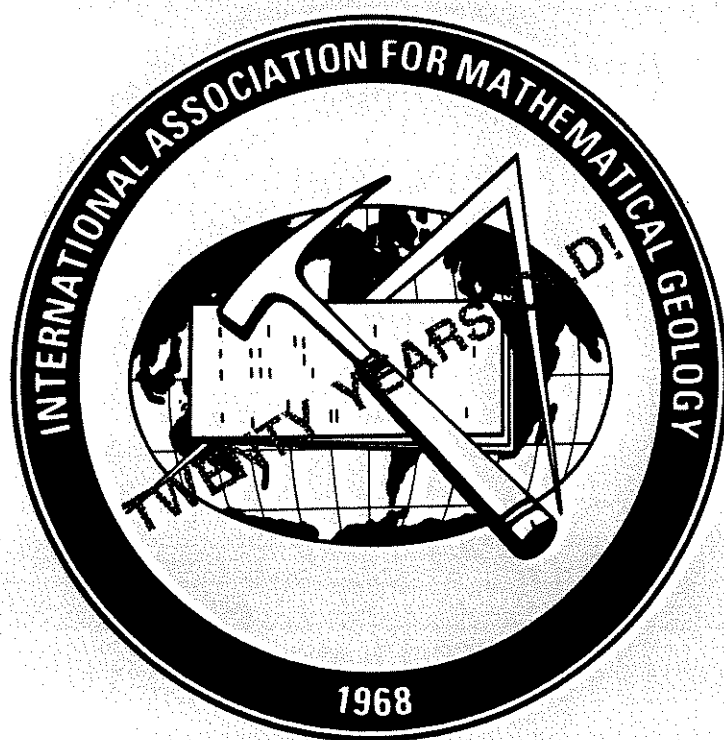


INTERNATIONAL ASSOCIATION  
FOR MATHEMATICAL GEOLOGY



# NEWSLETTER

MARCH 1990 ISSUE NO. 40

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JAMES R. CARR

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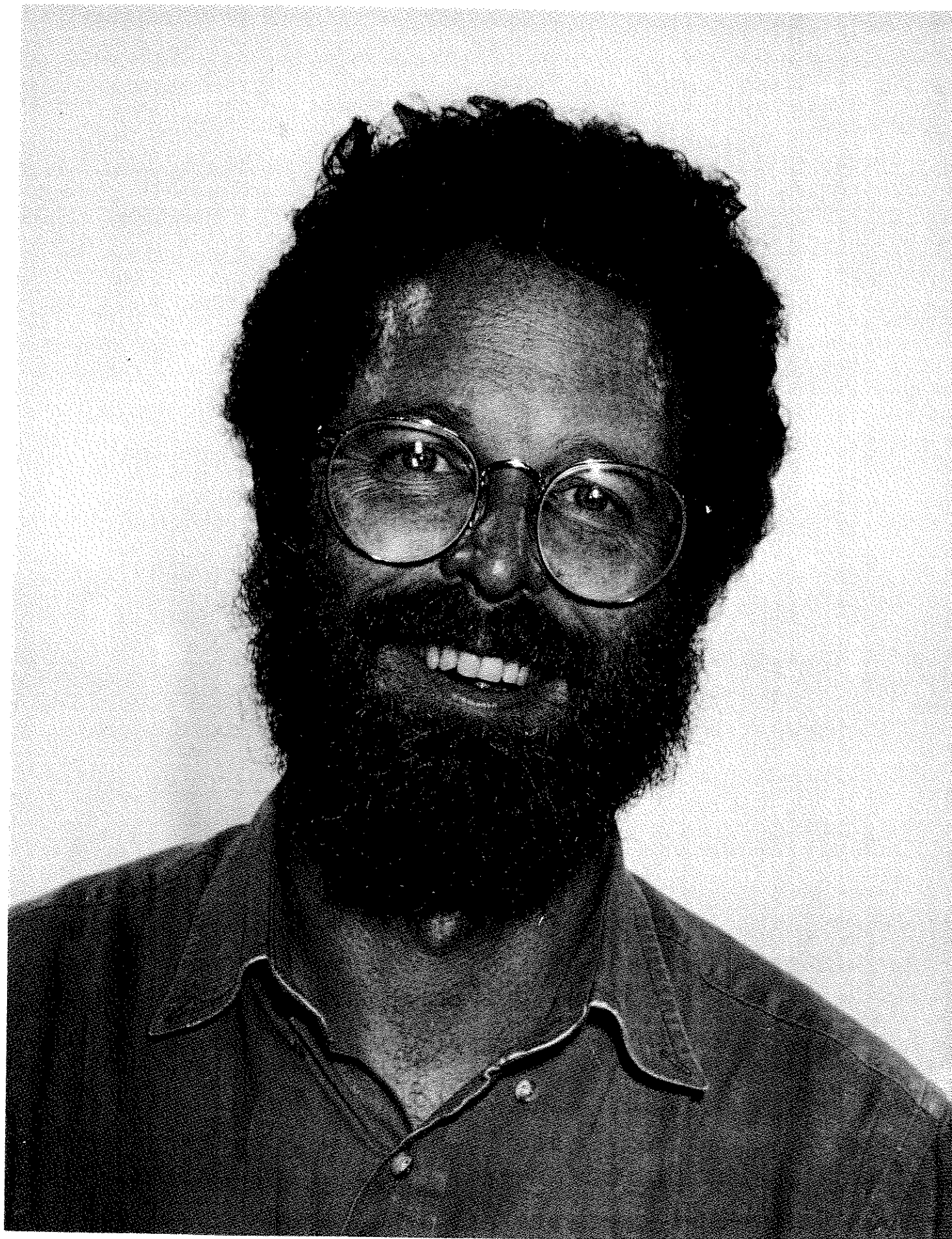
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DR. PAUL T. DELANEY

**PAUL DELANEY RECIPIENT OF 1988 BEST PAPER AWARD IN C & G**

The Best Paper Award for 1988 in Computers and Geosciences has gone to **Dr. Paul T. Delaney**, United States Geological Survey, Hawaiian Volcano Observatory. Dr. Delaney won the award for his paper entitled, "FORTRAN 77 Programs for Conductive Cooling of Dikes with Temperature-Dependent Thermal Properties and Heat of Crystallization." The abstract and Key Word index for this paper are reproduced below:

**Abstract**-Temperature histories obtained from transient heat-conduction theory are applicable to most dikes despite potential complicating effects related to magma flow during emplacement, groundwater circulation, and metamorphic reaction during cooling. Here, machine-independent FORTRAN-77 programs are presented to calculate temperatures in and around dikes as they cool conductively. Analytical solutions can treat thermal-property contrasts between the dike and host rocks, but cannot address the release of magmatic heat of crystallization after the early stages of cooling or the appreciable temperature dependence of thermal conductivity and diffusivity displayed by most rock types. Numerical solutions can incorporate these additional factors. The heat of crystallization can raise the initial temperature at the dike contact,  $[\theta_{ci}]$ , about 100 Celsius above that which would be estimated if it were neglected, and can decrease the rate at which the front of solidified magma moves to the dike center by a factor of as much as three. Thermal conductivity and diffusivity of rocks increase with decreasing temperature and, at low temperatures, these properties increase more if the rocks are saturated with water. Models that treat these temperature dependencies yield estimates of  $[\theta_{ci}]$  that are as much as 75 Celsius beneath those which would be predicted if they were neglected.

**KEY WORDS:** Numerical analysis, Finite-difference method, Dikes, Heat Conduction, Igneous intrusion, Contact metamorphism.

**REF:** Delaney, P. T., 1988, FORTRAN 77 programs for conductive cooling of dikes with temperature-dependent thermal properties and heat of crystallization, Computers and Geosciences, Vol. 14, No. 2, pp. 181 - 212.

COGEODATA: INTERNATIONAL UNION OF GEOLOGICAL SCIENCES  
ANNUAL REPORT FOR 1989

A report is presented on COGEODATA for 1989. This report is written by G. Gaal, Chairman of COGEODATA, of the Geological Survey of Finland and is submitted to the IUGS Secretariat. It is reproduced herein for members of IAMG:

ANNUAL REPORT

1989

SUMMARY

The topics of emphasis in the **research program** for 1988 were geoscientific digital maps and geographic information systems (Colloquim held in September 1989 in Würzburg, FRG). In the **regional program** the focus of interest was on computer applications in mineral resource studies as reflected in symposia held in April 1989 in Caracas, Venezuela and in October 1989 in Pribram, Czechoslovakia.

An updated report on "**Computerized Database on Current International Research in Geosciences**" was distributed among pertinent IUGS bodies, and an experimental test file utilizing dBaseIII on PC. For further developing the project a joint COGEODATA-COGEODOC Working Group on Data Sources and Data Integration has been formed.

On the initiative of the IUGS Advisory Board and USGS a new COGEODATA **Subcommission on Global Data Management and Information Systems** (SGDMIS), Chairman James E. Biesecker, has been founded.

For the **next year** Scientific meetings and symposia are planned in Canada, GDR, FRG, China and Japan.

1. Title of Constituent Body:

COGEODATA

Commission on Storage, Automatic Processing, and Retrieval of Geological Data

2. Overall Objectives:

(1) To assess computer-oriented information technology and to encourage its worldwide application to the management and interpretation of geological data.

(2) To facilitate the collection, compilation and communication of computer-processable geological data.

(3) To promote general awareness of digital data and other information resources in geology.

(4) To provide advice and training assistance within the scope of COGEODATA's objectives and activities.

3. Fit Within IUGS Science Policy:

To assist IUGS, COGEODATA

(1) acts as **advising body** in the field of computer applications in geosciences,

(2) is establishing a **Computerized Database on Current International Research in Geosciences** for maintaining the overview on worldwide geologic activities,

(3) develops international standards in **computer oriented methodology** in spatial information technology, resource exploration data and environmental geology, and

(4) organizes symposia and workshops to facilitate **international cooperation** within the field of COGEODATA objectives.

