Newsletter

of the

International Association of Geochemistry and Cosmochemistry

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Gunter Faure, Newsletter Editor

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Applied Isotope Geochemistry (AIG4)

June 25 to 29, 2001

Asilomar Conference Center

Pacific Grove, CA

Contact: T.D. Bullen

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Fax: 650-329-4538

News from the Association

Report of the Past President

by Gunter Faure

When I assumed the Presidency of the IAGC during the 30th International Geological Congress in August of 1996 in Beijing, I pledged to work to increase the number of Individual Memberships, to establish closer ties with our Working Groups, and to support APPLIED GEOCHEMISTRY. Now that my term of office is over, I can claim that we have made progress in all three facets of the IAGC; but I must admit that much unfinished business remains. Therefore, I take this opportunity to look to the future by identifying items of unfinished business.

1. Membership of the IAGC

The future of the IAGC depends on the support we receive from our Individual Members. In order to merit their support, we must continue to provide tangible benefits to our Members and we must find ways to involve them more directly in the administration of the IAGC. In addition, we must respond promptly and constructively to the concerns of individuals. These responses should come not only from the Officers of the IAGC, but should also involve our Councillors who each represent the IAGC in different regions of the world. Taking care of our Members means communicating with them regularly and inviting their input to important issues that confront the Association. I believe that the Newsletter should play an important role in this context because it can be used not only to inform but also to solicit advice and discussion.

2. Working Groups

At the present time, the IAGC has eight active Working Groups which organize symposia on a regular schedule. In order to maintain contact with the persons who lead these Working Groups and with the members of their Advisory Committees, the Newsletter will contain information on their activities and copies of the Newsletter will be mailed to the Chairpersons and Advisory committee members regardless of whether all of them actually pay their dues to the Association.

We will continue to provide small grants to Working Groups that organize symposia and request that they prominently acknowledge their affiliation with the IAGC. In addition, we will encourage the timely publication of extended abstracts or short papers as done recently by the Working Group on Water-Rock Interaction. Copies of such symposium volumes could be offered for sale by the IAGC at Annual Meetings of the Geological Society of America, American Geophysical Union, Goldschmidt Conference, etc.

3. APPLIED GEOCHEMISTRY

The journal has been growing both in volume and in quality under the leadership of its hard-working Executive Editor Ron Fuge. The relationship between the IAGC and Elsevier is the subject of a legal contract signed in 1995. The Association has the right to select the Executive Editor, subject to the concurrence of Elsevier. The Executive Editor is solely responsible for the editorial policy and the content of the journal. The Officers of the IAGC should closely monitor the interaction between the Executive Editor and Elsevier to assure that a harmonious working relationship is maintained and that the Executive Editor receives the necessary financial support from Elsevier to staff the editorial office.

4. Nomination of Officers and Councillors

The existing Statutes of the IAGC provide for

the appointment of a Committee to nominate candidates for consideration and approval by Council. I propose that in the future we should also solicit nominations from our Members and that at least two candidates for each vacant position be presented to Council for approval. However, the election of Officers and Councillors should continue to be based on an informed vote of Council.

5. Council Meetings

The Council of IAGC should continue meeting at least once each year. The venues for such meetings should alternate between North America and western Europe where most of the Members of the IAGC reside. The Chairs of our Working Groups should continue to be invited to present reports to Council and their views should be solicited on matters that affect their Working Groups.

6. Congress of Geochemistry and Cosmochemistry

The IAGC should consider organizing International Congresses of Geochemistry and Cosmochemistry at four-year intervals, offset by two years from the International Geological Congress. The highlight of the Congress of Geochemistry and Cosmochemistry could be the awarding of the Vernadsky Medal and the election of Fellows. The IUGS may be willing and able to provide financial support to the IAGC for such Congresses provided that we acknowledge the source of such funds.

In conclusion, I thank my fellow Officers and Councillors of the IAGC for their support and participation in the administration of our Association.

Join the IAGC

If you are not yet a Member or if your Membership has lapsed, contact our Secretary Mel Gascoyne at < gascoyne@granite.mb.ca >. Annual dues are only $15.00 US. For that you get two Newsletters per year and a low-cost subscription to APPLIED GEOCHEMISTRY at $50.00 for 2001.

Important Deliberations by the Council

by Gunter Faure

The Council of the IAGC met in Oxford, England, on the occasion of the Goldschmidt Conference convened by the Geochemical Society. The Meeting took place on Sunday, September 3, in the offices of Elsevier Science Limited. After the obligatory reports by the Officers of the Association (e.g. the President, the Secretary, the Treasurer, and the Executive Editor), the discussion turned to several issues of profound importance:

1. Termination of National Memberships.

At its previous Meeting in Denver in October of 1999, Council agreed to circulate a motion to terminate National Memberships. Seventeen ballots were subsequently mailed to the Representatives of the Member Nations. The motion to discontinue National Memberships, and hence to disband the National Assembly, passed without dissent. Accordingly, Dr. Mel Gascoyne, Secretary of the IAGC, announced at the Council Meeting in Oxford that Nation Memberships and the National Assembly have been abolished.

I take this opportunity to thank the National Representatives for their steadfast support of the IAGC since its founding. The Council Members and Officers will continue the international scope of the Association in the election of Councillors and in providing financial support for the symposia and workshops of our Working Groups in all parts of the world.

The termination of National Memberships requires major changes in the Statutes of the Association. These changes are presently being made for discussion by the Council. A final vote to approve the new Statutes will be taken at the next Council Meeting scheduled to coincide with the Annual Meeting of the Geological Society of America in October/November of 2001 in Boston, Massachusetts, USA.

2. Collection of Annual Membership Dues

During the past several years, the collection of dues to the IAGC and the renewal of subscriptions to APPLIED GEOCHEMISTRY has been handled by Elsevier Science Limited. This arrangement has been convenient and cost-free for which the management of Elsevier deserves our thanks. The downside of this arrangement is that we have not been able to maintain a list of addresses of our Members and therefore could not communicate with them effectively.

We are on the verge of changing this arrangement because we have a list of more than 750 addresses of our Members and have been using it to mail copies of the Newsletter. At the Oxford meeting, Council discussed a proposal to take over the annual collection of dues from our Members. Two aspects of this proposal deserve to be highlighted:

a) Payment of dues will be by credit card only, which means that Members can pay in their own currency based on the applicable exchange rate. This method of payment also avoids expensive bank charges associated with the purchase of bank drafts in foreign currencies.

b) An Assistant Secretary for Greater Europe may be appointed by action of Council to collect dues from European Members and to facilitate the scheduling and implementation of Council Meetings in Europe in alternate years.

Both proposals were tabled to permit more time for discussion. Therefore, the Membership dues and subscription renewals for 2001 will be handled by Elsevier Science Ltd. as before. However, the invoices may be distributed on the basis of our address list. In the meantime, an informal meeting of Officers and Councillors will take place at the next GSA Meeting in November of 2000 in Reno, Nevada. The purpose of this meeting will be to finalize plans to take over the collection of Member dues for 2002.

