The Geochemical News

Newsletter of the Geochemical Society

Number 76 Spring 1990

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UPCOMING MEETINGS (partial list only, consult more complete lists in *Geotimes* or *Terra Nova*).

March 12–16: *21st Lunar and Planetary Science Conference*, Houston, TX (Pamela Jones, LPI Projects Office, 3303 NASA Road 1, Houston, TX, 77058-4399).
May 2–4: *V.M. Goldschmidt Conference* (see pages 6–15 of this Newsletter)
May 16–18: *Geol. Assoc. of Canada/Mineral. Assoc. of Canada Annual Meeting*, Vancouver, Canada (R.I. Thompson, 801–750 Jervis St., Vancouver, V6E 2A9)
May 29–June 1: *American Geophysical Union Meeting*, Baltimore, MD (AGU, 2000 Florida Ave., NW, Washington, DC 20009)
Sept 24–29: *7th International Conference on Cosmochronology and Isotope Geology*, Canberra, Australia (ICOG 7 ACTS, GPO Box 2200, Canberra, ACT 2601, Australia)

MESSAGE FROM THE PRESIDENT OF THE GEOCHEMICAL SOCIETY

The Geochemical Society, founded in 1955, has a distinguished record and we all should be proud to be members. However, there is room for improvement in the effectiveness of the Society in terms of its service to the membership, and its interaction with national and international meetings. Larry Haskin, Past President, in two recent editorials in Geochimica et Cosmochimica Acta discussed these issues and I totally agree with his recommendations. (see v. **50**, p.1, '*Our National Scientific Meetings*' and v. **50**, p.265, '*Geochemist, Organize!*') I will focus on two major initiatives during my presidency. The first is to help in setting up a Geochemical Society business office at Ohio State University. We will be hiring a half- time staff person this spring. Top priority will be given to getting our membership information and other records in order. Our corporate memory is not in good health and the business office should help tremendously in this regard. I would also like our new staffer to work with me to prepare a "Geochemical Society Handbook" that documents all the "nuts and bolts" of how our Society operates. The handbook should be particularly useful to new committee members because it will contain details on how each committee operates (e.g., the Goldschmidt Medal Committee).

The second initiative I am working on is how to have a more visible presence of the Geochemical Society at national and international meetings. Fred Spilhaus, Executive Director of A.G.U., has written to me recently welcoming the Geochemical Society as a "Cooperating Society" and as a co-sponsor of selected sessions at Spring and Fall A.G.U. meetings. Robin Brett, Secretary General of the International Union of Geological Sciences, has invited the Geochemical Society to become an affiliated organization of the IUGS family. Among other benefits, this affiliation will give us the opportunity to co-sponsor symposia at the quadrennial International Geological Congress. The Geochemical Society officers and council are now considering these two invitations. We welcome your input on these and other issues. I will try my best as your President to make your Society even more responsive to your needs.

James J. Papike

"THEME SESSIONS": AN OPPORTUNITY FOR THE GEOCHEMICAL SOCIETY

There has been a major and positive change in the way Geochemical Society members can influence the technical program at our annual meeting, held each fall with the Geological Society of America. This change is in the form of the THEME SESSION concept. The Theme Session concept was implemented on a minor way at the 1988 meeting, but became a major and successful part of the program at the 1989 meeting in St. Louis.

Past President Larry Haskin recently addressed important issues concerning our national meetings (Geochimica et Cosmochimica Acta 54, p. 1–2), and reviewed the use of theme sessions. Theme sessions originate as topics for a technical session suggested by members-at-large. Theme session topics selected by GSA (the probability for selection has been very high in the past) are advertised by GSA as open (no invited abstracts) sessions. Members interested in contributing to a particular theme session mark their abstract for consideration as part of that theme session and then submit the abstract to GSA in the normal way. Theme session topics attracting sufficient abstracts for creation of a technical session (oral or poster, as desired by the proposer) become a reality; those topics that do not are dropped from the program, with any submitted abstracts put into the general abstract pool.

The idea behind theme sessions is to: 1) make the technical sessions more responsive to the desires of individual members and 2) provide numerous important focal points for submitted abstracts *without* resorting to Symposia, which usually are strictly controlled by one or a small number of individuals.

Clearly, theme sessions are an excellent vehicle for Geochemical Society members who wish to participate in formulating the technical content of our annual meeting with GSA. As pointed out by Larry Haskin we should, as a Society, take advantage of this opportunity. To do this effectively, we have to take timely action.

Practically, this means that members wishing to propose a theme session topic have to submit a title and a brief description of the topic in time for consideration by the Joint Technical Program Chair. This deadline is usually set at about the first of the year. Geochemical Society members can submit topics directly to GSA, but the Geochemical Society Program Committee is happy to facilitate to process and submit your proposal with the endorsement of your Society. Following selection of a topic by GSA, the proposer can and should further influence the success of the venture by encouraging colleagues to submit abstracts to the theme session, and by serving as the session "advocate." An advocate works in concert with a Program Committee member to screen abstracts submitted to the theme session for relevance to the topic, and then arranges and finalizes the technical session. The advocate usually chairs the session at the meeting as well.

Members are encouraged to begin thinking about possible theme session topics for the 1991 meeting in San Diego. Your Program Committee is ready and willing to help you in organizing your proposal. With sufficient response, we could include a preliminary listing of potential topics in the fall issue of *The Geochemical News*. For further information, please contact the Program Committee: L. Peter Gromet, Department of Geological Sciences, Brown University, Providence, RI 02912; (401) 863–1920.

GEOCHEMICAL SOCIETY SPONSORED EVENTS—1990 DALLAS GSA MEETING

The Organic Geochemistry Division of the Geochemical Society has organized a symposium for Sunday October 28, 1-5pm, convened by Lisa M. Pratt (Indiana University) and Philip A. Meyers (University of Michigan) and entitled, *"Geochemistry of Metalliferous Black Shales"*. A second symposium has been organized by the Geochemical Society for Tuesday October 30, 8-12am, convened by Ethan L. Grossman (Texas A&M) and entitled, *"Oxygen and carbon isotopes in Paleozoic and Early Mesozoic marine sediments: Toward a global isotope stratigraphy"*. Other events for Society members will be the Ingerson Lecture, to be given by Keith O'Nions on Monday, October 29 at 10:30–11:30am and of course, the Annual Geochemical Society Awards Luncheon and the fall council meeting.

GEOCHEMICAL SOCIETY AWARDS

•**V. M. Goldschmidt Award:** Nominations are invited for the V.M. Goldschmidt Award for 1991. The 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. The Goldschmidt Award will normally be given annually, but may be reserved at the discretion of Council. The award is normally not 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 Council are ineligible for the duration of their terms. Past medalists are permanently ineligible.

Nominations for the V.M. Goldschmidt Award should be submitted before December 1, 1990, to: Dr. E. A. Mathez, American Museum of Natural History, Department of Mineral Sciences, New York, New York 10024, USA.

•**F. W. Clarke Award:** Nominations are invited for the F.W. Clarke Award, for 1991. The Clarke Award, consisting of a 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. The award must be received no later than the year of the recipient's thirty-fifth birthday. Independence and originality shall be important factors. The Clarke Award will normally be given annually, but may be reserved at the discretion of Council. The award is normally not 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 Council are ineligible for the duration of their terms. Past medalists are permanently ineligible.

Nominations for the 1991 Clarke Award are to be submitted before November 15, 1990, to: Dr. G. W. Lugmair, University of California, San Diego, Scripps Inst. of Oceanography, Code A-012-L, La Jolla, CA 92093, USA.

Nominations should specify the name, address, citizenship, and chief fields of specialization of the nominee. They should also include the nominator's name, address, telephone number and signature.

Nominations for the Goldschmidt Award should also provide a biographical sketch, an account of the nominee's chief contributions to geochemistry and a selected biography.

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 full bibliographical details and a statement explaining the significant 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. A biographical sketch is also desirable.

All nominations will be considered by the Award committees and will remain active for three years, unless the candidate becomes ineligible on the grounds of membership in the Council 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.

Awards are made by the Council, chosen from a nominee or 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 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 chemistry. 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.

The Treibs Award is now given every two years. This award is subject to approval by the Council of the Geochemical Society.

Nominations for the Alfred Treibs Award should be submitted to: Dr. Philip A. Meyers, Department of Atmospheric and Ocean Sciences, University of Michigan, Ann Arbor, MI 48109-2143, USA.

IN MEMORIUM
I. LINUS BARNES
1929–1990

Dr. I. Lynus Barnes, 61, a senior scientist at the National Institute of Standards and Technology, died in his home in Gaithersburg on January 11, 1990. Born in Los Angeles, Dr. Barnes graduated from Indiana University and then earned his Ph.D. degree at the University of Hawaii.

From 1963 to 1967 Dr. Barnes was a professor of chemistry and geochemistry at the University of Hawaii. His lifelong interest in isotope mass spectrometry and geology led him to the National Bureau of Standards (now NIST) in 1968. At NIST, Dr. Barnes had a distinguished career with more than 60 archival publications and more than 100 lectures.

An active member of over ten scientific societies and organizations, Dr. Barnes was internationally recognized as an expert in mass spectrometry and chaired the subcommittee on Atomic Weights for the International Union of Pure and Applied Chemistry. In addition, Dr. Barnes had received the Superior Accomplishment Award at NIST and the

Commerce Department's Silver Medal. He served as Chief of the Analytical Mass Spectrometry Group and later as the Chief of the Inorganic Analytical Research Division at NIST.

A frequent lecturer, Dr. Barnes had a career-long interest in scientific education at all levels. A Lynus Barnes scholarship fund has been established through a scientific society and the family requests donations to the fund in lieu of flowers. Contributions may be sent to NIST, Chemistry Building, Room A-349, Gaithersburg, MD 20899.

IN MEMORIUM
GUNNAR KULLERUD
1921–1989

Professor Gunnar Kullerud died on October 21, 1989 following the recurrence of an incurable and extremely painful illness.

Gunnar was born on November 12, 1921 in Odda, Norway. He met his wife to be, A. Joan Reading, while on a trip to the United States and Canada and they were married a year later on March 29, 1947. They had five children. Unfortunately, following a protracted illness that began in the middle seventies, Joan died. Gunnar was subsequently remarried to Ruth Foster, the widow of Joseph Foster, Professor of Chemistry, on November 27, 1981.

As a youth, Gunnar lived a vigorous and active life. Among other adventures, as a young teenager he sailed a small sail boat from his home in Norway all the way to England and on his father's instructions returned home the same way. He was a middle distance track star of considerable renown and was actually planning to represent Norway in the 1940 Olympic Games. He studied opera and at some point was seriously considering a career in opera. Unfortunately, he had to defer these and other plans due to the opening of hostilities that initiated World War II.

Rather than going ahead with his career plans, in 1939 while the Hitler- Stalin pact was in force, he volunteered for the Finnish army and helped to defend Helsinki from the invading Russians. Following the Nazi occupation of Norway, he joined the Norwegian underground and overtly fought against the occupiers of his homeland. He played an important part in several major battles against the Nazis in the northern part of Norway, and helped several individuals escape to Sweden. Eventually, he went to England where he joined the Norwegian air Force being stationed first in England and then in Canada. He was a bomber pilot and flew a number of sorties into Nazi Europe. It is likely that if World War II had not intervened, he may not have chosen Geology as his profession. His experiences in World War II brought him into many remote areas of Norway where he developed a deep love for the land.

Gunnar received his formal education at the Technical University of Norway, where he received the Ph.D. in 1948. He then was a postdoctoral fellow and a research associate at the University of Chicago from 1948–1952. He also received D.Sc. from the University of Oslo in 1954. From 1954, and for a period lasting 16 years, he was a senior staff geochemist at the Geophysical Laboratory, Carnegie Institution in Washington. He came to Purdue in 1970 as a full professor and served as department head of the Geoscience Department for six years until 1976. He remained on the faculty until his death on October 21, 1989, just two and a half weeks before what would have been his 68th birthday.

He was a prolific researcher. During his career he authored more than 300 technical papers and 30 chapters in books on a variety of subjects including: phase equilibrium of mineral systems, economic geology, meteorites, moon rocks, coal chemistry, and X-ray analytical methods. He was a co-editor of *Mineralium Deposita* for twenty years and served on the editorial board of *Chemical Geology* for more than fifteen. He was a fellow of the Geological Society of America and of the Mineralogical Society of America, and a member of some ten professional and honorary societies. He was a visiting professor at 15 universities and research establishments abroad, including ones in Australia, Canada, Czechoslovakia, Japan, Norway, People's Republic of China, Poland, Taiwan, and West Germany. In addition, he presented numerous invited talks and colloquia, at some 100 universities and research institutes in 20 different countries and was a consultant to mining companies, and research laboratories in a number of countries.