4. Organization:

The **Research Program** of COGEODATA is carried out by its working groups and its **Regional Development Program** is coordinated by Regional Representatives. **Special Research Programs** are carried out in cooperation with geological surveys and with other IUGS commissions.

Organizational matters have been the major topic of COGEODATA during the 18th International Geological Congress in Washington, D.C. During its business meeting on July 12, 1989 the Executive Committee approved several changes in the organization which have been announced in the COGEODATA General Assembly on July 17, 1989.

- A new **COGEODATA Subcommittee on Global Data Management and Information Systems (SGDMIS)** has been founded, Chairman James E. Biesecker (U.S.A.). SGDMIS will report simultaneously to IUGS Executive Secretary and to COGEODATA Chairman.
- Former Working Group 4 on Data Sources has been reshaped to form a joint **COGEODATA - COGEODOC Working Group on Data Sources and Data Integration**. Chairman of the joint working group is J. Hruska who remains an Executive Member of COGEODATA. The activity of the joint COGEODATA-COGEODOC Working Group is steered by the chairmen of both commissions. Costs will be shared between the two commissions on equal basis.
- G. Gabert resigned as Chairman of Working Group 1 **Spatial Information Technology** but remains as Secretary-Treasurer. New Chairman of Working Group 1 is Horst Preuss (FRG).
- A new Working Group on **Energy Resource Data** has been formed, chaired by J. Harff (GDR).
- A new Working Group on **Dataprocessing and Computer Application in Environmental Geology** has been formed chaired by Fredrik Wolff (Norway).
- The Chairman of Working Group 2 on **Exploration Data and Interpretation** P. Leymarie (France) resigned and this Working group has been merged with **Working Group 2 on Resource Data and Resource Assessment** chaired by F. Agterberg (Canada) who replaces G. Raines (U.S.A.)
- New **Regional Representatives** have been nominated.

**The new Executive Committee of COGEODATA 1989-1992:**

Chairman: G. Gaál, Finland

Vice-Chairman: D. Rodionov, U.S.S.R.

Secretary-Treasurer: G. Gabert, FRG

**Working Group Chairmen:**

H. Preuss, FRG (WG 1 on Spatial Information Technology)

F. Agterberg, Canada (WG 2 on Resource Data and Resource  
Assessment/Exploration Data and Interpretation)

J. Harff, GDR (WG 3 on Energy Resource Data)

F. Wolff, Norway (WG 4 on Dataprocessing and Computer Applications  
in Environmental Geology)

**Associated bodies:**

J. Hruska, Czechoslovakia, Chairman of COGEODATA-COGEODOC  
Joint Working Group on Data Sources and Data Integration.

J. Biessecker, Chairman of Subcommittee of Global Data Management  
and Information Systems (SGDMIS)

**Regional Representatives:**

T. Albert, U.S.A. for North America

J. Harff, GDR for Eastern Europe

N. Nishiwaki-Nakajima for Japan

Zhao Pengda, China for Asia

Carlos Alfredo Guimaraes da Vinha, Brazil for South America

5. Extent of National/Regional/Global Support:

On the national level COGEODATA is chiefly supported by geological surveys or related organizations. On regional and global levels, COGEODATA is supported by regional groups for North America, South America, East European countries and Asia.

6. Interface with Other International Projects:

- With COGEODOC in a Joint Working Group on Data Sources and Data Integration.

- With the IUGS/UNESCO on **Mineral Deposit Modelling Program**: two members of COGEODATA were in the Steering Committee (Gaál and Sinding-Larsen).
- With the **Circum-Atlantic Project (CAP)**, IUGS.
- With the **International Association of Mathematical Geology (IAMG)** in the field of computerized mathematical applications in joint symposia.
- With IUGS Subcommittee on **Data Bases for Petrology/IGC 239 (Sedimentary Databases)**.
- With **Small Mining International** in constructing a world-wide databank for small-scale mining.

"Last Year"

7. Chief Accomplishments Last Year:

**The fifth South American COGEODATA Symposium** took place in Caracas, Venezuela from 20 to 22 April 1989. It was organized and sponsored by the Ministry of Energy and Mines and the Central University of Venezuela, Petróleos de Venezuela S.A., Sociedad Venezolana de Ingenieros Geofisicos and Corporacion Venezolana de Guayana. The papers presented dealt with the following subjects:

- digital maps and interactive cartographic systems in mineral exploration
- geological map analysis and geological modeling
- databases and database management systems in exploration and exploitation
- mineral deposit modeling and resource assessment
- geoinformation systems in resource assessment
- computer-based interpretation of seismic data
- geostatistic methods for lithologic discrimination.

The symposium, which started with an overview on COGEODATA's developments and achievements during the last ten years, was characterized by the high standard of presentations and lively discussion. About 90 professionals from North- and South American, European and Mediterranean countries participated and considered this symposium as most useful forum for the exchange of results in the field of computer applications to mineral and energy resource exploration.

WG 1 on Spatial Information Technology was involved in the organisation of international symposia in Hannover and Würzburg, and contributed to their subjects "Hydrogeological Maps as Tools for Economic and Social Development" held on May 29-31 in Hannover, and "Digital Maps in Geosciences" held on September 9-11, 1989 in Würzburg, FRG. The new chairman of the COGEODATA Working Group on Spatial Information Technology participated in the NATO Study Institute on 3-D-Modelling and 3-D-GIS in Santa Barbara, U.S.A., in December 1989.

The secretary represented COGEODATA at the International Unesco-INQUA-CGMW Workshop on Environmental Geological Maps in Santander, Spain 1-6, November 1989, and reported on the application of computer-assisted methods for the construction and display of geoscientific maps.

For the Joint Working Group of COGEODATA and COGEODOC on Data Sources and Data Integration: See Appendix 1.

Regional Group for Eastern Europe held its 2nd Plenary Session on October 18, 1989 in Pribram, Czechoslovakia. One of the main objectives of the group is the promotion of young scientists engaged in geoinformatics and mathematical geology. Annual scientific meetings are planned in Güstrow, GDR 1990, in Czechoslovakia 1991 and in U.S.S.R. 1992. See Appendix 2.

9. Chief Products (eg. publications, maps) Last Year:

J. Hruska: Twenty years of COGEODATA 1967-1987. Prague, December 1988, 32 p.

A report on "Computerized database on current international research in geosciences" was prepared in January 1989 and distributed for critical examination to pertinent IUGS bodies and officers. Simultaneously, an experimental testing file - using dBaseIII plus and PC equipment was prepared for presentation and discussion at the COGEODATA and COGEODOC sessions during the 28th IGC in Washington D.C.

10.	<u>Summary Expenditures Last Year:</u>		USD
	IUGS Allocation 1989		7000.-
	<u>Expenditures 1989</u>		
	V. COGEODATA South-American Symposium, Caracas:		
	D. Merriam	500.-	
	D. Harris	1000.-	
	D. Gill	1000.-	
	G. Gabert	<u>1500.-</u>	
		4000.-	4000.-
	28. IGC Washington:		
	J. Hruska	500.-	
	I. Somos	<u>250.-</u>	
		750.-	750.-
	COGEODATA-DFG Symposium, Würzburg:		
	F. Wolff	700.-	
	J. Harff	<u>550.-</u>	
		1250.-	1250.-
	WG 1		500.-
	Secretariat expenses: letterheads		<u>500.-</u>
		Total expenditures	7000.-
			"Next Year"

11. Work Plan for Next Year:

Cosponsoring (together with SMI - Small Mining International) a workshop on **International Information System on Small-Scale Mining** during the 4th International Conference on Geoscience information - GEOINFO IV on June 24-29, 1990 in Ottawa, Canada. (Representant of COGEODATA: J. Hruska).

International symposium on **Computerized Basin Analysis** on June 19-22, 1990 in Güstrow, GDR, June 19-22, 1990. (Organized by Regional Group for Eastern Europe: J. Harff)

Cosponsoring (together with Geological Institute of the University of Freiburg, AAPG, Deutsche Forschungsgemeinschaft, IAMG and the Society of Economic Paleontologists and Mineralogists) a symposium on **Three-Dimensional Computer Graphics in Modeling Geologic Structures and Simulating Geologic Processes** to be held on October 7-11, 1990 in Freiburg, FRG.

Cosponsoring (together with IAMG) an international workshop on **Statistical Prediction of Mineral Resources** to be held on October 20-25, 1990, Wuhan, China.

Sponsoring an international meeting on **Automated Integration Methods in Mineral Exploration**, organized by Mining and Mineral Processing Institute of Japan in Tokyo and Tsukuba, Japan, October 29 - November 2, 1990. (Representant of COGEODATA: Niichi Nishiwaki)

15. Summary Budget for Next Year:

Research Program:

Working Group 1, 2, 3, 4	4000.-
Joint COGEODATA-COGEODOC WG (Half of the	expected
	expenditures)
	4500.-
Symposium on Energy Resources Data in Güstrow,	
June 1990	1000.-
Workshop on International Information System on	
Small-Scale Mining	1000.-

Development Program:

Workshop on Mineral Resources Data in Wuhan, 1990	<u>1000.-</u>
	USD 11500.-

16. Potential Funding Sources Outside IUGS:

Host organizations of the members (mostly geological surveys)

"Last and Next 5 Years"

17. Review Chief Accomplishments/Results Over the Last 5 Years:

COGEODATA Research Program: International Colloquia/Symposia were conducted on the subjects "digital geoscientific maps" (FRG 1986 and 1989), "exploration data in geosciences" and "microcomputers in geosciences" (France 1985 and 1986), "computer applications in resource exploration" (Finland 1988).

