

IAMG

INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY

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IAMG SILVER ANNIVERSARY VENUE SET FOR PRAGUE

IAMG members, **Dan Merriam** and **Vaclav Nemeč**, have announced that the **IAMG Silver Anniversary Meeting** will be held in Prague, Czechoslovakia on October 10-15, 1993. Moreover, the **Pribram Mining Symposium** will also be held in Prague on October 14-16, hence complementing the Silver Anniversary Meeting. Hotels and meeting accommodations have yet to be confirmed. The Second Announcement for the Silver Anniversary meeting, moreover abstract preparation instructions, are included later in this Newsletter.

PRESIDENT'S PRIZES FOR 1991 AND 1992

Outgoing IAMG President **Dick McCammon** had the pleasure of awarding the IAMG President's Prizes for 1991 and 1992 this past December. For 1991, the winner is **Dr. George Christakos** of the University of North Carolina's Department of Environmental Science and Engineering. A major reason for the selection of **Dr. Christakos** is the publication of his book, "Random Field Models in Earth Sciences." He has also been a regular contributor to the journal, **Mathematical Geology**.

For 1992, the winner is **Dr. Ute C. Herzfeld**, presently an assistant research geomathematician at Scripps Institute of Oceanography, University of California, San Diego. She was selected on the basis of her large number of publications, their high quality, and their originality in both theoretical and applied mathematics. Moreover, her contributions to IAMG include being assistant editor of **Computers and Geosciences** since 1987.

The **IAMG President's Prize** is awarded annually to an individual, 35 years old or younger, who has made an outstanding contribution to the application of mathematics to the geological sciences. The committee selecting both **Drs. Christakos** and **Herzfeld** was comprised of IAMG members from Canada, Norway, the United Kingdom, Spain, and the United States.

INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY

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PRESIDENT'S FORUM

A QUESTION OF DEFINITION

"What is mathematical geology?" I've heard that question hotly debated. If we were asked, "What is structural geology?", we might answer: "Everything taught in the course I took as a student, and everything added to the course since." Even as glib an answer as this would be difficult to make in our field, because few courses are taught on the subject. We might answer: "Whatever is published by the IAMG, plus similar papers in other journals." That answer assumes our editors know what mathematical geology is, and are guided by that knowledge in accepting papers for publication. But, I suspect most papers are selected not on the basis of subject matter, so much as the quality of the research and the competence of the write-up.

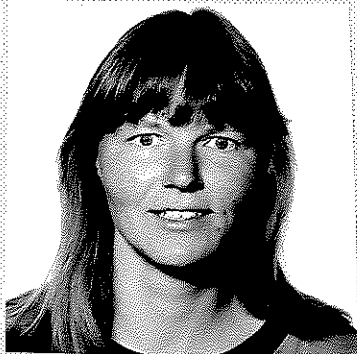
I've seen mathematical geology defined as the activity of building mathematical models of geologic phenomena. Most of us seem to include statistical analysis of geologic data, and perhaps computer programming as related to model building and statistical analysis. Often, the statistical analysis ends with qualitative statements, an example is the use of cluster analysis in paleoecology to define animal communities. At other times, the analysis has economic ramifications, such as in the estimation of ore, coal, or petroleum reserves.

Our journals are certainly capable of covering the gamut of topics generally considered mathematical geology. Computers and Geosciences is more concerned than our other journals with what has become a principal tool of our discipline. Mathematical Geology contains a preponderance of papers on theory and methodology, but applications papers also appear. Our newest member of the team, Nonrenewable Resources, is meant to be less technical than Mathematical Geology, and is the only one of our journals that is dedicated to a single topic, although resource appraisal is a broad subject. This diversity of journals reflects the changes in "mathematical geology" that have taken place over the past twenty-five years. Special issues devoted to expert systems and geographic information systems keep us up to date. Yes, it is possible for us to become outdated, although most of us consider ourselves to be on the cutting edge. But, do we need yet another paper on factor analysis? Yes, if it is allied with geostatistical methods so that spatial dependencies are treated along with nonspatial relationships. The target of our studies has also moved with time. Papers in early issues of Mathematical Geology were concerned with sedimentary geology, paleontology, and geochemistry; today, we have geologic hazards and the environment.