3. New Slate of Officers of the IAGC.

In accordance with the Statutes of the IAGC, a new slate of Officers has assumed responsibility for the administration of the Association:

President:	Eric M. Galimov (Russia)
Secretary:	Mel Gascoyne (Canada)
Treasurer:	David Long (USA)
Vice President:	John Ludden (France)
Executive Editor:	Ron Fuge (UK)
Newsletter Editor:	Gunter Faure (USA)
Past President:	Gunter Faure (USA)
Councillors:	Attila Demeny* (Hungary)
	John J. Gurney (South Africa)
	Russell S. Harmon* (USA)
	Jochen Hoefs (Germany)
	Marc Javoy (France)
	Jan Kramers* (Switzerland)
	Gero Kurat (Austria)
	N.V. Sobolev (Russia)
	K.V. Subbarao (India)
	Yishan Zeng (China)

*Newly elected or re-elected.

Dr. Hi toshi Sakai (Past President, Japan),
Dr. Pet r Jakes, (Council Member, Czech Republic),

and Dr. Malcolm McCulloch (Council Member, Australia) have retired from active service. The Council and Officers of the IAGC thank them for their contributions to the governance of the Association.

In addition, the Council welcomed **Dr. Ernest Angino** who has agreed to chair the Auditing Committee of the IAGC. Dr. Angino is uniquely qualified for this position because he is the former Treasurer who deserves much credit for stabilizing the financial assets of the Association.

THE MISSION OF THE IUGS

by Gunter Faure

The International Union of Geological Sciences (IUGS) has redefined its mission in order to become more effective in representing the interests of its many Member Countries, Commissions, Affiliated Organizations, and Working Groups. The new statement of goals was adopted by the Assembly of National Representatives on August 11, 2000, in Rio de Janeiro. The redefined mission of the IUGS includes the following statements:

1. The IUGS is of great value to the geoscience community; it must be maintained and strengthened.

2. The mission of the IUGS is to unite the global geological community in (*i*) promoting the development of the earth sciences through the support of broad-based scientific studies relevant to the entire earth system, and (*ii*) applying the results of these and other studies to preserving the Earth's natural environment, using all natural resources wisely, and improving the prosperity of nations and the quality of human life.

3. The goals of the IUGS should include the following:

   - Serve as an impartial international scientific union [by] addressing global issues that involve the earth sciences.

   - Contribute to the advancement of geological research throughout the world, including both fundamental earth science aimed at understanding the global earth system [...] and applied earth-science that uses the developing understanding of the earth system to address problems of particular relevance to the welfare of the earth's human population.

   - Represent the geological sciences in governmental and non-governmental forums to inform, advise, and influence public policy and decision-makers.

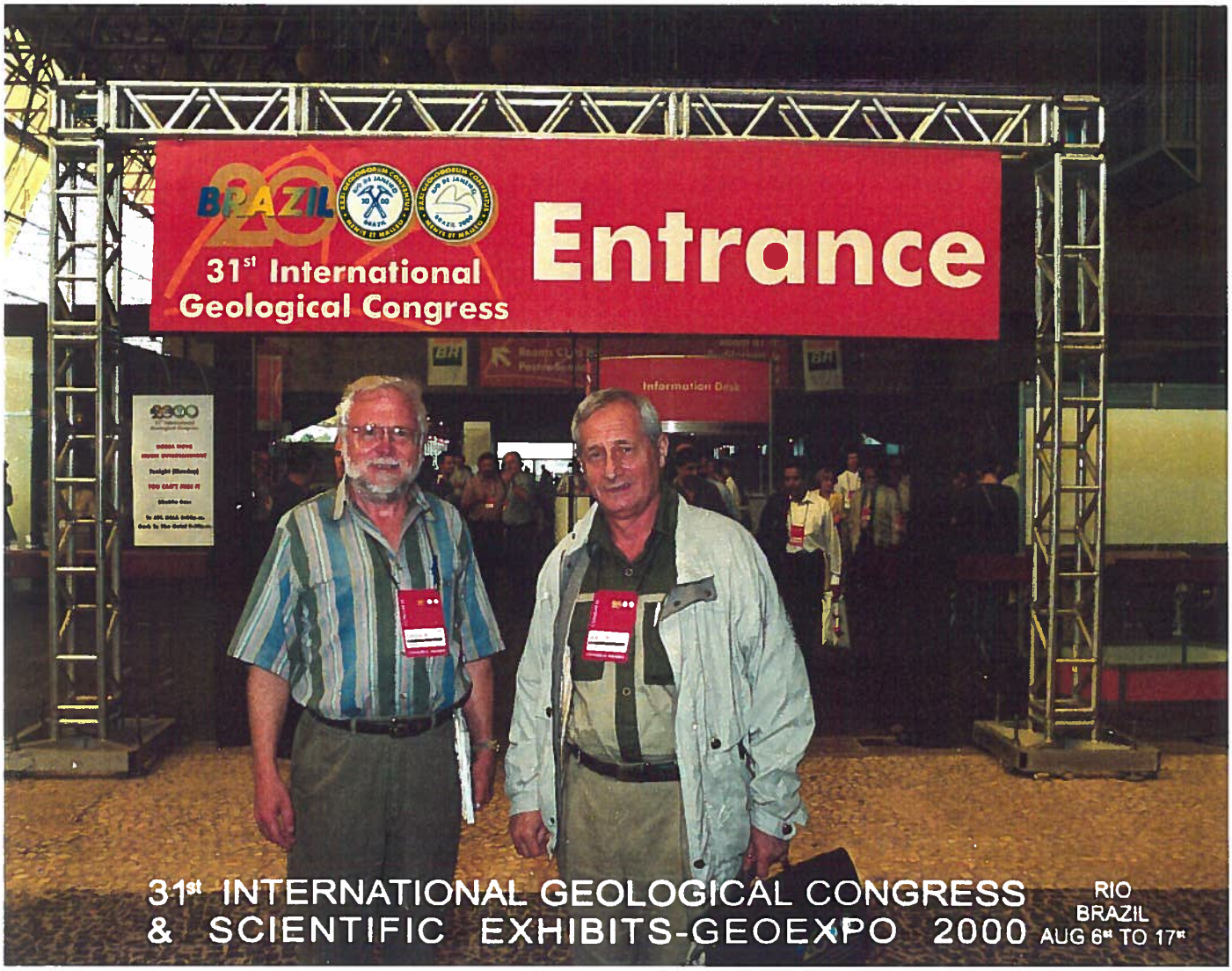
   - Encourage, in cooperation with other organizations, more interdisciplinary involvement within a broad spectrum of the geosciences in developing solutions to global problems.

   - Foster collaboration between developed and developing countries in earth-science research, capacity building, and applications.

   - Contribute to earth-science education and the advancement of public understanding of the earth sciences and their significance in solving societal problems.

   - Encourage the career development of young earth scientists.

   - Increase the relevance of IUGS publications to issues of truly global earth science and make these publications more widely available.



Gunter Faure (left) and Eric M. Galimov (right) at the International Geological Congress in Rio de Janeiro, Brazil. Since this picture was taken, Eric Galimov has succeeded Gunter Faure as President of the IAGC. He is the Director of the Vernadsky Institute of Geochemistry and Analytical Chemistry in Moscow, Russia. In addition, Eric Galimov is a Member of the Russian Academy of Science, and a Member of its Space Research Council and of its Committee on the World Ocean. Eric Galimov is widely known for his work on the isotope composition of carbon in terrestrial and extraterrestrial materials including plants, organic matter in marine sediment, hydrocarbons, diamonds, meteorites, as well as in lunar and martian rocks. His term as President of the IAGC extends from 2000 to 2004.

- Enhance the visibility of the earth sciences and demonstrate their profound influence in planning rehabilitation and preservation of the future planetary environment by seeking greater involvement in public affairs and by publicizing the critical role that only the earth sciences can play.

