpch-mainz.mpg.de

1996 Geochemistry Fellows (excluding Urey, Goldschmidt and Treibs Medalists)

William Compston, Willi Dansgaard, John Edmond, John M. Hayes, Marc Javoy, Ho-Kwang Mao, Stephen Moorbath, John Reynolds, Jean-Guy Schilling, Nick Shackleton, Mitsunobu Tatumoto, Werner Stumm, George Tilton, Grenville Turner, Heinrich Wanke, William White

## 1997 GSA and AGU Meetings!



The Geochemical Society holds its official annual meeting in conjunction with the Geological Society of America annual meeting, and is a co-sponsor of this meeting. Our Organic Geochemistry Division normally organizes an all-day symposium on the Sunday before the meeting, at which it also conducts its Business Meeting. In addition, the Geochemical Society is guaranteed a half-day symposium or theme session slot during the GSA meeting.

As co-sponsor of the Spring American Geophysical Union Meeting, the Society can submit an unlimited number of symposia and theme sessions. The Society is not allocated any official time at the Fall AGU meetings, but the Volcanology-Geochemistry-Petrology Section of AGU organizes special geochemical sessions at these.

Our Society's special session at the 1996 GSA meeting is described elsewhere in this issue. Now is the time to start thinking about the 1997 meetings. Deadlines for special session proposal submittals generally fall around the first of the year for both GSA and AGU for that year's meetings. If you want more information, or have an idea for GS-sponsored symposia (invited) or theme sessions (volunteered) at these meetings, please get in touch with our 1997 Program Committee Chairperson:

R. Lawrence Edwards	T: 612-626-0207
University of Minnesota	F: 612-625-3819
Shepherd Labs	E: edwar001@
100 Union Street SE	maroon.tc.umn.edu
Minneapolis, MN 55455 USA	

## Geochemical Society Annual Meeting at GSA in Denver

The Geochemical Society's annual meeting this year, held in conjunction with the Geological Society of America annual meeting, is October 28-31, 1996 at the Colorado Convention Center, Denver, Colorado. Current GS members should have received a copy of the June issue of *GSA Today* containing registration, abstract, and housing information for the GSA meeting. If you do not have this material, contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO, USA, 80301, Phone (1-800-472-1988), WWW <http://www.geosociety.org> (Preregistration deadline Sept. 20, Housing deadline Sept. 30).

The Geochemical Society has sponsored or organized a number of important sessions and events for our members at GSA this year. Please make every effort to attend the **Business Meeting on Monday** at noon, at which President Alex Halliday will present a summary of the Society's activities over the past year and entertain questions from the membership.

Also please come to the joint **Geochemical Society/Mineralogical Society of America reception on Tuesday evening**. This will be a ticketed event (\$10 for professionals and \$5 for students), with tickets available on the GSA registration form or at the reception. The ticketing is intended to help defray the cost of some very fine food and drinks. The pictures on this page are from last year's very successful reception in New Orleans.

Listed below are the special meetings and events. On the following pages are the schedules for the GS-sponsored symposia, technical, and theme sessions.

1. **Geochemical Society Board of Directors Meeting**, Sunday, Oct. 27, 6:00-10:00 PM, Marriott City Center, Denver Ballroom V
2. **Geochemical Society Business Meeting** (Open to all), Monday, Oct. 28, 12:00-12:30 PM, Colorado Convention Center, Room C109
3. **Joint MSA/GS Reception** (ticketed event), Tuesday, Oct. 29, 5:30-7:30 PM, Marriott City Center, Room Colorado F
4. **Geochemical Society Ingerson Lecture**, Edward M. Stolper, "Adiabatic Melting of the Mantle", Wednesday, Oct. 30, 11:00 AM - 12:00 PM, Colorado Convention Center, Room C209



## SESSION NO. 1, 1996 GSA Annual Meeting, Sunday, October 27, 1996

*Organic Geochemistry Division of the GS Symposium (S13):**Organic Geochemistry: Linking the Biosphere and Geosphere*

Colorado Convention Center, A101-103, 8:20 AM

Keith A. Kvenvolden, Michael D. Lewan, and Joseph A. Curiale, Presiding

- 8:20 AM INTRODUCTION
- 8:30 AM Bada, Jeffrey L.\*: ORGANIC COSMOGEOCHEMISTRY [36690]
- 9:10 AM Des Marais, David J.\*: THE BIOGEOCHEMICAL CARBON CYCLE AND THE EVOLUTION OF VOLCANISM AND THE CONTINENTS [50341]
- 9:50 AM BREAK
- 10:00 AM Hayes, John M.\*: THE CYCLING OF CARBON [25044]
- 10:40 AM Hedges, John I.\*, Keil, Richard G.: WHAT HAPPENS TO TERRESTRIAL ORGANIC MATTER IN THE OCEAN? [36683]
- 11:20 AM Meyers, Philip A.\*: ORGANIC GEOCHEMICAL PROXIES OF PALEOCEANOGRAPHIC, PALEOLIMNOLOGICAL, AND PALEOCLIMATIC PROCESSES [36681]
- 12:00 PM LUNCH
- 1:30 PM Lewan, M. D.\*: RESEARCH ISSUES IN PETROLEUM GEOCHEMISTRY [36679]
- 2:10 PM Hatcher, Patrick G.\*: THE ORGANIC GEOCHEMISTRY OF COAL: FROM PLANT REMAINS TO ECONOMIC FOSSIL REMAINS [36678]
- 2:50 PM Fogel, Marilyn L.\*: BIOGEOCHEMICAL RECORD OF ANCIENT MAN [50331]
- 3:30 PM BREAK
- 3:40 PM Eganhouse, Robert P.\*: ENVIRONMENTAL ORGANIC GEOCHEMISTRY: PAST, PRESENT AND FUTURE [17910]
- 4:20 PM Kaplan, Ian\*: FORENSIC GEOCHEMISTRY [36671]
- 5:00 PM SUMMATION BY JOSEPH CURIALE
- 5:10 PM OGD BUSINESS MEETING

## SESSION NO. 8, 1996 GSA Annual Meeting, Monday, October 28, 1996

*Aqueous Geochemistry I: Organic and Biogeochemistry*

Colorado Convention Center, C109, 8:00 AM

W.-L. Huang and Meg A. Grantham, Presiding

- 8:00 AM Huang, Wu-Liang\*, Otten, Glenn A.: IN SITU MONITORING OF ORGANIC TRANSFORMATION IN HYDROTHERMAL DIAMOND ANVIL CELL USING ULTRAVIOLET AND INFRARED SPECTROSCOPY [30683]
- 8:15 AM Schulte, M.\*, Shook, E., Obsil, M., Mayer, V.: EXPERIMENTAL AND THEORETICAL STUDY OF HIGH-TEMPERATURE THERMODYNAMIC PROPERTIES OF AQUEOUS ALCOHOLS, KETONES AND ETHERS [4137]
- 8:30 AM Rafalska, Janina K.\*, Eglinton, Geoffrey: GEOLOGIC SIGNIFICANCE OF PORPHYRIN DISTRIBUTIONS IN OIL SHALES: THERMAL MATURATION SIMULATION AND FIELD STUDIES [51075]
- 8:45 AM Watanabe, Yumiko\*, Suzuki, Akihisa, Ohmoto, Hiroshi: THERMAL ALTERATION OF ORGANIC MATTER IN OIL SHALES: CHEMICAL AND ISOTOPIC EFFECTS [5149]
- 9:00 AM Yane, Lawrence J.\*, Fein, Jeremy B.: EXPERIMENTAL STUDY OF AQUEOUS COMPLEXATION AND ADSORPTION IN THE ANILINE-ALUMINUM-CORUNDUM SYSTEM [51061]

- 9:15 AM Fein, Jeremy B.\*, Boily, Jean-François, Daughney, Christopher J., Davis, Thomas A., Wightman, Peter G., Yane, Lawrence J., Yee, Nathan: THE THERMODYNAMICS OF METAL ADSORPTION ONTO BACTERIAL SURFACES [27737]
- 9:30 AM Daughney, Christopher J.\*, Fein, Jeremy B., Yee, Nathan: A COMPARISON OF THE THERMODYNAMICS OF METAL ADSORPTION ONTO TWO GRAM-POSITIVE BACTERIA [27735]
- 9:45 AM BREAK
- 10:00 AM Konhauser, Kurt O.\*: DIVERSITY OF BACTERIAL IRON MINERAL FORMATION [50086]
- 10:15 AM Teng, H. Henry\*, Dove, Patricia M.: CRYSTAL CHEMICAL CONTROLS OF ASPARTATE IN THE SITE-SPECIFIC DISSOLUTION OF CALCITE: IMPLICATIONS FOR BIOMINERALIZATION [35069]
- 10:30 AM Grantham, Meg C.\*, Dove, Patricia M.: BIOGEOCHEMISTRY OF ANAEROBIC SUBSURFACE ENVIRONMENTS: BACTERIAL MOBILIZATION OF IRON OXYHYDROXIDE CEMENTS [9466]
- 10:45 AM Brown, D. Ann\*, Liwanag, Janice, Sherriff, Barbara L.: ALTERATION OF CRYSTALLINE ROCK BY A MICROBIAL CONSORTIUM [50530]
- 11:00 AM MacGowan, Donald B., Ford, Lawrence\*: FTIR STUDY OF ARTIFICIAL AND NATURAL COAL MATURATION: IMPLICATIONS FOR THE ROLE OF WATER AS AN OXIDANT DURING HYDROUS PYROLYSIS [30603]
- 11:15 AM Finley, J. B.\*, Jett, S. M., Vanni, M. J., Headworth, J. L., Renwick, W. H.: BIOTIC PROCESSING AND CA-BOUND PHOSPHOROUS IN A MID-WESTERN EUTROPHIC RESERVOIR [51277]
- 11:30 AM Cruse, Anna M.\*, Lyons, Timothy W., Glascock, Michael D.: PALEOCEANOGRAPHIC CONTROLS ON METAL PARTITIONING IN PENNSYLVANIAN CYCLOTHEMIC BLACK SHALES, MIDCONTINENT NORTH AMERICA [36911]
- 11:45 AM Rozan, Tim F.\*, Benoit, Gaboury: COMPLEXATION OF TRACE METALS BY DISSOLVED ORGANIC CARBON (DOC) IN RIVER SYSTEMS: THE ROLE OF COLLOIDS [50340]

**SESSION NO. 9, 1996 GSA Annual Meeting, Monday, October 28, 1996**

*Aqueous Geochemistry (Posters)*

Colorado Convention Center, Posters Hall B1, 8:00 AM

Authors will be present from 9:00 to 11:00 AM

**Booth #**

- 1 Johnson, S. E.\*, Herman, J. S., Mills, A. L.: ENVIRONMENTAL FATE OF BOUND (NONEXTRACTABLE) ATRAZINE RESIDUES IN AN AGRICULTURAL SOIL. [31843]
- 2 Apodaca, Lori E.\*: SOURCES OF HIGH TRACE-ELEMENT CONCENTRATIONS IN THE FRENCH GULCH DRAINAGE, BRECKENRIDGE, COLORADO [27262]
- 3 Wilson, Cindy L.\*, Hinman, Nancy W.: HYDROGEN PEROXIDE IN GEOTHERMAL WATERS: A PRELIMINARY REPORT [50683]
- 4 Laepke, James J.\*, Lyons, Timothy W.: GEOCHEMICAL TRENDS WITHIN FINE-GRAINED SEDIMENTS OF THE LOWER BELT SUPERGROUP, NORTHWESTERN U.S.: PALEOENVIRONMENTAL IMPLICATIONS [36914]
- 5 Webb, Cathleen J.\*, Davis, Arden D., Chupka, K., Sorensen, J., Kuxhaus, T., Chapman, Tom: ARSENIC TRANSPORT AND BIOINDICATOR EVALUATION IN THE STRAWBERRY/BEAR BUTTE CREEK WATERSHED OF THE BLACK HILLS [50952]
- 6 Romero, Dennis\*, Whitworth, T. M.: SOLUTE-SIEVING EFFECTS DURING FILTERING OF SURFACE WATERS [50338]
- 7 Logan, William S.\*, Dyer, Linda Jo: INFLUENCE OF MINERAL WEATHERING REACTIONS, ROAD SALT AND CATION EXCHANGE ON GROUNDWATER CHEMISTRY, CATOCTIN MOUNTAIN, CENTRAL MARYLAND. [51100]
- 8 Menounou, Nektaria\*, Presley, Bobby J.: MERCURY IN SEDIMENT CORES FROM CENTRAL TEXAS LAKES [51204]