His honors were many. In 1964 his colleagues named the newly discovered mineral, ($NiSe_2$) *Kullerudite* in his honor. He received the Andre H. Dumont Medal from the Geological Society of Belgium in 1965, and was an elected member of the very prestigious Cosmos Club since 1968, and became a member of the National Academy of Science of Norway in 1977. He received an honorary doctorate, *Doctor Technicas Honoris Causa*, from the Norwegian Institute of Technology in 1982, and was elected a member of the Royal Norwegian Academy of Science and Letters in 1983. He

Advisory Committee at the University of Toronto from 1967–70, was appointed a member of the Argonne National Laboratory Energy Advisory Board in 1975 and was named an alternate Purdue representative to the United States Committee of the World Energy Conference in 1974. He is cited in more than a dozen biographical works including *International Who's Who, Who's Who, Dictionary of International Biography*, and *Notable Americans*. Very recently, he was honored by being asked to write a biography - including the published works - of V.M. Goldschmidt, the founder of modern geochemistry on the centennial of his birth. Gunnar was engaged in this task when he succumbed to his final illness.

Besides his professional achievements, he became well known in the community for his active participation in the annual Holocaust Conference which takes place each year in the spring and attracts scholars nationwide. Except for his untimely death, he would have been co-chairman of the conference in 1990.

In the spring of 1987, he was elected to represent his department in the Purdue University Senate. In the fall of that year a controversy arose over the way changes in medical benefits had been implemented. With tempers rising, at the October meeting of the senate Professor Kullerud proposed a motion to hold a referendum on whether the faculty had confidence in the Purdue administration. The proposal did not receive the necessary two- thirds vote, but Professor Kullerud became a leader in the subsequent efforts to increase the influence of faculty in the Senate. He was elected chairman of the senate in March 1988 and had the unusual distinction of being the first person ever to be re-elected to serve a second term in that post. He was the natural and undisputed leader of the faculty and was looked up to and respected by his colleagues on the faculty, the administration, and the Board of Trustees.

He is survived by his wife Ruth; his five children, Finn, Bjorn, Kari Dalton, Marit Sue Best, and Ingrid; by his three step-children, Ann Lohn, Gregory M. Foster, and Dr. Michael C. Foster; by his seventeen grandchildren and by his twin sisters Aud Lie and Liv Bauck who live in Norway.

Lyle F. Albright, Solomon Gartenhaus, Michael E. Lipschutz

GENERAL ANNOUNCEMENTS

• The annual spring Geochemical Society Council Meeting will be held at the site for the Goldschmidt Conference, the Hunt Valley Inn, Salons E and F on Tuesday, May 1, 1990 from 5–8pm. A second meeting involving members of the Council, some members of the Goldschmidt Conference organizing committee and others will take place after the conference at the Hunt Valley Inn on Friday, May 4 from 6–8pm. The purpose of this second meeting is to discuss plans for future Goldschmidt Conferences.

• The Mineralogical Society of America will sponsor a short course entitled *"Mineral–Water Interface Geochemistry"*, that will take place October 25-28 in Dallas, TX. Speakers from the US, Canada, Australia and Switzerland will discuss fundamental aspects of important geochemical reactions that occur at mineral-water interfaces including sorption, ion exchange, dissolution, precipitation analysis, and electron transfer (oxidation-reduction). Application of these topics to more applied subjects, such as the geochemical cycling of the elements, ore deposit formation, and the mobility of pollutants in groundwater will be explored. The meeting is being convened by Michael F. Hochella, Jr. (Stanford University) and Art F. White (USGS, Menlo Park). The course will be held at the Tanglewood Resort and Conference Center in Pottsboro, TX, located approximately 60 miles north of Dallas. Bus service will be provided to and from the site. Registration is limited to 115 individuals. For further inforamtion or a registration form contact the MSA Business Office at 1625 I Street, N.W., Suite 414, Washington, DC 20006. (PHONE: 202-775-4344, FAX: 202-775-0018).

• Items of general interest to members of the Geochemical Society should be considered to be under perpetual solicitation from any member of the Society by the Newsletter editor. Please contact: Dr. Steven B. Shirey, Carnegie Institution of Washington, Department of Terrestrial Magnetism, 5241 Broad Branch Rd., NW, Washington, DC 20015. (PHONE: 202–686–4387,4370; FAX: 202–364–8726).

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V. M. GOLDSCHMIDT CONFERENCE

An International Conference
for the Advancement of Geochemistry

Advance Registration Form
V. M. Goldschmidt Conference
May 2–4, 1990

Please print in ink or type. This form must arrive at the Conference Center by March 15, 1990.

Social Security no

Last Name First name Middle initial

( ) male ( ) female
Title

Institution

Business address (number and street or box no.)

(city) (state) (zip code)

( ) ( )
Business phone Home phone

Home address (number and street or box no.)

(city) (state) (zip code) (country)

Name, for badge Name of guest, for badge

Field Trips
Show your first and second choices.

____1. Geochemistry, Petrology, and Economic Geology of Mesozoic Diabase in Pennsylvania. $55 per person
____2. Geochemistry of the Chesapeake Bay Estuary. $55 per person
____3. Distribution of Radon in Montgomery and Prince Georges Counties, Maryland. $55 per person
____4. Ultramafite-Associated Cu-Fe-Co-Ni-Zn Deposits of the Sykesville District, Maryland Piedmont. $35 per person
____5. A Case History of Base Metal Contamination at the Palmerton, Pa., Environmental Protection Agency Superfund Site. $55 per person

Please include the cost of the field trip with your registration fee.

Special Activities for Guests
Number attending:

____1. Baltimore: Its History, Culture, and Charm. $30 per person
____2. Baltimore: A Factory and Seaport Tour. $30 per person
____3. Annapolis: Maryland's Colonial History. $30 per person
____4. Baltimore County: The Maryland Countryside. $30 per person

Please include the cost of the activity with your registration fee.

Registration Fees
Membership in sponsoring societies:

____AEG ____ACS ____EAG ____GS ____IGC ____SEGH

	Advance	*Late*	
____ Members	$100	$120	$ _____
____ Nonmembers	120	140	$ _____
____ Students	50	60	$ _____
____ Guests	30	30	$ _____
____ Banquet	____ no. attending @ $27 each		$ _____
____ Tour or Field Trip			$ _____
	TOTAL ENCLOSED		$ _____

Payment by: _____ Check or money order (U.S. dollars)
_____ VISA ____ MasterCard

Cardholder's name (please print)

Cardholder's signature

Card no. Expiration date: mo./yr.

____I will be driving ____I will be flying
Arrival date: _____ Time: _____

Indicate which technical sessions you plan to attend:

CONTRIBUTED
____ atmosphere chem.
____ cosmochemistry
____ environmental geochem.
____ exploration geochem.
____ fossil fuels
____ geochron. radioisotopes
____ low temp. geochemistry
____ marine geochemistry
____ meteorites & tectites
____ mineral deposits
____ mineralogy & crystallog.
____ organic geochemistry
____ petrology, igneous
____ petrology, metamorphic
____ petrology, sedimentary
____ petrology, experimental
____ stable isotope geochem.
____ trace element geochem.
____ other

SYMPOSIUM
____ ab-initio methods
____ advances in mass spectrom.
____ advances in spectros.
____ aqueous surface chem.
____ fluids in melts
____ aqueous geochemistry
____ high pressure min. phys.
____ geochron. & geospeed.
____ chem. reactions in crust
____ geochem. of environment
____ isotopic modeling
____ crustal flow
____ fluids in subduct. zones
____ geochem. cycles

Contact by phone or mail this form to :

Donna Ricketts, Conference Coordinator
409 Keller Conference Center
The Pennsylvania State University
University Park, PA 16802
814-863-1743

WEDNESDAY, MAY 2, 1990

WEDNESDAY AM

FLUIDS IN MELTS

8:15 **P. McMillan:** WATER DISSOLUTION MECHANISMS IN SILICATE MELTS

8:35 **M. B. Epel'baum, A. S. Chekhmir:** ON THE MODEL OF INTERACTION BETWEEN ACID SILICATE MELT AND WATER

8:55 **E. S. Persikov, V. A. Zharikov, P. G. Bukhtiyarov:** MECHANISM OF THE WATER AND HYDROGEN SOLUBILITY IN MAGMATIC MELTS

9:15 **P. D. Ihinger, E. M. Stolper, S. Epstein:** HYDROGEN ISOTOPE FRACTIONATION BETWEEN RHYOLITIC MELT AND HYDROUS VAPOR AT 850°C

9:35 DISCUSSION
9:55 COFFEE

10:15 **B. O. Mysen:** HOW DOES OH INTERACT WITH ALUMINOSILICATE MELT, OR DOES IT MATTER?

10:35 **L. A. Leshin, E. M. Stolper, H. Eckert:** WATER IN ALKALI SILICATE GLASSES: A MAS NMR AND FTIR STUDY

10:55 **S. C. Kohn, R. Dupree, M. G. Mortuza, C. M. B. Henderson:** SOLUTION MECHANISMS OF FLUORINE IN ALUMINOSILICATE GLASSES. A MULTINUCLEAR NMR STUDY

11:15 **Y. Zhang, E. M. Stolper, P. D. Ihinger:** REACTION KINETICS OF $H_2O + O = 2OH$ AND ITS EQUILIBRIUM, REVISITED

11:35 DISCUSSION
11:55 LUNCH

GEOCHEMISTRY OF THE ENVIRONMENT

8:15 **D. B. Kent, J. A. Davis, B. A. Rea, A. S. Maest, L. C. D. Anderson, A. J. Roman-Mas, T. O. Waite:** GEOCHEMICAL PROCESSES AFFECTING THE TRANSPORT OF REACTIVE IONIC SOLUTES IN GROUNDWATER

8:35 **D. W. Blowes, J. A. Cherry, E. J. Reardon, J. L. Jambor:** THE PORE-WATER GEOCHEMISTRY AND MINERALOGY OF TWO INACTIVE BASE-METAL TAILINGS IMPOUNDMENTS

8:55 **D. Postma, C. Boesen:** REDOX CHEMISTRY AND NITRATE REDUCTION IN AN UNCONFINED SANDY AQUIFER: PROCESSES AND 1-D MODELLING

9:15 **B. Wehrli, P. Höhener, R. Gächter:** COMPARISON OF FLUXES ACROSS THE SEDIMENT-WATER INTERFACE OBTAINED FROM A FLUX CHAMBER AND DIALYSIS-PORE-WATER SAMPLING

9:35 DISCUSSION
9:55 COFFEE

10:15 **J. N. Valette-Silver, G. R. Helz:** BEHAVIOR OF DISSOLVED Al, Cu, Be, AND Cr DURING SIMULATED DILUTION OF ACIDIC COAL LEACHATES WITH ALKALINE SURFACE WATERS

10:35 **J.-E. Haugeen:** AMINO ACID DIAGENESIS IN OXIC AND ANOXIC SURFACE SEDIMENTS, INNER OSLOFJORD

10:55 **E. Ghiara, R. Gragnani, M. G. Martini, I. Michetti, C. Polizzano:** TRACE ELEMENT DISTRIBUTIONS AT THE BOUNDARY BETWEEN REDUCED AND OXIDIZED ENVIRONMENTS

11:15 **T. Nöltner, H. Puchelt:** NATURAL TRACE ELEMENT CONCENTRATIONS OF DRINKING WATER AND CONTAMINATION BY DOMESTIC PLUMBING SYSTEMS

11:35 DISCUSSION
11:55 LUNCH

FLUIDS IN SUBDUCTION ZONES: THERMAL, GEOCHEMICAL, AND PETROLOGICAL CONSTRAINTS

8:15 **R. W. Kay:** SUBDUCTION ZONE FLUIDS: FACT AND FICTION

8:35 **G. E. Behout:** PROGRESSIVE DEVOLATILIZATION OF SUBDUCTED SEDIMENTARY AND MAFIC ROCKS: FIELD-BASED OBSERVATIONS FROM HIGH-PRESSURE METAMORPHIC COMPLEXES