4. The IUGS should embark on new, high-priority earth science activities of demonstrable relevance to society, including, but not limited to:

   - Reducing vulnerability of communities to natural hazards.
   - Mitigation the effects of waste and pollution.
   - Understanding global environmental change.
   - Biodiversity
   - Managing resources and sustaining the environment.

Altogether, the Assembly of Member Countries of the IUGS accepted 32 recommendations presented by its Strategic Planning Committee which were based in large part on information and suggestions provided by 85 individuals (including Mel Gascoyne and Gunter Faure) who returned a questionnaire concerning the future of IUGS.

These matters are relevant to the Members of our Association because the IAGC is one of 36 organizations that are affiliated with the IUGS. The new statement of goals and other information provided by the Executive Committee of the IUGS at the International Geological Congress in Rio de Janeiro provide the basis for mutually beneficial interactions between the IAGC and the IUGS in the future.

HOW CAN WE DELIVER THE GOODS?

Reflections about the 31st IGC in Rio

by Gunter Faure

The 31st International Geological Congress in Rio de Janeiro (August 6 to 17, 2000) adopted the motto: "Geology and Sustainable Development: Challenges for the Third Millenium." This theme was eloquently developed by a series of lectures presented by outstanding geologists from different countries including Brazil, USA, France, Kenya, Colombia, and the UK. In addition, Dr. Robin Brett, Past President of the International Union of Geological Sciences (IUGS), reviewed the advances of the Earth Sciences during the 20th century and considered the subject areas where significant progress might occur in the 21st century. All of these lectures were well attended and received enthusiastic support from the audience of geologist from around the world.

The two most outstanding lectures in this series were those of Dr. Brian Skinner: "New Perspectives for Mineral Exploration in the Next Century" and of Dr. Umberto Cordani: "The Role of Geology for a Sustainable Society". Both speakers presented factual data and derived from them highly relevant conclusions. A theme common to both presentations was that the simultaneous increases both of per capita consumption of natural resources and of the human population, especially in developing countries, cannot be sustained in the future. When the lagging production of food, coastal flooding caused by sea level rise, and local overcrowding are added to the list of problems confronting humans on the Earth, the picture is troubling. Inequalities in the consumption of natural resources existing at present cannot be eliminated because the Earth cannot provide sufficient

resources to permit the peoples of the developing nations to achieve the standard of living presently enjoyed by the peoples of the industrial nations. These and other environmental problems could escalate out of control resulting in civil unrest and open warfare.

The speakers at the 31st IGC did well in identifying the problems and their causes. They even advocated remedial actions which may permit the development of a global economy that is sustainable for all time. Unfortunately, they were preaching to the converted. The response of the audience to these presentations indicated that the problems the speakers were discussing were understood by a majority of the assembled Earth Scientists. Unfortunately, these same Earth Scientists do not have enough influence on the public policy in their respective countries to cause the course corrections that are necessary to assure the continued well-being of the human population on the Earth.

For this reason, I raise the question: "How Can we Deliver the Goods?" Perhaps the International Union of Geological Sciences will evaluate the relevant scientific facts and translate them into authoritative recommendations relevant to the many disciples involved in formulating public policy: from city planning to agriculture, energy production and distribution, mining, transport, communication, and geopolitics. The new guidelines adopted by the IUGS include this important function, but only time will tell whether this organization can live up to its new mission statement (see elsewhere in this issue). The key words that describe what is needed are: sharing, distributing, and monitoring on a global basis.

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International Ingerson Lecture

The highlight of the activities sponsored by the IAGC at the 31st IGC was the International Ingerson Lecture on August 16, 2000, entitled:

"Crustal Evolution of the South American Platform"

presented by **Professor Umberto Cordani**

of the University of Sao Paulo, Brazil, who is the most outstanding Earth Scientist of South America. In addition to his many accomplishments in the service of the Earth Sciences (detailed below), Dr. Cordani was a member of the Council of the IAGC from 1980 to 1984. A summary of his Ingerson Lecture will be presented in the next Newsletter.

Dr. Umberto G. Cordani of Brazil

Dr. Umberto G. Cordani was born in Italy in 1938 and has been a Brazilian national since 1960, when he graduate in geology from the University of São Paulo (USP). He did post-graduate studies in geochronology at the University of California at Berkeley and he holds the academic degrees of Dr.Sc. and L.Doc. from the USP (1968-1973, respectively).

Dr. Cordani was chair of the Department of Geology of the Institute of Geosciences of the USP from 1979 to 1983 and Director of its Geochronology Research Center from 1974 to1978, and again from 1980 to 1982. He was Vice-Director (1984-1987) and Director of the Institute of Geosciences from 1987 to 1991. Later, he was Director of the Institute of Advanced Studies of the University of São Paulo (1994-1997) and presently he is the Chair of the Commission on International Cooperation of the USP. Invitations to serve as Visiting Professor have taken him to the Université

Libre in Brussels, the Universidad de Chile in Santiago, the University of Texas in Dallas, the University of Oxford in England, the University of California at San Diego, and Universitá degli Studi di Milano in Italy.

Dr. Cordani's main interest has long been in geochronology and its application to geotectonic problems. His own research began in the 60s with his work on K-Ar dating of volcanic rocks. He and his colleagues carried out, in cooperation with co-workers at M.I.T., an extensive reconnaissance geochronological survey of Brazil and West Africa in order to test the theory of continental drift. The resulting paper published in Science in 1967 was a major contribution to geological comparisons across the Atlantic Ocean.

In the 1970s, work on Rb-Sr geochronology began under his guidance at the CPGeo-USP, with the main objective to establish and characterize the major age provinces of South America. From this program have come several articles in specialized journals especially on ancient terrains of Brazil. In recent years, he has applied the U-Pb SHRIMP technology to various Brazilian rocks and he has published, together with his colleagues of the CPGeo, several syntheses on the crustal evolution of the South American Platform. In addition, about twenty five years ago, Dr. Cordani and his group began to use the Rb-Sr method to date shale and related rocks, a technique that has yielded some remarkable results.

Dr. Cordani is well-known for his active broad-ranging participation in the international scientific community and especially in the International Union of Geological Sciences (IUGS). He was elected Vice-President of IUGS from 1984 to 1988 and President of the Union from May 1988 to August 1992. He has also served as a member of the Advisory Board of Research Development of IUGS, as a member of the IUGS-UNESCO International Geological Correlation Program (1980-1985), as a member of the Council of the International Association of Geochemistry and Cosmochemistry (1980-1984), and as a member of the Bureau of the International Commission of the Lithosphere (1981-1985). Presently he is President of the Organizing Committee for the 31st International Geological Congress.

From 1990 to 1993, he was a member of the Executive Board of the International Council of Scientific Unions (ICSU), and from 1991 to 1996 he served as a member of the United Nations Scientific and Technical Committee for the "International Decade on Natural Disasters Reduction" (IDNDR).

In addition, Dr. Cordani has served as Director of Publications for the Brazilian Geological Society, as Chief Editor of Revista Brasileira de Geociências, and he is on the Editorial Boards of Earth and Planetary Science Letters (Elsevier), of Revista Geologica Chilena (Chile), of Revista Brasileira de Geofísica, of Anais da Academia Brasileira de Ciências, of Ciência e Cultura, and of the Journal of South American Earth Sciences (Pergamon).