Computer-assisted methods for basin analysis were the subject of a COGEODATA conference in Hungary (1987).

COGEODATA Regional Development Program: The 3rd, 4th and 5th South-American COGEODATA Symposia, held in Peru (1985), Brazil (1987) and Venezuela (1989), dealt with computer applications for resource assessment in the Latin American region.

A joint COGEODATA/IGCP 247 seminar held in Tanzania (1987) concerned computerized mineral assessment methods applied to metallogenic provinces in Africa.

The Regional Group of Eastern Europe was founded in 1987 comprising 8 countries. It aims at the realisation of the COGEODATA research and development program in Eastern Europe.

The joint COGEODATA/COGEODOC Working group presented the compilation of a worldwide inventory of geoscience databases at the 28th IGC in Washington/USA.

COGEODATA contributed considerably to the Unesco/IUGS Deposit Modeling Program and to the planning of the IUGS Circum-Atlantic Project.

18. Summarize Anticipated Objectives and Work Plan for the Next 5 years:

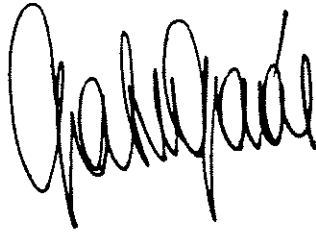
Establishing the **Computerized Database on International Geoscientific Research Projects** by the joint COGEODATA-COGEODOC Working Group.

Initiate and conduct a research program on **Computer Applications in Environmental Geology**.

Meetings:

For 1990 see point 11.

Plans are being made for participation in the 29th IGC in Japan 1992. Besides COGEODATA Business Meeting and General Assembly, COGEODATA will sponsor symposia concerning data processing in geosciences.



Signature:

G. Gaál

Position:

Chairman of COGEODATA

Date:

30. November, 1989

Address:

Geological Survey Finland  
SF-02150 ESPOO  
Finland

Submitted to  
IUGS Secretariat  
Geological Survey of Norway  
P.O. Box 3006  
N-7002 Trondheim, Norway

## 29th IGC Councillor's Report: Nishiwaki-Nakajima

The scientific program for the 29th International Geological Congress to be held in Kyoto, Japan in 1992 is taking shape. Based on the preliminary recommendations and suggestions by IAMG individuals and others, the proposed program is as follows:

### Section 22: Geomathematics and Geoinformation

#### A. Symposia for both oral and poster presentations

1. Computer simulation of geologic processes and events.
2. Computer graphics and 3-dimensional analysis in geoscience.
3. Mathematical and statistical analysis of geological data.
4. Integration of data processing in geosciences.

#### B. Symposia only for poster presentation

5. Management of geoscience data: tools and techniques.
6. Digital mapping in geosciences.

### Multidisciplinary Symposium (proposed by Section 22)

- I.48. Application of artificial intelligence in geosciences.

### Symposia related to Section 22

(\* means that the symposium is only for poster presentation.  
Others are for both oral and poster presentation.)

- Sp.B.2. Prediction of natural hazards and environmental protection.  
Sp.B.4. Geological disposal of radioactive and hazardous wastes.  
I.11. Remote sensing methods for evaluation of natural hazards and environments.  
I.46. Contaminant transport: Modeling and case studies.  
I.47. Concept and method of mapping in applied geosciences.  
I.49. Development of new technology in geosciences.\*  
D.1.6. Quantitative stratigraphy: New developments in lithostratigraphy and biostratigraphy. (Originally proposed by Section 22, but organized by Section I.)  
D.16.6. New exploration methods for blind ore deposits.  
D.17.7. Advanced methods of petroleum exploration.  
D.21.4. Prediction and reduction of geologic hazards.  
D.23.1. Remote sensing in exploration geology.  
D.23.2. Integrated analysis and interpretation of remotely sensed data.  
D.23.4. Remote sensing: Frontier and future system.\*  
D.24.1. Application of new technology in geologists' training.

It is important to note that the above program is only preliminary. The final program will be decided by the Scientific Program Committee of the 29th IGC of which Professor Wadatsumi and myself are members of the Committee for Section 22 on geomathematics and geoinformatics. The final version of the Scientific Program will be determined based on the replies to the 1st Circular now being printed and scheduled for mailing before the end of March. The replies to the 1st Circular should be received before **July 15, 1990**.

### **IMPORTANT!**

**Symposia with many replies will be accepted, and Symposia with few replies will be rejected. New proposals will also be accepted, if many replies request the new one. It is important that everyone respond to the 1st Circular. The more favorable replies that are received the more likely our programs will be accepted.**

The 1st Circular will be sent to all participants of the 28th IGC and major organizations in the world. To request the 1st Circular, a letter, telefax, or telex, should be sent to:

IGC 92 Office  
P.O. Box 65  
Tsukuba, Ibaraki  
305 JAPAN  
Telefax: +81-298-54-3629  
Telex: 3652511 GSJ J

(IAMG President McCammon's note: I have instructed the IAMG Treasurer, John Kork, to send the list of names of current IAMG members to the above address. By doing this, the 1st Circulars will also be sent to the Treasurer, not by air mail, but by surface mail which will take about one month to be received. We will mail these to members when they are received.)

## **IAMG ARCHIVE ESTABLISHED**

An Archive has been established at the Kansas Geological Survey Library for preserving the documents, letters and correspondence of the International Association for Mathematical Geology (IAMG). The offer to establish this Archive was made by **Dr. Lee C. Gerhard**, Director of the Kansas Geological Survey. **Dick McCammon** has asked **Dan Merriam** to serve as Archivist Pro-tem.

## **IAMG: TWENTY YEARS YOUNG AND GROWING!**

The International Association for Mathematical Geology was organized in 1968 at the 23 International Geological Congress held in Prague, Czechoslovakia. Today, IAMG has grown to incorporate over 550 individual members. To maintain this growth in IAMG, new members are always appreciated. A membership form is included at the end of this Newsletter. If every reader solicits one new member ...

## **IAMG PRESIDENT'S PRIZE FOR 1988 AND 1989**

We are accepting nominations for the President's Prize for exceptional contributions of mathematics to geology for the years 1988 and 1989. Conditions of the prize include: 1) the nominee shall have made through publication an original and outstanding contribution to the application of mathematics to the geological sciences, and 2) the nominee shall be 35 years or younger for 1989 (36 years or younger for 1988) at December 31, 1989.

Please send the names of candidates to:

**Dr. Chang-Jo F. Chung**  
Committee for 1988 and 1989 IAMG President's Prize

Postal address: Geological Survey of Canada  
601 Booth Street  
Ottawa, Ontario, Canada K1A 0E8  
Bitnet address: CHUNG@EMRCAN.BITNET  
Telefax number: 613-996-9990  
Voice number: 613-996-3413

## **ONCE AGAIN, IT IS TIME TO STAND UP AND BE COUNTED**

A survey form is included at the back of this Newsletter from **John Butler**, University of Houston. This form solicits personal and professional information from IAMG members. A similar survey was completed by John in 1986 and was published in Computers and Geosciences. The present survey is designed to update the information obtained in the 1986 survey. Please take the time to complete the form. Once complete, please return the form to John; his address is included at the bottom of the form.

REQUEST FOR NOMINATIONS FOR EDITORIAL BOARD FOR NEW JOURNAL

It is proposed that a journal be started by the International Association for Mathematical Geology that has, as its objective, the analysis of non-renewable natural resources. The journal would invite contributions on papers dealing with analytic studies on the size, distribution, and character of these resources, and those aspects which relate to assessment, exploration, discovery, and extraction. This is a broad-based area of research which is not fully recognized worldwide. The idea is to provide an international forum for contributions in this field. Presumably, the journal would start as a quarterly; later, should the number of acceptable manuscripts dictate, a bi-monthly, and perhaps eventually, a semi-quarterly, the same as our other two journals, Mathematical Geology and Computers & Geosciences.

	Name	Country	Area of Specialization
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

Suggested by:

Return to: Richard B. McCammon  
President, IAMG  
U.S. Geological Survey  
National Center 920  
Reston, VA 22092 USA

FORTHCOMING ARTICLES: COMPUTERS AND GEOSCIENCES

Vol. 16, No. 5, 1990:

FEGO: a two phase finite-element program for miscible recovery processes in porous media, by G. Gottardi and E. Mesini

FE2DY: a finite element FORTRAN program for the solution of the shallow-water equations with energy conservation, by J. Steppeler

GEDEMON: a FORTRAN 77 program for restoration and derivative processing of digital image data, by D. R. Peddle and S. E. Franklin

An algorithm for generating spatially autocorrelated unsaturated flow properties, by S. Mishra, J. C. Parker, and J. L. Zhu

Efficiency of different equation solvers in cokriging, by J. R. Carr and D. E. Myers

FISHER: a turbo Pascal unit for optimal partitions, by M. B. Lindberg

Cova functions for unevenly and noncorrespondingly spaced processes, by U. C. Herzfeld

GREETINGS FROM VACLAV NEMEC

A message is received from Dr. Vaclav Nemeč, Eastern Treasurer of IAMG, and is reproduced below:

"THE MINING PRIBRAM SYMPOSIUM - CZECHOSLOVAKIA:

The International Section on MATHEMATICAL METHODS IN GEOLOGY will be held again under the cosponsorship of the International Association for Mathematical Geology in October, 1991. Complete information with preliminary registration form will follow in May, 1990.

It is my pleasure to express deepest thanks to all 193 authors from 21 countries who prepared 120 contributions published in our Proceedings in October, 1989, as well as to 260 colleagues from 5 continents who took part in the meeting."