8:55 **S. S. Sorensen:** GEOCHEMICAL EVOLUTION OF HIGH-T HYDROTHERMAL FLUIDS IN A PALEO-SUBDUCTION ZONE

9:15 **J. Selverstone, G. Franz, S. Thomas:** FLUIDS AT HIGH PRESSURE: INFERENCES FROM 20 KBAR ECLOGITES AND ASSOCIATED VEINS IN THE TAUERN WINDOW, AUSTRIA

9:35 **A. E. Moran, V. B. Sisson, W. P. Leeman:** THE FATE OF BORON IN SUBDUCTED OCEANIC SLAB: EFFECTS OF BURIAL, METAMORPHISM, AND CHEMICAL PROCESSING

9:55 COFFEE

10:15 **S. M. Peacock:** PRESSURE-TEMPERATURE-TIME PATHS AND FLUID PROCESSES IN SUBDUCTION ZONES

10:35 **I. S. Sacks, H. Sato:** THE ROLE OF WATER IN MAGMA GENESIS IN ISLAND ARCS

10:55 **Y. Tatsumi:** ROLE OF FLUID PHASES IN SUBDUCTION ZONE MAGMATISM

11:15 **J. M. Brenan, E. B. Watson:** OLIVINE/WATER PARTITIONING OF REE'S, Be, Ba, Cs, Sr AT HIGH P-T CONDITIONS

11:35 DISCUSSION
11:55 LUNCH

AQUEOUS SURFACE CHEMISTRY AND KINETICS

8:15 **G. E. Brown, Jr., C. J. Chisholm-Brause, P. A. O'Day, G. A. Parks:** X-RAY ABSORPTION SPECTROSCOPIC INVESTIGATION OF METAL ION CHEMISORPTION AT OXIDE-WATER INTERFACES

8:35 **M. Machesky, W. Andrade, A. Rose:** THE ADSORPTION OF GOLD(III)-CHLORIDE AND GOLD(I)-THIOSULFATE ANIONS ONTO GOETHITE

8:55 **L. Charlet, A. Manceau:** SORPTION MECHANISM OF Cr^{3+} AT THE HYDROUS Fe OXIDE/WATER INTERFACE AT DIFFERENT SURFACE COVERAGES

9:15 **L. Stillings, M. Machesky, S. Brantley:** PROTONATION REACTIONS OF FELDSPAR SURFACES IN AQUEOUS SOLUTION

9:35 **J. Schott, P. Penhoud, W. H. Casey:** SURFACE SPECIATION AND THE DISSOLUTION OF SILICATES

9:55 COFFEE

10:15 **G. Sposito:** SURFACE COMPLEXATION OF IONS BY NATURAL COLLOIDS

10:35 **C. M. Eggleston, M. F. Hochella, Jr.:** STRUCTURAL ASPECTS OF REACTION OF SILICATE SURFACES WITH AQUEOUS SOLUTIONS

10:55 **A. J. Gratz, P. Bird, G. B. Quiro:** QUARTZ DISSOLUTION IN AQUEOUS BASIC SOLUTION: SURFACE KINETICS OF "PERFECT" CRYSTALLOGRAPHIC SURFACES AND THE ROLE OF DEFECTS

11:15 **I. N. MacInnis, S. L. Brantley:** THE ROLE OF DISLOCATIONS AND SURFACE MORPHOLOGY IN THE DISSOLUTION KINETICS OF CALCITE

11:35 **K. L. Nagy, A. C. Lasaga, A. E. Blum:** KINETICS OF DISSOLUTION AND PRECIPITATION OF THE CLAY MINERALS KAOLINITE AND GIBBSITE

11:55 LUNCH

HYDROTHERMAL GEOCHEMISTRY

8:15 **P. Pan, S. A. Wood:** A STUDY OF GOLD HALIDE (Cl, Br) COMPLEXES BY LASER RAMAN SPECTROSCOPY AT TEMPERATURES 25° - 280° C

8:35 **R. E. Krupp:** EXPERIMENTAL STUDY INTO THE SPECIATION OF ANTIMONY IN HYDROTHERMAL SOLUTIONS

8:55 **D. Rickard, M. Cowper:** CHALCOPYRITE FORMATION IN AQUEOUS SOLUTIONS

9:15 **U. M. Graham, H. L. Barnes, H. Ohmoto:** THE EFFECTS OF ELEMENTAL SULFUR (S°) ON THE KINETIC PATHWAYS OF FeS_2 FORMATION AT LOW pH

9:35 DISCUSSION
9:55 COFFEE

10:15 **S. U. Aja:** AN EXPERIMENTAL STUDY OF THE THERMOCHEMICAL PROPERTIES OF ILLITE BETWEEN 25° AND 250° C

10:35 **H. Armannsson, M. P. Tole:** EFFECTS OF ANALYTICAL UNCERTAINTIES ON COMPLETE FLUID/MINERAL EQUILIBRIA CALCULATIONS: AN EXAMPLE OF Al

10:55 **J. J. Papike, M. N. Spilde, K. C. Galbreath, C. K. Shearer, T. E. C. Keith, J. C. Laul:** GEOCHEMISTRY AND MINERALOGY OF FUMAROLE DEPOSITS, VALLEY OF TEN THOUSAND SMOKES, ALASKA: ALTERATION OF RHYOLITE ASH-FLOW TUFF PROTOLITH

11:15 **G. R. Drennan, L. J. Robb, F. M. Meyer:** FLUID INCLUSION MICROTHERMOMETRY ON ARCHAEAN GRANITES IN THE HINTERLAND TO THE WELKOM GOLDFIELD, SOUTH AFRICA

11:35 DISCUSSION
11:55 LUNCH

HIGH-PRESSURE MINERAL PHYSICS

8:15 **C. B. Sclar:** THE SYSTEM MgO-SiO_2-H_2O AT HIGH PRESSURE AND HIGH TEMPERATURE

8:35 **M. Kanzaki:** STABILITY OF HYDROUS MAGNESIUM SILICATES IN THE MANTLE

8:55 **L. W. Finger:** CRYSTAL STRUCTURE AND CHEMISTRY OF PHASE B AND A NEW HIGH-PRESSURE MAGNESIUM SILICATE

9:15 **T. Gasparik:** EVIDENCE FOR THE MINERAL AND CHEMICAL LAYERING IN THE EARTH'S UPPER MANTLE

9:35 **C. Herzberg:** MELTING EXPERIMENTS IN ULTRAMAFIC SYSTEMS TO 165 KILOBARS

9:55 COFFEE

10:15 **F. Vannereau, G. Calas, J. Petiau, J. P. Itie, A. Polian, A. Fontaine, E. Dartyge:** PRESSURE-INDUCED COORDINATION CHANGES OF Ge IN GERMANATE GLASSES: AN IN SITU EXAFS AND XANES STUDY

10:35 **Q. Williams, E. Knittle:** EXPERIMENTS ON MELTS UNDER LOWER MANTLE CONDITIONS

10:55 **B. O'Neill, R. Jeanloz:** EXPERIMENTAL PETROLOGY OF A NATURAL PERIDOTITE AT LOWER MANTLE CONDITIONS

11:15 **M. Tarrida, I. Ahmed Zaid, M. Madon, P. Richet:** HIGH-PRESSURE MINERAL PHYSICS AND CHEMISTRY IN THE CaO-MgO-FeO-Al_2O_3-SiO_2 SYSTEM

11:35 DISCUSSION
11:55 LUNCH

ADVANCES IN MASS SPECTROMETRY

8:15 **W. Compston, P. D. Kinny:** Hf ISOTOPE SIGNATURES OF ZIRCONS BY ION MICROPROBE

8:35 **E. Zinner:** ION MICROPROBE MASS SPECTROMETRY 1990: ISOTOPIC AND TRACE ELEMENT ANALYSIS AT THE MICROMETER AND FEMTOGRAM LEVEL

8:55 **R. J. Walker, P. J. Paulsen, J. D. Fassett:** RESONANCE IONIZATION AND INDUCTIVELY COUPLED PLASMA SOURCE MASS SPECTROMETRIC TECHNIQUES USED FOR RE-OS ISOTOPIC MEASUREMENTS

9:15 **L. Brown, S. B. Shirey, R. W. Carlson:** A MULTI-DETECTOR RESONANCE IONIZATION MASS SPECTROMETER FOR Re-Os ISOTOPIC ANALYSIS

9:35 **M. T. Murrell, S. J. Goldstein, A. M. Volpe, B. L. Fearey, R. E. Perrin, R. W. Williams:** MEASUREMENT OF LONG-LIVED MEMBERS OF THE URANIUM DECAY SERIES BY MASS SPECTROMETRY

9:55 COFFEE

10:15 **G. W. Lugmair:** MEASURING ISOTOPIC ANOMALIES FROM Ba TO Zn WITH MULTI-DYNAMIC ALGORITHMS

10:35 **D. York, C. M. Hall:** CONTINUOUS-LASER PROBE $^{40}Ar/^{39}Ar$ MASS SPECTROMETRY

10:55 **G. H. Curtis:** LASER FUSION SINGLE CRYSTAL ^{40}Ar-^{39}Ar DATING

11:15 **A. N. Halliday, S. Nakai, M. Ohr, C. P. Dewolf, J. T. Chesley:** NEW TECHNIQUES FOR DATING THE MOVEMENT OF CRUSTAL FLUIDS

11:35 DISCUSSION
11:55 LUNCH

WEDNESDAY PM

FLUIDS IN MELTS

1:30 **D. B. Dingwell:** EFFECT OF VOLATILES ON THE GLASS TRANSITION IN SILICATE MELTS: CONSEQUENCES FOR MELT PROPERTIES AND SPECIATION

1:50 **T. R. Stanton, J. A. Tyburczy, J. R. Holloway, W. T. Petuskey:** ELECTRO-MIGRATION OF WATER IN SILICATE GLASS: VALENCE CHARGE OF THE DIFFUSING SPECIES

2:10 **E. B. Watson:** DIFFUSION OF DISSOLVED CARBONATE AND CHLORINE IN WATER-BEARING SILICIC MAGMAS AT 1 GPa AND 800°-1100°C

2:30 **A. F. Trial, F. J. Spera:** ROLE OF H_2O IN MAGMA CHAMBER CONVECTIVE-DIFFUSIVE BOUNDARY LAYER FLOWS

2:50 DISCUSSION
3:10 COFFEE

3:30 **R. A. Fogel, M. J. Rutherford:** THE SOLUBILITY OF C-O GASSES IN RHYOLITE MELT

3:50 **A. A. Kadik, S. N. Shilobreeva:** THE SOLUBILITIES OF GRAPHITE AND C-O-H SYSTEM VOLATILE COMPOUNDS IN MAGMATIC MELTS AND CRYSTALS; EXPERIMENTAL AND THERMODYNAMIC STUDY

4:10 **J. R. Holloway, V. Pan, G. Gudmundsson:** OXYGEN FUGACITY, FERRIC/FERROUS RATIO AND DISSOLVED CO_2 CONTENT OF GRAPHITE SATURATED BASALTIC LIQUIDS IN EXPERIMENT AND NATURE

4:30 **I. S. E. Carmichael:** THE REDOX STATE OF BASIC AND SILICIC MAGMAS: A REFLECTION OF THEIR SOURCE REGIONS?