Dr. Cordani is a member of the Brazilian Academy of Sciences where he was Director between 1993 and 1999. He is also a founding member of the Academy of Sciences of the State of São Paulo and is a corresponding member of the Associación Geológica Argentina. He has served on the Advisory Board for Geosciences in the Brazilian National Research Council and, in 1994, he was awarded the Great Cross of Scientific Merit which is the highest Brazilian award in science. He also received the Silver Hammer and the José Bonifácio Gold Medal from the Brazilian Geological Society, and the Medal of Merit from the Brazilian Federation of Engineering. In 1999 he was made *Chevalier de l'ordre des Palmes Academiques* by the French Ministry of Education and Science.

In his scientific life, Dr. Cordani has authored more than 200 scientific articles, papers, and monographs in national and international books, journals, and magazines.

Symposium on "Trace Metals in the Environment: Sources, Transport, Fate, and Toxicology"

31st International Geological Congress

Rio de Janeiro, August, 2000

The Symposium identified above was convened by David Long and Gunter Faure, and took place on August 15 at the Rio Centro Convention Center of Rio de Janeiro. Forty one abstracts were accepted for presentation as Posters in accordance with the rules of the Congress. Ten of the presenters were Members of IAGC or asked to become Members.

The Poster Session was followed on August 16 by oral presentations by three keynote speakers:

David Long: Fingerprinting Balkan Endemic Nephrophathy in the Bulgarian environment with geochemical markers.

Rognvald Boyd: Use of geological and ecogeochemical data in assessing metal emissions from the Cu-Ni industry in Russia.

Gunter Faure: Geochemical processes affecting cations and anions in metal-rich streams of Colorado and Tennessee, USA.

The abstracts submitted by Members of the IAGC to this Symposium of the 31st IGC are reproduced below.

Mahadevan Symposium

"Challenges of Water Resources Management in the Developing Countries", Andhra University, Visakhapatnam, Andhra Pradesh, India.

May 6 to 10, 2001

Summary of the Program

May 6: Guru puja (Homage to the Guru) Inauguration of the Mahadevan Symposium by Dr. G.O.P. Obasi, Secretary General, WMO, Geneva, Switzerland.

May 7, AM: Water resources inventories, with special reference to the management of coastal aquifers (Prof. V.V.J. Sarma, India; Prof. I.A. Shiklomanov, Russia).

May 7, PM: Water quality in relation to water use. (Dr. Kittu, India; Prof. M. Meybeck, France).

May 8, AM: Augmentation, conservation, and protection of water resources (Dr. D.K. Chadha, India; Dr. M. Evenari, Israel).

May 8, PM: Techno-socio-economic challenges of water transfers. (Prof. P.V. Indiresan, India; Dr. C. Yangbo, China).

May 9, AM: Information technology in the management of water supplies (Dr. D.P. Rao, India; Dr. M.M. Paul, New Zealand).

May 9, PM: Drinking water issues (Prof. D. Chakraborti, India; Dr. C. Abernathy, USA).

May 10, AM: Climate change impacts on water resources (Prof. M. Kulshreshta, India; Dr. F. Giorgi, Italy).

May 10, PM: Special Seminar of the Association of Geologists for International Development: "Role of NGOs in the sustainable management of water resources." Convener, Dr. S.D. Limaye, President, AGID: Chair, Prof. U. Aswathanarayana, Mozambique. (Prof. M. Falkenmark, Sweden).

Abstracts Submitted by Members to the IAGC Session at the 31st International Geological Congress in Rio de Janeiro.

Hydrogeochemisry of Metals in Taxco, Mexico

Armienta, M.A., O. Talavera, N. Ceniceros, O. Cruz, and A. Aguayo, Instituto de Geofisica, UNAM, Mexico

Mining is one of the most important economical activities of Mexico since the 15th Century. Different kinds of residues associated with the extraction and processing of metals constitute potential environmental pollution sources. Taxco has been one of the main silver producing locations of Mexico since prehispanic times. Old and recent tailing piles resulting from the processing of Ag, Au, Pb, Cu, and Zn minerals are located inside and near the city. The study presented here was developed to evaluate the concentration of metals in waters from Taxco-El Viejo, and to study their hydrogeochemical behaviour. Water samples from rivers and wells were taken in the area. Alkalinity, pH, Eh, conductivity, and T were measured in the field. Cr, As, Zn, Cu, Fe, Pb, and major ions were analyzed in the laboratory. Greater concentrations of Zn, Pb, and Fe were found in the samples obtained near the tailing piles of the mines. Most of the waters were of the calcium bicarbonate and sulfate type. Lower Eh values and higher sulfate concentrations were obtained in waters influenced by the tailings. High concentrations of arsenic (0.339 mg/L) were detected in waters leaching from one of the tailings. This water is used as a potable water source in one small community near Taxco. Concentrations of Pb (up to 0.097 mg/L) above the drinking water standard were found in some dug wells. Oxidation of tailings was shown to be releasing metals to the surficial waters in the area. Metal transport in the rivers may be influenced by iron oxyhydroxide solubility. Environmental and water-management measures should be taken to eliminate the environmental risk.

Clean-Water Alternatives to Naturally Arsenic Polluted Groundwater in a Semi-Arid Zone of Mexico

M.A. Armienta, H. Brust, R. Rodriguez, L.K. Ongley, A. Aguayo, N. Ceniceros, Instituto de Geofisica, UNAM, Mexico.

Arsenic-related health effects have been observed in the population of Zimapán, Mexico. Zimapán is a low income community with nearly 9000 inhabitants located in the central part of Mexico. Groundwater is the only drinking water source at Zimapán. Natural and anthropogenic pollution sources have been found to release arsenic into the aquifer system. Hyperkeratosis, hypopigmentation, and hyperpigmentation have been related to the continuous consumption of water containing more than 0.3 mg/L of arsenic. Groundwater exploitation alternatives have been proven to be limited for the solution of the problem. The more productive wells drilled in the limestone aquifer are also the most polluted by natural causes. Good quality groundwater is found in the volcanic aquifer which, however, has a low productivity. Various alternatives have been proposed to supply Zimapán inhabitants with clean water. The most polluted well (1.0 mg/L of As) was closed in early 1996. Groundwater treatment procedures requiring low investment and straightforward operation have been tested. A potable water treatment plant based on flocculation with ferric sulfate and filtration has just started to operate. Water from one of the most polluted (0.5 mg/L of As) and also more productive wells will be treated by this plant. One of the local limestones has been proven to eliminate a high proportion of the arsenic through agitation with the polluted water. This procedure could be applied as an in-house method to reduce As in the water coming from one contaminated well (0.7

mg/L of As) still in operation. In developing and semi-arid countries, a unique solution to As-polluted water seems difficult. Different measures must be established to solve the As-related health problem.

Geochemical Assessment of Soil Contamination by Toxic Elements in Urban Tallinn (Estonia)

Bityukova, Liidia. Institute of Geology at Tallinn Technical University, Tallinn, Estonia.

First time in Estonia there was carried out the monitoring of pollution of soils on the territory of the biggest industrial city of the country, its capital Tallinn. In the frame of a joint project "Urban geochemistry of Tallinn", supported by Scientific and Environmental Affairs Division NATO, 532 topsoil samples from an area of 1291,2 square km were analysed for 40 elements. The special attention in the interpretation of the results was paid to heavy metals as most toxic and harmful for the health of the people.