# ANNOUNCEMENTS

## POSTGRADUATE COURSES IN GEOSTATISTICS AT FONTAINEBLEAU

For the past ten years, the Centre de Geostatistique has been offering a postgraduate course in geostatistics. Its objectives have been twofold: to train geostatisticians to work in industry and to provide basic training in practical and theoretical geostatistics for young researchers who want to go on to do a doctorate. From October, 1990, onwards, the two groups will be separate. A DEA (doctoral qualifying course) will be available for those with a strong mathematical background who wish to do research in geostatistics; a specialized program in mining geostatistics called the CFSEG will be offered for those who are interested in applying mining geostatistics in a practical context.

Both courses are full-time for one academic year. The DEA is offered only in French; the CFSEG will be given alternately in English and French. The CFSEG program has two options (mining geostatistics and project planning) and is jointly organized by the Centres for Geostatistics and for Mining Engineering of the Ecole des Mines de Paris, at its Fontainebleau research laboratories.

For more information on these two postgraduate courses, please write to:

Centre de Geostatistique  
35 rue St. Honore,  
77305 Fontainebleau  
FRANCE

## SIAM: SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

A Conference Calendar for SIAM meetings, conferences, workshops, and short courses is included at the end of this Newsletter. This calendar includes a Reply Form for those interested in the various meetings.

## INTERNATIONAL SYMPOSIUM ON MINERAL EXPLORATION: THE USE OF ARTIFICIAL INTELLIGENCE, 1990

The Branch of Exploration Engineering (BEE) of Mining and Mineral Processing Institute of Japan (MMIJ) extends an invitation to attend a symposium on the use of Artificial Intelligence for Mineral Exploration. The following topics will be covered:

- 1) expert systems for resource exploration;
- 2) methods of artificial intelligence for resource assessment;
- 3) practical use of artificial intelligence in exploration;

- 4) others (fuzzy, pattern recognition, etc.).

Also, a one day short course on resource assessment will probably be held.

General Information:

- 1) Date: October 29 - November 2, 1990
- 2) Location: October 29 - October 31, 1990:  
The University of Tokyo;  
November 1 - November 2, 1990  
Geological Survey of Japan

The Preregistration fee for this conference is 50,000 yen (about \$350-US) until August 31, 1990. Moreover, Dick McCammon was able to have the deadline for abstracts extended to April 30, 1990.

All correspondence should be addressed to:

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Phone: +81-298-54-3637  
Fax: +81-298-54-3533

A Provisional Registration Form (2 pages) is included for your convenience at the end of this Newsletter.

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

Attached at the end of this Newsletter is a list of Symposia. Please review this list. If you feel that one or several of these meetings should be co-sponsored by IAMG, please contact Dick McCammon at his address shown at the front of this Newsletter.



McGILL UNIVERSITY  
Department of Mining and Metallurgical Engineering  
**Professional Development Seminars**

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**GEOSTATISTICS FOR NATURAL RESOURCES CHARACTERIZATION**

April 23rd - 27th, 1990  
Seminar Leader: R. Dimitrakopoulos

A five day seminar for mining and petroleum geologists or engineers involved in spatial modelling of geological variates. This seminar provides a comprehensive step-by-step presentation of the theory and practice of geostatistics. More specifically, it covers the basic data preparation and statistical description, spatial continuity of data and variogram analysis, point and block estimation, non parametric geostatistics, case studies, and a brief presentation of advanced topics including the estimation of non additive variables such as permeability, conditional simulations, space-time estimation and artificially intelligent geostatistics. Seminar participants will be using interactive software to experiment with the practical aspects of geostatistics on a variety of real data sets.

Invited lecturers for the seminar are Prof. K. Fytas of Laval University, who will be presenting non parametric geostatistics with applications on gold deposits, and Prof. M. David, a world wide expert, who will be presenting a series of case studies as well as an evaluation of the pros and cons of different techniques in real life situations.

**PROGRAM**

Monday - April 23rd:

- a.m. General Introduction and Course Outline.  
Sampling, Data Preparation, and Statistical Confidence.  
Data Descriptive Statistics and Effect on Estimation.  
Spatial Continuity.
- p.m. Introduction to Geostatistical Software Used in the Course.  
Computer Exercises on Descriptive Statistics (Gold, Uranium, Copper, Coal or Petroleum).

Tuesday - April 24th:

- a.m. Introduction to Random Functions.  
Geostatistical Models and Assumptions.  
Variogram Models and Inference.
- p.m. Computer Exercises on Variogram Calculation and Modelling.  
Modelling of Anisotropies.  
Variogram Interpretation.

Wednesday - April 25th:

- a.m. Ordinary Point and Block Kriging.  
Effect of Variogram on Estimation.  
Conditional Simulation.
- p.m. Case Study.  
Computer Exercises on Ordinary Kriging - Estimation of a Deposit.

---

for further information:

Department of Mining & Metallurgical Engineering  
McConnell Engineering Building

3480 University Street  
Montreal, PQ  
Canada H3A 2A7

Telephone: (514) 398-4583  
Fax: (514) 398-7099

Thursday - April 26th:

a.m. Introduction to Non Parametric Geostatistics.  
Indicator and Probability Kriging.  
Applications on Gold Deposits.

p.m. Computer Exercises on Indicator Kriging.

Friday - April 27th:

a.m. The Practice of Geostatistics.  
Comparative Geostatistical Case Studies.  
Evaluation of Geostatistical Techniques in Real Life Situations.

p.m. Estimation of Permeability.  
Space-Time Estimation.  
Artificially Intelligent Geostatistics.

**GENERAL INFORMATION**

**REGISTRATION**

Registration Fees **\$975**

The fees include course notes, coffee breaks, cocktail party, and a closing luncheon or dinner. The McGill Faculty Club and Currie Gym facilities will be made available to participants on request. Certificates for each seminar will be presented to participants who attend the entire seminar. **Cheques made payable to McGill University, in Canadian funds, should accompany the application.** All registrations will be confirmed. There is no cancellation charge provided the Department is notified at least ten working days in advance of the seminar. **If there is a withdrawal less than ten working days before the seminar, there will be a cancellation charge of one-third the seminar fee unless a substitute is provided. The full fee is payable if the registrant fails to attend without notice.**

Early registration is recommended. The Department reserves the right to limit registration to ensure effective discussion. In the event that a seminar is cancelled, participants will be notified at least one week prior to the beginning of the seminar.

**LOCATION**

McGill University is situated in the heart of downtown Montreal, near hotels, shops, restaurants and a metro (subway) line. All sessions will be held in the Department's seminar facilities in room 1612 at 550 Sherbrooke Street West, near the university campus, at the corner of Sherbrooke and Aylmer streets, in downtown Montreal.

Morning Session: 9:00 - 12:30      Afternoon Session: 2:00 - 5:15

**McGill University  
DEPARTMENT OF MINING AND METALLURGICAL ENGINEERING**

**REGISTRATION FORM**

Please register me in:

Seminar title **GEOSTATISTICS FOR NATURAL RESOURCES CHARACTERIZATION - APRIL 23-27, 1990**

Your name ..... First name (for name card) .....

Your position .....

Name, address, and postal code of company or organization .....

Fax or Telex .....

Business telephone .....

I enclose a cheque for \$ ..... (Cdn) payable to McGill University.

I will be sponsored by UN  CIDA  and enclose documents supporting my sponsorship.

Signed .....

Date .....

If you wish us to make a hotel reservation for you, please indicate the name of the hotel, the type of accommodation desired, and the dates of your arrival and departure.

Return to:  
**Lorna McFadden  
Department of Mining and Metallurgical Engineering  
McGill University  
3480 University Street  
Montreal, Quebec, Canada H3A 2A7**

**Tel.: (514) 398-4383  
Fax: (514) 398-7099  
Telex: 05-268510**

Second Announcement  
November 15, 1989  
Symposium and Alpine Field Excursion

### THREE-DIMENSIONAL COMPUTER GRAPHICS IN MODELING GEOLOGIC STRUCTURES AND SIMULATING GEOLOGIC PROCESSES

October 7 - 11, 1990  
Freiburg i.Br., West Germany

followed by an optional field geology excursion  
Lucerne and Zermatt, Switzerland  
October 12 - 14, 1990

Sponsored by  
Geological Institute of the University of Freiburg  
American Association of Petroleum Geologists  
COGEO DATA  
Deutsche Forschungsgemeinschaft  
International Association for Mathematical Geology  
Society of Economic Paleontologists and Mineralogists

**Theme:** The symposium will focus on the role of three-dimensional computer graphics in geology and geophysics, with emphasis on modeling and visualizing complex geologic structures. Stress also will be placed on use of dynamic graphic displays in two- and three-dimensional simulation models of geologic processes, including fluid flow and evolution of sedimentary basins.

**Schedule in Freiburg:** The initial meeting will be an "ice breaker" party on Sunday evening, October 7. The symposium itself will be held at the University of Freiburg, beginning October 8 and extending through Thursday, October 11. Oral presentations, panel discussions, poster sessions, and demonstrations will be featured. Demonstrations will include dynamic displays with graphic workstations, as well as conventional static displays. Ardent Computers, IBM, and Silicon Graphics are among manufacturers that probably will provide workstations for demonstrations.

**Presentations:** The response to the first announcement on April 15, 1989 was larger than expected, and as of October 15, 1989, almost 50 formal presentations have been offered, providing a wide range of topics. Since the number of oral presentations is limited to 50, the organizing committee must decide which will be accepted for oral presentation, and which for presentation in poster sessions or as demonstrations. Contributors will be informed of the status of their presentations on April 15, 1990. Guidelines for preparing extended abstracts and manuscripts will be distributed to contributors whose oral presentations, posters, or demonstrations are accepted.