Obviously, our editors have chosen to be fairly inclusive in what they consider to be mathematical geology. This has probably benefitted all of us, for it replicates in a microcosm the type of cross-disciplinary attitude that we all adopted before we tacked the "mathematical" in front of "geologist" to describe our work.

Now, what about all those kriging papers that keep appearing? Another hot topic for debate.

Michael Ed. Hohn



Ute Herzfeld, 1992 IAMG President's Prize Winner

1991 BEST PAPERS, C&G

A committee called by Dan Merriam, editor of Computers and Geosciences, has met and selected the best paper for 1991; actually, two papers share this award. One, authored by Dr. John C. Tipper of the Geologisches Institut der Albert-Ludwigs-Universität, Germany, is titled, "FORTRAN Programs to Construct the Planar Voronoi Diagram." The second paper is authored by two researchers, Dr. Chris J. Moran, CSIRO, and Dr. Alex B. McBratney, School of Crop Sciences, University of Sydney, both in Australia; their paper is titled, "STRUCTURA: A C Program for Estimating Attributes of Two-Phase, Heterogeneous Structures Digitized From Planar Specimens." As has been done in the recent past in this Newsletter, the abstracts for these papers are reproduced to briefly describe each paper.

FORTRAN Programs to Construct the Planar Voronoi Diagram, by John C. Tipper:

Abstract - The Voronoi diagram and its geometric dual, the Delaunay triangulation, both have been applied extensively in spatial modeling and analysis. This paper gives two FORTRAN programs which use a new algorithm that creates the Voronoi diagram and Delaunay triangulation rapidly and efficiently for large data sets ($N > 1000$). The first program applies to the special situation of data points lying either in an open domain or in a simply connected closed domain bounded by their convex hull: under certain conditions the running time of this program is linear in the number of data points. The second program applies to the general situation of data points lying in a domain that may be open or closed, simply or multiply connected, and have convex or reentrant boundaries. A GKS-based plotting program to give graphic output is also provided.

Key Words - Voronoi diagram, Delaunay triangulation, Thiessen polygons, Dirichlet tessellation, Spatial data structure, FORTRAN, GKS.

STRUCTURA: A C Program for Estimating Attributes of Two-Phase, Heterogeneous Structures Digitized From Planar Specimens, by Chris J. Moran and Alex B. McBratney:

Abstract - A command line controlled C program, STRUCTURA, is presented for estimation of attributes describing digital images of vertical sections through two-phase structures. The generation of attributes is in accordance with a horizontally isotropic and vertically heterogeneous structure model. The input to STRUCTURA is a binary digital image in the form of a 2-D array of zeros and ones. Two 3-D attributes (surface area and porosity) and two 1-D attributes (horizontal pore and solid lengths) are estimated. The four attributes are placed in the output file; one row for each raster line. A set of test input data and its corresponding output also are given. An example of soil pore structure and possible approaches to other data analysis are described.

Key Words - Pore structure, Stereology, Soil, Image Analysis.

IAMG 25TH ANNIVERSARY

The International Association for Mathematical Geology was founded in 1968 during the XXIII International Geological Congress in Prague. From that tumultuous beginning, the Association has grown into a professional society devoted to the quantitative aspects of all branches of the earth sciences, representing the interests of geoscientists and mathematicians from every corner of the world. To commemorate the 25th Anniversary of its founding, the Association will return to Prague on October 10-15, 1993, for an extraordinary Silver Anniversary Meeting.

The Silver Anniversary Meeting will include technical sessions, posters and exhibits, workshops, short field trips, and social events. The official language will be English. Technical papers are solicited on any topic relevant to mathematical geology; the presentations will be organized into 12 sessions:

1) Modeling of Geological Processes; 2) Quantitative Stratigraphy; 3) Mineral Resource Assessment; 4) Fossil Fuels; 5) Quantitative Modeling in Hydrogeology; 6) Environmental Geology; 7) Multivariate Statistics and Geostatistics; 8) Nonparametric Procedures; 9) Computer Graphics; 10) Artificial Intelligence and Expert Systems; 11) Inverse Methods in the Earth Sciences; and 12) General Topics.