- 9 Chasey, Michael L.\*, Unger, Michael A., MacIntyre, William G., Chisholm-Brause, Catherine J.: LABORATORY AND FIELD INVESTIGATIONS OF ZINC AND IRON MOBILIZATION AT AN INDUSTRIAL WASTE FACILITY [51074]
- 10 Lorenson, Thomas D.\*, Kvenvolden, Keith A., Rust, Terri M., Popp, Brian N., Sansone, Francis J., Macdonald, Robie: ISOTOPIC COMPOSITION AND CONCENTRATION OF METHANE IN THE ARCTIC OCEAN [36404]
- 11 Yang, Bencal\*, Hajash, Andrew: ALBITE DISSOLUTION IN ACETIC, CITRIC, AND INORGANIC ACIDS: AN EXPERIMENTAL STUDY AT 100 DEGREES C, 13.8 MPA, AT PH 2 - 7 [36128]
- 12 Suwanakijboriharn, Soamwadee\*, Harrison, Wendy J.: SOLUBILITY OF IRON (II) CARBONATE AT TEMPERATURES BETWEEN 25 DEGREES TO 70 DEGREES AND 1 ATM TOTAL PRESSURE [19962]
- 13 Prapaipong, Panjai\*, Shock, Everett L.: ESTIMATING THE TEMPERATURE DEPENDENCE FOR ASSOCIATION CONSTANTS OF METAL-ORGANIC COMPLEXES AND CHELATES [9593]
- 14 Hoch, A. R.\*, Reddy, M. M., Drever, J. L.: THE IMPORTANCE OF FRESHLY CREATED ROCK AND MINERAL SURFACES IN A COLD, ALPINE ENVIRONMENT [27152]
- 15 Buis, Patricia F.\*: ACID DISSOLUTION BY ECTOMYCORRHIZAL FUNGI: IMPLICATIONS FOR PHOSPHORUS REMOVAL [27334]
- 16 Banfield, Jillian F.\*, Higgins, Steven R., Hamers, Robert J.: MICRO- TO MACROSCOPIC EVOLUTION OF SURFACE STRUCTURE AND SOLUTION CHEMISTRY DURING GALENA DISSOLUTION: ROLE OF MICROSTRUCTURES AND CHEMICAL HETEROGENEITIES [50465]
- 17 Zdansky, Erik O. F.\*, Moses, Carl O., Iltun, Eugene S.: X-RAY PHOTOELECTRON SPECTROSCOPIC (XPS) OBSERVATION OF A BASIC LEAD THIOSULPHATE AS REACTION INTERMEDIATE IN THE WEATHERING OF GALENA [1290]
- 18 Eggleston, Carrick M.\*, Ehrhardt, J.-J., Stumm, Werner: KINETICS OF ELECTRON TRANSFER AT MINERAL SURFACES: OBSERVATION AND INTERPRETATION OF PYRITE OXIDATION AT THE ATOMIC SCALE [50980]
- 19 Wilkin, Richard T.\*, Barnes, H. L.: KINETICS OF ANALCIME DISSOLUTION AND PRECIPITATION AT 175 DEGREES C AND PH 8 [29222]
- 20 Yates, Douglas M.\*, Joyce, Kevin J., Heaney, Peter J.: EFFECT OF PH AND COPPER(II) CONCENTRATION ON THE FIXATION OF COPPER BY SILICA POLYMERS IN AQUEOUS SOLUTION [10122]
- 21 Mercy, M. A.\*, Rock, P. A., Casey, W. H., III: ELECTROCHEMICAL CELL DETERMINATION OF THE GIBBS ENERGY OF FORMATION OF HYDROXYCARBONATE MINERALS [25864]
- 22 Burton, Elizabeth A.\*, Hult, Laura L., Winter, David J.: EFFECTS OF PCO2 AND CALCIUM TO CARBONATE ION ACTIVITY RATIO ON CALCITE PRECIPITATION RATES: EVIDENCE FOR SURFACE COMPLEXES AND SURFACE PH AS RATE CONTROLS [51149]
- 23 Roberts, Sheila J.\*: PREDICTION OF PH IN HYDROTHERMAL FLUIDS AT ELEVATED P-T CONDITIONS: SENSITIVITY TO MEASURED PH [50279]
- 24 Berndt, Michael E.\*, Seyfried, W. E., Jr.: CONVERSION RATES OF ARAGONITE TO CALCITE AND OF CALCITE + MAGNESITE TO PROTO-DOLOMITE [50776]
- 25 Rodgers, Teresa M.\*, Banfield, Jillian F., Alpers, Charles N., Goodman, Robert M.: BACTERIAL DIVERSITY IN ACID MINE DRAINAGE FROM IRON MOUNTAIN, SHASTA CO., CALIFORNIA: A RIBOSOMAL DNA APPROACH [50408]

## SESSION NO. 55, 1996 GSA Annual Meeting, Tuesday, October 29, 1996

*Aqueous Geochemistry II: Experimental and Theoretical Geochemistry*

Colorado Convention Center, A201, 8:00 AM

Nita Sahai and Dave Wesolowski, Presiding

- 8:00 AM Higgins, Steven R.\*, Hamers, Robert J., Banfield, Jillian F., Liu, Hongbing: ATOMIC-SCALE STRUCTURE AND CHEMISTRY OF GALENA (PbS) SURFACES UNDERGOING DISSOLUTION IN ACID SOLUTIONS [50548]

- 8:15 AM Nugent, Melissa A.\*, Brantley, Susan L., Chen, Yang, Pantano, Carlo, Cherniak, Daniele: WEATHERING OF ALBITE: SURFACE ANALYSIS OF IN-SITU, NATURALLY WEATHERED FELDSPAR [29224]
- 8:30 AM Rimstidt, J. Donald\*, Rosso, Jodi J., Weissbart, Erich J., Hatfield, Jennifer, Skinner, Kimball: FACTORS AFFECTING MINERAL DISSOLUTION RATE MEASUREMENTS [4936]
- 8:45 AM Rosso, Jodi J.\*, Weissbart, Erich J., Rimstidt, J. Donald, Skinner, Kimball L.: INFLUENCE OF THE EVOLUTION OF MINERAL SURFACE PROPERTIES ON MEASURED DISSOLUTION RATES [15960]
- 9:00 AM Mukhopadhyay, Biswajit\*, Walther, John V.: ZERO POINT OF CHARGE AND SURFACE COMPLEXATION OF ALBITE [22716]
- 9:15 AM Samson, Sherry D.\*, Eggleston, Carrick M.: EVIDENCE FOR SLOW INTERMEDIATE REACTIONS DURING MINERAL DISSOLUTION: RESPONSE OF HEMATITE DISSOLUTION RATE TO PH-JUMPS [50876]
- 9:30 AM Hamilton, James P.\*, Pantano, Carlo G., Bojan, Vince J., Brantley, Susan L.: XPS STUDIES OF ALTERED LAYERS ON CRYSTALLINE AND AMORPHOUS ALKALI-ALUMINOSILICATES [29226]
- 9:45 AM MacInnis, Ian N.\*, Lutge, Andreas, Lasaga, Antonio C.: NEW SURFACE EXPERIMENTAL TECHNIQUE USING INTERFEROMETRY FOR IN SITU MEASUREMENT OF SILICATE DISSOLUTION/PRECIPITATION KINETICS AT HYDROTHERMAL CONDITIONS [51107]
- 10:00 AM Sahai, Nita\*, Sverjensky, Dimitri A.: EXTENDED TRIPLE-LAYER MODEL FOR PREDICTING SPECIFIC ELECTROLYTE ADSORPTION [35102]
- 10:15 AM Koretsky, Carla M.\*, Sahai, Nita, Sverjensky, Dimitri A.: CALCULATION OF SURFACE SITE DENSITIES ON A VARIETY OF OXIDE AND SILICATE MINERALS USING CRYSTAL STRUCTURES AND MORPHOLOGIES [10144]
- 10:30 AM Wesolowski, David J.\*, Hayashi, Ken-ichiro, Palmer, Donald A., Machesky, Michael L., Benezeth, Pascale: SOLUBILITY OF METAL OXIDES TO 250 DEGREES C WITH IN SITU PH MONITORING [30072]
- 10:45 AM Sherman, David M.\*, Oelkers, Eric H., Ragnarsdottir, K. Vala, Collins, Clare R.: AQUEOUS SPECIATION OF SN AND SB CHLORIDE COMPLEXES UP TO 250C: RESULTS FROM IN-SITU EXAFS [51274]
- 11:00 AM Nagy, Kathryn L.\*, Chiarello, Ronald P., Sturchio, Neil C., Cygan, Randall T.: CLAY FORMATION BY EPITAXIAL NUCLEATION AND GROWTH ON MICA [22459]
- 11:15 AM Langmuir, Donald\*: THE SOLUBILITIES OF AMORPHOUS FORMS OF URANINITE AND COFFINITE IN REDUCED GROUNDWATERS: IMPLICATIONS FOR NUCLEAR WASTE DISPOSAL [34793]
- 11:30 AM Shock, Everett L.\*, Sassani, David C.: AQUEOUS GEOCHEMISTRY OF ACTINIDE IONS [9592]
- 11:45 AM Pickrell, Julie M.\*, Wood, Scott A.: STABILITY CONSTANTS OF PALLADIUM-HYDROXIDE COMPLEXES AS A FUNCTION OF IONIC STRENGTH (0.1-1M) AND TEMPERATURE (25-850C) [50201]

**SESSION NO. 61, 1996 GSA Annual Meeting, Tuesday, October 29, 1996**

*Geochemistry I: High Temperature and Hydrothermal Geochemistry*

Colorado Convention Center, A105-107, 8:00 AM

Juske Horita and Paul Tommscak, Presiding

- 8:00 AM Cole, David R.\*, Fortier, Steven M.: OXYGEN ISOTOPE EXCHANGE IN THE SYSTEMS CARBONATE- WATER AND SHEET SILICATE-WATER: A LINK BETWEEN EXCHANGE RATES AND MINERAL CHEMISTRY [30069]
- 8:15 AM Horita, Juske\*: CARBON ISOTOPE EXCHANGE BETWEEN CO<sub>2</sub> AND CH<sub>4</sub> AT ELEVATED TEMPERATURES [30293]
- 8:30 AM Corfield, Richard M.\*, Charnley, Norman R., Preston, Derek, Cartledge, Julie E.: ISOCARB II: A NEW STABLE ISOTOPE RATIO MASS SPECTROMETER ACCESSORY [17718]
- 8:45 AM Gilliam, Carrie E.\*, Valley, John W.: ZIRCON EVIDENCE FOR LOW-180 MAGMA, ISLE OF SKYE, SCOTLAND [24221]