Statistical factor analyses of obtained and new geochemical data have been used to identify: 1) primary contaminants associated with natural sources of pollution; 2) secondary contamination attributed to processes of pollution in the results of industrial activity. Trends in the changing dominance of these environmental factors reflect changes in technogenic impact.

Calcium, Mg, and Mn showed natural enrichment arising from subsurface parent carbonate rocks. The polluted areas of urban Tallinn are clearly outlined by As, Cr, Cu, Ni, Pb, Sb, Sn, and Zn. The elevated concentrations in the local geochemical anomalies exceed the background level by 7-9 times. Geochemical mapping of the contamination confirmed that the extreme concentrations of heavy metals are caused by input from anthropogenic sources and permitted us to typify them. Study of geochemical mobility of Cr, Cu, Mn, Ni, Pb, and Zn by sequential extraction revealed that only about 50% of the total content of these elements can participate in biochemical cycles. The geochemical monitoring also showed that the level of soil contamination in the city by Co, Cr, Cu, Ga, Ni and Pb decreased during last ten years.

Use of Geological and Ecogeochemical Data in Assessing Metal Emissions from the Cu-Ni Industry in Russia

Boyd, R., S.-J. Barnes, P. De Caritat, V.A. Chekushin, V.A. Melezhik, C. Reimann, and M.A. Zientek, Geological Survey of Norway, Trondheim, Norway.

Published estimates for heavy metal emissions from the Cu-Ni industry on the Kola Peninsula in NW Russia are examined in the light of: a) Official emission figures for 1993 and 1994, b) Modelled emissions based on calculated dry and wet deposition estimates based on data from snow and rain sampling in 1994, c) Chemical data on the composition of the ores processed. The modelled emissions, official emission figures, and chemical data are compatible for Ni, Cu, and Co and show that previous estimates underestimated the emissions of Ni and Cu (but within the same order of magnitude). Comparison of published estimates with the modelled emissions and chemical data for trace elements in the ores shows that the published figures overestimated the emissions of certain trace metals by up to several orders of magnitude in some cases, exceeding the calculated total input of these metals to the plants. These conclusions have implications for estimates of emissions from the Cu-Ni industries in the Noril'sk area and from the metallurgical industry in the Urals; published estimates of these emissions have neglected the implications of information on the nature of the ores being processed (plants in the Urals) and on the chemistry of the ores (both the Urals and at Noril'sk). Ore geologists should ensure that society recognises the importance of their data in environmental matters.

Variations in Fluxes of Heavy Metals During Intense Rainstorms in Small Subtropical Watersheds

De Carlo, E.H., V.L. Beltran, M.S. Tomlinson, and K.J. Spencer, Dept. of Oceanography, University of Hawaii, Honolulu, Hawaii, USA

Short duration high-intensity rainstorms result in rapidly changing hydrographs in streams of mountainous subtropical islands and often lead to the delivery of pulses of terrestrial material to the coastal ocean. We have evaluated the short term and annual variability in heavy metal transport to estuaries and coastal waters. Because lower reaches of the streams in our study pass through areas with vastly different populations, our research has focused on spatial and temporal variations in the composition and abundance of dissolved and suspended matter in the waterways. The concentrations of dissolved and suspended heavy metals and the isotopic composition of Pb vary during rapidly changing hydrographic conditions. These variations are inferred to reflect rapid changes in the source of materials including: 1) pulses of easily eroded soils and 2) rapidly mobilized anthropogenic material accumulated since the previous rainstorm on the impervious urbanized surfaces of the watershed. Thus, fluxes of heavy metals derived from natural processes are supplemented by anthropogenic activity in the watershed. Natural soils from the unimpacted portions of the watersheds comprise the bulk of suspended material flux during storms. Anthropogenic contributions of Pb are easily resolved from natural inputs, but these are less obvious for other metals such as Cu and Zn.

Investigation of Chemistry Controlling the Mobility of Chromium in Contaminated Lands

Dolgopolova, Alla, YugGEO, Almaty, Kazakhstan

Potentially hazardous levels of chromium (Cr) have been identified in soils, surface water, and groundwater caused by use of process waste, originating from a former chemical works. The contaminated sites are amenable to an integrated approach of remediation. The most significant form in which chromium exists is Cr(VI), which is toxic, carcinogenic, and mobile. The key technical objective for each technique was to effect reduction in total Cr(VI) and leachable Cr(VI) concentration such that a significant risk was no longer presented to sensitive human, ecological receptors, or controlled waters. Innovative techniques were used for treating chromium contamination in soils at several sites. During the ex-situ physicochemical trial, proprietary chemicals were used to treat Cr through a chemical reduction or stabilisation process. The optimal formulation demonstrated a capability of reducing both total soil Cr(VI) (by up to 86%) and leachable Cr(VI) concentrations to low levels. The in-situ physicochemical bench scale trial comprised testing slurries of reducing and immobilisation reagents including E-clays, bentonite, slag, and OPC. Several of the slurries formulated demonstrated a capability of reducing total soil Cr(VI) by up to 95%. New experiments discovered that treatment used rust material as source of iron (II) to convert Cr(VI) to Cr(III) and also different manipulations with reduction effect of ferrous sulphate are techniques that show the fastest and most effective way of Cr reduction.

Geochemical Processes Affecting Cations and Anions in Metal-Rich Acid Streams of Colorado and Tennessee, USA.

Faure, G., Pride, D.E., Lee, G., Munk, L.A., Piatak, N.M., and Centeno, L. Department of Geological Sciences, The Ohio State University, Columbus, Ohio, USA 43210.

Streams draining bedrock basins where sulfide minerals are exposed to oxidation are characterized by a low pH and elevated concentrations of sulfate as well as of Fe, Al, and other metals. When such waters are neutralized, ferric hydroxide and, in some cases, aluminum hydroxide precipitate. These solid compounds sorb anions at low pH and cations at near neutral pH. The sorption is selective and is inversely proportional to the hydrated radii of the ions. Consequently, the chemical composition of the water

changes as the pH increases from strongly acidic to near neutral. The result is that potentially toxic cations are removed from the water by sorption. This process detoxifies the water by removal of cations from solution, but causes metal-rich sediment to accumulate in ponds and reservoirs within the drainage basin. The metal-rich sediment is a potential public-health hazard because the sorbed metals are released selectively in cases where the water is later acidified and because the metal-rich sediment may require remediaton before it can be safely disposed of in case the reservoirs must be dredge.

Environmental Implications of Heavy Metal Pollution Index for Waters of the Eastern Part of the Pench Valley Coalfield Area, District-Chindwara (M.P.) India

D.C. Gupta, Dept. of Applied Geology, Barkatullah University, Bhopal, India

The Heavy Metal Pollution Index (HPI) represents the overall quality of water with respect to selected parameters in contrast to other indices usually employed which use a composite of all parameters of pollution. The concentrations of heavy toxic metals in surface and sub-surface waters in parts of the Pench Valley Coalfield indicate that these metals are not universally present in all samples and, in many cases, their concentration is below detectable limit. To know the overall impact of heavy metal contamina-tion on waters of Pench Valley, HPI values have been calculated after Mohan et al. (1996). The proposed index is intended for drinking water and the permissible pollution index (P) value is 100. The study reveals that the concentrations of heavy metals like As, Cd, Cu, Fe, Hg, Mn, Pb, and Se, when considered for the determination of HPI, the 'P' value exceeds far above 100 for all water samples of the area. Therefore, the water of the eastern part of the Pench Valley coalfield is not safe for drinking purpose. Ingestion exposure to polluted waters may cause a variety of carcinogenic and noncarcinogenic diseases to the people of the area. In the present paper, health hazards related to exposure pathway of the above toxic metals are discussed in detail.