**Alpine field geology excursion:** The field excursion is optional and involves travel to the central and western Swiss Alps on Friday through Sunday, October 12 - 14. It will provide an

introduction to the main Alpine structural units and their evolution in time and space. It will also link field observations of Alpine structures with three-dimensional graphic displays presented in Freiburg. The excursion will include the folded Jura, Helvetic geology of the Lake Lucerne area, the Aar and Gollhard external massifs, and the Pennine and Helvetic nappes of the Upper Rhone Valley. The excursion begins and ends in Freiburg. Overnight stops will be in Lucerne and Zermatt, with travel by bus. Strenuous walking will not be involved. Non-geologist spouses of participants in the field excursion may also wish to participate, but may be transported separately because of limited space at many of the outcrops.

**Travel to Freiburg:** Freiburg is a city of 180,000 people in the southwest corner of Germany, at the margin of the Black Forest. Basel airport is 40 kms distance. If one exits on the French side, and provides the closest trunk airport, Zurich (140 kms) and Frankfurt (290 kms) may be more convenient, however, because they provide overseas airport gateways. Hourly trains link Frankfurt and Zurich with Freiburg, and require about two hours travel time. Bus service between Basel airport and Freiburg is available, but is less convenient than train service to Frankfurt or Zurich. Persons traveling by bus or taxi from Basel airport should exit the airport on the French side and not on the Swiss side.

**Accommodations and costs:** Registrants should make reservations directly with Freiburg hotels. Information about hotels will be sent to symposium registrants on March 15, 1990. Freiburg hotel rooms range from 45 to 200 Deutsche Mark (DM) per day. Registration for the symposium in Freiburg is DM 200, and the excursion is DM 750, including transportation, hotels in Lucerne and Zermatt, breakfast, lunches, and guidebook. The exchange rate is roughly 2 DM per US Dollar, but varies.

**Publication of proceedings:** Pergamon Press will publish papers in a symposium volume within the series "Computers and Geology". Manuscripts must be submitted not later than the date of the symposium to be considered for inclusion in the volume. Specifications for manuscript will be provided later, and will involve submission of text in machine form.

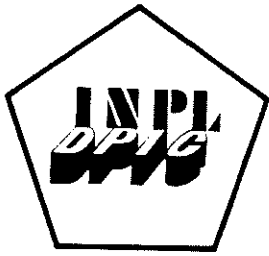
**Organizing committee:** The meeting is being organized by Professors Reinhard Pflug (University of Freiburg), Daniel F. Merriam (Wichita State University), and John W. Harbaugh (Stanford University). All correspondence should be addressed to

Prof. Reinhard Pflug  
Geologisches Institut der Universität  
Alberstrasse 23-B  
D-7800 Freiburg i.Br.  
West Germany

Telephone: 49 761 203 2410  
E-Mail: r.pflug@iugf.freiburg.de; rpl@iugf.freiburg.de  
Fax: 49 761 203 4122  
Telex: 772 740 65

**Response:** Persons interested in attending must return the enclosed registration form by March 1, 1990. Attendance at the sessions in Freiburg may be limited and participation in the field excursion is limited to 35 persons.





INSTITUT NATIONAL POLYTECHNIQUE DE LORRAINE  
DÉPARTEMENT DE PERFECTIONNEMENT  
DES INGÉNIEURS ET CADRES

N/réf. : FCE-O

Tuesday January 2nd 1990  
Nancy,

Dear Sir or Madam,

The CERCHAR, ITASCA-Consulting Group and DPIC are delighted to inform you of the organization of a short, high level course, in the field of Civil and Mining Engineering, wich will take place from March 26th to March 30th 1990, in Nancy (France).

This Course, (see presentation enclosed) has as principal aim to preseht the more recent developments in numerical modeling in the field of Civil and Mining Engineering, and is entitled : "Discontinuum Modeling of Jointed Rock Masses- Fundamental concepts and applications".

We would be grateful if you would contribute to the distribution of this information, either by an announcement in your bulletin or Newsletter, or any other way you would consider suitable.

If you require further information about this course, please, do not hesitate to contact us. We will do our best as quickly as possible.

We thank you in advance for your cooperation and look forward to hearing from you.

Yours sincerely.

M. PIGUET  
Head of Education

Tel : (33) 83 57 42 89

M. DURBET  
Coordinator

Tel : (33) 83 98 45 45

# P

## ROGRAMME

### SEMINAR-1

#### DISCONTINUUM MODELING OF JOINTED ROCK MASSES Fundamental concepts and applications

NANCY, 26-28 March 1990

##### MONDAY, 26 MARCH

**a.m. :** 11 h - Reception of the participants.

**Animator :** J.P. Pigué (Cerchar-Ecole des Mines)

- Introduction : numerical modeling in rock mechanics, state of the art.

**p.m. :**

**Animators :** H. Baroudi (Cerchar)  
D. Billaux (BRGM)

- Geometrical representation of a blocky rock mass. Different approaches, Resoblok software.
- Stability analysis of single blocks. Fundamental principles, contributions and limits of the method.

##### TUESDAY, 27 MARCH

**a.m. :**

**Animator :** R. Hart (Itasca)

- Mechanical behavior of a blocky rock mass. Discrete Element Methods : Distinct Element Analysis, Discontinuum Deformation Analysis, Modal Methods. Case studies with UDEC and 3DEC.

**p.m. :**

**Animators :** F. Homand (Ecole de Géologie)  
D. Billaux (BRGM)

- Discontinuity mapping methodology. Statistics of spacial data, contribution of geostatistics.
- Mechanical and hydraulic behavior of natural joints. Laboratory and field measurements.

##### WEDNESDAY, 28 MARCH

**a.m. :**

**Animator :** J.P. Pigué (Cerchar-Ecole des Mines)

- Block modeling applications to reinforcement design. Rock bolting, cable bolts, applications to underground excavations and rock slopes.
- Dynamic design considerations. Induced and natural seismicity effects.

**p.m. :**

**Animator :** R. Hart (Itasca)

- Hydraulic and thermal modeling in a jointed media. Fluid flow, application to dam foundation, waste storage.

### SEMINAR-2

#### 2-D AND 3-D DISTINCT ELEMENT ANALYSIS WITH UDEC AND 3DEC Advanced concepts and practical applications

**Animator :** R. Hart (Itasca) — **Assistant :** H. Baroudi (Cerchar)

*This seminar is based on computer use, and participants will be able to solve their own problems.*

##### THURSDAY, 29 MARCH

**a.m. :**

- Approach to discontinuum modeling. Guidelines for successful modeling with UDEC and 3DEC.
- Model generation. Joint structure specification, model size, boundary conditions.

**p.m. :**

- Modeling sequence. Initial conditions, applied loading, excavation and construction, equilibrium and failure.
- Material models.

Explanation of models for intact rock and joints.

**Evening :**

- Individual modeling with assistance.

##### FRIDAY, 30 MARCH

**a.m. :**

- Special models. Fluid flow logic in 2-D, thermal logic in 2-D and 3-D, structural modeling.

**p.m. :**

- Practical problem solving with UDEC and 3DEC. Underground control application.

### REGISTRATION FORM

Company : \_\_\_\_\_

Address : \_\_\_\_\_

Telephone : \_\_\_\_\_ Fax : \_\_\_\_\_

Participant Nr 1 : \_\_\_\_\_ Sem. 1 and 2  Sem. 1  Sem. 2

Participant Nr 2 : \_\_\_\_\_ Sem. 1 and 2  Sem. 1  Sem. 2

\_\_\_\_\_ Sem. 1 and 2  Sem. 1  Sem. 2

SECOND ANNOUNCEMENT OF INTERNATIONAL WORKSHOP  
ON  
STATISTICAL PREDICTION OF MINERAL RESOURCES (IWSPMR)

TO BE HELD ON OCTOBER 20-25, 1990  
AT THE

CHINA UNIVERSITY OF GEOSCIENCES (WUHAN)  
THE PEOPLE'S REPUBLIC OF CHINA

CO-SPONSORS: COGEO DATA AND IAMG

1. Revised deadlines for authors are as follows:
  - (1) Final date for receipt of abstract:  
February 28, 1990.
  - (2) Notification of acceptance to authors:  
March 15, 1990, (i.e., third announcement).
  - (3) Final manuscripts for proceedings:  
July 31, 1990.
  
2. International Academic Committee:

Richard McCammon	(U.S.A.)
Zhao Pengda	(P.R.C.)
Gabor Gaál	(COGEO DATA)
Frits Agterberg	(CANADA)
John Davis	(U.S.A.)
Dmitry Rodionov	(U.S.S.R.)
Václav Nemeč	(CZECHOSLOVAKIA)
  
3. Chairman of Workshop:

Zhao Pengda
  
4. Organizing Committee:

The members of this committee all come from the  
China University of Geosciences (Wuhan).
  
5. The registration fee for one delegate is \$150.00.

## FIRST CIRCULAR

The Austrian National Committee of Geodesy and Geophysics, represented by the Local Organizing Committee of IUGG'91 in collaboration with and under auspices of the International Union of Geodesy and Geophysics, has the honor of inviting you to participate in the

## XX General Assembly of the International Union of Geodesy and Geophysics in Vienna, Austria, 11-24 August 1991

### GENERAL INFORMATION

#### Place and Date

The General Assembly will be held at the Technical University of Vienna (TUW) and at the adjacent "Messepalast" -exhibition halls on August 11-24, 1991. These buildings are conveniently located in down-town Vienna, nearby to several historical monuments, museums, theaters and other cultural centers; shopping areas, hotels, government-buildings and business facilities, banks and money exchanges.

#### Meeting Locations

The TUW was founded in 1815 and is situated next to the center of the City. The world-famous concert hall "Musikverein" and the Vienna State Opera are within easy walking distance. The TUW is not a campus but a city-university. All main University-buildings and dormitories are concentrated inside of a circle of 300 meters in radius; an area with a lot of shops, cafes, restaurants etc qualified to please the visitors.

The exhibition-halls of "Messepalast" are established in the Baroque edifices of the former Imperial court-stables, designed and erected by the famous architect Fischer von Erlach in 1719 - 1723.