4:50 **T. M. Gerlach:** O_2 FUGACITY OF KILAUEA MAGMA: EFFECTS OF DEGASSING DURING CRUSTAL STORAGE

GEOCHEMISTRY OF THE ENVIRONMENT

1:30 **J. C. Meranger, R. E. Lett, T. Pickering:** THE DISTRIBUTION OF ALUMINUM AND OTHER ELEMENTS IN WATER FROM SHALLOW WELLS IN AREAS EXPOSED TO ACID RAIN

1:50 **R. A. Livingston:** STABILITY RELATIONSHIPS OF BASIC COPPER MINERALS AS A FUNCTION OF RAINWATER CHEMISTRY

2:10 **L. E. Eary, E. A. Jenne:** EFFECTS OF ALUMINUM, IRON, AND SULFATE EQUILIBRIA ON THE RECOVERY OF A SEVERELY ACIDIFIED WATERSHED NEAR SUDBURY, ONTARIO

2:30 **D. F. Sangster, G. P. Watson, A. N. Rencz:** AN ENVIRONMENTAL STUDY OF THE REGIONAL GEOCHEMISTRY OF EASTERN ONTARIO LAKES

2:50 DISCUSSION
3:10 COFFEE

ENVIRONMENTAL GEOCHEMISTRY

3:30 **S. R. Cooper, G. S. Brush, J. H. U. Dogee:** THE HISTORY OF ANOXIA AND EUTROPHICATION IN CHESAPEAKE BAY AS DOCUMENTED IN THE STRATIGRAPHIC RECORD

3:50 **C. V. Miller, G. R. Helz, G. Brush:** MOLYBDENUM PROFILES IN SEDIMENTS AS AN HISTORICAL RECORD OF ANOXIA IN CHESAPEAKE BAY

4:10 **J. L. Mogollon, A. J. Ramirez, R. Guillen, C. Bifano:** HEAVY METALS AND ORGANIC CARBON IN SEDIMENTS FROM THE TUY RIVER BASIN, VENEZUELA

4:30 **A. J. Ramirez, A. Andara, A. Colina:** CHEMICAL WEATHERING, EROSION AND PHOSPHORUS EXPORT RATES BY VENEZUELAN RIVERS

4:50 **M. I. Odigi, I. C. A. Ofoma, V. C. Madu:** EFFECT OF INDUSTRIAL AND COMMERCIAL COMPLEXES ON THE REGIONAL DISTRIBUTION OF LEAD, CADMIUM, ARSENIC, ZINC, COPPER AND VANADIUM IN SOIL HORIZONS IN PARTS OF NIGER DELTA, NIGERIA

FLUIDS IN SUBDUCTION ZONES: THERMAL, GEOCHEMICAL, AND PETROLOGICAL CONSTRAINTS

1:30 **D. H. Eggler:** SOLUTE CHEMISTRY OF HYDROUS FLUIDS: A CRITICAL FACTOR IN PARTITION COEFFICIENTS?

1:50 **T. W. Trull, M. R. Perfit, M. D. Kurz:** He AND Sr ISOTOPIC CONSTRAINTS ON SUBDUCTION CONTRIBUTIONS TO WOODLARK BASIN VOLCANISM

2:10 **F. Pineau, M. Javoy:** CARBON ISOTOPE GEOCHEMISTRY AT CONVERGENT MARGINS AND FLUID EXCHANGES AT MANTLE-CRUST BOUNDARIES

2:30 **S. Newman:** WATER AND CARBON DIOXIDE CONTENTS OF BACK ARD BASIN BASALTS

2:50 **T. Plank, C. Langmuir:** TRACE ELEMENT SYSTEMATICS OF CONVERGENT MARGIN BASALTS

3:10 COFFEE

3:30 **A. W. Hofmann:** VOLATILE OR MELT TRANSFER OF Nb, Ta and Pb DURING SUBDUCTION?

3:50 **A. J. Crawford:** BONINITE PETROGENESIS AND SHALLOW MANTLE WEDGE FLUIDS

4:10 **R. J. Stern, S. H. Bloomer, J. D. Morris:** MARIANA BONINITES: TRACE ELEMENT AND Sr-, Nd-, and Pb- ISOTOPIC CONSTRAINTS ON THE ORIGIN OF LIL-ENRICHED FLUIDS AT CONVERGENT MARGINS

4:30 **R. Hickey-Vargas:** EVIDENCE FOR SEDIMENT-FREE, SUBDUCTED-MORB-DOMINATED FLUIDS IN LAVAS FROM THE PALAU-KYUSHU ARC, PHILIPPINE SEA PLATE

4:50 DISCUSSION

AQUEOUS SURFACE CHEMISTRY AND KINETICS

1:30 **V. Seymour, D. Voigt, S. Brantley, M. Machesky:** THE EFFECT OF IONIC STRENGTH AND ORGANIC ACIDS ON THE DISSOLUTION RATES OF FELDSPARS

1:50 **P. Bennett, D. Siegel:** QUARTZ SURFACE-CHEMISTRY IN ORGANIC-RICH AQUEOUS SYSTEM

2:10 **P. M. Dove, D. A. Crerar:** THERMODYNAMICS OF THE RATE-LIMITING REACTION FOR QUARTZ DISSOLUTION IN HYDROTHERMAL SOLUTIONS

2:30 **W. H. Casey, G. V. Gibbs, A. C. Lasaga:** THE KINETIC ISOTOPE EFFECT AS A PROBE OF OXIDE DISSOLUTION RATES

2:50 **B. C. Bunker, W. H. Casey:** HYDROLYSIS MECHANISMS IN OXIDE DISSOLUTION AND ALTERATION

3:10 COFFEE

3:30 **H. W. Nesbitt, W. Shotyk:** CONGRUENT-INCONGRUENT DISSOLUTION OF LABRADORITE IN HCl SOLUTIONS CONTAINING Na, K, Ca, Al AND Si

3:50 **W. Shotyk, H. W. Nesbitt:** DIRECT EVIDENCE OF LIGAND-PROMOTED DISSOLUTION FROM SIMS ANALYSES OF FELDSPAR SURFACES

4:10 **W. M. Murphy, E. H. Oelkers:** CONCENTRATION GRADIENT EFFECTS ON SURFACE REACTIONS IN MULTICOMPONENT GEOCHEMICAL SYSTEMS

4:30 **S. Stipp, M. F. Hochella, Jr.:** ADSORPTION OF Cd^{2+} ON CALCITE AND ITS DIFFUSION INTO THE CRYSTAL: A SURFACE SPECTROSCOPIC AND DIFFRACTION STUDY

4:50 **J-C. Petit:** APPLICATION OF ENERGETIC-ION BEAM TECHNIQUES TO KINETICS GEOCHEMISTRY

PLATINUM GROUP ELEMENT GEOCHEMISTRY

1:30 **P. Pan, S. A. Wood:** SOLUBILITIES OF PtS_2, PdS AND Au IN AQUEOUS SULFIDE SOLUTIONS AND AT TEMPERATURES 200°-350°C

1:50 **S. A. Wood:** THE SOLUBILITY OF Pt AND Pd IN NaOH SOLUTIONS AND DERIVATION OF STABILITY CONSTRAINTS FOR Pt AND Pd HYDROXIDE COMPLEXES

2:10 **N. J. Cook, S. A. Wood:** SECONDARY DISPERSION AND FIXATION OF Pd, Pt AND Au SURROUNDING A Pd-Pt PROSPECT IN QUEBEC

2:30 **D. C. Sassani, E. L. Shock, J. D. Pasteris:** HYDROTHERMAL ALTERATION OF MAFIC INTRUSIVE ROCKS AND THE POTENTIAL TRANSPORT OF PLATNIUM-GROUP ELEMENTS IN SUPERCRITICAL AQUEOUS SOLUTIONS

2:50 DISCUSSION

3:10 COFFEE

3:30 **N. I. Taib, E. M. Ripley:** GEOCHEMICAL STUDIES OF PGE-ENRICHMENT IN THE BABBITT Cu-Ni DEPOSIT, DULUTH COMPLEX, MINNESOTA

3:50 **C. J. Capobianco, M. J. Drake, P. S. Z. Rogers:** EXPERIMENTAL INVESTIGATION OF THE PARTITIONING OF NOBLE SIDEROPHILE ELEMENTS AMONG BASALTIC LIQUIDUS PHASES

4:10 **S-J. Barnes:** THE MODELING OF PLATINUM-GROUP ELEMENTS IN KOMATIITES

4:30 **H. M. Elsayed:** A STUDY OF THE DISTRIBUTION TRENDS AND MODE OF OCCURRENCE OF PLATINUM GROUP ELEMENTS OCCURRING IN A FERROGABBRO AT REESERS SUMMIT, PA

4:50 DISCUSSION

HIGH-PRESSURE MINERAL PHYSICS

1:30 **R. C. Liebermann, Y. Wang, X. Liu, F. Guyot:** WHAT IS THE STABLE PHASE OF $MgSiO_3$ IN THE LOWER MANTLE?

1:50 **A. Navrotsky:** THERMOCHEMISTRY OF LOWER MANTLE PHASES

2:10 **Y. Fei:** A SYNTHESIS OF THEORY AND EXPERIMENTAL DATA AND COMPUTATION OF PHASE EQUILIBRIUM IN THE Mg-Fe-Al-Si-O SYSTEM

2:30 **F. Guyot, F. Goarant, J. Peyronneau, J. P. Poirier, Y. Wang:** HIGH PRESSURE EXPERIMENTS RELEVANT TO THE STUDY OF THE CORE MANTLE BOUNDARY

2:50 DISCUSSION

3:10 COFFEE

MINERALOGY AND CRYSTALLOGRAPHY

3:30 **N. J. Cook, S. L. Chryssoulis:** SUBSTITUTION OF GOLD INTO THE CRYSTAL STRUCTURES OF ARSENOPYRITE AND PYRITE

3:50 **X. Xue, M. Kanzaki, J. F. Stebbins, P. McMillan, B. D. Santarsiero:** STRUCTURE OF TWO NEW HIGH PRESSURE $Na_2Si_2O_5$ POLYMORPHS

4:10 **M. A. Wise:** COMPOSITIONAL FEATURES OF SARCOPSIDE-GRAFTONITE AND SARCOPSIDE-TRIPHYLITE INTERGROWTHS FROM GRANITIC PEGMATITES

4:30 **C. B. Sclar:** REE GEOCHEMISTRY OF LEUCOXENIZED PEROVSKITITE FROM ST. JOSEPH DU LAC, OKA DISTRICT, QUEBEC

4:50 **C-L. Chan:** GRAIN BOUNDARY GRAPHITE AND IRON IN ECLOGITES FROM THE ROBERTS VICTOR MINE, SOUTH AFRICA

ADVANCES IN MASS SPECTROMETRY

1:30 **A. M. Volpe, M. T. Murrell:** MEASUREMENT OF $^{226}Ra/^{228}Ra$ ISOTOPIC RATIOS & RADIUM ABUNDANCES IN YOUNG VOLCANIC ROCKS BY MASS SPECTROSCOPY

1:50 **T. N. Tingle, C. H. Becker, M. F. Hochella:** SALI - A NEW SURFACE ANALYTICAL MASS SPECTROMETRIC TECHNIQUE WITH APPLICATIONS IN EARTH SCIENCES

2:10 **H.-J. Laue, K. Habfast:** ABUNDANCE SENSITIVITY IMPROVEMENT FOR A SECTOR TYPE ISOTOPE RATIO MASS SPECTROMETER

2:30 **S. E. DeLong, D. W. Mitchell, T. L. Spell, B. A. Hearn, T. M. Harrison:** ISOTOPE RATIO MEASUREMENT BY FOURIER TRANSFORM/ION CYCLOTRON RESONANCE MASS SPECTROMETRY

2:50 DISCUSSION
3:10 COFFEE

GEOCHRONOMETRY AND GEOSPEEDOMETRY

3:30 **A. N. Halliday:** RATES OF DIFFERENTIATION OF RHYOLITES

3:50 **P. Copeland, T. M. Harrison, W. S. F. Kidd, Y. Pan:** $^{40}Ar/^{39}Ar$ DETERMINATIONS OF COOLING, DENUDATION, AND UPLIFT RATES IN THE GANGDESE BATHOLITH, SOUTHERN TIBET

4:10 **P. K. Zeitler:** APATITE U-Th-He THERMOCHRONOMETRY—A TRIAL APPLICATION IN THE NW HIMALAYA

4:30 **T. M. Harrison, J. Kingsbury, C. F. Miller:** PROGRADE THERMO-CHRONOLOGY: U-Pb DATING OF MONAZITE GROWTH

4:50 **C. P. Chamberlain, L. Sonder, H. W. Day:** QUANTITATIVE MODELS FOR METAMORPHIC FIELD GRADIENTS: APPLICATIONS TO THE NEW ENGLAND APPALACHIANS

WEDNESDAY EVENING

POSTER SESSION

Posters set up before 10:00 AM and on display all day. Authors present 6:30-8:30 PM

1. **U. Aswathanarayana, M.M. Makweba:** ENVIRONMENTAL IMPLICATIONS OF MINING AND APPLICATION OF RADIOACTIVE PHOSPHORITE OF MINJINGA, NORTHERN TANZANIA

2. **C. H. Van Der Weijden:** HYDROGEOCHEMISTRY OF THE RIO VOUGA (PORTUGAL)

3. **H. Niskavaara, P. Lehmuspelto, L.-M. Westerberg:** SULPHUR AND HEAVY METALS IN FEATHER MOSS (HYLOCOMIUM SPLENDENS) IN EASTERN FINNISH LAPLAND; PRELIMINARY RESULTS ON SULPHUR