- 9:00 AM Peck, William H.\*, Valley, John W.: OXYGEN ISOTOPE GEOCHEMISTRY OF THE MORIN COMPLEX, QUEBEC: IMPLICATIONS FOR ANORTHOSITE PETROGENESIS [27476]
- 9:15 AM Deines, Peter\*, Haggerty, Stephen: OXYGEN ISOTOPIC COMPOSITIONS OF MINERALS IN ULTRADEEP (>300 KM) AND TRANSITION ZONE XENOLITHS AND THEIR IMPLICATIONS [50761]
- 9:30 AM Nadeau, Serge\*, Epstein, Samuel, Stolper, Edward M.: WATER CONTENTS AND H ISOTOPES IN APATITE FROM CARBONATITES AND ALKALINE INTRUSIONS [30456]
- 9:45 AM Park, Young-Rok\*, Ripley, E. M.: OXYGEN ISOTOPIC STUDIES OF HYDROTHERMAL SYSTEMS LOCATED ABOVE AND BELOW THE DULUTH COMPLEX, MIDCONTINENT RIFT SYSTEM, MINNESOTA [18561]
- 10:00 AM Knedel, G.\*, Knaath, L. Paul: ORIGIN OF SECONDARY QUARTZ IN A SILICIC VOLCANIC COMPLEX; IMPLICATIONS OF O AND H ISOTOPE DATA FOR HYDROTHERMAL DEPOSITION VERSUS LOW TEMPERATURE WEATHERING [27361]
- 10:15 AM Young, Edward D.\*: DEVELOPMENT OF AN ULTRAVIOLET LASER-ABLATION GAS CHROMATOGRAPHY ISOTOPE RATIO MONITORING OXYGEN ISOTOPE MICROPROBE [29862]
- 10:30 AM Beard, Brian L.\*, Johnson, Clark M.: HAFNIUM ISOTOPIC EVIDENCE FOR DERIVATION OF CENOZOIC BASIN AND RANGE TYPE BASALTS FROM THE SHALLOW ASTHENOSPHERE [8731]
- 10:45 AM Encarnacion, John\*, Fleming, Thomas H., Elliot, David H., Eales, Hugh V.: U-PB AGE CONSTRAINTS ON THE TIMING OF FERRAR AND KAROO MAGMATISM [51266]
- 11:00 AM Blaylock, Joe\*, Smith, Eugene, Holm, Richard: GEOCHEMICAL INVESTIGATION OF SUNSET CRATER, ARIZONA: COMPLEX PETROGENETIC HISTORY OF A LOW-VOLUME MAGMATIC SYSTEM [50182]
- 11:15 AM Tomascak, Paul B.\*: THE USE OF ND ISOTOPES TO EVALUATE GRANITIC PEGMATITE PETROGENESIS [17236]
- 11:30 AM Shaw, Denis M., Pereira, M. Dolores\*, Acosta, A., Bea, F.: DISTRIBUTION OF BORON IN THE SERPENTINIZATION OF THE RONDA PERIDOTTITE [31658]
- 11:45 AM Pereira, M. D.\*, Hall, A., Shaw, D. M.: PARALLEL BEHAVIOR OF TWO RARE COMPONENTS, BORON AND AMMONIUM, IN THE GENERATION OF AN ANATECTIC COMPLEX IN CENTRAL SPAIN [31659]

## SESSION NO. 83, 1996 GSA Annual Meeting, Tuesday, October 29, 1996

*Geochemistry (Posters)*

Colorado Convention Center, Posters Hall B1, 1:30 PM

Authors will be present from 2:30 to 4:30 PM

**Booth #**

- 1 Todd, Clifford S.\*: FLUORINE ANALYSIS BY ELECTRON MICROPROBE: CORRECTION FOR IRON INTERFERENCE [50519]
- 2 Tingle, Tracy N.\*, Neuhoff, Philip S., Ostergren, John D., Jones, Robert E., Donovan, John J.: THE EFFECT OF 'MISSING' (UNANALYZED) OXYGEN ON QUANTITATIVE ELECTRON PROBE MICROANALYSIS OF HYDROUS SILICATE AND OXIDE MINERALS [50948]
- 3 Wampler, J. M.\*, Satterfield, D. A.: A MICROANALYTICAL TECHNIQUE FOR POTASSIUM-ARGON DATING WITH LITHIUM METABORATE FLUX [21260]
- 4 Smith, Harold A.\*: TAKING RADIOMETRIC AGES AND THE DIFFUSION OF DAUGHTER PRODUCTS BEYOND THE CONCEPT OF CLOSURE TEMPERATURE [16641]
- 5 Guo, Xincheng\*, Ji, Kejian: OXYGEN ISOTOPE STUDY OF GRANITES AND MARBLES IN THE VICINITY OF THE SHIZUYUAN MINE, HUNAN, CHINA [35177]
- 6 Sessions, Alex L.\*, Brady, John B., Chamberlain, C. Page: EXPERIMENTAL CALIBRATION OF AN OXYGEN ISOTOPE FRACTIONATION FACTOR FOR ZIRCON [50538]

(continued on page 18)

# SEVENTH ANNUAL



## V. M. GOLDSCHMIDT CONFERENCE

June 2–6, 1997  
Tucson, Arizona

<http://cass.jsc.nasa.gov/goldschmidt.html>

The Seventh Annual Goldschmidt Conference will be held at the Westin La Paloma in Tucson, Arizona, from June 2–6, 1997. The conference will be hosted by the University of Arizona's Department of Planetary Sciences/Lunar and Planetary Laboratory and Department of Geosciences. Dr. Michael J. Drake is the Conference Chair, and Dr. Joaquin Ruiz is the Program Committee Chair. Current sponsors include the Lunar and Planetary Institute, The University of Arizona, and the National Aeronautics and Space Administration.

The Goldschmidt Conference is an international conference of 400–600 geochemists, and is held alternatively in Europe and North America. The content of the meeting reflects to some extent the host institution(s). The Department of Planetary Sciences/Lunar and Planetary Laboratory is dedicated to the goal of research and teaching about the formation and evolution of the plan-

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### Program Committee

Chair:	J. Ruiz
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Surficial Processes and Hydrology:	J. Quade and M. Zredt
Geochronology:	G. Gehrels and S. Balwin
Planetary:	T. Swindle
Experimental:	J. Ganguly
Hydrothermal:	M. Barton

etary system and its constituent objects and processes. The Department of Geosciences focuses on research and education dealing with the nature, genesis, and history of the Earth and its crust.

The city of Tucson is located in Pima County, Arizona. It is 116 miles south of Phoenix, the state capital, and is about 65 miles north of the U.S.-Mexico border. Located in the Basin and Range province near the Colorado Plateau, the southern Rocky Mountains, and the Gulf of California, Tucson offers a remarkable natural setting for field studies. Arizona is famous for its warm, dry climate, with an





## INDICATION OF INTEREST

### Seventh Annual V. M. Goldschmidt Conference

June 2-6, 1997  
Tucson, Arizona

PLEASE RETURN BY  
November 8, 1996

Name \_\_\_\_\_

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Topic of my potential contribution \_\_\_\_\_

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For future information regarding logistics, registration, and abstract submission, please complete and return this form to the address shown at right.

Return by November 8, 1996, to Goldschmidt Conference, Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2166; fax: 713-486-2125.



The rugged beauty of the Santa Catalina mountains provides a lush backdrop for the Westin La Paloma, the site of the Seventh Annual V. M. Goldschmidt Conference.

average June minimum temperature of 67°F (19°C), an average June maximum temperature of 99°F (37°C), a relative humidity of 13%, and almost no chance of rain (June average = 0.22 inches).

The program committee welcomes your suggestions for potential symposia topics, and solicits volunteers to act as symposia organizers. Please send your suggestions for topics and offers to organize to [goldconf@lpi.arizona.edu](mailto:goldconf@lpi.arizona.edu).

### Deadlines

November 8, 1996	Indication of interest forms due at LPI
early January 1997	Second announcement, including logistical and registration information
February 21, 1997	Abstract deadline
early April 1997	Final announcement
May 2, 1997	Preregistration deadline
June 2-6, 1997	Seventh Annual Goldschmidt Conference



- 7 Mattie, Patrick D.\*, Condie, Kent C., Kyle, Philip R.: MAFIC XENOLITHS FROM THE NAVAJO VOLCANIC FIELD, FOUR CORNERS REGION, SW UNITED STATES: CONSTRAINTS ON THE COMPOSITION OF THE LOWER CRUST IN THE COLORADO PLATEAU [6065]
- 8 Chamberlain, V. E.\*, Solt, R.: SR AND ND ISOTOPIC RATIOS OF LATE INTRUSIVE DIKES IN THE REPUBLIC GRABEN MINING DISTRICT, WASHINGTON STATE [19128]
- 9 Werner, Cindy\*, Hickmott, Donald, Stimac, James A.: TRACE ELEMENT DISTRIBUTIONS IN THE UPPER BANDELIER TUFF, NEW MEXICO: RELEVANCE OF ZIRCON TO THE MAGMATIC EVOLUTION OF THE VALLES SYSTEM [30198]
- 10 White-Pinilla, Kimberly C.\*, Wendlandt, Richard F.: CHARACTERIZATION OF FENITIZING FLUIDS AT THE IRON HILL CARBONATITE COMPLEX, GUNNISON COUNTY, COLORADO [30487]
- 11 Berntan, Kathi K.\*: SECONDARY SILICA AND HEMATITE AS A PROXY FOR POTASSIUM METASOMATISM; WHIPPLE MOUNTAINS, CA AND SOCORRO, NM [4703]
- 12 Cullers, Robert L.\*: THE PROVENANCE FOR THE SANGRE DE CRISTO, BELDEN AND MAROON FORMATIONS FORMED IN THE CENTRAL COLORADO TROUGH DURING THE PENNSYLVANIAN-LOWER PERMIAN [22850]
- 13 Finkelstein, David B.\*, Hay, Richard L., Altaner, Stephen P.: UNMASKING THE EFFECTS OF DIAGENESIS IN ANCIENT LACUSTRINE ROCKS OF THE LATE OLIGOCENE CREEDE FORMATION, SOUTHWESTERN COLORADO [18886]
- 14 Higgins, K. M.\*, Rigsby, C. A., Baker, P. A., Burns, S. J.: THE RELATIONSHIP BETWEEN HYDROTHERMAL FLOW AND SEDIMENTARY DIAGENESIS, STRUCTURE, AND TEXTURE IN DISTAL TURBIDITES OF MIDDLE VALLEY OF THE JUAN DE FUCA RIDGE, ODP LEG 139 [13008]
- 15 Routh, Joyanto\*, Grossman, Ethan L., McDonald, Thomas J.: GEOCHEMISTRY OF SEDIMENTARY AND DISSOLVED ORGANIC MATTER IN YEGUA FORMATION, EAST-CENTRAL TEXAS [51113]
- 16 Ziegler, Karen\*, Longstaffe, Fred J.: ISOTOPIC EVIDENCE FOR THE ORIGIN OF CLAY ALTERATION AT THE PRECAMBRIAN/PALEOZOIC UNCONFORMITY, NE APPALACHIAN BASIN [50449]
- 17 Grathoff, Georg H.\*, Moore, Duane M., Hay, Richard L.: KINETIC MODELING AND THE ANOMALOUS HISTORY OF LOWER PALEOZOIC ROCKS IN THE ILLINOIS BASIN [30203]
- 18 McIntosh, Julie M.\*, Groat, Lee A.: BACTERIALLY-ASSISTED WEATHERING OF SULFIDE MINERAL SURFACES IN AN AQUEOUS ACID SULFATE MEDIUM [11487]
- 19 Cooper, D. Craig\*, Morse, John W.: BIOGEOCHEMICAL CONTROLS ON TRACE METAL CYCLING IN ANOXIC MARINE SEDIMENTS [50601]
- 20 Ikramuddin, Mohammed\*: USE OF LEAD ISOTOPES TO IDENTIFY THE SOURCE OF LEAD CONTAMINATION IN RIVERS, LAKES AND GROUNDWATERS [11724]
- 21 Macko, Stephen A.\*, Uhle, Maria E., Engel, Michael H.: STABLE NITROGEN ISOTOPE ANALYSES OF INDIVIDUAL AMINO ACID STEREOISOMERS [50477]
- 22 Engel, M. H.\*, Andrushevich, V., Pigott, K. L., Maynard, R., Macko, S. A.: STABLE CARBON AND NITROGEN ISOTOPE FRACTIONATIONS RESULTING FROM PEPTIDE CYCLIZATION [22761]
- 23 Fish, Susan\*, Brassard, Pierre: CADMIUM SORPTION ON SETTLED AND RESUSPENDED SEDIMENTS [50991]