#### Free Circulation of Scientists

The Local Organizing Committee affirms the right of scientists throughout the world to attend the General Assembly without restrictions based on nationality, race, colour, age, religion, political philosophy, ethnic origins, citizenship, language or sex. In accordance with the Austrian entry permit regulations whose liberal spirit is a continuing tradition the Local Organizing Committee affirms the application of the ICSU principles of nondiscrimination and the ICSU guidelines on the free circulation of scientists.

This has been confirmed by written endorsement of the Austrian Government granting entry visas to people of all nationalities.

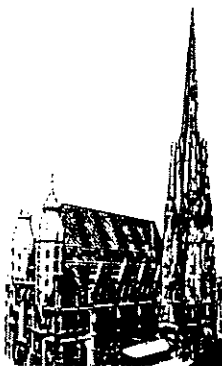
#### Employment Exchange

As a special service an "Employment Exchange" will be organized. Within this service we shall try to establish contacts between scientific organizations, industrial companies and participants interested in jobs.

Corporate and academic recruiters are invited to review participants' resumes and interview candidates on site.

#### Geohost Program

The Local Organizing Committee is preparing a grant program in order to support delegates who are in need of financial assistance. The objective of this program will be to enable scientists from as many regions of the world as possible to attend the General Assembly. Each Geohost grant will cover the registration fee and lodging in dormitories but Geohost will not pay the cost of travel to and from Vienna. Details will be announced in the second circular.



## SCIENTIFIC PROGRAM

The Local Organizing Committee is prepared to meet all requests from IUGG and its Associations concerning :

- Union and Association Lectures
- Symposia with invited and contributed papers
- Workshops, both specialized and interdisciplinary
- Excursions and Exhibitions



### Scope of Program

In addition to Union and Interdisciplinary meetings, the Assembly will include sessions, sponsored by IUGG member associations, which are:

- Geodesy
- Seismology and Physics of the Earth's Interior
- Vulcanology and Chemistry of the Earth's Interior
- Geomagnetism and Aeronomy
- Meteorology and Atmospheric Physics
- Hydrological Sciences
- Physical Sciences of the Ocean

The various committees and working groups of the Union and of the Associations will be holding meetings concurrently. It is expected that Inter-Union Programs will participate too. This concerns especially:

- ILP - International Lithosphere Program
- IGBP - International Geosphere-Biosphere Program
- STEP - Solar-Terrestrial Energy Program



### Science Theater

A new feature for IUGG General Assemblies will be the installation of a Science Theater. It is planned to show geoscience films both well-known classics as well as new releases.

### Excursions

Longer scientific excursions will take place both before and after the meeting. Short excursions will be arranged for the weekend during the meeting.

### Poster Presentation

The Local Organizing Committee prepares to enable poster presentations within all symposia, workshops, etc. Poster presentations are promoted by offering conveniently located, spacious halls and by uninterrupted exposition of each poster during the entire meeting.

## Scientific Exhibition

Universities or other academic institutions, governmental agencies and scientific societies are invited to present educational exhibits and highlights from research activities, in order to demonstrate each institution's identity to the scientific community, students and the industry. This Science Fair is intended to promote cooperation and the exchange of ideas. Interested scientific institutions are asked to contact the Local Organizing Committee for additional information and to reserve space.



## Industrial Exhibition

The Technical Exhibition shall feature a trade-fair styled presentation of state of the art technology, instruments, heavy equipment, computer software, publications and maps, as well as all types of companies related to geosciences.

In contrast to former assemblies this exhibition will be in the midst of all activities: exhibition-booths, mixed with poster presentation - areas, will be interspersed among lecture halls and sidewalk cafes.

This arrangement results in a scene of much frequented places, where the delegates may study the exhibits over and over again.

Companies interested in these exhibitions are invited to contact the Local Organizing Committee to obtain additional information and space-reservation.

## Call for Papers

The call for papers will follow in the second circular published in spring 1990.

It will be mailed to all who complete and return the attached form or have replied to other announcements.



Attention!

The second circular will be mailed only to those who complete and return the attached form.

---

IUGG '91 Vienna, Austria 11-24 August 1991

Please put my name on the mailing list for further circulars

Name/First Name .....

University/Company/Agency .....

Institute/Department .....

Street .....

Postal Code \*) ..... City .....

Country/State ..... Zip Code \*) .....

\*) If applicable

## Climate

The City enjoys a mild temperate climate in August. It is characterized by mean daytime temperatures of 18 - 22° C (64 - 72° F) mean night temperatures of 15 - 18° C (59 - 64° F). The probability for an occasional thundershower is given during a two weeks meeting, so it is advisable to bring an umbrella, but average duration of daily sunshine is about 8 hours in August. Typical for Vienna is a gentle breeze (Wiener Lüfterl) which makes the evenings very pleasant even on hot days.



## The Venue

In the course of its history beginning from Roman times, Vienna has always found its fate linked to its geographical position at the end of the Alpine ranges, at the edge of the great plains of Europe's east, on the banks of the Danube that provided a natural thoroughfare long before mankind build artificial ones. Different centuries have formed the image of this city together with people coming from the West and the East, from the South and the North of Europe. St. Stephan's Cathedral, the medieval landmark of Vienna, baroque palaces like Schoenbrunn and Belvedere and the eclectic collage of 19 th century historicism forming the Ring as a showcase boulevard of the old empire, are examples for this mixture as well as gems of "fin de siecle" Art Nouveau like the exhibition hall "Sezession".

This blend of different cultures, nations and traditions also contributed to the very attractive and inspiring Viennese way of life. Numerous coffeehouses, pastry shops and "Heurigen" wine taverns are one aspect of that; operas, operettas, theater performances, the Spanish Riding School and art exhibitions are another one. Academic institutions have also a long tradition in Vienna since the University of Vienna was founded in 1365. Nowadays some 110 000 students are enrolled in 7 Viennese universities and art schools and form a major impetus for the intellectual and social life of the city.

Attention!



The second circular will be mailed only to those who complete and return the attached form.

---

IUGG '91 Organizing Committee  
c/o Prof. Peter Steinhauser  
ZAMG  
Hohe Warte 38  
A-1190 Vienna, Austria, EUROPE

LETTERS:

The following is reproduced exactly as received:

"Dr. Carr:

In the same spirit as your note in the November newsletter, I also wish to openly and sincerely thank C. John Mann for his past service as editor of Mathematical Geology. With regard to my own submissions to the journal, Dr. Mann treated them with fairness and diligence. He also improved my prose through his editorial reviews and suggestions. I suspect many others could attest to similar positive experiences."

Sincerely,  
David Jon Furbish  
The Florida State University, Tallahassee, Florida 32306



FACULTY OF SCIENCE, CHARLES UNIVERSITY

128 43 Albertov 6, Prague 2  
Czechoslovakia

10.01.1990

Dear Sirs,

Following the recent dramatic changes which took place in Czechoslovakia also students of the Faculty of Natural Sciences - Charles University, Prague - are doing their best to contribute to the democratization and modernization of our educational system which brings forth a number of problems. We feel that one of the most urgent problems is to establish personal contacts with similar universities and institutions abroad since we would like to learn about their work /our Faculty of Natural Sciences has Biology, Ecology, Geography, Environment & Landscape Ecology and Chemistry Departments/. We would greatly appreciate receiving any information concerning possible scholarships, research fellowships, long and short period attachments or temporary employment for our students.

We should be very grateful if we could receive journals or publications informing us about present research and knowledge which are of utmost importance for our present studies and future work. Naturally, we shall welcome any kind of help you may offer us.

Thank you very much in advance for your kind understanding and help.

Yours sincerely,

Jakub Šelbický

on behalf of the students of  
Faculty of Natural Sciences  
Charles University, Prague

Please contact: Přírodovědecká fakulta  
Univerzity Karlovy  
zahraniční komise SSU  
Jakub Šelbický  
Albertov 6  
128 43 Praha 2  
Czechoslovakia

## INFORMATION LETTER

Scientific-Productive Union "KAZRUDGEOLOGIA" and the Kazakh SSR Exhibition of National Economic Achievement arrange a three-day seminar "Quantitative forecast of hard minerals (state, new ideas, technology, prospects) to be held 23-25 April 1990 in Alma-Ata. The purpose of the seminar is to exchange experience and to discuss problems in quantitative forecast of hard minerals using computer technology and formalized models.

The following topics are suggested for discussion :

- Real state and efficiency of forecasting hard minerals
- Principles, theory and methods of quantitative forecasting hard minerals
- New ideas and approaches to quantitative forecast of hard minerals
- Problem-solving technology for quantitative forecast of hard minerals using computers
- Prospects of quantitative forecast of hard minerals, place and role of computer technologies in the package of geological exploration.

The Organizing Committee advises to pay attention to the following :

1. Despite the conditional character of distinction between forecast and quantitative forecast of hard minerals, by quantitative we mean quantitative estimation of purpose characteristics of forecasting (undiscovered potential resources, concentration of components, density of mineralization etc.).
2. It is supposed to focus attention on "weak points" of quantitative forecast of hard minerals as well as on new ideas and new approaches to solving the problem.