4. **S. A. Welch, W. J. Ullman:** EFFECT OF ORGANIC ACIDS ON FELDSPAR DISSOLUTION

5. **B. Wehrli:** A LINEAR FREE ENERGY RELATION FOR THE OXGENATION KINETICS OF METAL IONS IN SOLUTION AND ON MINERAL SURFACES

6. **G. E. M. Hall, J. E. Vaive:** CAPABILITIES OF ANODIC STRIPPING VOLTAMMETRY (ASV) IN ENVIRONMENTAL ANALYSIS

7. **G. E. M. Hall, P. W. B. Friske, G. F. Bonham-Carter, W. Spirito:** REGIONAL GEOCHEMICAL RECONNAISSANCE DATABASES FOR ENVIRONMENTAL STUDIES

8. **J. C. Groen, J. R. Craig, M. S. Najjar:** SCANNING ELECTRON MICROSCOPIC CHARACTERIZATION OF PETROLEUM-COKE GASIFICATION SLAGS

9. **A. Matsumoto, K. Shibata:** ARGON ISOTOPIC ANALYSES OF HISTORICAL LAVA FLOWS—INITIAL $^{40}Ar/^{36}Ar$ RATIO PROBLEMS ON K-Ar DATING OF YOUNG VOLCANIC ROCKS

10. **S. Nakai, A. N. Halliday, S. E. Kesler, H. D. Jones:** Rb-Sr DATING OF SPHALERITES FROM APPALACHIAN MVT DEPOSITS

11. **R. S. Kaufmann:** AMMONIA GEOCHEMISTRY AND NITROGEN ISOTOPE DISTRIBUTION IN WATER AND SEDIMENT OF THE ILLINOIS RIVER

12. **M. A. Williamson, J. D. Rimstidt:** THERMODYNAMIC AND KINETIC CONTROLS ON THE AQUEOUS OXIDATION OF SULFIDE MINERALS

13. **G. Zhang, Z. Fang, X. Wang, Y. Zhou:** THE CELL DIMENSIONS OF CASSITERITES AND TIN-METALLOGENY IN SOUTH CHINA

14. **H. Xu, H. Xu:** DISCUSSION ON NONSTOICHIOMETRY IN SOME ORE MINERALS

15. **Y. Zeng, R. Ai, F. Wang:** SOLUBILITY OF THE MAGNETITE + HEMATITE BUFFER ASSEMBLAGE IN HCl SOLUTIONS AT 300°C AND 500 BARS

16. **S. A. Skrabal, G. W. Luther III, W. J. Ullman:** ESTUARINE DISTRIBUTION OF DISSOLVED TITANIUM

17. **P. Shen, J. Chen, Y. Peng:** STUDY ON FEATURES OF AROMATIC COMPOUNDS IN CONDENSATE AND LIGHT OIL

18. **G. M. Yogodzinski, J. D. Romick, O. N. Volneyets, A. V. Koloskov, N. I. Silverstov:** WESTERN ALEUTIAN HIGH MAGNESIUM ANDESITES: EVIDENCE FOR STORAGE OF CRUSTAL COMPONENTS IN THE BACK-ARC MANTLE

19. **M. I. Odigi and M. C. Ezepue:** GEOCHEMICAL EVOLUTION OF PAN-AFRICAN CHARNOCKITIC AND ASSOCIATED GRANITIC ROCKS IN KABBA-LOKOJA AREA, SOUTHWESTERN NIGERIA

20. **M. D. Krohn, T. L. Purdy:** DISCOVERY OF A 10-KM ZONE OF MINERAL-BOUND AMMONIUM IN THE CEDAR MOUNTAINS, ESMERALDA COUNTY, NEVADA

21. **S. Mitra, S. Ahmed:** EXSOLUTION FEATURES OF COX'S BAZAR ILMENITE AND THEIR POSSIBLE RELEVANCE TO THE GENETIC ENVIRONMENT

THURSDAY, MAY 3, 1990

THURSDAY AM

FLUIDS IN MELTS

8:15 **M. Javoy, F. Pineau:** MORB VOLATILES AT 14°N ON THE MID ATLANTIC RIDGE

8:35 **A. Jambon, J. L. Zimmermann:** WATER IN OCEANIC BASALT GLASSES: EVIDENCE FOR DEHYDRATION OF RECYCLED CRUST?

8:55 **J. B. Lowenstern, G. A. Mahood:** LOW WATER AND CARBON DIOXIDE CONTENTS IN PANTELLERITES: IMPLICATIONS FOR ERUPTIVE STYLE AND PETROGENESIS OF STRONGLY PERALKALINE MAGMAS

9:15 **V. I. Kovalenko, R. L. Hervig, V. B. Naumov, I. P. Solovova, S. Schauer:** FLUIDS IN MELTS FROM PANTELLERIA ISLAND

9:35 DISCUSSION
9:55 COFFEE

10:15 **C. R. Bacon, S. Newman, E. M. Stolper:** WATER, CO_2, Cl, AND F CONTENTS OF GLASS INCLUSIONS IN PHENOCRYSTS FROM THREE HOLOCENE EXPLOSIVE ERUPTIONS, CRATER LAKE, OREGON

10:35 **N. W. Dunbar, R. L. Hervig:** WATER, FLUORINE, AND CHLORINE IN THE UPPER LEVELS OF SILICIC MAGMA CHAMBERS: IMPLICATIONS FOR THE PRESENCE OF FLUIDS IN MAGMAS

10:55 **M. Pichavant, F. Holtz, B. Scaillet:** FLUIDS IN LEUCOGRANITIC MELTS

11:15 DISCUSSION
11:35 DISCUSSION
11:55 LUNCH

ENVIRONMENTAL GEOCHEMISTRY

8:15 **M. A. Mazurek, G. R. Cass, M. Jones, L. Salmon, D. Winner, M. Leach:** GEOCHEMISTRY AND SOURCE EVALUATION OF AEROSOL PARTICLES AT GRAND CANYON NATIONAL PARK

8:35 **A. R. Hutter, A. C. George, M. L. Maiello:** ^{222}Rn, ^{222}Rn PROGENY AND ^{220}Rn PROGENY AS ATMOSPHERIC TRACERS OF AIR MASSES AT THE MAUNA LOA OBSERVATORY

8:55 **M. A. Powell, B. Hart, W. S. Fyfe, K. C. Sahu, S. Tripathy:** ENVIRONMENTAL ASPECTS OF COAL UTILIZATION AT KORBA, M.P, INDIA

9:15 **S. Mitra, P. Maity:** BIOGEOCHEMICAL DISPERSION OF MERCURY IN THE AREA AROUND GHATSILA COPPER DEPOSITS, E. INDIA

9:35 DISCUSSION
9:55 COFFEE

CHEMICAL REACTIONS IN THE CRUST

10:15 **M. J. Pavich:** ZONATION OF CHEMICAL REACTIONS IN SAPROLITE

10:35 **G. H. Brimhall, C. Lewis:** POTENTIAL EFFECTS OF ROOT GROWTH-LIMITING METAL TOXICITY AND MOLYBDOENZYMES IN THE BIOGEOCHEMICAL MECHANICS OF WEATHERING

10:55 **O. A. Chadwick:** SOIL DEVELOPMENT IN NORTHERN CALIFORNIA BEACH SANDS WITH EMPHASIS ON LONG-TERM MASS BALANCE AND MINERAL TRANSFORMATIONS

11:15 **J. D. Rimstidt:** THE RATE OF REACTION OF FERRIC IRON WITH SULFIDE MINERALS

11:35 DISCUSSION
11:55 LUNCH

FLUIDS IN SUBDUCTION: THERMAL, GEOCHEMICAL, AND PETROLOGICAL CONSTRAINTS

8:15 **F. McDermott, C. Hawkesworth:** Th-U FLUXES AT SUBDUCTION ZONES - CONSTRAINTS FROM Th, Pb ISOTOPE AND TRACE ELEMENT DATA

8:35 **R. S. Harmon, J. D. Morris, O. Sigmarsson, W. P. Leeman:** SUBDUCTION ZONE CONTRIBUTIONS TO ANDEAN MAGMAS

8:55 **G. M. Yogodzinski, S. M. Kay, R. W. Kay:** THE CHANGING SLAB COMPONENT IN CENTRAL ALEUTIAN MAGMAS

9:15 **W. P. Leeman:** THE UTILITY OF BORON AS A TRACER OF SUBDUCTION PROCESSES: SLAB CONTRIBUTIONS TO ARC MAGMATISM AND IMPLICATIONS FOR RECYCLING OF LITHOSPHERIC MATERIAL INTO THE DEEP MANTLE

9:35 DISCUSSION

9:55 COFFEE

10:15 **J. G. Ryan, W. P. Leeman, J. D. Morris:** LITHIUM, BERYLLIUM AND BORON CYCLES THROUGH SUBDUCTION ZONES: IMPLICATIONS FOR LIL ENRICHMENT PROCESSES AT ARCS

10:35 **J. D. Morris, F. Tera, W. P. Leeman:** ^{10}Be AND B CONSTRAINTS ON THE SOURCE OF FLUIDS IN SUBDUCTION ZONES

10:55 **C. Hawkesworth, R. Ellam, F. McDermott:** CHEMICAL BUDGETS AT SUBDUCTION ZONES

11:15 **S. R. Hart:** RECYCLING AND CHEMICAL FRACTIONATIONS IN SUBDUCTION ZONES

11:35 DISCUSSION
11:55 LUNCH

FRONTIERS IN AQUEOUS GEOCHEMISTRY

8:15 **J. S. Herman, W. Back:** THE HYDROGEOLOGICAL CONTEXT FOR GEOCHEMICAL STUDIES OF WATER-ROCK INTERACTIONS IN THE FRESHWATER-SALTWATER MIXING ZONE IN COASTAL LIMESTONE AQUIFERS

8:35 **H. K. Haskin, C. H. Moore:** COUPLED REACTION/TRANSPORT MODELING OF LOW TEMPERATURE DIAGENESIS: CRETACEOUS SANDSTONES, ALASKAN NORTH SLOPE

8:55 **C. H. Moore, H. K. Haskin:** INPUT PARAMETER CONSIDERATIONS FOR COUPLED FLOW/REACTION MODELLING: AN EXAMPLE

9:15 **M. A. A. Schoonen:** PYRITE FORMATION VIA A FeS PRECURSOR: GEOLOGICAL IMPLICATIONS

9:35 DISCUSSION
9:55 COFFEE

10:15 **W. L. Bourcier, K. G. Knauss:** THE MECHANISMS OF BOROSILICATE GLASS DISSOLUTION WITH APPLICATIONS TO NUCLEAR WASTE DISPOSAL

10:35 **J. C. Seitz, R. J. Bodnar:** STRUCTURES I AND II CLATHRATES IN SEDIMENTS ON THE SEAFLOOR: IMPLICATIONS FOR WATER DEPTH AND FLUID SOURCE

10:55 **T. S. Bowers:** THE GEOCHEMICAL CONSEQUENCES OF FLUID IMMISCIBILITY ON ORE DEPOSITION AND ASSOCIATED STABLE ISOTOPE SIGNATURES

11:15 **D. J. Wesolowski, D. A. Palmer:** PRECISE POTENTIOMETRIC DETERMINATION OF THE DISSOCIATION CONSTANTS OF HSO_4^- IN 0.1 TO 5.0 MOLAL AQUEOUS SODIUM CHLORIDE SOLUTIONS FROM 50 TO 250°C USING A HYDROGEN ELECTRODE CONCENTRATION CELL

11:35 DISCUSSION
11:55 LUNCH

METAMORPHIC PETROLOGY

10:15 **D. E. Barnett, C. P. Chamberlain:** MASS TRANSFER BETWEEN ADJACENT METASEDIMENTARY UNITS DURING REGIONAL METAMORPHISM, EAST CENTRAL VERMONT

10:35 **C. D. Laughrey:** ANOMALOUS STERANE MATURITY INDICES IN BITUMEN OF THE UPPER DEVONIAN HURON SHALE IN NORTHWESTERN PENNYSLVANIA

10:55 **P. B. Leavens:** XCO_2 IN THE FRANKLIN AND STERLING HILL, NEW JERSEY METAMORPHOSED Zn-Fe-Mn DEPOSITS AND PROTOLITH MINERALOGY

11:15 **J. M. Palin, D. E. Seidemann:** INTERGRANULAR CONTROL OF ARGON AND OXYGEN ISOTOPE TRANSPORT IN METAMORPHIC ROCKS: IMPLICATIONS FOR COOLING-RATE STUDIES

11:35 **F. S. Spear, F. Florence:** ON THE INTERPRETATION OF PEAK METAMORPHIC TEMPERATURES IN LIGHT OF GARNET DIFFUSION DURING COOLING

11:55 LUNCH

ADVANCES IN SPECTROSCOPY OF MINERALS, MELTS, AND GLASSES.