Fingerprinting Balkan Endemic Nephropathy in the Bulgarian Environment with Geochemical Makers: A Pilot Study.

[1]Long, D., [1]Icopini, G., [2]Ganev, V, [1]Petropoulos, E., Voice, T., and Chou, K. [1]Michigan State University, East Lansing, MI USA, [2]Medical University, Sofia, Bulgaria.

Balkan endemic Nephropathy (BEN) is a chronic tubulointerstitial disease whose mosaic like distribution throughout the Balkans has not changed significantly since its initial description. Hypotheses to explain the occurrences of BEN include genetic predisposition; infection with a slow virus; selenium deficiency; and exposure to selected metals (e.g., As), Ochratoxin A, or polycyclic aromatic hydrocarbons. Here we explore the hypothesis that the occurrence of BEN is related to the inorganic geochemistry of the environment.

Preliminary environmental samples (soils, drinking water, and selected foods) were collected from BEN and non-BEN areas in Bulgaria. Solid samples were digested in nitric acid. Water samples and nitric acid leachates were analyzed for 22 elements by hexapole inductively coupled plasma mass spectrometry (HEX-ICP-MS).

Selected results include 1) absolute concentrations from both types of locations were not enriched above "background" concentrations; 2) As concentrations were typically higher in BEN samples than non-BEN soils and Se concentrations were lower; 3) Mo and Al also showed patterns of higher concentration in BEN samples; and 4) depending on the sample type, other elemental differences were found between BEN and non-BEN locations.

Although geochemical differences between BEN and non-BEN areas were evident, not all differences were found to be statistically significant, in part due to small sample sizes. However, the results do indicate the potential difference in the inorganic geochemistry of BEN and non-BEN areas, that HEX-ICP-MS is an exciting tool to measure environmental geochemical fingerprints, and that the occurrence of BEN is most likely a multifactorial disease.

Environmental Impact and Acid Drainage in Mineral Exploitation: A Case Study in Cundinamarca, Colombia

Gloria Prieto, INGEOMINAS, Santa Fe de Bogota, Colombia

Minerals in Cundinamarca are exploited by small and medium operations that use underground and surface systems, which have not involved appreciable levels of technology in any of the mining stages. The main environmental effects are: 1) acid drainage caused by sulphide oxidation (pyrite is present in the mineralised rocks); 2) particulate matter production (dust) that is emitted to the atmosphere, to surface waters, soils, biota, and to the labour force (health and safety risk). Also important are the improper disposal of wastes which affects soils, water, and biota; the removal of vegetation; and the over use of forest resources. Positive socio-economic effects include employment and the payment of royalties, as well as a boost to the economy. pH and conductivity measurements demonstrate the occurrence of acid mine drainage (AMD) which contains high levels of ions in solution including toxic metals leached from the mineralised rocks. In the Carboniferous area, acid mine drainage (pH 2.6-5.5) with high values of conductivity (up to 3000μS/cm) were detected. Previous data showed that, although total sulphur contents in Cundinamarca's coal are quite low (0.84%), the acidity of AMD and the sulphur concentrations (pyrite FeS_2) in the exploited coal are correlated. Although the AMD causes economic losses and affects the biota, soils, and waters, no studies to characterize AMD exist. Therefore, such a study is recommended in this area as a basis to propose mitigation and remediation plans for the affected mining areas.

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If you are not yet a Member or if your Membership has lapsed, contact our Secretary Mel Gascoyne at < gascoyne@granite.mb.ca >. Annual dues are only $15.00 US. For that you get two Newsletters per year and a low-cost subscription to APPLIED GEOCHEMISTRY at $50.00 for 2001.

Studies of the Berkeley Pit-Lake System at Montana Tech

Willett, M.E., S.M. Dakel, and C.A. Williams-Beam, MT Tech of the University of Montana, Butte, MT, USA.

The Berkeley Pit-Lake System, the largest Superfund site in the United States, is an open-pit copper mine which operated from 1955 to 1982. When operations ceased, acidic water began to infiltrate the open pit at a rate of 12 million liters per day. Since 1984, various studies have been conducted on the water and its chemical interactions with the surrounding pit walls. New research at Montana Tech includes organic carbon influence, thallium concentrations, and investigation of the microorganisms in the pit. Organic carbon-trace metal interactions in the pit water and sediments are being investigated. The main objectives are to isolate, identify, and model organic carbon, focusing on its interaction with trace metals in the sediment and water. Microorganisms indigenous to the Berkeley Pit are being identified and characterized. Six species of algae have been isolated and identified. Minimum nutrient requirements and bioremediative potential will be determined from results of controlled laboratory experiments. Preliminary results show significant metal uptake by one of the algal species. Thallium, an element present in most mine wastewater, surpasses the toxicity of mercury in humans. Total world mobilization of thallium exceeds 2,000,000 kg/yr, in contrast to the U.S. EPA's drinking water regulation for Maximum Contaminant Level of 2 ppb. Thallium contamination in the pit water and sediment will be determined.

Thallium Attenuation and Remediation from Mine Wastewaters

Williams-Beam, C.A., L.G. Twidwell, J.D. Hobbs, MT Tech of the University of Montana, Butte, MT, USA

Thallium, an element present in many mine

wastewaters, presents a global environmental problem. The toxicity of thallium to humans surpasses that of mercury. The present worldwide industrial production of thallium from sulfide ore exceeds 15,500 kg/year. More than 160,000 kg/year of thallium-rich ore enters lead, zinc, and copper smelting operations and an additional 140,000-kg/year enter from iron and steel smelting. The total world mobilization of thallium is estimated to be greater than 2,000,000 kg/year. The significance of this number is emphasized when compared to the United States Environmental Protection Agency's (USEPA) drinking water regulation for Maximum Contaminant Level of 2 parts per billion. A cost effective and efficient technology for the remediation/collection of thallium is essential to prevent contamination from this pollutant. Laboratory and actual mine wastewater experimentation has been conducted in conjunction with advanced geochemical modeling. The molecular modeling studies will emphasize validation of the computer simulations by direct comparisons with experimental results. Results from this USEPA sponsored Mine Waste Treatment Project for removing thallium from wastewater will be presented. A USEPA-sanctioned Quality Assurance Plan for analysis was followed using Inductively Coupled Plasma and Atomic Adsorption.

COMING EVENTS

Sixth International Conference on Acid Rain Deposition, December 10-16, 2000, Tsukuba, Japan. Contact at: < acid2000@ics-inc.co.jp >, Fax: 81-3-3263-7077.

Near-Earth Asteroid Sample Return Workshop, December 11-13, 2000 at the Lunar and Planetary Institute, Houston, Texas. Contact: < www.lpi.usra.edu/meetings/asteroid 2000/ >.

AGU Fall Meeting, December 15-19, 2000, San Francisco, California. Contact: < meetings@ kosmos .agu.org > or < http:/www.agu.org/meetings.

The Gondwana Platform During Ordovician Times: Climatic, Eustatic, and Geodynamic Evolution, January 30 to February 7, 2001, in Morocco. Contact: < hamoumi@wanadoo.net.ma >, Fax: (212-7) 68 01 81.