**SESSION NO. 86, 1996 GSA Annual Meeting, Tuesday, October 29, 1996**

*GS Symposium (S12): Geochemical Constraints on Seawater Composition and the Coupled Ocean-Atmosphere System: The Precambrian Revisited*

Colorado Convention Center, A201, 1:30 PM  
Timothy W. Lyons and Tracy D. Frank, Presiding

- 1:30 PM Bowring, Samuel A.\*, Coleman, Drew S.: EARLY EARTH'S CONTINENTS [51026]

- 1:50 PM Grotzinger, John P.\*: CONSTRAINTS ON THE COMPOSITION OF PRECAMBRIAN SEAWATER FROM THE RECORD OF CARBONATES AND EVAPORATES [35978]
- 2:10 PM Des Marais, David J.\*: THE BIOGEOCHEMICAL CARBON CYCLE AND THE EVOLUTION OF THE PROTEROZOIC ATMOSPHERE [50343]
- 2:30 PM Sumner, Dawn Y.\*: EVIDENCE FOR LOW LATE ARCHEAN ATMOSPHERIC OXYGEN FROM OCEANIC DEPTH GRADIENTS IN IRON CONCENTRATION [50103]
- 2:50 PM Ohmoto, Hiroshi\*: EVIDENCE OF PRE-2.2 GA PALEOSOLS AND SHALES OF THE EARLY DEVELOPMENT OF AN OXIC ATMOSPHERE AND TERRESTRIAL BIOSPHERE [7202]
- 3:10 PM Kah, Linda C.\*: PRESERVATION OF DEPOSITIONAL  $\delta^{18}\text{O}$  SIGNATURES IN PROTEROZOIC DOLOMITES: GEOCHEMICAL CONSTRAINTS ON SEAWATER CHEMISTRY AND ENVIRONMENT OF EARLY DIAGENESIS [36926]
- 3:30 PM Frank, T. D.\*, Lyons, T. W., Lohmann, K. C., Winston, D.: ISOTOPIC AND GEOCHEMICAL HETEROGENEITIES IN THE HELENA FM. BELT SUPERGROUP (M. PROTEROZOIC): DIAGENETIC CONSIDERATIONS AND THE INTEGRITY OF PRIMARY SIGNATURES [1629]
- 3:50 PM Lyons, Timothy W.\*, Luepke, James J., Frank, Tracy D.: A GEOCHEMICAL MODEL FOR MIDDLE PROTEROZOIC MARINE DEPOSITION: EXAMPLES FROM THE BELT SUPERGROUP, NORTHWESTERN U.S. [36910]
- 4:10 PM Kaufman, Alan J.\*, Hoffman, Paul F., Bowring, Samuel A.: THE CARBON-ISOTOPIC RECORD OF NEOPROTEROZOIC GLACIATIONS IN CONTINUOUS CARBONATE SEQUENCES, OTAVI GROUP, NAMIBIA [11381]
- 4:30 PM Kennedy, M. J.\*, Derry, L. A., Christie-Blick, N.: DEGLACIATION, MASSIVE CARBONATE PRECIPITATION, AND DRAMATIC EXCURSIONS IN THE CARBON ISOTOPIC RECORD: THE PECULIAR INORGANIC CARBON CYCLE OF THE LATE PRECAMBRIAN [38183]
- 4:50 PM Derry, Louis\*, Kennedy, Martin, Kurtz, Andrew: UNDERSTANDING VERTICAL  $\delta^{13}\text{C}$  GRADIENTS: THE NEOPROTEROZOIC EXAMPLE [38182]
- 5:10 PM Bartley, J. K.\*, Knoll, A. H., Pope, M., Petrov, P. Yu, Semikhatov, M. A., Sergeev, V. N.: CHEMOSTRATIGRAPHIC RECOGNITION OF A PROTEROZOIC-CAMBRIAN BOUNDARY SUCCESSION ON THE WESTERN SIBERIAN PLATFORM: IMPLICATIONS FOR PALEOGEOGRAPHY AND OCEAN CIRCULATION [36927]

## SESSION NO. 115, 1996 GSA Annual Meeting, Wednesday, October 30, 1996

*Igneous Petrology I*

Colorado Convention Center, C209, 8:00 AM

Daniel S. Barker and Robert F. Dymek, Presiding

- 8:00 AM Dymek, Robert F.\*, Owens, Brent E.: PETROGENETIC RELATIONSHIPS AMONG "FTP-ROCKS" OF THE ANORTHOSITE SUITE (NELSONITES, OAGNS, JOTUNITES & OXIDE ORES) AS REVEALED BY REE CHARACTERISTICS OF SEPARATED APATITES [4135]
- 8:15 AM Papike, J. J.\*, Fowler, G. W., Shearer, C. K.: EVOLUTION OF THE LUNAR CRUST: SIMS STUDY OF PLAGIOCLASE FROM FERROAN ANORTHOSITES AND MG-SUITE NORITES [8516]
- 8:30 AM Shearer, C. K.\*, Wiedenbeck, M., Spilde, M. N., Papike, J. J.: ELEMENT PARTITIONING BETWEEN IMMISCIBLE HIGH-FE BASALTIC MELT AND HIGH-SI RHYOLITIC MELT [8534]
- 8:45 AM Cullcott, Catherine E.\*: MAGMA CHAMBER DIMENSIONS DURING CRYSTALLIZATION OF GABBRO-NORITE ZONE III, UPPER BANDED SERIES, STILLWATER COMPLEX, MONTANA [50835]
- 9:00 AM Meurer, W. P.\*, Boudreau, A. E.: QUANTITATIVE PETROFABRIC ANALYSIS OF VARIABLY FOLIATED CUMULATES IN THE STILLWATER COMPLEX, MONTANA [50494]
- 9:15 AM Philpotts, Anthony R.\*, Carroll, Maureen: PHYSICAL PROPERTIES OF PARTLY MELTED THOLEIITIC BASALT [50134]

- 9:30 AM Barker, Daniel S.\*, McMahon, Amy K.: INJECTION AND DRAINING OF MAGMA IN A XENOLITH-RICH SILL, TEXAS [20017]
- 9:45 AM Miller, James D., Jr.\*: VENTING OF HYDROUS MAGMAS FROM SHALLOW MAFIC LAYERED INTRUSIONS: EVIDENCE FROM THE DULUTH COMPLEX AT DULUTH, MINNESOTA [23636]
- 10:00 AM Hoover, Sarah\*, Ginn, Fred, Fodor, R. V.: MAGMA-RESERVOIR CRYSTALLIZATION PROCESSES: SMALL-SCALE DIKES IN CUMULATE GABBRO, MAUNA KEA VOLCANO, HAWAII [4827]
- 10:15 AM Dingwell, Donald B.\*: MAGMAS AT HIGH STRAIN RATES: IMPLICATIONS FOR EXPLOSIVE VOLCANISM [35155]
- 10:30 AM Smith, Douglas\*, Riter, J. C. Alexis: GENESIS AND EVOLUTION OF LOW-AL ORTHOPYROXENE IN SPINEL PERIDOTITE XENOLITHS, GRAND CANYON FIELD, ARIZONA [50100]
- 10:45 AM Snyder, G. A.\*, Taylor, L. A., Sobolev, N. V.: DIAMOND GENESIS IN ARCHEAN YAKUTIAN ECLOGITES, SIBERIA [10412]
- 11:00 AM Stolper, Edward M.\*, Asimow, Paul D., Hirschmann, Marc M.: GEOCHEMICAL SOCIETY INGERSON LECTURER: ADIABATIC MELTING OF THE MANTLE [30457]

**SESSION NO. 124, 1996 GSA Annual Meeting, Wednesday, October 30, 1996**

***T33. Geofluids: The Role of Fluids in Crustal Processes - Part I***

Colorado Convention Center, C207, 8:00 AM

Mark Person and Emi Ito, Presiding

- 8:00 AM INTRODUCTION
- 8:15 AM Nesbitt, B. E.\*, Morris, G. A., Muehlenbachs, K., Prochaska, W.: CRUSTAL SCALE PROCESSES IN THE GENERATION OF HYDROTHERMAL DOLOMITE IN THE WESTERN CANADA SEDIMENTARY BASIN [11517]
- 8:30 AM Bekele, Elise B.\*, Person, Mark, Rostron, Ben J.: CONTROLS ON THE LONG-RANGE MIGRATION OF PETROLEUM THROUGH THE VIKING FORMATION OF THE ALBERTA BASIN [50603]
- 8:45 AM Morris, George A.\*, Nesbitt, Bruce E., Muehlenbachs, K.: PALEOHYDROGEOLOGY OF THE NAHANNI RIVER REGION, NWT, CANADA: RESOLVING MULTIPLE EVENTS FROM A LONG AND COMPLEX FLUID HISTORY [35117]
- 9:00 AM Melchiorre, Erik B.\*, Criss, Robert E., Davisson, M. Lee: CORRELATION BETWEEN ZONES OF FORMATION FLUID EXPULSION AND ASEISMIC REGIONS IN THE CENTRAL CALIFORNIA COAST RANGES [9580]
- 9:15 AM Gordon, David S.\*, Flemings, Peter B.: ONE AND TWO DIMENSIONAL MODELING OF COMPACTION DRIVEN FLUID FLOW IN A PLIO-PLEISTOCENE GROWTH-FAULTED BASIN, OFFSHORE LOUISIANA [50809]
- 9:30 AM Strayer, Luther M.\*, Hudleston, Peter J.: COUPLED FLUID-FLOW AND DEFORMATION ASSOCIATED WITH FOLDING AT THRUST RAMPS: INITIAL RESULTS AND OBSERVATIONS [22624]
- 9:45 AM Kharaka, Yousif K.\*, Thorsen, James J., Evans, William C.: ROLE OF FLUIDS ON THE DYNAMICS OF THE SAN ANDREAS FAULT SYSTEM, CALIFORNIA [51262]
- 10:00 AM McAdoo, Brian G.\*, Orange, Daniel L., Sreaton, Elizabeth, Kayen, Robert, Lee, Homa: HEADLESS SUBMARINE CANYONS AND TRANSIENT SLOPE FAILURE: CASCADIA ACCRETIONARY PRISM, OFFSHORE OREGON [50882]
- 10:15 AM Wetzel, Laura Reiser\*, Shock, Everett L.: NUMERICAL MODELING OF HYDROTHERMAL CIRCULATION THROUGHOUT THE OCEANIC CRUST SUGGESTS A SPREADING RATE DEPENDENCE OF FLUID AND HEAT FLOW PATTERNS [27194]
- 10:30 AM Seyfried, William E., Jr.\*, Chen, Xian, Chan, Lai-Heung: EXPERIMENTAL CONSTRAINTS ON TRACE ELEMENT MOBILITY AND LI ISOTOPE EXCHANGE DURING HYDROTHERMAL ALTERATION OF SEAFLOOR WEATHERED BASALT [50493]
- 10:45 AM Gerdex, M. L.\*, Baumgartner, L. P., Person, M.: FLUID CONVECTION IN HETEROGENEOUS COUNTRY ROCKS DURING CONTACT METAMORPHISM [50918]

- 11:00 AM Tacinelli, John C., Jr.\*; Ito, Emi: MAJOR AND TRACE ELEMENT SHIFTS IN HYDROTHERMAL VEINS FROM BASALT XENOLITHS, CUILLIN COMPLEX, ISLE OF SKYE, NW SCOTLAND [50583]
- 11:15 AM Bergfeld, Deborah\*, Goff, Fraser, Janik, Cathy J.: FLUID-ROCK INTERACTION AND CO<sub>2</sub> GENERATION WITHIN THE GEYSERS-CLEAR LAKE GEOTHERMAL REGION OF NORTHERN CALIFORNIA [35846]
- 11:30 AM Budai, J. M.\*; Stearns, C. H., Martini, A. M., Ku, T. C. W., Walter, L. M.: FRACTURE CEMENTS IN THE ANTRIM SHALE: A RECORD OF MICROBIAL METHANOGENESIS AT A GLACIATED BASIN MARGIN [36918]
- 11:45 AM Markl, Gregor\*, Bucher, Kurt: SALINE BRINES IN THE LOWER CRUST OF LOFOTEN, NORWAY - EVIDENCE FROM CL-RICH HYDROSILICATES [1568]