8:15 **A. U. Gehring, R. Karthein:** AN ESR STUDY OF STRUCTURAL CHANGES IN THE FeOOH - Fe_2O_3 SYSTEM

8:35 **P. Ildefonse, S. Lamacq, G. Calas, A. M. Flanck, P. Lagarde:** ALUMINUM K-EDGE X-RAY ABSORPTION SPECTROSCOPY IN WEATHERING MINERALS

8:55 **A. Manceau, D. Bonnin, W. E. Stone, J. Sanz:** DISTRIBUTION OF Fe IN THE OCTAHEDRAL SHEET OF TRIOCTAHEDRAL MICAS BY POLARIZED EXAFS. COMPARISON WITH NMR RESULTS

9:15 **D. Greenidge, A. J. Cohen:** ANALOGUES OF ALUMINUM TRAPPED-HOLE CENTERS IN HYDROTHERMAL TOPAZ FROM OURO PRETO, BRAZIL

9:35 DISCUSSION
9:55 COFFEE

10:15 **J. A. Tossell:** AB INITIO CALCULATION OF ZINC NMR SHIELDINGS FOR ZINC CHLORIDES, HYDROXIDES AND BISULFIDES IN AQUEOUS SOLUTION

10:35 **R. Dupree, M. G. Mortuza, S. C. Kohn, C. M. B. Henderson:** STRUCTURAL INFORMATION FROM NMR. APPLICATION TO A SYNTHETIC LEUCITE ANALOGUE

10:55 **B. L. Phillips, R. J. Kirkpatrick:** INVESTIGATION OF STRUCTURAL PHASE TRANSITIONS IN MINERALS USING MAS NMR SPECTROSCOPY

11:15 **I. Farnan, J. F. Stebbins:** THE RELATIONSHIP BETWEEN ATOMIC SCALE DYNAMICS AND THE BULK MACROSCOPIC PROPERTIES OF SILICATE LIQUIDS: RESULTS FROM HIGH TEMPERATURE NMR.

11:35 **J. F. Stebbins, X. Xue, M. Kanzaki, P. McMillan:** PRESSURE-INDUCED SILICON SPECIATION AND COORDINATION CHANGES IN ALKALI SILICATE LIQUIDS: NMR AND RAMAN SPECTROSCOPIC RESULTS

11:55 LUNCH

GEOCHRONOMETRY AND GEOSPEEDOMETRY

8:15 **K. Mezger, S. R. Bohlen, E. J. Essene, A. N. Halliday:** GEOCHRONOLOGY IN GRANULITES

8:35 **R. R. Parrish:** COOLING RATES FROM 700° - 400°C IN HIGH GRADE ROCKS: APPLICATIONS OF U/Pb GEOCHRONOMETRY

8:55 **J. Jiang, A. C. Lasaga:** INVERSE GEOSPEEDOMETRY: THEORY AND APPLICATION

9:15 **O. M. Lovera, F. M. Richter, T. M. Harrison:** $^{40}Ar/^{39}Ar$ THERMO-CHRONOLOGY FOR K-FELDSPARS HAVING A DISTRIBUTION OF DIFFUSION DOMAIN SIZES

9:35 **F. S. Spear, T. M. Harrison:** POST ACADIAN UPLIFT HISTORY OF CENTRAL NEW ENGLAND FROM DETAILED PETROLOGIC AND $^{40}Ar/^{39}Ar$ STUDIES

9:55 COFFEE

ISOTOPIC MODELING

10:15 **S. L. Goldstein, C. Chauvel:** EVOLUTION OF THE MORB RESERVOIR

10:35 **T. Elliott, C. Hawkesworth:** DYNAMIC MELTING MODELS: IMPLICATIONS FOR U-TH ISOTOPE SYSTEMATICS OF ICELAND'S LOW K THOLEIITES

10:55 **J. Rosenbaum, D. Walker, T. K. Kyser:** OXYGEN ISOTOPE EXCHANGE IN THE MANTLE

11:15 **D. S. Ormerod, N. W. Rogers, C. J. Hawkesworth:** COHERENT MELTING RELATIONSHIPS IN THE LITHOSPHERIC MANTLE BY INVERSE MODELLING OF ALKALI BASALTS

11:35 DISCUSSION
11:55 LUNCH

THURSDAY PM

FLUIDS IN MELTS

1:30 **C. Jaupart, S. Vergniolle:** DEGASSING DYNAMICS IN BASALTIC VOLCANIC ERUPTIONS

1:50 **M. J. Rutherford:** EXPERIMENTAL STUDY OF DEHYDRATION AND CRYSTALLIZATION PRODUCED BY DECOMPRESSION OF DACITES; IMPLICATIONS FOR MAGMA ASCENT RATES

2:10 **S. Tait, C. Jaupart:** SELECTIVE PRESERVATION OF MELT INCLUSIONS IN CRYSTALS

2:30 **Y. Bottinga, M. Javoy:** CARBON DIOXIDE AND WATER IN HAWAIIAN THOLEIITE

2:50 DISCUSSION
3:10 COFFEE

CHEMICAL REACTIONS IN THE CRUST

1:30 **K. J. Ague, G. H. Brimhall:** GEOCHEMICAL MODELLING OF THE SUPERGENE ENRICHMENT OF PORPHYRY COPPER DEPOSITS

1:50 **D. A. Sverjensky:** WEATHERING OF UNCONFORMITY-TYPE URANIUM DEPOSITS AND THE FORMATION OF SECONDARY URANYL PHOSPHATE MINERALIZATION

2:10 **C. I. Steefel, A. C. Lasaga:** MODELING FLOW-REACTION PATHS IN HYDROTHERMAL SYSTEMS

2:30 **E. H. Oelkers:** CALCULATION OF THE GROWTH RATES OF HYDROTHERMAL ALTERATION BANDS USING THE QUASI-STATIONARY STATE APPROXIMATION

2:50 DISCUSSION
3:10 COFFEE

CRUSTAL FLOW

3:30 **J. R. Cann, M. R. Strens:** GENERATION OF MEGAPLUMES AND OTHER INSTABILITIES OF HYDROTHERMAL FLOW

3:50 **C. M. Schiffries:** HYDROTHERMNAL SYSTEMS ASSOCIATED WITH LAYERED INTRUSIONS

4:10 **L. M. Cathles:** A CAPLESS MODEL TO EXPLAIN SALINITY VARIATIONS, MEGAPLUMES, AND HIGH TEMPERATURE VEINS IN RIDGE AXIX HYDROTHERMAL SYSTEMS

4:30 **M. A. McKibben, A. E. Williams:** INTRUSION-DRIVEN BRINE DIAPIRISM AND ORE GENESIS IN THE SALTON TROUGH

4:50 **J. D. Harper:** HYDROCARBONS, MIGRATION, DIFFERENTIATION, AND DEEP STRUCTURE

GEOCHEMICAL CYCLES 2ND EARTH HISTORY

1:30 **D. J. Des Marais:** THE CARBON ISOTOPE BIOGEOCHEMISTRY OF STROMATOLITES AND MICROBIAL MATS AND LONG-TERM CHANGE OF THE CARBON CYCLE

2:00 **M. Magaritz:** THE CARBON ISOTOPE RECORDS OF CARBONATE ROCKS AND THEIR REFLECTION OF FAUNAL EVENTS

2:30 **M. A. Arthur, K. Hinga, D. Allard, D. Whitaker, M. E. Q. Pilson:** CONTROLS ON CARBON ISOTOPIC COMPOSITION OF MARINE PLANKTON AND ESTIMATES OF PAST pCO_2

3:00 COFFEE

3:30 **B. N. Popp, K. H. Freeman, J. M. Hayes:** MECHANISMS UNDERLYING ISOTOPIC FRACTIONATION IN THE GLOBAL CARBON CYCLE

4:00 **D. J. Hollander, J. A. McKenzie:** EFFECTS OF CHANGING DISSOLVED CO_2 CONCENTRATIONS AND BIO-ASSEMBLAGE ON ISOTOPE FRACTIONATION BETWEEN ORGANIC AND INORGANIC CARBON IN AQUEOUS ENVIRONMENTS

4:30 **G. H. Rau, T. Takahashi, D. J. Des Marais:** THE RELATIONSHIP BETWEEN MARINE PLANKTON DELTA ^{13}C AND $[CO_2(AQ)]$: PALEOCEANOGRAPHIC IMPLICATIONS

FRONTIERS IN AQUEOUS GEOCHEMISTRY

1:30 **S. L. Brantley, V. Lee, S. J. Mackwell:** EQUILIBRIUM AND NON-EQUILIBRIUM POROSITY TEXTURES IN CRUSTAL ROCKS

1:50 **P. Rogers, J. Simonson, R. Mesmer:** STANDARD STATE AND EXCESS THERMODYNAMIC PROPERTIES OF NaOH (aq) TO 573 K AND 40 MPa

2:10 **I-Ming Chou:** RECENT ADVANCES IN THE MEASUREMENT OF H_2O ACTIVITY IN SUPERCRITICAL FLUIDS

2:30 **C. S. Kirby, J. D. Rimstidt:** A MODEL OF ELECTROLYTE SOLUTION PROPERTIES BASED ON CLASSICAL SOLUTION INTERACTION THEORIES

2:50 DISCUSSION
3:10 COFFEE

3:30 **E. L. Shock:** OXIDATION/REDUCTION REACTIONS INVOLVING HYDROCARBONS AND HYDROTHERMAL SOLUTIONS

3:50 **J. L. S. Bell, H. L. Barnes, S. E. Drummond, D. A. Palmer:** THE EFFECT OF SOLUTION pH ON ACETATE DECOMPOSITION KINETICS

4:10 **C. S. Oakes, J. M. Simonson, R. J. Bodnar:** THE SYSTEM $NaCl-CaCl_2-H_2O$: VOLUMETRIC PROPERTIES FROM 25°TO 250°C AT 70 AND 400 BARS

4:30 **S. M. Sterner, R. J. Bodnar:** EXPERIMENTAL DETERMINATION OF PVTX PROPERTIES OF CO_2-H_2O FROM 400°-600°C AND 2-6 KBAR

4:50 DISCUSSION

METAMORPHIC PETROLOGY

1:30 **N. M. Rose, D. K. Bird:** A MODEL FOR METASOMATISM IN BASIC DIKES

1:50 **F. R. M. Pires:** PHASE RELATIONS IN THE SYSTEM Na-Mg-Fe-Si-O-H IN THE ITABIRA IRON FORMATION, QUADRILATERO FERRIFERO, MINAS GERAIS, BRAZIL

2:10 **M. Brown, R. S. D'Lemos:** ON THE RELATIONSHIP BETWEEN MIGMATITE AND GRANITE: THE ST. MALO MIGMATITES AND THE MANCELLIAN GRANITES OF NORTH-WEST FRANCE

2:30 **E. W. Sawyer:** DISEQUILIBRIUM MELTING AND THE MELT-RESIDUUM SEPARATION TIME IN MIGMATITES

2:50 DISCUSSION

3:10 COFFEE

STABLE ISOTOPE GEOCHEMISTRY

3:30 **J. P. Dugan, Jr., C-L. Chan:** KRYPTON AND XENON ISOTOPIC COMPOSITIONS OF PERIDOTITE IN THE PRAIRIE CREEK COMPLEX, ARKANSAS

3:50 **R. S. Harmon, M. B. Fowler:** OXYGEN ISOTOPE COMPOSITON OF THE LOWER CRUST

4:10 **B. Gautason, K. Muehlenbachs, M. Sultan:** OXYGEN ISOTOPE RATIOS IN A LATE PRECAMBRIAN OPHIOLITE, WADI GHADIR AREA, EASTERN DESERT, EGYPT

4:30 **T. E. Burch, D. R. Cole, D. M. Rye, A. C. Lasaga:** ISOTOPIC GEOSPEEDOMETRY: MODEL CALCULATIONS OF COUPLED DIFFUSION AND SURFACE REACTION STABLE ISOTOPE EXCHANGE MECHANISMS