Vth International Conference
dedicated to the 300th anniversary
of the Department of Mines of Russia
"New Ideas in Earth Sciences"
April 3 to 6, 2001
Moscow, Russia
Organizing Committee: Mikulkho-Maklaya 23, GSP-7, 117873 Moscow, Russia
E-mail: science@msgpa.msgpa.ru
or: bos@msgpa.msgpa.ou
Fax: 095-433-6455

XIIth Global Warming International Conference & Expo
April 8 to 11, 2001
Cambridge, UK
Topics: Global warming and climate change
Global surveillance: climate future
Education: global change
Human health in a changing climate
Kyoto Protocol: energy and natural resources management
International law and policy making
State and local government actions
Fax: 1-630-910-1561

Third IAEA Symposium on Isotope Techniques in the Study of Environmental Change, April 19-23, 2001, in Vienna, Austria. Contact: < p.aggarwal @iaea.org >.

Joint SOHO-ACE Workshop on "Solar and Galactic Composition" March 6 to 9, 2001, in Bern, Switzerland. Contact: < http://www.cx.unibe.ch/phim/soho/soho_ace/soho_ace.html >. Conference fee approximately 400 Swiss francs, abstracts and registration due on Dec. 1, 2000.

The Jordanian Geologists Association will hold an International Symposium on Geology and Investment from April 2 to 4, 2001, in Amman, Jordan. Papers are invited on any topic related to the theme of the conference. More details are available at < http:// www.jordanian-geologists.com >.

Goldschmidt 2001, May 20-24, 2001, Roanoke, Virginia, USA. Contact: Dr. Michael Hochella at < hocella@vt.edu > or Dr. Robert Bodnar at < bubbles@vt.edu >.

10th Water-Rock Interaction Symposium, June 10-15, 2001 at Tanka Village Congress Center, Villasimius, Sardinia, Italy. Contact: < wri10@unica. it > or < http://www.unica.it/wri10/ >.

4th International Symposium on Eastern Mediterranean Geology
May 21 to 25, 2001
Isparta, Turkey
Tel: 90-246-237-08-55
Fax: 90-246-237-08-59
E-mail: emgeol@mmf.sdu.edu.tr

European Mineralogical Union
Third EMU School & Symposium
June 2001, Lübeck, Germany
"Solid Solutions in Silicate and Oxide Systems of Geological Importance"
Speakers: V. Heine, M. Dove, M. Carpenter, M. Hillert, J. Ganguly, L. Ungaretti, R. Oberti, L. Aranovich, C.A. Geiger, G. von Tendeloo, J. Blundy, and P. Richet.
Contact: C.A. Geiger, Kiel Universität, Institut für Geowissenschaften, Olshausen st. 40, D-24098 Kiel, Germany.
E-mail: chg@min.uni-kiel.de
Fax: 49-431-880-4457

Sixth International Conference on the Biogeochemistry of Trace Elements
July 29 to August 2, 2001
University of Guelph, Ontario, Canada
Tel.: 519-824-4120, ext. 2531
Fax: 519-823-1587
E-mail: icobte@lrs.uoguelph.ca
Website: http://icobte.crle-uoguelph.ca

Geophysical Detection of Subsurface Water on Mars
August 6 to 10, 2001
Lunar and Planetary Institute
Houston, Texas
E-mail: tanner@lpi.usra.edu
Tel.: 281-486-2142
Fax: 281-486-2125
Abstract submission by April 20, 2001 (hardcopy)
April 27, 2001 (electronic)

IMA 2002, 18th General Meeting of the International Mineralogical Association
1 to 6 September, 2002
"Mineralogy for the New Millenium"
E-mail: ima2002@ed.ac.uk
or: adrian@minersoc.demon.co.uk
Website: www.minesoc.org/IMA2002

Environmental Health Risk 2001
10 to 12 September, 2001
Cardiff, Wales, UK
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, S040 7AA, UK
Tel.: 44(0)238-029-3233
Contact: Susan Hanley
E-mail: shanley@wessex.ac.uk
Website: http://www.wessex.ac.uk/ conferences/2001/envh01/

SUMMARIES OF THE ACTIVITIES OF OUR WORKING GROUPS

Working Group on Global Geochemical Baselines

by David B. Smith, Co-Chair

The IUGS/IAGC Working Group on Global Geochemical Baselines is currently quite active throughout the world. Most of the current effort is centered on Europe where approximately 27 countries are actively participating in sampling and chemical analysis to establish the global geochemical reference network for that portion of the world. This activity has been formally recognized by the Directors of the Forum of European Geological Surveys (FOREGS) and an official FOREGS Geochemical Baseline Working Group has been established under the leadership of Prof. Reijo Salminen of the Geological Survey of Finland. The databases and maps generated by the FOREGS working group will be Europe's contribution to the IUGS/IAGC working group. The specific goals include: 1) Collect, analyze, and store several sampling media (stream sediments, flood plain sediments, overbank sediments, soil, water, and humus) from the global reference network cells throughout Europe; 2) Normalize national geochemical data sets across national boundaries using results from the global reference network; and 3) Publish a geochemical atlas of Europe. The sampling and analysis should be completed this year (2000) and the atlas is scheduled to be published by the end of 2001. We will have a joint business meeting of both the IUGS/IAGC and FOREGS working groups in Athens this November to discuss progress of the European effort to make plans for interpreting the results, and to discuss the specifics for publishing the geochemical atlas. Elsewhere, many countries are initiating pilot studies for implementing the recommendations from the IUGS/IAGC Working Group. For example, India, Morocco, South Africa, Columbia, Brazil, and Botswana are conducting geochemical mapping programs based on IUGS/IAGC methods. The CCOP has agreed to act as coordinator for the southeast Asian countries in the same way that FOREGS acts as coordinator for the European countries. Prof. Jane Plant and Dr. David Smith, co-leaders of the IUGS/IAGC Working Group, along with Dr. Carlow Alberto Lins of the Geological Survey of Brazil, convened a symposium on Geochemical Mapping at the 31st International Geological Congress (IGC) in Rio de Janeiro in August, 2000. Thirty-two abstracts were submitted for the symposium and were presented as posters. In addition, five keynote lectures were presented by members of the Working Group. An informal meeting of the Working Group was held in Rio de Janeiro primarily to generate interest among IGC attendees who may not be familiar with the group's activities.

The IUGS/IAGC Working Group maintains a web site at: http://www.bgs.ac.uk/argg/iugs/iugshome.htm/. Dr. David B. Smith can be reached at U.S. Geological Survey, Denver Federal Center, Box 25046, MS 973, Denver, CO 80225, USA. Phone: 303-236-1849, FAX: 303-236-3200, email: dsmith@usgs.gov.

Working Group on Thermodynamics of Natural Processes

by German Kolonin

The participation of this WG and its members in the Joint International Symposium on Hydrothermal Reactions-VI and International Conference on Solvo-Thermal Reactions-IV was the main event of the year 2000. About 250 participants from 16 countries attended this meeting. IAGC was one of the cosponsors and provided financial assistance to its Organizing Committee.

In spite of the technological character of the Program, the geochemical contributions were sufficiently variable and representative. In particular, the following authors made remarkable presentations:

- M. Azaroul (BRGM) and J. Dubessy (CNRS), France;
- K. Hayashi (Tohoku Univ.) and Bignal et al. (Tohoku Univ.) Japan;
- G. Kolonin, Yu. Laptev, G. Palyanova, G. Pavlova (UIGGM), and G. Bondarenko (IEM), Russia;
- S. Lvov (Penn. State Univ.), D. Palmer and D. Wesolowsky (Oak Ridge NL), USA;
- M. Huber (Ludw.-Maxim. Univ.), G. Schnedier (Univ. of Bochum) and S. Zuern (YTONG Center), Germany; and
- O. Suleimenov (ETH-Zentrum), Switzerland.