Requests for participation in the work of the seminar and theses (2 copies) of reports should be mailed to :

V.L.Los'  
Organizing Committee  
Kazakh Research Institute of  
Mineral Resources  
K.Marks st. 105  
Alma-Ata 480091  
USSR

251232 TELEX SU

FAX 73272 63-66-34,  
7 3272 63-12-07

Phones for inquiry:   62-01-94   Vladimir I. los'  
                          62-67-13  
                          61-80-41   Svetlana G. Holod

**REQUEST**

for participation in the work of the seminar  
"Quantitative forecast of hard minerals (state,  
new ideas, technology, prospects )"

-----  
Please, fill in this questionnaire in capital letters  
-----

Last name \_\_\_\_\_

Forename \_\_\_\_\_

Organization \_\_\_\_\_

Occupation/Title \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_

I plan to read a paper, tentative title :

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# SIAM Meetings, Conferences, Workshops, and Short Courses

Sponsored by the Society for Industrial and Applied Mathematics

## 1990

**January 22-24, 1990**  
**ACM-SIAM Symposium on Discrete Algorithms**  
 Cathedral Hill Hotel, San Francisco, CA  
*Organizers:* Fan R.K. Chung, Bellcore, and David Johnson, AT&T Bell Laboratories

**March 5-7, 1990**  
**SIAM Conference on Applied Probability in Science and Engineering**  
 Clarion Hotel, New Orleans, LA  
*Organizers:* Bernard Matkowsky, Northwestern University, James McKenna, Bellcore, and George Shanbhukumar, University of California, Berkeley

**MAY 7-10, 1990**  
**SIAM Conference on Applications of Dynamical Systems**  
 Marriott Hotel, Orlando, FL  
*Sponsored by the SIAM Activity Group on Dynamical Systems*  
*Organizers:* Shui-Nee Chow, Georgia Institute of Technology, and Harlan Stech, University of Minnesota, Duluth

## 1991

**June 11-14, 1990**  
**Fifth SIAM Conference on Discrete Mathematics**  
 Hyatt Regency Hotel, Atlanta, GA  
*Sponsored by the SIAM Activity Group on Discrete Mathematics*  
*Organizer:* Peter Winkler, Bellcore and Emory University

**JULY 15-20, 1990**  
**SIAM Annual Meeting**  
 Hyatt Regency Hotel, Chicago, IL  
*Organizer:* Andrzej Manitius, George Mason University  
 Plus a one-day short course on **Chaotic Dynamics, an Emerging Science**

**November 5-7, 1990**  
**Second SIAM Conference on Linear Algebra in Signals, Systems, and Control**  
 Cathedral Hill Hotel, San Francisco, CA  
*Sponsored by the SIAM Activity Group on Linear Algebra*  
*Organizers:* Biswa Datta, Northern Illinois University, and David Carlson, San Diego State University

**March 22-24, 1991**  
**Fifth SIAM Conference on Parallel Processing for Scientific Computing**  
 The Westin Hotel (tentative)  
 Houston, TX  
*Organizer:* Danny Sorensen, Rice University

**JULY 8-12, 1991**  
**Second International Conference on Industrial and Applied Mathematics (ICIAM 91)**  
 Sheraton Washington Hotel  
 Washington, D.C.  
*Organizer:* Robert E. O'Malley, Jr., Kennesawer Polytechnic Institute  
 Plus a one-day short course (to be announced)

**September 16-19, 1991**  
**Fourth SIAM Conference on Applied Linear Algebra**  
 University of Minnesota  
 Minneapolis, MN  
*Organizer:* Richard Brualdi, University of Wisconsin, Madison

Detach reply form at right and mail to: SIAM, Conference Coordinator, Dept. CCM190, 3600 University City Science Center, Philadelphia, PA 19104-2688. Or phone (215) 382-9800; Fax: (215) 386-7999; E-mail: siam@wharton.upenn.edu

## REPLY FORM

Please send me information on the following:

<b>1990</b>	<input type="checkbox"/> Program/Registration material
ACM-SIAM Symposium on Discrete Algorithms	<input type="checkbox"/> Program/Registration material
January 22-24, 1990	
SIAM Conference on Applied Probability in Science and Engineering	<input type="checkbox"/> Program/Registration material
March 5-7, 1990	
SIAM Conference on Applications of Dynamical Systems	<input type="checkbox"/> Program/Registration material
May 7-10, 1990	
Fifth SIAM Conference on Discrete Mathematics	<input type="checkbox"/> Program/Registration material
June 11-14, 1990	
SIAM Annual Meeting	<input type="checkbox"/> Program/Registration material
July 15-20, 1990	<input type="checkbox"/> Exhibitor Kit
Second SIAM Conference on Linear Algebra in Signals, Systems, & Control	<input type="checkbox"/> Program/Registration material
November 5-7, 1990	<input type="checkbox"/> Contributed/poster abstract
	<input type="checkbox"/> Minisymposium proposal form
<b>1991</b>	
Fifth SIAM Conference on Parallel Processing for Scientific Computing	<input type="checkbox"/> Program/Registration material
March 22-24, 1991	<input type="checkbox"/> Contributed/poster abstract
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Second International Conference on Industrial and Applied Mathematics	<input type="checkbox"/> Program/Registration material
July 8-12, 1991	<input type="checkbox"/> Contributed/poster abstract
	<input type="checkbox"/> Minisymposium proposal form
	<input type="checkbox"/> Exhibitor Kit
Fourth SIAM Conference on Applied Linear Algebra	<input type="checkbox"/> Program/Registration material
September 16-19, 1991	<input type="checkbox"/> Contributed/poster abstract
	<input type="checkbox"/> Minisymposium proposal form

I am a SIAM member.  Please send me a SIAM poster.  
 I am not a SIAM member. Please send me information on SIAM.

Name \_\_\_\_\_

Organization \_\_\_\_\_

Department \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip Code \_\_\_\_\_

Area Code/Phone Number \_\_\_\_\_

# INTERNATIONAL SYMPOSIUM ON MINERAL EXPLORATION

## PROVISIONAL REGISTRATION FORM

*(Participants who wish to present a paper should return this with the abstract not later than February 28, 1990. Participants who will not present papers will be able to return this not later than July 31, 1990.)*

Mr./Ms./Prof./Dr.


\_\_\_\_\_  
(surname)                      (first name)                      (middle name)

Affiliation : \_\_\_\_\_  
\_\_\_\_\_


Mailing address : \_\_\_\_\_  
\_\_\_\_\_


FAX. \_\_\_\_\_

Please check appropriate part.

 I am interested in attending the symposium :

definite \_\_\_ good \_\_\_ fair \_\_\_ slight \_\_\_


 I wish to present a paper : YES \_\_\_ NO \_\_\_


 If YES, please fill in the next two parts and send the abstract.

Preliminary title of the paper : \_\_\_\_\_  
\_\_\_\_\_

Author(s) : \_\_\_\_\_  
\_\_\_\_\_


Please attach your one page abstract, and return it **not later than February 28, 1990**. The Organizing Committee assisted by the Advisory Committee will review it and reply within two weeks after receiving the abstract. Accepted papers will be required the extended abstract for pre-print.

 I wish to show a computer demonstration : YES \_\_\_ NO \_\_\_

 If YES, what kind of facilities do you need ?

IBM-PC/PS2 \_\_\_\_\_ , Macintosh \_\_\_\_\_ , NEC-PC9801 \_\_\_\_\_ ,  
Other \_\_\_\_\_

# INTERNATIONAL SYMPOSIUM ON MINERAL EXPLORATION

 Number of persons accompanying participants : \_\_\_\_\_

Accompanying participants (please give name) :


\_\_\_\_\_

Children (please give name and ages) :

\_\_\_\_\_

Others :

\_\_\_\_\_

 Do you recommend any others who might be interested in the Symposium

YES \_\_\_\_\_ (Please provide the proper name and the address)

(Name) \_\_\_\_\_


(Address) \_\_\_\_\_

\_\_\_\_\_

(Fax) \_\_\_\_\_


If you know many, please attach a list.

NO \_\_\_\_\_

 Do you wish to participate the Short Course on Resource Assessment ?

YES \_\_\_\_\_ NO \_\_\_\_\_

If enough participants are interested, we might hold the short course for the beginners and other people who are interested in it.

 If you remit the registration fee, please note the method.

Through Bank \_\_\_\_\_ Date of Payment \_\_\_\_\_

Bank Check \_\_\_\_\_

Please complete this form and return it **not later than February 28, 1990.**

- The participant who will not present papers can return this form not later than **July 31, 1990.**

Date \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ Signature \_\_\_\_\_



UNION GÉODÉSIQUE ET GÉOPHYSIQUE INTERNATIONALE  
INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

*Président:* Vladimir KEILIS-BOROK (URSS)

*Vice-President:* Carl KISSLINGER (USA)

Secrétaire Général: Paul MELCHIOR

Observatoire Royal, Av. Circulaire 3  
B - 1180 Bruxelles BELGIQUE

Trésorier: Søren OREGERSEN

Geodætisk Institut, Gamlehave Alle 23  
DK - 2920 Charlottenlund DANEMARK

Brussels, 28 november 1989

General Assembly, Vienna 1991  
\*\*\*\*\*

Union's Symposia  
\*\*\*\*\*

- |  | duration in<br>half days |
|--|--------------------------|
| 1 - Jeffreys Symposium<br>Interrelation between geophysical structures<br>and processes<br>convener : K. Aki (IUGG) + (IASPEI)<br>co-conveners : - (IAMAP) 3<br>S. Dreiss (IAHS)   |                          |
| 2 - Hann Symposium<br>Fluxes of matter between global climate<br>subsystems<br>convener : G. Mc Bean (IUGG)<br>co-conveners : S. Dyck (IAHS)<br>H. Sigurdsson (IAVCEI) 4<br>J. Sarmiento (IAPSO) second week   |                          |
| 3 - Major puzzling problems or paradoxes<br>in contemporary geophysics<br>convener : L. Knopoff (IUGG) 2<br>co-conveners : G. Holloway (IAPSO)   |                          |
| 4 - Non-linear dynamics and predictability of<br>critical geophysical phenomena (Symposium<br>for IDNDR)<br>convener : A.M. Gabrielov (IUGG) 4<br>co-conveners : Sir James Lighthill (IUTAM) second week<br>R. Cheney (IAPSO)<br>I. Rodriguez-Iturbe (IAHS)<br>J. Lomnitz-Adler (IASPEI) |                          |