4:50 DISCUSSION

ADVANCES IN SPECTROSCOPY OF MINERALS, MELTS AND GLASSES

1:30 **R. K. Sato, P. F. McMillan, R. Dupree, P. Dennison:** MAS NMR INVESTIGATION OF Al AND Si COORDINATION IN ALUMINOSILICATE GLASSES

1:50 **G. Calas, L. Galoisy, J. Petiau:** TRANSITION ELEMENT COORDINATION IN SILICATE GLASSES: A COMPARATIVE SPECTROSCOPIC STUDY

2:10 **L. Galoisy, G. Calas:** SPECIATION OF NICKEL IN QUENCHED SILICATE MELTS: GEOCHEMICAL IMPLICATIONS

2:30 **B. T. Poe, P. F. McMillan, X. Xue, M. Kanzaki:** VIBRATIONAL PROPERTIES OF ALKALI SILICATE LIQUIDS QUENCHED AT HIGH PRESSURES: RAMAN, IR AND COMPUTER-GENERATED RESULTS

2:50 DISCUSSION
3:10 COFFEE

3:30 **M. F. Hochella Jr., C. M. Eggleston:** TUNNELING SPECTROSCOPY: A NEW TOOL FOR THE STUDY OF CONDUCTING AND SEMICONDUCTING MINERAL SURFACES

3:50 **D. B. Dingwell, S. L. Webb:** RELAXATION SPECTROSCOPY OF SILICATE MELTS

4:10 **A. J. Cohen:** V.M. GOLDSCHMIDT AND THE YELLOW SLAG FROM Ge-RICH COAL

4:30 **G. S. Henderson, M. E. Fleet, R. G. Trønnes:** PRESSURE EFFECTS ON R_2O-GeO_2(R = Na, K) GLASSES

4:50 DISCUSSION

ISOTOPIC MODELING

1:30 **S. B. Jacobsen:** ISOTOPIC MODELING OF CRUST AND MANTLE EVOLUTION

1:50 **F. Albarede, W. Abouchamy, M. Boher, A. Michard:** THE CONTINENTAL CRUST PROTOLITH: OROGENIC OR INTRA-PLATE MAGMAS?

2:10 **R. T. Gregory, R. E. Criss:** CHARACTERISTIC TIME AND LENGTH SCALES FOR OXYGEN ISOTOPIC EXCHANGE IN THE CRUST BETWEEN FLUIDS AND ROCKS

2:30 **L. A. Derry, S. B. Jacobsen:** ISOTOPIC MODELING OF CONTROLS ON THE CHEMICAL EVOLUTION OF PROTEROZOIC SEAWATER

2:50 DISCUSSION
3:10 COFFEE

GEOCHRONOLOGY AND RADIOISOTOPES

3:30 **B. R. Doe, Z. E. Peterman, E. R. Force:** LEAD AND STRONTIUM ISOTOPES IN THE UPPER CRETACEOUS IMINI MANGANESE DEPOSIT OF MOROCCO

3:50 **M. J. Duane:** RADIOGENIC ISOTOPIC EVIDENCE FOR THE MIGRATION OF OROGENICALLY-AND THERMALLY-DRIVEN ORE FLUIDS THROUGH THE LOWER PROTEROZOIC TRANSVAAL SEQUENCE, SOUTH AFRICA

4:10 **J. M. Richardson, A. P. Dickin, J. H. Crocket, R. H. McNutt, W. V. Peredery:** Re-Os ISOTOPE GEOCHEMISTRY OF THE Ni-Cu-PGE ORE FROM THE CREIGHTON MINE, SUDBURY INTRUSIVE COMPLEX, CANADA

4:30 **D. D. Lambert, S. B. Shirey, R. W. Carlson, R. J. Walker, J. W. Morgan:** Os AND Nd ISOTOPE GEOCHEMISTRY OF THE STILLWATER COMPLEX, MONTANA: EVIDENCE FOR ARCHEAN CRUSTAL RECYCLING

4:50 **W. J. Davis, E. Hegner:** Nd EVIDENCE FOR CRUSTAL GROWTH AND RECYCLING DURING LATE-ARCHEAN ACCRETION AND STABILIZATION OF THE SLAVE PROVINCE, CANADA

FRIDAY, MAY 4, 1990

FRIDAY AM

CRUSTAL FLOW

8:15 **N. D. Rosenberg, F. J. Spera:** DOUBLE DIFFUSIVE CONVECTION IN HYDROTHERMAL SYSTEMS WITH COMPLEX PERMEABILITY FIELDS

8:35 **D. E. Powley:** PRESSURE COMPARTMENTS AND FLUID FLOW IN BASINS

8:55 **J. Bredehoeft, J. B. Wesley, T. Fouch:** HYDRODYNAMICS OF THE UINTA BASIN: ROLE OF OIL GENERATION

9:15 **J. R. Wood, J. R. Boles:** EVIDENCE FOR EPISODIC CEMENTATION AND ISOTOPIC RECORDING OF DIAGENETIC EVENTS AT N. COLES LEVEE, CA

9:35 DISCUSSION
9:55 COFFEE

10:15 **E. C. Jowett, L. M. Cathles:** PALEO-FLUID PENETRATION OF SHALE SEALS AS EXEMPLIFIED BY STRATIFORM Cu-Ag DEPOSITS

10:35 **C. McCabe, L. Gang, J. S. Hanor:** LARGE-SCALE FLUID FLOW AND LATE PALEOZOIC REMAGNETIZATION OF SEDIMENTARY ROCKS IN NORTH AMERICA

10:55 **L. S. Land:** THE ORIGIN OF SALINE FORMATION WATERS, CENOZOIC SECTION, GULF OF MEXICO SEDIMENTARY BASIN

11:15 **W. J. Harrison:** PALEOHYDROLOGIC EVOLUTION OF THE GULF OF MEXICO BASIN

11:35 DISCUSSION
11:55 LUNCH

CHEMICAL CYCLES AND EARTH HISTORY

8:15 **R. J. Oglesby:** A STUDY OF GCM SENSITIVITY TO ATMOSPHERIC CARBON DIOXIDE CONCENTRATION

8:45 **L. R. Kump:** A TWO-BOX-OCEAN CARBON ISOTOPE MODEL: IMPLICATIONS FOR 'STRANGELOVE' OCEANS

9:15 **R. A. Berner, M. A. Arthur:** AN EVALUATION OF FACTORS AFFECTING ATMOSPHERIC CO_2 OVER THE PAST 140 MILLION YEARS

9:45 COFFEE

10:15 **L. M. Walter, K. Muehlenbachs, W. P. Patterson, L. Bonnell:** CARBON ISOTOPIC EQUILIBRATION OF RECENT PLATFORM CARBONATE SEDIMENTS WITH PORE FLUIDS: IMPLICATIONS FOR SECULAR VARIATIONS IN OCEAN CHEMISTRY

10:45 **F. T. Mackenzie:** DISTRIBUTION, CHEMISTRY, MINERALOGY AND CYCLING OF THE PHANEROZOIC CARBONATE MASS

11:15 **D. Schwartzman, T. Volk:** FROM ABIOTIC TO BIOTIC EARTH, THE CARBON CYCLE'S CLIMATIC CONSEQUENCES

11:45 LUNCH

FRONTIERS IN AQUEOUS GEOCHEMISTRY

8:15 **M. A. McKibben:** CONSTRAINTS ON HYDROTHERMAL METAL TRANSPORT FROM STUDIES OF ACTIVE GEOTHERMAL SYSTEMS

8:35 **S. A. Wood:** DO TUNGSTEN CHLORIDE COMPLEXES CONTRIBUTE TO THE GENESIS OF HYDROTHERMAL TUNGSTEN DEPOSITS?

8:55 **P. A. Candela:** TOWARD AN INTEGRATED PHYSICAL AND CHEMICAL MODEL OF MAGMATIC AQUEOUS PHASE EXSOLUTION

9:15 **D. A. Sverjensky, P. A. Molling, C. Zhu:** CHEMICAL MASS TRANSFER CALCULATION FOR MAGMATIC HYDROTHERMAL SYSTEMS

9:35 DISCUSSION
9:55 COFFEE

AB-INITIO METHODS AND MOLECULAR DYNAMICS

10:15 **P. McMillan:** AB INITIO DERIVED VALENCE FORCE FIELD CALCULATIONS FOR SOLIDS

10:35 **M. Newton:** TRANSITION METAL COMPLEXES: THEORETICAL STUDIES OF GEOMETRICAL AND ELECTRONIC STRUCTURE IN RELATION TO MECHANISMS FOR ELECTRON TRANSFER

10:55 **J. A. Tossell:** THEORETICAL AND EXPERIMENTAL STUDIES OF SILOXANE RING COMPOUNDS

11:15 **P. D'Arco:** AB INITIO CALCULATIONS ON Mg_2SiO_4, Mg_2GeO_4 AND AL_2MgO_4: SPINEL STRUCTURE

11:35 DISCUSSION
11:55 LUNCH

STABLE ISOTOPE GEOCHEMISTRY

8:15 **W. Albrecht, S. R. Poulson, H. Ohmoto:** A TWO STAGE MODEL FOR THE FORMATION OF A SEAL ZONE IN THE APPALACHIAN BASIN

8:35 **R. D. Vocke, Jr., E. S. Beary, R. J. Walker:** HIGH PRECISION LITHIUM ISOTOPE RATIO MEASUREMENTS OF SAMPLES FROM A VARIETY OF NATURAL SOURCES

8:55 **Y-F. Zheng:** SULFUR ISOTOPE FRACTIONATION BETWEEN SULATE AND SULFIDE DURING PARAMETAMORPHISM: A QUASI-EQUILIBRIUM PROCESS

9:15 **M. A. McKibben, C. S. Eldridge:** RADICAL $\delta^{34}S$-ZONATION OF PYRITE, BOILING, AND EPITHERMAL GOLD DEPOSITION

9:35 **P. R. Dixon, D. J. Janecky, D. M. Rye:** ORIGIN OF ISOTOPICALLY HEAVY SULFIDES FROM THE KILDARE INLIER DEPOSITS, CO. KILDARE, IRELAND

9:55 COFFEE

STABLE ISOTOPE GEOCHEMISTRY

10:15 **H. C. Van der Weijden:** BEHAVIOUR OF HEAVY METALS UPON TRANSITION FROM RIVERINE TO MARINE ENVIRONMENT

10:35 **A. M. Bailey, H. H. Roberts, E. M. Zanghi:** MINERALOGICAL AND ELEMENTAL DISTRIBUTIONS IN DELTAIC SEDIMENTS

10:55 **F. Siegel, B. Shergill, N. Gupta, C. Gerber:** FACTOR ANALYSIS OF THE GEOCHEMISTRY OF HOLOCENE SEDIMENTS FROM THE NILE DELTA, EGYPT (DAMIETTA TO THE PLAIN OF TINEH)

11:15 **J. M. Hill, L. Hennessee, J. Park, D. Wells:** INTERPRETIVE TECHNIQUES FOR ASSESSING TEMPORAL VARIABILITY OF TRACE METAL LEVELS IN ESTUARINE SEDIMENTS

11:35 DISCUSSION
11:55 LUNCH

LOW TEMPERATURE GEOCHEMISTRY

8:15 **D. J. Vaughan, G. R. Helz, J. M. Charnock, C. D. Garner:** AN EXAFS STUDY OF COPPER SULFIDE COMPLEXES IN AQUEOUS SOLUTION

8:35 **R. Thompson, G. R. Helz:** SOLUBILITY OF COPPER SULFIDES IN SULFIDE SOLUTIONS

8:55 **W. Kornicker, A. Presta, C. Paige, D. Johnson, O. E. Hileman Jr.:** THE AQUEOUS DISSOLUTION KINETICS OF THE BARIUM/LEAD SULFATE SOLID SOLUTION SERIES AT 25°C AND 60°C

9:15 **J. F. Acker, W. P. Bricker:** A COMPARATIVE STUDY OF BIOTITE DISSOLUTION AT pH 4 IN SATURATED AND UNSATURATED FLOW-THROUGH COLUMNS VS. FLUIDIZED-BED REACTORS

9:35 **P. Van Cappellen:** NUCLEATION AND CRYSTAL GROWTH OF FLUORAPATITE IN ARTIFICIAL SEAWATER

9:55 COFFEE

10:15 **S. S. Singh, H. Kodama:** THE FORMATION OF CRYSTALLINE FERRI-OXYHYDROXIDES (FeOOH) ON AUTOHYDROLYSIS OF IRON SOLUTIONS IN THE PRESENCE OF ALUMINUM UNDER ACIDIC CONDITIONS AT ROOM TEMPERATURE