**SESSION NO. 131, 1996 GSA Annual Meeting, Wednesday, October 30, 1996**

***Geochemistry II: Low Temperature Geochemistry***

Colorado Convention Center, C209, 1:30 PM

Louis Derry and Claudia I. Mora, Presiding

- 1:30 PM Rye, Rob\*, Holland, Heinrich D.: CARBON DIOXIDE, METHANE, AND OXYGEN IN EARLY ATMOSPHERE [35946]
- 1:45 PM Moulton, Katherine L.\*, Berner, Robert A.: THE EFFECT OF HIGHER LAND PLANTS ON THE WEATHERING OF CALCIUM AND MAGNESIUM SILICATES IN ICELAND [25867]
- 2:00 PM Fernann, E. J.\*, Derry, L. A., Moore, A.: A HIGH RESOLUTION CARBON ISOTOPE STRATIGRAPHY OF MIDDLE CAMBRIAN CARBONATES AND A POSSIBLE CORRELATION BETWEEN THE NORTH AMERICAN CORDILLERA AND THE SIBERIAN CRATON [36924]
- 2:15 PM Derry, L. A.\*, France-Lanord, C.: HIMALAYAN EROSION AND THE NEOGENE CARBON CYCLE: ORGANIC VS. INORGANIC CARBON SINKS [38181]
- 2:30 PM Moore, A.\*, Duncan, K., Derry, L.: CARBON ISOTOPIC VARIATIONS ACROSS THE TRIASSIC-JURASSIC BOUNDARY [38184]
- 2:45 PM Mora, C. I.\*, Driese, S. G., King, D. C.: INTERPRETING THE CARBON ISOTOPE SIGNATURE OF PEDOGENIC CARBONATE IN LATE SILURIAN PALEOSOLS [11440]
- 3:00 PM Azmy, Kareem\*, Veizer, Jan, Bassett, Mike G., Copper, Paul: ISOTOPIC COMPOSITION OF SILURIAN BRACHIOPODS AND SILURIAN SEAWATER [26673]
- 3:15 PM Farmer, G. Lang\*, Ball, Theodore T.: SOURCES OF MIDDLE PROTEROZOIC TO EARLY CAMBRIAN SILICICLASTIC SEDIMENTS IN THE GREAT BASIN: A ND ISOTOPE STUDY [35576]
- 3:30 PM Chesley, John\*, Stillings, Lisa L., Brantley, Susan L.: RATE OF RELEASE AND ISOTOPIC SIGNATURE OF STRONTIUM DURING DISSOLUTION OF FELDSPAR AT 25 C AND PH=3 [29231]
- 3:45 PM Williams, L. B.\*, Hervig, R. L., Bjørlykke, K.: THE ORIGIN OF QUARTZ CEMENTS IN HYDROCARBON RESERVOIRS, OFFSHORE NORWAY: EVIDENCE FROM O-ISOTOPE MICROANALYSES [27358]
- 4:00 PM Tuttle, Michele L. W.\*, Clayton, Jerry L.: A SYSTEMATIC APPROACH USING SULFUR ISOTOPES TO INVESTIGATE CONTROLS ON THE SULFIDIZATION OF ORGANIC MATTER IN IMMATURE PETROLEUM SOURCE ROCKS [50834]
- 4:15 PM Ku, Tim C. W.\*, Walter, Lynn M., Blake, Ruth E., Martini, Anna M.: ROLE OF SULFUR CYCLING IN THE EARLY MARINE DIAGENESIS OF CARBONATES: NEW CONSTRAINTS FROM THE OXYGEN AND SULFUR ISOTOPE COMPOSITION OF SULFATE [18037]
- 4:30 PM Kohn, Matthew J.\*, Schoeninger, Margaret J., Valley, John W.: OXYGEN ISOTOPE VARIATIONS IN TOOTH ENAMEL: A MEASURE OF SEASONALITY [27487]
- 4:45 PM Yapp, Crayton J.\*: A POSSIBLE CONSTRAINT ON MINIMUM ATMOSPHERIC OXYGEN PARTIAL PRESSURES IN THE PHANEROZOIC FROM CARBON ABUNDANCES IN OOLITIC GOETHITE (FeOOH) [50141]

- 5:00 PM Olesen, A. E.\*, Reagan, M. K., Barnett, S., Edwards, R. L.: DATING HEMATITE AND GOETHITE USING URANIUM SERIES TECHNIQUES [24039]
- 5:15 PM Osmond, J. K.\*, Cowart, J. B., Burnett, W. C.: URANIUM VALENCE-ASSOCIATED ISOTOPIC DISEQUILIBRIUM IN PHOSPHATE CRUSTS AND NODULES [34766]

**SESSION NO. 147, 1996 GSA Annual Meeting, Wednesday, October 30, 1996**

**T33. Geofluids: The Role of Fluids in Crustal Processes - Part II (Posters)**

Colorado Convention Center, Posters Hall B1, 1:30 PM

Authors will be present from 2:30 to 4:30 PM

**Booth #**

- 86 Gardner, Rebecca D.\*, Crossley, Laura J.: HYDROGEOCHEMISTRY OF LATE PLEISTOCENE TO RECENT TRAVERTINE DEPOSITS AND WARM SPRINGS, EASTERN SAN JUAN BASIN, NEW MEXICO [27415]
- 87 Tempel, Regina N.\*, Herring, Donna M.: MISSISSIPPIAN CHAINMAN SHALE IN THE UE17E CORE, NYE COUNTY, NEVADA: STUDY OF SHALE DIAGENESIS AND ESTIMATION OF PALEOFLUID COMPOSITIONS [30795]
- 88 Swenson, John B.\*, Person, Mark, Cannon, William F., Woodruff, Laurel G.: HYDROLOGIC MODELS OF MAIN-STAGE COPPER SULFIDE MINERALIZATION WITHIN THE MIDCONTINENT RIFT SYSTEM [50528]
- 89 Hasbargen, L. E.\*, Paola, C.: EFFECTS OF LITHOLOGIC CONTRAST, REGIONAL SURFACE SLOPE, AND UPLIFT RATE ON BURIED CHANNEL EXCAVATION AND REOCCUPATION IN A TWO-LAYER LANDFORM EVOLUTION MODEL [50647]
- 90 Donovan, Joseph J., Panek, Valerie A.\*, Smith, Alison J.: CLIMATE-INDUCED DIVIDE CAPTURE BY GROUNDWATER-FED LAKES: EVIDENCE FROM 1930'S LAKE STAGE DECLINES, NORTHERN GREAT PLAINS [50920]
- 91 Rowan, E. L.\*, Hatch, J. R., Goldhaber, M. B.: CONSTRAINTS ON THE THERMAL AND BURIAL HISTORY OF THE ILLINOIS BASIN FROM FLUID INCLUSIONS AND THERMAL MATURITY OF ORGANIC MATTER [51077]
- 92 Allen, Douglas E.\*, Tipping, R., Spivack, A. J., Seyfried, William E., Jr.: THE CHEMICAL EVOLUTION AND BORON ISOTOPIC COMPOSITION OF FLUIDS AND ROCKS OF THE NORTH SHORE VOLCANIC GROUP, NORTHEASTERN MINNESOTA [50139]
- 93 Diehl, S. F.\*, Humphrey, J. D., Anderson, R. E., Nealey, D.: GEOCHEMICAL AND PETROGRAPHIC EVIDENCE FOR FLUID FLOW AND DISSOLUTION IN SOME LOW-ANGLE NORMAL FAULTS, UTAH AND NEVADA [30739]
- 94 Liu, Junzhe\*, Hay, R. L.: K-METASOMATISM OF UPPERMOST PRECAMBRIAN GRANITIC AND BASALTIC ROCKS IN WEST-CENTRAL WISCONSIN - MINERALOGICAL AND CHEMICAL CHANGES [1678]

**SESSION NO. 178, 1996 GSA Annual Meeting, Thursday, October 31, 1996**

**Aqueous Geochemistry III: Geochemistry of Surface and Groundwaters**

Colorado Convention Center, C109, 1:30 PM

Alex E. Blum and Kevin H. Johannesson, Presiding

- 1:30 PM van Middlesworth, Paul\*, Wood, Scott A.: GEOCHEMISTRY OF REE, U AND TH IN THERMAL WATERS ON THE PERIPHERY OF THE IDAHO BATHOLITH. PART I. ANALYTICAL METHODS AND RESULTS [50160]
- 1:45 PM Wood, Scott A.\*, van Middlesworth, Paul: GEOCHEMISTRY OF REE, U AND TH IN THERMAL WATERS ON THE PERIPHERY OF THE IDAHO BATHOLITH. PART II. REE SPECIATION AND MONAZITE SOLUBILITY MODELING [50163]
- 2:00 PM Gimeno, Maria-José\*, Auqué, Luis F., Nordstrom, D. Kirk, Bruno, Jordi: RARE EARTH ELEMENT (REE) GEOCHEMISTRY AND THE TETRAD EFFECT IN THE NATURALLY ACIDIC WATERS OF ARROYO DEL VAL, NORTHEASTERN SPAIN [18314]
- 2:15 PM Holloway, JoAnn M.\*: CHEMICAL WEATHERING OF AMMONIUM MINERALS: IMPLICATIONS FOR NITROGEN CYCLING [50180]
- 2:30 PM Blum, Alex E.\*, McKnight, Diane M., Lyons, W. Berry: SILICATE WEATHERING RATES ALONG A STREAM CHANNEL DRAINING INTO LAKE FRYXELL, TAYLOR VALLEY, ANTARCTICA [18319]

- 2:45 PM Kirby, Carl S.\*, Elder, Jennifer A.: IRON OXIDATION AND PRECIPITATION RATES USING A NOVEL FIELD MIXED-FLOW REACTOR IN ACID MINE DRAINAGE [38040]
- 3:00 PM Carey, J. William\*, Chipera, Steve J., Bish, David L.: THE EFFECT OF CATION EXCHANGE AND DEHYDRATION ON CLINOPTILOLITE-ANALCIME EQUILIBRIA: APPLICATION TO YUCCA MOUNTAIN, NEVADA [51054]
- 3:15 PM Leybourne, Matthew I.\*, Goodfellow, Wayne D., Boyle, Dan R.: CONTRASTING CHEMICAL AND ISOTOPIC COMPOSITIONS OF GROUNDWATERS FROM THE HALFMILE LAKE AND RESTIGOUCHE ZN-PB DEPOSITS, BATHURST MINING CAMP, N.B., CANADA [50678]
- 3:30 PM Johannesson, Kevin H.\*: SOLUTION AND SURFACE COMPLEXATION OF THE RARE EARTH ELEMENTS AND IMPLICATIONS FOR THEIR USE AS GEOCHEMICAL TRACERS OF REGIONAL GROUNDWATER MIXING [8504]
- 3:45 PM Bundy, Maria E.\*, Oreskes, Naomi, Hanchar, John M.: ORIGIN OF CONVEX-UPWARD REE TREND IN BOG SEEP AND MINE EFFLUENT WATERS IN PARADISE BASIN, SAN JUAN MOUNTAINS, CO. [51239]
- 4:00 PM Berger, A. C.\*, Bethke, C. M., Krumbansl, J. L., Brady, P. V.: CONTROLS ON HEAVY METAL MOBILITY AT THE PECOS MINE OPERABLE UNIT, NEW MEXICO [51048]
- 4:15 PM Martel, A. Thomas\*, Gibling, Martin R., Kennedy, Angela, MacLeod, Glenn, Baechler, Fred: SPATIAL TRENDS IN BRINE CHEMISTRY FROM THE SHALLOW SUBSEA AREA OF THE CARBONIFEROUS SYDNEY BASIN, NOVA SCOTIA, CANADA [50781]
- 4:30 PM Dann, Shannon M.\*, Aller, Robert C.: HORIZONTAL AND VERTICAL TRANSPORT OF SOLUTES IN THE BIOTURBATED ZONE OF MARINE SEDIMENTS [50827]
- 4:45 PM Kolak, Jonathan J.\*, Long, David T., Larson, Grahame J., Sibley, Duncan F., Matty, June M.: SPATIAL EVALUATION OF GROUNDWATER-SURFACE WATER INTERACTIONS IN THE SAGINAW BAY WATERSHED, LAKE HURON [50983]
- 5:00 PM Donahoe, Rona J.\*, Jones, Steven C., Liu, Chongxuan: EFFECTS OF DRAINING ON WETLAND SEDIMENT AND POREWATER CHEMISTRY [50921]
- 5:15 PM Rao, Usha\*, Fehn, Udo, Teng, Ray: THE PRESENCE AND PENETRATION DEPTH OF NUCLEAR FUEL REPROCESSING RELATED IODINE-129 IN SOILS OF WESTERN NEW YORK [16942]