- 5 - Application of gravimetry and space techniques  
to geodynamics and ocean dynamics  
convener : B.E. Schutz (IAG)  
co-convener : M. Parke (IAPSO)  
C. Froidevaux (IASPEI) 3
- 6 - Dynamics of the Earth's deep interior and Earth rotation  
convener : J.L. Le Mouél (IAGA)  
co-convener : D.E. Smylie (IAG)  
K. Lambeck (IASPEI)  
D.E. Loper (SEDI) 2
- 7 - Anthropogenic and Natural External Forcing of the  
Middle atmosphere  
convener : (IAMAP)  
co-convener : G.C. Reid (IAGA)  
B.A. Tinsley (IAGA) 2  
(Tuesday)  
1st week
- 8 - Water and Ice as Geophysical Agents  
convener : J. Klinger (IAHS)  
co-convener : B. Warren (IAPSO)  
- (IAMAP)  
- (IAVCEI)  
R.D. Hyndman (IASPEI) 4
- 9 - Dynamic and Thermodynamic Links among Polar Ice, the Ocean  
and the Atmosphere  
convener : R. Muench (IAPSO)  
co-convener : E. Augstein (IAMAP)  
C.R. Bentley (IAHS)  
P. Wadham (IAPSO) 4
- 10 - The application of topographic data bases to  
geodynamic prediction and interpretation  
convener : W.E. Strange (IAG)  
co-convener : Y. Ricard (IASPEI)  
- (IAVCEI)  
- (ICL) 2
- 11 - Structures beneath Marginal Sea Basins  
convener : H. Shimamura (IASPEI)  
co-convener : - (IAVCEI)  
F.N. Spiess (IAG)  
- (ICL) 2



# INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY

## WHAT IS THE IAMG?

The International Association for Mathematical Geology is an organization of geoscientists, statisticians, and other interested individuals dedicated to the advancement of mathematics in geological research and technology. To promote the international development of mathematical geology, the IAMG sponsors meetings and discussion, issues publications, and cooperates with other organizations with related goals.

The IAMG was founded in 1968 at the 23rd International Geological Congress in Prague, Czechoslovakia and is an affiliate of the International Union of Geological Sciences (IUGS) and the International Statistical Institute (ISI).

## ACTIVITIES

The IAMG sponsors meetings, edits two journals and a monograph series, and organizes symposia at major conferences. For nearly twenty years, the IAMG has sponsored the Geochautauquas, annual symposia covering topics of current interest in mathematical geology. Recent Geochautauquas have treated quantitative methods in oil and gas exploration, mining for coal, mineral exploration, and use of microcomputers. Many papers given at these meetings have been published subsequently in the association's two journals.

In 1989, the IAMG is sponsoring several symposia and workshops in conjunction with the International Geological Congress.

The IAMG recognizes significant contributions to mathematical geology in several ways. The William Christian Krumbein Medal is given to an individual who has made important contributions to the field over a period of time. The Presidents Prize recognizes originality and excellence in published research by a young scientist each year. Best Paper Awards are given for outstanding articles published in the association's two journals.

## OUR MEMBERS

The interests of our members range from the theory of fractals, to the application of geostatistics to mining gold. Our members work for universities, governments, or private companies. Areas of academic research include all disciplines within the geological sciences, such as geochemistry, geomorphology, oceanography, geophysics, paleontology, hydrology, and so forth. Members in industry are employed by mining companies, oil and gas producers, and consultants on environmental problems.

We are truly international, with about half the membership from the United States, 20% from Europe, 10% from Asia, and the rest from Canada, South and Central America, Australia and New Zealand.

## PUBLICATIONS

The IAMG edits two journals that complement each other in scope and content: *Mathematical Geology*, published by Plenum Corporation, and *Computers and Geosciences*, published by Pergamon Press. The Association has also started a monograph series, published by Oxford Press.

In addition to the two journals, members receive a newsletter informing them of IAMG activities, meetings announcements, and news relevant to the membership.

## HOW TO JOIN

Anyone with an interest in the work of the association and its publications may join. There are no requirements for membership. The IAMG has three levels of membership, depending upon the journals you wish to receive.

To join, submit the form below to:

Dr. John Kork  
Western Treasurer, IAMG  
c/o U.S. Geological Survey  
P.O. Box 25046, Mail Stop 937  
Denver, CO 80225

## INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY

Enclosed are my 1990 dues in the amount of \$

U.S.

Professional Address for North American Members Only

Please make remittance payable in U.S. currency drawn on a U.S. Bank.

\_\_\_\_\_  
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Telephone No. \_\_\_\_\_

**\$29.00 US includes  
MATH. GEOLOGY**  
**\$50.00 US includes  
COMP. & GEOSCIENCES**  
**\$78.00 US includes MATH.  
GEOLOGY and  
COMP. & GEOSCIENCES**

Please return this portion to the address shown above.

Make checks payable to:  
*International Assn. for Math. Geology*

Mailing address

INTERNATIONAL ASSOCIATION OF MATHEMATICAL GEOLOGISTS

**I. PERSONAL**

NAME: \_\_\_\_\_  
(family name) (given name) (Initial)

ADDRESS: \_\_\_\_\_ Home? \_\_\_\_\_  
(street address) (box no.) Work? \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_  
(or Province) (or Postal Code)

COUNTRY \_\_\_\_\_ TELEPHONE: \_\_\_\_\_  
(area code)

**II. WORK:**

JOB AFFILIATION \_\_\_\_\_ (Company, University, or Organization Name)

PROFESSIONAL SPECIALITY \_\_\_\_\_  
(Stratigrapher, Data Processor, Statistician, etc.)

**III. GENERAL COMPUTER APPLICATIONS**

DO YOU USE A MAINFRAME COMPUTER? YES \_\_\_ NO \_\_\_ IF YES GIVE:

Make \_\_\_\_\_ Model \_\_\_\_\_

DO YOU USE A MICRO- OR PERSONAL COMPUTER? YES \_\_\_ NO \_\_\_  
(IF YES, PLEASE ANSWER PART IV)

DO YOU PROGRAM? YES \_\_\_ NO \_\_\_ IF YES, WHAT LANGUAGE(S) \_\_\_\_\_

**IV. MICROCOMPUTER USERS ONLY BRIEF DESCRIPTION OF SYSTEM**

Manufacture \_\_\_\_\_ Operating System \_\_\_\_\_  
Memory \_\_\_\_\_ Storage \_\_\_\_\_ Modem(?) \_\_\_\_\_ Plotter(?) \_\_\_\_\_

PLEASE RANK ORDER THE THREE APPLICATION AREAS OF COMPUTING THAT ARE MOST IMPORTANT TO YOU (1 IS THE HIGHEST - 3 THE LOWEST):

- |                             |       |                       |       |
|-----------------------------|-------|-----------------------|-------|
| (1) Artificial Intelligence | _____ | (2) Computer Graphics | _____ |
| (3) Databases               | _____ | (4) Data Processing   | _____ |
| (5) Expert Systems          | _____ | (6) Geostatistics     | _____ |
| (7) Mapping                 | _____ | (8) Modelling         | _____ |
| (9) Statistics              | _____ | (10) Other            | _____ |

What projects would you like to see IAMG undertake?

Please return to: John C. Butler  
214 SR I  
University of Houston  
Houston, TX 77204 USA

## IN CLOSING: AN EDITORIAL

On Friday, February 16, 1990, Reno, Nevada experienced its second worst snow storm this century. Within a twenty four hour period, eighteen inches of snow fell within the city; a total of seven feet fell at Donner Pass, 45 miles west of Reno at an elevation of 8000 feet. Interstate 80, which links Reno and San Francisco, was closed for three days, the third day due to a landslide of rock, mud and snow. The police force for Reno and Sparks [twin city to Reno] urged businesses be closed at noon on Friday to allow people to get home, thus clearing the streets of traffic; a snow emergency was declared. A blizzard warning was issued for Lake Tahoe for the first time this century; highways to Lake Tahoe were closed, allowing no traffic in or out. In a word, the storm was frightening.

I have often wondered what the storm was like that halted the progress of the Donner Party in October, 1846; their misfortune placed a stigma on travel to California via the Truckee River route (the Truckee flows through Reno, originating at Lake Tahoe). Now I can appreciate what the Donner Party faced. It was not until Sunday, for example, that I was able to dig our driveway out; that we dared venture out; three cats, three poodles, a wife, a daughter, and me; stranded. I will greatly appreciate not hearing the phrase "Greenhouse Effect" for a while.

Although I have conducted research involving the application of geostatistics to earthquake ground motion; I have never experienced an earthquake. I did experience a fierce Atlantic storm once in the Azores when I was five years old. Once, when I was eight and living in San Angelo, Texas, school was dismissed early; the sky was so dark street lights turned on; 2 inch diameter hail starting to fall just as I got home; but, no tornado came; I have never experienced a tornado, or a hurricane for that matter. Within the past year, these disasters have been most devastating.

I have not experienced many of these disasters; I have been lucky. I have, however, experienced one of the worst snow storms to ever hit the Sierra Nevada Mountains. This storm scared me; I am not ashamed to admit this. This storm humbled me.

This Newsletter is dedicated to those who have experienced hardship within the last year: to those who survived earthquakes in San Francisco, China, Australia, and Japan; Hurricane Hugo in the Southeastern United States; the Atlantic storm that ravaged Great Britain and northern Europe; and to those who brave the daily hardship of life.

James R. Carr  
Mackay School of Mines  
University of Nevada, Reno

## HAS YOUR ADDRESS CHANGED?

If your address has changed, please notify John Kork at the address shown in the front of this Newsletter. By notifying John, your address will automatically be changed for all IAMG correspondence, including this Newsletter.