10:35 **C. C. Fuller, J. A. Davis:** ADSORPTION KINETICS OF ARSENATE ON AMORPHOUS IRON OXYHYDROXIDES

10:55 **J. G. Catts:** GEOCHEMICAL CONTROLS ON THE AQUEOUS CONCENTRATIONS OF CU, PB, AND ZN IN THE PRESENCE OF AN ACTIVELY PRECIPITATING HYDROUS MANGANESE OXIDE

11:15 **G. Waychunas, C. Fuller, B. Rea, J. Davis:** CHARACTERIZATION OF ARSENATE COMPLEXES ON FERRIHYDRITE AND FeOOH SURFACES VIA EXAFS SPECTROSCOPY

11:35 DISCUSSION
11:55 LUNCH

GEOCHRONOLOGY AND RADIOISOTOPES

8:15 **M. Ohr, A. N. Halliday, D. R. Peacor:** Rb-Sr DATING OF AUTHIGENIC ILLITE, TEXAS GULF COAST

8:35 **C. P. DeWolf, A. N. Halliday:** U-Pb DATING OF APPALACHIAN PALEOZOIC LIMESTONES

8:55 **Z. Fang, B. Xia:** THE EVOLUTION OF METAMORPHIC ROCKS IN LATER PALEOZOIC RIFT IN HAINAN ISLAND, CHINA

9:15 **E. Jagoutz, V. S. Shatsky, N. V. Sobelev:** Sr-Nd-Pb ISOTOPIC STUDY OF ULTRA HIGH PT ROCKS FROM KOKCHETAV MASSIF

9:35 **G. Caprarelli, M. Voltaggio:** GAMMA AND ALPHA SPECTROMETRY ANALYSES OF DEEP ROCK SAMPLES FROM THE PHLAEGREAN FIELDS (CAMPANIA, SOUTH ITALY)

9:55 COFFEE

IGNEOUS PETROLOGY

10:15 **M. E. Lipschutz, S. M. Samuels:** ANTARCTIC/NON-ANTARCTIC METEORITE COMPOSITIONAL DIFFERENCES: STATISTICAL ANALYSIS OF TRACE ELEMENT DATA

10:35 **J. W. Delano, G. A. Gaetani, S. E. Delong:** PARTITIONING OF Cr AND Fe BETWEEN SPINEL AND BASALTIC MELT AS A FUNCTION OF TEMPERATURE AND OXYGEN FUGACITY

10:55 **N. J. Hess:** DETERMINATION OF CALCIUM CARBONATE PHASE EQUILIBRIA TO 40 KBAR AND 350°C USING RAMAN SPECTROSCOPY

11:15 **J. P. Brodholt, B. J. Wood:** MOLECULAR DYNAMICS SIMULATIONS OF WATER USING THE TIP4P INTERMOLECULAR POTENTIAL AT HIGH TEMPERATURES AND PRESSURES

11:35 DISCUSSION
11:55 LUNCH

FRIDAY PM

CRUSTAL FLOW

1:30 **D. Cassidy:** VARIATIONS IN FLUID PROPERTIES DERIVED FROM BOREHOLE LOGS NEAR THE BAY ST. ELAINE SALT DOME IN SOUTHEAST LOUISIANA

1:50 **V. Ranganathan:** HYDRODYNAMICS OF BRINE FORMATION AROUND SALT DOMES IN THE SOUTH LOUISIANA GULF COAST

2:10 **J. A. Nunn, D. G. Evans, J. S. Hanor, K. M. McManus:** VERTICAL FLUID MIGRATION NEAR SALT DOMES IN THE LOUISIANA GULF COAST

2:30 **W. Hallager, M. Ulrich:** SALT DOME SULFIDE MINERALIZATION AND EPISODIC FLUID FLOW IN TEXAS AND LOUISIANA

2:50 DISCUSSION
3:10 COFFEE

3:30 **T. Torgersen:** RARE GAS CONSTRAINTS ON LARGE-SCALE FLUID TRANSPORT IN THE EARTH'S CRUST

3:50 **S. M. Wickham:** ISOTOPIC CONSTRAINTS ON METAMORPHIC FLUID DYNAMICS AT DEEP CRUSTAL LEVELS

4:10 **J. M. Ferry:** PERVASIVE FLUID FLOW IN THE DEEP CRUST DURING REGIONAL METAMORPHISM

4:30 **C. P. Chamberlain:** METAMORPHIC HOT SPOTS: MID-CRUSTAL HYDROTHERMAL SYSTEMS

4:50 DISCUSSION

AB-INITIO METHODS AND MOLECULAR DYNAMICS

1:30 **M. S. T. Bukowinski, H. Zhang:** A SELF CONSISTENT ELECTRON GAS THEORY OF BONDING IN OXIDES

1:50 **M. L. Cohen:** PREDICTING NEW SOLIDS AND THEIR PROPERTIES

2:10 **M. S. Gordon:** THE DIRECT USE OF POTENTIAL ENERGY SURFACES IN THE STUDY OF THE DYNAMICS OF CHEMICAL REACTIONS

2:30 **A. C. Lasaga, G. V. Gibbs, W. H. Casey:** NEW INSIGHT INTO REACTION MECHANISMS, ISOTOPE EFFECTS AND CATALYSIS OF WATER-SILICA REACTIONS FROM AB-INITIO CALCULATIONS

2:50 **A. J. Gratz, E. A. Carter:** AB INITIO VALENCE BOND MODELS OF ACTIVE SITES FOR QUARTZ DISSOLUTION

3:10 COFFEE

3:30 **S. H. Garofalini:** WATER INTERACTIONS WITH SiO_2: SIMULATIONS OF SURFACE REACTIONS AND SOL-GEL POLYMERIZATION

3:50 **C. A. Scamehorn, C. A. Angell:** A RELATIONSHIP BETWEEN FRAGILITY AND HIGH COORDINATION OF Si^{4+} AND Al^{3+} IONS IN FULLY POLYMERIZED ALUMINOSILICATE MELTS AS STUDIED BY THE MOLECULAR DYNAMICS METHOD

4:10 **S. Tsuneyuki, H. Aoki, Y. Matsui:** MOLECULAR DYNAMICS STUDY OF PRESSURE-INDUCED STRUCTURAL TRANSFORMATIONS AND DIFFUSION MECHANISM IN SILICA

4:30 **J. R. Rustad, D. A. Yuen, F. J. Spera:** MOLECULAR DYNAMICS AND FREQUENCY SPECTRAL ANALYSIS OF LIQUID SiO_2 UNDER PRESSURE AND HIGH TEMPERATURE

4:50 DISCUSSION

STABLE ISOTOPE GEOCHEMISTRY

1:30 **J. H. Trefry, G. P. Klinkhammer:** BARIUM ENRICHMENT IN SULFATE-REDUCING INTERSTITIAL WATERS

1:50 **A. C. Campbell, J. Edmond:** THE TRACE ELEMENT CHEMISTRY OF SUBMARINE HYDROTHERMAL FLUIDS FROM SEDIMENT-HOSTED AND SEDIMENT-STARVED SPREADING CENTERS

2:10 **S. Metz, J. H. Trefry, R. P. Trocine, R. A. Feely, G. J. Massoth:** ROLE OF HYDROTHERMALLY-DERIVED IRON OXIDES IN THE GEOCHEMICAL CYCLING OF TRACE ELEMENTS

2:30 **C. R. German, G. P. Klinkhammer, A. C. Campbell, J. M. Edmond, M. P. Bacon, A. P. Fleer:** HYDROTHERMAL SCAVENGING OF TRACE ELEMENTS AND RADIO-ISOTOPES AT THE MID-ATLANTIC RIDGE (26°N)

2:50 DISCUSSION
3:10 COFFEE

3:30 **H. C. Van der Weijden:** CHALCOPHILE ELEMENTS IN THE VRICA-SEMAFORO SECTION (CALABRIA, ITALY), THE STRATOTYPE FOR THE PLIOCENE-PLEISTOCENE BOUNDARY

3:50 **M. Zhao, J. L. Bada:** AMINO ACIDS IN CRETACEOUS-TERTIARY BOUNDARY SEDIMENTS

4:10 **D. Colodner, J. Edmond, E. Boyle:** IRIDIUM IN MARINE SEDIMENTS: ANALYSIS BY INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY

4:30 **S. J. Gaffey, C. Bronnimann:** EFFECTS OF ROUTINE SAMPLE PREPARATION ON WATER AND ORGANICS IN SKELETAL CARBONATES

4:50 DISCUSSION

LOW TEMPERATURE GEOCHEMISTRY

1:30 **A. White, M. Hochella, Jr.:** AN XPS STUDY OF THE SURFACE CHEMISTRY AND WEATHERING CHARACTERISTICS OF RECENT BASALT FLOWS FROM HAWAII AND ICELAND

1:50 **M. Baedecker, I. M. Cozzarelli, P. C. Bennett, D. I. Siegel:** CYCLING OF ORGANIC AND INORGANIC CARBON IN A SHALLOW AQUIFER

2:10 **R. J. Donahoe, A. K. Ward, J. W. Nunley:** EFFECT OF ROCK SURFACE CHARACTERISTICS ON STREAM EPILITHIC COMMUNITIES

2:30 **M. Palmer, J. Edmond:** THE FLUVIAL GEOCHEMISTRY OF URANIUM

2:50 DISCUSSION
3:10 COFFEE

3:30 **J. N. Edmond:** THE GEOCHEMICAL CYCLE OF URANIUM

3:50 **C. M. Wicks, J. S. Herman, A. F. Randazzo:** GEOCHEMICAL INTERPRETATION OF A DEPTH PROFILE THROUGH A COASTAL MIXING ZONE

4:10 **C. Duffy:** LOW TEMPERATURE ZEOLITE TRANSFORMATIONS IN TUFF

4:30 DISCUSSION

IGNEOUS PETROLOGY

1:30 **G. L. Farmer, D. Broxton, R. Warren, W. Pickthorn:** A Nd, Sr, AND O ISOTOPIC STUDY OF "SMALL" VOLUME RHYOLITES AT THE TIMBER MOUNTAIN/OASIS VALLEY VOLCANIC CENTER, SOUTHERN NEVADA

1:50 **C. A. Manduca, L. T. Silver, H. P. Taylor:** GEOCHEMICAL MODELING OF A STEEPLY DIPPING BOUNDARY BETWEEN CONTINENTAL AND OCEANIC-ARC LITHOSPHERE, WEST-CENTRAL IDAHO

2:10 **G. R. Davies, A. N. Halliday, G. A. Mahood:** THE GEOCHRONOLOGY OF A RHYOLITIC MAGMA CHAMBER

2:30 **D. Francis:** THE CHEMICAL INTERACTION BETWEEN THE MAGMAS OF THE MUSKOX INTRUSION AND PROTEROZOIC CRUST

2:50 **J. K. Meen, S. H. Bloomer, R. J. Stern:** CONTEMPORANEOUS ALKALINE SHOSHONITE AND ISLAND-ARC BASALT-DACITE MAGMATISM IN THE MARIANA ARC SYSTEM

3:10 COFFEE

3:30 **M. F. J Flower, K. Tu, M. Zhang, R. W. Carlson, G. Xie:** ENDOGENEOUS DUPAL MANTLE BENEATH THE SOUTH CHINA BASIN

3:50 **J. N. Ludden, T. Plank, A. Ishiwatari:** GEOCHEMISTRY OF OCEANIC CRUST AT THE ONSET OF RIFTING IN THE INDIAN OCEAN

4:10 **M. Boily, H. Pintson, J. N. Ludden:** S-TYPE GRANITOIDS IN THE ARCHEAN: EVIDENCE FOR CRUSTAL RECYCLING?

4:30 **R. C. Smith, II, S. W. Berkheiser, Jr. J. H. Barnes:** TRACE-ELEMENT GEOCHEMISTRY OF MAFIC ROCKS OF PRECAMBRIAN THROUGH MESOZOIC AGE, SOUTHEASTERN PENNSYLVANIA AND ADJACENT MARYLAND

4:50 DISCUSSION

Department of Terrestrial Magnetism
Carnegie Institution of Washington
5241 Broad Branch Road, NW
Washington, DC 20015

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