## EUROPEAN UNION OF GEOSCIENCES (EUG)

### EUG 9

Sunday 23 March to Thursday 27 March 1997

Strasbourg - France

The EUG biennial convention is a well-established event attracting scientists from all over Europe and increasing numbers from the rest of the world. Each meeting is organized by a different European country. France organized the first meeting in 1981, then Germany, UK, Switzerland, Norway, Italy, The Netherlands, and France again in 1995. Once again it is Germany's turn in March of 1997. EUG 9 will feature a combination of interdisciplinary symposia, forums, special and open sessions:

#### Union symposia

- U 1 Core and lower mantle: Structure, composition and dynamics (co-sponsored by SEDI)

- U 2 Global seismic tomography, mineral physics and geodynamics (co-sponsored by SEDI)
- U 3 Hot spots and mantle plumes
- U 4 Quantifying timescales of Earth and planetary processes
- U 5 Continents and their mantle roots: Structure, properties and evolution
- U 6 Dynamics of deep subduction
- U 7 Orogenic processes
- U 8 EUROPROBE: Lithosphere dynamics across Europe (organized and co-sponsored by Europrobe)
- U 8.1 URALIDES - Palaeozoic collisional orogeny between Baltica and Asian terranes
- U 8.2 SVEKALAPKO and EUROBRIDGE - Evolution of Palaeoproterozoic and Archaean lithosphere
- U 8.3 The East European Craton and its margins - Intraplate tectonics and basin dynamics
- U 8.4 Trans-European Suture Zone (TESZ) - Phanerozoic accretion and evolution of contrasted continental lithosphere
- U 8.5 PANCARDI - The Pannonian-Carpathian-Dinaride System - Dynamics of ongoing orogeny
- U 9 Supercontinent construction and destruction

- U 10 The role of water in driving geological processes
- U 11 Modern modelling trends in tectonics
- U 12 Basin modelling: integration of geophysics and sedimentology
- U 13 Volcanic eruptions: causes and consequences
- U 14 Physics and chemistry of partially molten rocks
- U 15 Polar Earth sciences
  - a. Arctic
  - b. Antarctic
- U 16 Geological hazards for megacities
- U 17 Active tectonics and quantitative geomorphology
- U 18 Global carbon cycle
- U 19 Climatic, oceanographic and tectonic forcing of sedimentary systems
- U 20 Biogeochemistry and climatic history of depositional environments
- U 21 Bioconstructions
- U 22 Environmental geoscience: from resource to recycling
- U 23 Nuclear waste management in Earth sciences

#### Special Sessions

- S 1 Interpretation of marine gravity data
- S 2 Earthquake prediction
- S 3 Seismotectonics
- S 4 Recent advances in magnetostratigraphy and rock magnetism
- S 5 Evolution of accretionary wedges and foreland basins
- S 6 Tectonics of the Caledonian/Appalachian orogen and the palaeogeography of Iapetus
- S 7 Dynamics of active margins and collision zones
- S 8 Proterozoic collision belts in the North Atlantic Region (co-sponsored by IGCP Project 371)
- S 9 Cratonization and relationship between cratons and high-grade mobile belts in the Precambrian
- S 10 Strain and fabrics
- S 11 Suture zones - modern and ancient
- S 12 Crustal rotations: Causes and consequences
- S 13 Palaeoclimate, palaeoceanography and tectonics of the Mediterranean region
- S 14 Mountain uplift and climate change
- S 15 Transformations and reactions in minerals (co-sponsored by EMU)
- S 16 Cation ordering in rock-forming silicates
- S 17 Ferric iron and oxygen fugacity
- S 18 Internally consistent data bases: promises and perils
- S 19 New developments of analytical techniques
- S 20 Microbeam trace element analysis; a tool for understanding geological processes
- S 21 Generation of granitic rocks and deep crustal processes
- S 22 Island arc magmatism
- S 23 Water and melts
- S 24 Dating metamorphism and deformation
- S 25 Post-collisional magmatism
- S 26 Ocean ridge processes

- S 27 Large igneous provinces and Earth's evolution
- S 28 Processes of ore formation in the magmatic environment
- S 29 Hydrothermal systems, alteration, and ore deposition
- S 30 Aqueous geochemistry, thermodynamics and kinetics of low temperature water-rock interaction
- S 31 Very low-grade metamorphism
- S 32 Characterization of ancient depositional environments by molecular organic geochemistry
- S 33 Weathering processes: Mineral deposits and soil formation in tropical environments
- S 34 Turbidite deep-sea fans
- S 35 Advanced techniques in provenance analysis of sedimentary rocks
- S 36 Particle flux and its preservation in deep-sea sediments
- S 37 Proxies in palaeoceanography and palaeoclimatology
- S 38 Lacustrine systems as archives of climatic and tectonic events
- S 39 High resolution biochronological and integrated timescales
- S 40 Palaeodiversity
- S 41 Events and extinctions
- S 42 Environmental mineralogy (co-sponsored by EMU)
- S 43 Geomechanics of porous rocks
- S 44 Hydrogeology in crystalline rocks
- S 45 Groundwater protection (co-sponsored by IAH)
- S 46 Environmental engineering
- S 47 Anthropogenic contaminants in aquatic and sedimentary environments
- S 48 Anthropogenic impact on weathering processes (co-sponsored by IGCP Project 405)

#### Deadlines

- Submission of abstracts 15 Nov. 1996
- Application for grants 30 Nov. 1996
- Registration w. payment 31 Nov. 1996  
(late registration will be 30 % higher)

#### Contact address

EUG 9 Office  
 EOPG  
 5 rue René Descartes  
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 FRANCE  
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 from 19 Oct. 1996: 33 (0)3 88 41 63 93  
 or 33 (0)3 88 45 01 91  
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 from 19 Oct. 1996: 33 (0)3 88 60 68 87  
 e-mail: eug@eopg.u-strasbg.fr  
 www: <http://sparc.ipgp.jussieu.fr/EUG/>



## Calendar of Meetings

**Sep. 29-Oct. 2, 1996: Geothermal Resources Council 1996 Annual Meeting, *Geothermal Development in the Pacific Rim*,** Portland, Oregon, Portland Marriott Hotel. Contact: Geothermal Resources Council, P.O. Box 1350, 2001 Second Street, Suite 5, Davis, California 95617-1350 USA, Tel. 916-758-2360, Fax 916-758-2839, Email: [geores@wheel.dcn.davis.ca.us](mailto:geores@wheel.dcn.davis.ca.us)

**Sep. 29-Oct. 4, 1996: Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) 23rd Annual Conference,** Kansas City, MO. Contact: FACSS, 201B Broadway St., Frederick, MD 21701-6501, Tel. 301-846-4797 (deadline for 100 word brief: March 29, 1996).

**Oct. 2-4, 1996: Gulf Coast Association of Geological Societies and Gulf Coast Section SEPM Meeting,** San Antonio, TX. Contact: Thomas E. Ewing, Venus Exploration, 700 N. St. Mary's, San Antonio, TX 78205, Tel. 210-222-9481, Email: [sa96@aol.com](mailto:sa96@aol.com)

**Oct. 7-11, 1996: Environmental Issues and Waste Management in Energy and Mineral Production, 4th International Symposium,** Cagliari, Italy. Contact: R. Cicco, Dipartimento di Geoingegneria et Tecnologie Ambientali, Universita degli Studi di Cagliari, Piazza d'Armi; 09 123 Cagliari, Italy; Tel. 39 7022 2317; Fax 39 7027 2031

**Oct. 8-11, 1996: Large and Unique Deposits of Rare and Precious Metals, International Symposium,** St. Petersburg, Russia. Contact: Y. B. Marin, St. Petersburg State Mining Institute, 21—th Line, 2, V.O., St. Petersburg 199026, Russia; Tel. 7-812-2188247, Fax 7-812-2132613; Email: [marin@mineral.spb.su](mailto:marin@mineral.spb.su)

**Oct. 13-15, 1996: 27th Underwater Mining Institute Conference,** Washington, D.C., USA. Sponsors: International Marine Minerals Society; Marine Minerals Technology Center; Hawaii Natural Energy Institute, University of Hawaii. Contact: K. C. Morgan, Underwater Mining Institute, c/o Marine Minerals Technology Center, 811 Olomehane St., Honolulu, HI 96813 USA; Tel. 808-522-5611; Fax 808-522-5618; Email: [70673.534@compuserve.com](mailto:70673.534@compuserve.com)

**Oct. 16-18, 1996: Lunar and Planetary Institute, *Workshop on Evolution of Igneous Asteroids: Focus on Vesta and the HED Meteorites*,** Houston, TX, USA. Contact: D. Mittlefehldt, Email: [duck@smmail.jsc.nasa.gov](mailto:duck@smmail.jsc.nasa.gov) or J. Papike, Email: [jpupike@unm.edu](mailto:jpupike@unm.edu)

**Oct. 20-25, 1996: International Workshop, *Interactions of Small Solutes with Materials of Environmental Relevance*,** Monte Verità, Ascona, Switzerland. Conference is limited to 40 participants (in addition to speakers). (Deadline for registration and receipt of poster abstracts: September 1, 1996) Contact: M. Borkovec, ETH-ITO, Grabenstrasse 3, CH-8952 Schlieren, Switzerland; Tel. (+41) 1 633 6003; Fax (+41) 1 633 1118; Email: [borkovec@wawona.vmsmail.ethz.ch](mailto:borkovec@wawona.vmsmail.ethz.ch)

**Oct. 21-24, 1996: 11th Annual Conference on Contaminated Soils: Analysis, Fate, Environmental and Public Health Effects and Remediation,** Amhurst, MA, USA. Sponsors: U.S. Department of Energy, Association for the Environmental Health of Soils; others. Contact: L. Rosen, Environmental Health and Sciences, N344 Morrill, University of Massachusetts, Amhurst, MA 01003; Tel. 413-545-2934; Fax 413-545-4692.