Unfortunately, some WG members (K. Shmulovich, Russia/UK; R. Zhang, China) were unable to attend. The annual meeting and discussions among the members of the WG on TNP were informative and useful.

The next event of our WG being discussed presently is participation in WRI-10 Symposium (Italy, June, 2001). We are proposing an Interdisciplinary Symposium "Thermodynamics and Kinetics of Water-Rock Interaction" with WRI-10. This proposal is supported actively by the Organizing Committee of WRI-10.

In view of the increasing efforts for physical-chemical descriptions of hazardous components and radionuclides in repositories of mining and nuclear wastes, the possible formation of a sub-group on Thermodynamic Modeling of Environmental Pollution (TMEP) is being considered.

New Geochemistry Book

Schulz, H.D. and M. Zabel, eds. 2000. Marine Geochemistry, 455 pages, 241 Figures and 23 Tables. Springer Verlag, Heidelberg, Germany.

Working Group on Geochemistry and Disease

by Robert Finkelman

The Working Group on Geochemistry and Disease helped to sponsor the 6th International Symposium on Metal Ions in Biology and Medicine held in San Juan, Puerto Rico in May of 2000. Our Working Group developed a short course on Metal Ions in Environmental Health and Disease. The course had the highest attendance (more than 50 attendees) of the five courses that were offered. The Working Group also sponsored Myoung-Jin Kim, a student in the School of Public Health at the University of Michigan, to enable him to present a paper on: "Arsenic Dissolution and Speciation in Groundwater of Southeast Michigan."

The members of the Working Group have agreed to develop a series of Symposia on the health impacts of geologic materials at a regularly scheduled international conference. For the first symposium (theme to be determined) we selected the International Symposium on Environmental Geochemistry to be held in Edinburgh in 2003. The Symposium is sponsored by IAGC and SEGH.

Our Working Group is trying to bring together groups with a common interest in health issues caused by geologic materials. We believe that holding joint meetings will benefit each organization by bringing together the largest possible group of experts to exchange ideas and initiate collaborations. Olle Selinus, Chair of the Cogeoenvironment Working Group on Medical Geology, has expressed interest in the concept and an officer from the Society of Environmental Geochemistry and Health has also been approached with this idea.

Several members of our Working Group will be attending an IGCP-sponsored workshop on Medical Geology in Uppsala, Sweden in September.

Catastrophic Events and Mass Extinctions: Impacts and Beyond, Vienna July 9-12, 2000

Christian Koeberl, Convener

The international conference on "Catastrophic Events & Mass Extinctions: Impacts and Beyond" was held at the University of Vienna from Sunday, July 9 to Wednesday, July 12, 2000. The meeting was co-sponsored by the Working Group on Meteoritics and Cosmochemistry of the International Association of Geochemistry and Cosmochemistry (IAGC), the ESF Impact programme, as well as by about a dozen other national and international organizations and companies. The meeting started on Sunday with registration, a public lecture, and a welcome party at the Geological Survey of Austria, Rasumofskygasse 23, A-1030 Vienna. Oral and poster sessions were held Monday to Wednesday at the "Geozentrum" (UZA II) of the University of Vienna, Althanstrasse 14, 1090 Vienna. This building houses all earth science institutes of the University of Vienna, as well as a library and various lecture halls. Oral sessions were held from 8:30 - 12:30 and from 13:45 - 18:00 or 18:30, with a half-hour coffee break during each session. Lunches were served at the nearby University cafeteria. A four-hour poster session (with sandwiches, wine, and other refreshments) was held next to the lecture hall on Monday afternoon (July 10, 2000) from 15:00 to 19:00 (in reality, 20:00). Posters were on display throughout the duration of the meeting and proved to be very efficient and interactive.

This conference was the fourth of an informal series of meetings on mass extinctions and global catastrophes, including the geological and biological consequences of large-scale impact events. The first two meetings were held in 1981 (October 19-22) and 1988 (October 20-23) at Snowbird, Utah. The third took place in 1994 (February 9-12) in Houston, Texas. The main focus of the Vienna meeting was the question whether high-energy events influence the biological evolution on the Earth and the duration of such effects. Various mass extinctions of different intensities mark some of the geological boundaries. Other short-term events (e.g., Proterozoic Snowball Earth, late Devonian, late Eocene) in the stratigraphic record of the Earth also received attention because their study helps to understand impact events and their influence on the environment. At the Vienna meeting, a series of invited and contributed talks and posters summarized the current state of knowledge of the character and causes of mass extinctions and catastrophic events in the history of our planet. Extensive discussions helped to define and clarify the problems.

A wide variety of topics was covered including: 1) K/T boundary: the marine record; 2) K/T boundary: the terrestrial record; 3) K/T boundary melange; 4) the Chicxulub impact structure; 5) Snowball Earth/late Eocene record; 6) Permian/Triassic boundary; 7) Carbon cycle early Paleocene record; 8) Catastrophic event markers; 9) Causes of extinctions; 10) Impact volcanism/environmental effects; and 11) Impacts and beyond. The posters reflected the same variety of themes and contributions. The main topics were reviewed by 28 invited speakers from Europe and North America who presented 20-minute oral review talks. In total, 65 oral presentations were given: in addition to the invited reviews, 5-minute-summary presentations were selected from all contributed papers. This format allowed for presentation of a variety of topics and results within the three-day timeframe of the meeting and left plenty of time for discussion, which proved to be very efficient. In addition, 118 poster presentations were made at the conference.

The meeting was attended by 221 persons from 33 countries from all over the world, ranging from Argentina to the USA, from Belarus to South Africa. The largest contingent by far came from the U.S.A. with 60 participants, followed by Germany, Austria,

England, France, Italy, and Japan. Of the total number of participants, 34 were students. Many participants came from developing countries in Europe and elsewhere around the world. Funds received from the ESF Impact programme, the Austrian Ministry of Education, Science, and Culture, and the Barringer Crater Company were used to issue 39 travel grants for participants from developing countries (researchers and students) and for students and a few other participants from ESF member countries. The grant from the International Association of Geochemistry and Cosmochemistry (IAGC) helped to fund invited speakers.

Four geological field trips on the topic of the meeting were offered, of which three were well subscribed and took place as planned. There was a 4-day pre-meeting field trip to the Ries and Steinheim impact structures in Germany and K/T boundary sites in Austria, as well as a 4-day post-meeting field trip to the classical K/T boundary and late Eocene impactoclastic layers in central Italy.

The proceedings of the meeting will be edited by C. Koeberl (Univ. of Vienna) and Ken MacLeod (Univ. of Missouri); the deadline for submission of manuscripts is October 1, 2000.

Working Group on the Geochemistry of the Earth's Surface

by Blair Jones

Some planning has begun for the GES-6 meeting in Hawaii in August of 2002, though exact dates have not yet been chosen. Fred Mackenzie, the meeting organizer, has started arrangements for a field trip concerning soils and climate effects on the big island to be led by Oliver Chadwick. I hope to get together with other key non-U.S. participants of our group at the Water-Rock Interaction meeting in Sardinia in June. Following the WRI-10 Meeting in Sardinia, I will fly to Madison, Wisconsin, to become President of The Clay Minerals Society.

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