**Oct. 21-24, 1996: National Institute of Oceanography, *International Symposium on Geology and Geophysics of the Indian Ocean*,** Goa, India. Contact: Ch. M. Rao, Tel. 91-832-221380, Fax 91-832-223340; Email: [msrao@bcgoa.ernet.in](mailto:msrao@bcgoa.ernet.in)

**Oct. 25-30, 1996: European Research Conferences, *Water Treatment Processes*,** Aghia Pelaghia, Crete. Contact: J. Hendekovic, Tel. 33-88-767135, Fax 33-88-366987, Email: [euresco@esf.org](mailto:euresco@esf.org); <http://www.esf.org/euresco>

**Oct. 25-27, 1996: Mineralogical Society of America, *Short Course: Reactive Transport in Porous Media: General Principles and Application to Geochemical Processes*,** Golden, CO, USA. Contact: P. C. Lichtner, Email: [lichtner@swri.edu](mailto:lichtner@swri.edu); C. I. Steefel, Email: [steefel@margaux.cas.usf.edu](mailto:steefel@margaux.cas.usf.edu); E. H. Oelkers, Email: [oelkers@cix.cict.fr](mailto:oelkers@cix.cict.fr)

**Oct. 26-27, 1996: Society of Economic Geologists, *Application of Microanalytical Techniques to Understanding Mineralizing Processes*,** Florissant, CO, USA. Contact: M. A. McKibben, Email: [michael.mckibben@ucr.edu](mailto:michael.mckibben@ucr.edu); <http://rgpp2413a.ucr.edu> or W. C. Shanks, Tel. 303-236-2497, Email: [pshanks@helios.cr.usgs.gov](mailto:pshanks@helios.cr.usgs.gov)

- Oct. 27, 1996: Organic Geochemistry Division of the Geochemical Society and the Geological Society of America, *Organic Geochemistry—Linking the Biosphere and Geosphere***, Denver, CO, USA. Contact: K. A. Kvenvolden, Email: [kk@octopus.wr.usgs.gov](mailto:kk@octopus.wr.usgs.gov), Tel. 415-354-3213, Fax 415-354-3191
- Oct. 27-31, 1996: Geological Society of America Annual Meeting**, Denver, CO, USA. Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301, Tel. 303-447-2020 or 800-472-1988 (USA only), Email: [meetings@geosociety.org](mailto:meetings@geosociety.org), URL: <http://www.aescon.com/geosociety/index.html> (abstract deadline: July 9, 1996)
- Oct. 29, 1996: Geochemical Society, *Geochemistry of the Precambrian***, Denver, CO, USA. Contact: T. Lyons, Tel. 573-882-6328, Fax 573-882-5458, Email: [geotl@showme.missouri.edu](mailto:geotl@showme.missouri.edu) or T. Frank, Tel. 313-764-1435, Fax 313-763-4690, Email: [tdfrank@umich.edu](mailto:tdfrank@umich.edu)
- Nov. 6-8, 1996: The 18th New Zealand Geothermal Workshop**, Auckland, New Zealand. (Deadline: June 18, 1996) Contact: Geothermal Institute, The University of Auckland, Private Bag 92019, Auckland, New Zealand, Tel. 64-9-373-7599, ext. 7050; Fax 64-9-373-7436
- Nov. 10-16, 1996: AGU Chapman Conference on Shallow-Level Processes in Ocean Island Magmatism: Distinguishing Mantle and Crustal Signatures**, Tenerife, Canary Islands. Contact: Wendy Bohron, Dept. of Geological Sciences, Univ. of CA, Santa Barbara, Santa Barbara, CA 93106, Tel. 805-893-8782, Email: [bohron@magic.geol.ucsb.edu](mailto:bohron@magic.geol.ucsb.edu); URL: <http://earth.agu.org/kosmos/canaries.html> (abstract deadline: July 16, 1996).
- Nov. 11-14, 1996: Physical Research Laboratory International Conference, *Isotopes in the Solar System***, Navrangpura, Ahmedabad, India. Contact: J. N. Goswami, Tel. 91-79-462-129; Fax 91-79-6560502; Email: [isotope@prl.ernet.in](mailto:isotope@prl.ernet.in)
- Nov. 11-15, 1996: *Comparative Evolution of PeriTethyan Rift Basins***, Cairo, Egypt. Contact: W. Cavazza, Dept. Earth and Geoenvironmental Sciences, University of Bologna, Italy; Fax +39 51 243336; Email: [cavazza@geomin.unibo.it](mailto:cavazza@geomin.unibo.it)
- Nov. 18-21, 1996: 2nd International Symposium: Environmental Geochemistry in Tropical Countries**, Cartagena, Colombia. Contact: Gloria Prieto R., Luis E. Lesmes, Conference Secretariat and Information, INGEOMINAS, Diagonal 53 No. 34-53, Santafé de Bogotá D. C., Colombia; Fax 57(1) 2220797 - 57(1) 2220650; Email: [<ingeomin@cdnet.uniandes.edu.co>](mailto:<ingeomin@cdnet.uniandes.edu.co>), [<ingeomin@colciencias.gov.co>](mailto:<ingeomin@colciencias.gov.co>)
- Nov. 21-22, 1996: Radioactive Waste Disposal**, Kensington Hilton, London, UK. Contact: Emma Tamlyn or Sarah Ashmore, Tel. 171-637-4383
- Nov. 20-22, 1996: 2nd Annual Strategic Environmental Research and Development Program Symposium**, Vienna, VA USA. Contact: Erin Cannelli, Labat-Anderson Inc., 8000 Westpark Dr., Ste. 400, McLean, VA 22102; Tel. 703-506-1400 ext. 512; Fax 703-506-0946; Email: [Erin\\_Cannelli@laib.labat.com](mailto:Erin_Cannelli@laib.labat.com)
- Dec. 2-5, 1996: The Third Marine and Estuarine Shallow Water Conference: The Interrelationship Among Habitats and Their Management**, Atlantic City, N.J., USA. Contact: E. Ambrogio, Tel. 215-597-3697; Fax 215-597-1850; Email: [ambrogio.edward@epamail.epa.gov](mailto:ambrogio.edward@epamail.epa.gov)
- Dec. 6-11, 1996: European Research Foundation, 1st Euroconference on Geochemistry of Surficial and Crustal Fluids**, Seefeld, Tyrol, Austria. Contact: K. V. Ragnarsdottir, Email: [vala.ragnarsdottir@bris.ac.uk](mailto:vala.ragnarsdottir@bris.ac.uk); E. H. Oelkers, Email: [oelkers@cix.cict.fr](mailto:oelkers@cix.cict.fr); J. Hendekvik, Email: [euresc.@esf.c-strasbourg.fr](mailto:euresc.@esf.c-strasbourg.fr)
- Dec. 15-19, 1996: Fall AGU Meeting**, San Francisco, CA, USA. (Abstract deadline: Sept. 11, 1996) Contact: AGU Meetings Dept., 1996 Fall Meeting, 2000 Florida Ave., NW, Washington, DC 20009 USA. Contact: 202-462-6900 (outside US), 800-966-2481 (US), Fax 202-328-0566, Email: [meetinginfo@kosmos.agu.org](mailto:meetinginfo@kosmos.agu.org); <http://www.agu.org>
- Dec. 18, 1996: Computer Modelling Inorganic Chemicals**, Scientific Societies Lecture Theatre, London. Contact: Dr. Philip C. H. Mitchell, Dept. Of Chemistry, University of Reading, Whiteknights, Reading RG6 2AD, UK; Email: [p.c.h.mitchell@reading.ac.uk](mailto:p.c.h.mitchell@reading.ac.uk) or [scsmith@reading.ac.uk](mailto:scsmith@reading.ac.uk); Tel. +44 (0) 1734 875123 x7448 or x6591 (secretary), Fax +44 (0) 1734 311610

**Jan. 13-17, 1997: Tailings and Mine Waste '97**, Fort Collins, CO, USA. Contact: L. Hinshaw, Dept. Of Civil Engineering, Colorado State University, Fort Collins, CO 80523-1372 USA; Tel. 970-491-6081; Fax 970-491-3584; Email: lhinshaw@vines.colostate.edu

**Jan. 19-24, 1997: IAVCEI General Assembly, High-Level Silicic Magmatism and Related Hydrothermal Systems**, Puerto Vallarta, Mexico. Contact: R. Seltmann, Dept. of Earth Sciences, Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6 CANADA, Fax 613-520-4490, Email: seltm@gsc.emr.ca; or B. Lehmann, Technische Universitaet Clausthal, Adolph-Roemer-Str. 2A, 38678 Clausthal-Zellerfeld, GERMANY, Fax 49 5323 72 2321, Email: lehmann@immr.tu-clausthal.de; or J. Lowenstern, US Geological Survey, Volcanic Hazards Team, Mail Stop 910, 345 Middlefield Road, Menlo Park, CA 94025, USA, Fax 415-329-5203, Email: jlowstern@usgs.gov (abstract deadline: September 1, 1996).

**Feb. 2-7, 1997: American Meteorological Society 77th Annual Meeting**, Long Beach, CA USA. Contact: Evelyn Mazur, American Meteorological Society, 45 Beacon St., Boston, MA 02108-3693; Tel. 617-227-2426 ext. 204

**Feb. 2-7, 1997: State of the Arc '97, Island Arcs Magma Genesis Workshop**, Mawson Laboratories, Dept. Of Geology and Geophysics, University of Adelaide, South Australia. Contact: Gerald Buttfield; Tel. 61-8-303-5844; Fax 61-8-303-4347; Email: gbuttfield@geology.adelaide.edu.au

**Feb. 2-7, 1997: Third Conference on Atmospheric Chemistry**, Long Beach, CA, USA. Sponsors: American Meteorological Society, AGU. Contact: Chris Walcek, ASRC, State University of New York at Albany, 100 Fuller Rd., Albany, NY 12205, Tel. 518-442-3840, Fax 518-442-9071; Email: walcek@conrail.asrc.albany.edu (abstract deadline: July 1, 1996)

**Feb. 3-16, 1997: Flood Basalts, Rifting and Paleoclimates in the Ethiopian Rift and the Afar Depression**, Addis Ababa, Ethiopia. (Abstract deadline: Nov. 30, 1996) Contact: S. Nadir, INSU, 3 rue Michel-Ange 75016, Paris, France; Tel. 33-1-44-96-43-72; Fax 33-1-44-96-49-65; Email: sofia.nadir@cnsr.dir.fr

**Feb. 9-12, 1997: 1997 International Containment Technology Conference and Exhibition**, St. Petersburg, FL USA. Contact: L. Kollar, 1997 International Containment Technology Conference and Exhibition, Florida State University, 2035 East Paul Dirac Dr., 226 HMB, Tallahassee, FL 32310-3700 USA; Tel. 904-644-5524; Fax 904-574-6704; Email: IC-TCE@mailier.fsu.edu

**Feb. 12-13, 1997: Composition and Structure of the Continental Lithosphere: Constraints from Petrology and Geophysics**, Joint Meeting with the Joint Association for Geophysics, Burlington House. Contact: Drs. Richard England and Richard Hobbs, BIRPS, Byullard Laboratories, Madingley Road, Cambridge CB3 0EZ; Tel. 01223 360376; Fax 01223 360779; Email: england@esc.cam.ac.uk

**Mar. 23-27, 1997: European Union of Geosciences (EUG 9)**, Strasbourg, France. Contact: EUG 9 Office, EOPG, 5 rue René Descartes, 67084 Strasbourg Cedex, FRANCE, Tel. 33 88 41 63 93 or 33 88 45 01 91; Fax 33 88 60 38 87; Email: eug@eopg.u-strasbg.fr (abstract deadline: November 15, 1996)

**Mar. 31-Apr. 4, 1997: Materials Research Society, 1997 Spring Meeting**, San Francisco, CA USA. (Abstract deadline: Nov. 1, 1996) Contact: Linda G. Griffith-Cima, Room 66-556, 77 Massachusetts Avenue, Cambridge, MA 02139, Tel. 617-253-0013; Fax 617-258-8224; Email: griff@mit.edu

**Apr. 8-10, 1997: Symposium, Principle Genetic Problems Related to Mineral Deposits of Magmatic Affiliation**, dedicated to the Centenary of Academician Anatolii G. Betekhtin, Moscow, Russia. Contact: Dr. Nick S. Bortnikov, Secretary of the Org. Committee, IGEM RAS, Staromonetny per., 35, Moscow 109017, Russia; Tel. 007-095-230-8259 or 230-8244, Fax 7-95-230-2179, Email: symposium@igem.msk.su

**Apr. 14-18, 1997: Plumes, Plates and Mineralization**, Pretoria, South Africa. Contact: PPM'97, c/o Prof. S. A. de Waal, Dept. of Geology, University of Pretoria, Pretoria 0002, South Africa, Tel. 012 4202454; Fax 012 433430; Email: ppm97@scientia.up.ac.za

**Apr. 22-24, 1997: First International Conference on Measurements and Modeling in Environmental Pollution**, Madrid, Spain. Contact: S. Owen, MMEP 97 Conference Secretariat, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA UK; Tel. 44-1703-293-223; Fax: 44-1703-292-853; Email: wit@wessex.witmi.ac.uk; URL: <http://www.witmi.ac.uk/>

**Apr. 28-29, 1997: Volcanoes and Archaeology**, Burlington House. Contact: Dr. Bill McGuire, Dept. of Geography and Geology, Cheltenham & Gloucester College of HE, Francis Close Hall, Swindon Road, Cheltenham GL50 4AZ; Tel. 01242 543496; Fax 01242 532997; and Dept. of Geological Sciences, University College London, Gower Street, London WC1E 6BT; Tel. 0171 387 7050 x2383; Fax 0171 388 7614; Email: w.mcguire@ucl.ac.uk

**May 19-21, 1997: Geological Association of Canada/Mineralogical Association of Canada**, Ottawa, Canada. Contact: GAC, Room 757, 601 Booth St., Ottawa, Ontario K1A 0E8, Tel. 613-947-7649, Fax 613-947-7650, URL: <http://www.emr.ca/~ottawa97/>; Special symposium: *Extraction, Transport, and Emplacement of Granitic Magmas: Physical Processes and Structural Signatures*; Contact: Keith Benn, Email: kbenn@aix1.uottawa.ca, or Alexander Cruden, Email: cruden@credit.erin.utoronto.ca, or Edward W. Sawyer, Email: edward\_w\_sawyer@uqac.quebec.ca

**May 25-28, 1997: 8th Global Warming International Conference & Expo**, New York, NY, USA. (Abstract deadline: Oct. 17, 1996) Contact: B. J. Jefferson, Global Warming International Center, P.O. Box 5275, Woodbridge, IL 60517; Tel. 630-910-1551; Fax 630-910-1561

**May 25-30, 1997: Geochemical Exploration**, 18th International Symposium of AEG, Jerusalem, Israel. Contact: IGES Secretariat, PO Box 50006, Tel Aviv, 61500 Israel; Fax 972 3 5140000; Email: igs@mail.igs.gov.il

**June 2-6, 1997: Seventh Annual V. M. Goldschmidt Conference**, Tucson, AZ, USA. Contact: M. J. Drake, Tel. 520-621-6962, Fax 520-621-4933, Email: goldeconf@lpl.arizona.edu

**June 15-17, 1997: The South American Symposium on Isotope Geology**, Sao Paulo, Brazil. Contact: Dr. M. A. S. Basei, Tel. 55-11-818-39-89; Fax 55-11-818-39-93; Email: BASEIMAS@USP.BR

**June 15-21, 1997: Eleventh International Clay Conference**, Ottawa, Ontario, Canada. Contact: Jeanne Percival, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario K1A 0E8, Canada; Fax 613-943-1287; Email: ICC97@gsc.emr.ca

**June 15-21, 1997: Clay Minerals Society 34th Annual Meeting**, Ottawa, Ontario, Canada. Contact: Hideomi Kodama, Center for Land & Biological Research, Agriculture Canada C.E.F., Ottawa, Ontario K1A 0C6, Canada; Tel. 613-995-5011; Fax 613-995-1823; Email: kodama@nccot.agr.ca

**June 18-20, 1997: Water Pollution Modelling, Measuring and Prediction, Fourth International Conference**, Bled, Slovenia. (Abstract deadline: Aug. 30, 1996) Contact: Liz Kerr, WATER POLLUTION 97 Conference Secretariat, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA, UK; Tel. 44-1703-293-223; Fax 44-1703-292-853; Email: wit@wessex.witcmi.ac.uk; Web: <http://www.witcmi.ac.uk> (choose conference information link)

**July 1-9, 1997: 1997 Joint Assemblies of the International Association of Meteorology and Atmospheric Sciences and the International Association for Physical Sciences of the Ocean**, Melbourne, Australia. Contact: IAMAS/IAPSO Secretariat, Convention Network, 224 Rouse St., Port Melbourne, Victoria 3207, Australia; Tel. +61-3-9646-4122; Fax +61-3-9646-7737; Email: mscarlett@peg.apc.org

**July 20-24, 1997: Fifth International Symposium on Hydrothermal Reactions (ISHR '97)**, Gatlinburg, TN, USA. Contact: ISHR '97, ORNL, P.O. Box 2008, Building 4500S, MS 6110, Oak Ridge, TN 37831-6110 USA; Tel. 423-576-5109; Fax 423-574-4961; Email: ddp@ornl.gov; <http://flory.engr.utk.edu/ishr97>

**July 28-Aug. 1, 1997: Second International Conference on Geoscience Education**, Hilo, HI USA. Contact: M. Frank Watt Ireton, GeoSciEd II, American Geophysical Union, 2000 Florida Ave., NW, Washington, DC 20009; Email: fireton@kosmos.agu.org

**Aug. 19-20, 1997: I.M.A. Working Group on Mineral Equilibria and Data Bases International Meeting**, Helsinki, Finland. Contact: Pentti Holttä, Geological Survey of Finland, SF-02150 Espoo, FINLAND, Tel. 358-0-46932312, Fax 358-0-462205, Email: pentti.holttä@gsf.fi (abstract deadline: November 31, 1996)

**Aug. 24-29, 1997: Second International Symposium on Granites and Associated Mineralizations**, Brazil. Contact: General Secretariat, SGM-ISGAM, Av. 3, 390 Plataforma IV, CAB, 41.746-900 Salvador, BA, Brazil, Tel. 55-71-370-6274 (14:00-18:00 local time), Fax 55-71-231-5655, Email: ISGAM@NPD.UFPE.BR (Abstract Deadline: February 28, 1997)

**Aug. 30-Sept. 5, 1997: Lunar and Planetary Institute, *Second International Conference on Large Meteorite Impacts and Planetary Evolution*, Sudbury, Ontario, Canada. Contact: Burkhard Dressler, Tel. 713-486-2112, Fax 713-486-2162; Email: dressler@lpi.jsc.nasa.gov; <http://cass.jsc.nasa.gov/lpi.html>**

**Sep. 1-5, 1997: Challenges to Chemical Geology, 10th Meeting of the European Geological Societies, Carlsbad, Czech Republic. Contact: Dr. Martin Novak, Czech Geol. Survey, Geologicka 6, 15200 Prague 5, Czech Republic, Tel. 422-581-71-20, Fax 422-581-87-48, Email: Novak@cgu.cz**

**Sep. 1-7, 1997: Fifth International Eclogite Conference, *Centro Stefano Franscini*, Monte Verita, Ascona, Switzerland. (Preliminary registration: Oct. 31, 1996; Registration Due: May 31, 1997; Abstracts due: May 31, 1997) Contact: Dr. Rolf Schmid, Mineralogy, IEC 97, ETH-Centre, NO E43, 8092 Zurich, Switzerland, Tel. direct: XX41 1 6323791, Tel. secr.: XX41 1 6323779, Fax XX41 1 6321088, Email: rolf@erdw.ethz.ch; [http://www.erdw.ethz.ch/~rolf/pre\\_reg.html](http://www.erdw.ethz.ch/~rolf/pre_reg.html)**

**Sep. 2-6, 1997: International Symposium on Geology and Environment, Istanbul, Turkey. Contact: Secretary GEOENV '97, P. K. 464 K\_x\_lay, 06424 Ankara, Turkey, Tel. 90-312-4343601, Fax 90-312-4342388, Email: jdogan@et.cc.hun.edu.tr**

**Sep. 7-9, 1997: Earth-Sciences Education in Southern Africa - Workshop, University of Zimbabwe, Harare. Contact: The Conference Secretary, Geological Society of Zimbabwe, PO Box CW1719, Harare, Zimbabwe**

**Sep. 10-12, 1997: Intraplate Magmatism and Tectonics of Southern Africa Conference, University of Zimbabwe, Harare. Contact: The Conference Secretary, Geological Society of Zimbabwe, PO Box CW1719, Harare, Zimbabwe**

**Sep. 22-26, 1997: European Association of Organic Geochemists, *18th International Meeting on Organic Geochemistry*, Maastricht, The Netherlands. Contact: B. Horsfield, Tel. 49-2461-613670, Fax 49-2461-614666, Email: b.horsfield@kfa-juelich.de**

**Oct. 8-10, 1997: Fourth International Conference on Rare Gas Geochemistry, Rome, Italy. Contact: Conference Secretariat, W. Plastino, 4th ICRGG, Physics Department, University of Roma III, Via della Vasca Navale, 84, I-00146 Rome, Italy; Tel. +39 6 49914200; Fax +39 6 4957697; Email: 4ICRGG@uniroma3.it**

**Nov. 12-13, 1997: The Rates and Timescales of Magmatic Processes, Geological Society of London, Burlington House, London, UK. Contact: Nick Rogers; Tel. 1908-653013; Fax 1908-655151; Email: n.w.rogers@open.ac.uk**

**1998: Canadian Institute of Mining, Metallurgy and Petroleum, 100th Annual General Meeting, Quebec, Canada. Contact: John Gaydos, Meetings Manager, Canadian Institute of Mining and Metallurgy, 1 Place Alexis Nihon, 1210-3400 de Maisonneuve Boulevard West, Montreal, Quebec H3S 3B8, Canada; Tel. 514-939-2710; Fax 514-939-2714.**

**1998: 10th IAGOD Symposium, Australia. Contact: Professor I. R. Pliner, University of Melbourne, Parkville, VIC 3052, Australia; Tel. 613 3446520; Fax 613 3447761.**

**Mar. 30-Apr. 4, 1998: International Association of Geochemistry and Cosmochemistry, *Water-Rock Interaction-9*, Taupo, New Zealand. Contact: B. W. Robinson, Tel. 64-7-374-8211, Fax 64-7-374-8199, Email: wri-9@gns.cri.nz; <http://www.rvamoko.gns.cri.nz/wri-9>**

**Apr. 1998: 7th International Kimberlite Conference, Capetown, South Africa. Contact: John Gurney, University of Capetown; Email: jgurn@geology.uct.ac.za**

**May 18-21, 1998: First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, USA. Contact: J. Purvis, The Conference Group, Inc., 1989 West Fifth Ave., Suite 5, Columbus, OH 43212-1912 USA; Tel. 800-783-6338 or 614-424-5461; Fax 614-488-5747**

**June 29-July 18, 1998: 8th International Platinum Symposium (IAGOD/CODMUR), Johannesburg, South Africa. Contact: Dr. C. A. Lee, PO Box 68108, Bryanston, South Africa; Tel. 2711 411 2253; Fax 2711 692 3693.**

**Aug. 9-15, 1998: International Mineralogical Association: IMA '98, 17th General Meeting, Toronto, Canada.** Contact: Professor A. J. Naldreli, Department of Geology, University of Toronto, Canada M5S 3B1; Tel. 461-978-3030; Fax 416-978-3938; Email: ima98@quartz.geology.utoronto.ca

**Oct./Nov. 1998: Physical, Chemical and Biological Aspects of Aquifer—Stream Sediment Interrelations, 28th IAH Congress.** Contact: Dr. J. Rosenschein, USGS, MS 414, National Center, Reston, VA 22092, USA; Fax 703-648-5722.

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Suggestions may be communicated before December, 1996 to any member of the committee:

William White, chairman (Geol. Sci., Cornell Univ., Ithaca, NY 14853 USA, white@geology.cornell.edu)

Robert Bodnar (Geol. Sci., VPI, Blackburg, VA 24061 USA, bubbles@vt.edu)

Cindy Lee (Marine Sci. Res. Center, SUNY Stony Brook, Stony Brook, NY 11794 USA, cindylee@ccmail.sunysb.edu)

Eric Oelkers (Lab. de Geochimie CNRS, Universite Paul Sabatier, 38 rue des Trent-six Ponts, 31400 Toulouse, France; oelkers@lucid.ups-tlse.fr)

Roberta Rudnick (Earth and Planetary Sci., Harvard Univ., 20 Oxford St., Cambridge, MA 02138 USA; rudnick@eps.harvard.edu)

Bernard Wehrli (EAWAG-ETH, Limnological Research Center Kastienbaum, Kastienbaum, 6047 Switzerland; bernhard.wehrli@eawag.ch).



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