Smaller meetings on specialized topics, poster sessions, and demonstrations will also be conducted. A selection of social and cultural activities and field trips will be available for participants and accompanying persons. Registration materials will be sent to all respondents and members of the IAMG. Those wishing to make technical presentations at the meeting should note that Abstracts will be accepted as they are received by the Technical Program Chairmen, so the sooner your Abstract is submitted, the more quickly you will receive acknowledgment of your spot in the program. The deadline for a guarantee of inclusion in the Abstracts Volume is APRIL 1, 1993. Registration fee for the Silver Anniversary Meeting is \$125 (U.S.A. dollars); some grants are available to help participants from countries with hard-currency restrictions. Complete information on accommodations and events will be included in the Final Announcement, which will include Meeting and Event Registration Forms and a Hotel Reservation Form.

WHAT YOU SHOULD DO NOW!

Plan your presentation and decide if a 20-minute oral presentation or poster is most appropriate (large maps, cross-sections, and detailed graphs are best seen on posters). Only 35mm slides can be used in talks. While we will do our best to follow your wishes, it may be necessary to shift some presentations if sessions are over-subscribed. Abstracts will be evaluated and accepted as they are received, so send yours in as soon as possible. Prepare a camera-ready copy of your Abstract according to the instructions given on the back page of this Newsletter. Abstracts will be reproduced from the material you submit without any editing or changes, so be very careful. Abstracts will be printed two on a page, so it is critical that you do not exceed the specified dimensions. **Send your abstract with a letter indicating whether you want to give an oral or poster presentation**, and which session you prefer. Your letter should clearly indicate your preferred address for future correspondence, so we can send the official acceptance and information on registration and hotel reservations to you. Since your Abstract copy will be photographed for reproduction in the Abstracts Volume, be sure to send it in a sturdy envelope so it will not be torn or damaged in the mail. Please send abstracts to:

1. North and South America: Dr. John C. Davis, Kansas Geological Survey, 1930 Constant Avenue, Lawrence, KS 66047 USA; FAX: 913-864-5317; e-mail: johndavis@kgs.ukans.edu.

2. All other: Dr. Jan Harff, Institut für Ostseeforschung Warnemünde, Seestr. 15, O-2530 Warnemünde, Federal Republic of Germany; FAX: 37-815-8336; e-mail: harff@geologie.io-warnemuende.dbn.de

INSTRUCTIONS FOR PREPARING YOUR 25TH ANNIVERSARY MEETING ABSTRACT

Your abstract should be printed on plain, smooth-finished white paper, either US letter or A4 size. If possible, print the abstract using a laser printer. Otherwise, use a well-cleaned impact printer with a carbon ribbon. Copy produced by dot matrix printers does not reproduce legibly, so such printers should not be used. Symbols that cannot be printed should be carefully drawn in black drafting ink. Use a 12-point Roman typeface (10 pitch on a typewriter). Bold, italic, and special characters are permissible for titles and emphasis. The body of the abstract should be typed single-spaced, or using 14-point leading. If possible, justify the text for uniform right and left margins. Skip one line after the title, after the affiliation, and between paragraphs. Do not indent paragraphs. Do not include any citations, references, or illustrations in your abstract. The entire abstract, including the title, authors' names and affiliations, and any footnotes, must fit inside a rectangle 6 inches (15.2 cm) wide and no more than 4.5 inches (11.5 cm) tall. The space should be sufficient to contain about 250 words.

GEOSTATISTICS FOR THE NEXT CENTURY

This meeting is an International Forum in honor of **Dr. Michel David** for his contribution to Geostatistics and will be held June 3-5, 1993, in Montreal, Quebec, Canada. For further information, please contact: Roussos Dimitrakopoulos, Department of Mining and Metallurgical Engineering, McGill University, 3480 University Street, Montreal, Quebec, Canada H3A 2A7; tel: 514-398-4379; fax: 514-398-7099.

SIAM CONFERENCES

For a schedule of upcoming SIAM (Society for Industrial and Applied Mathematics), please write to: SIAM Conference Coordinator, 3600 University City Science Center, Philadelphia, PA 19104-2688; tel: 215-382-9800; fax: 215-386-7999; e-mail: meetings@siam.org.

SHORT COURSES AT FONTAINEBLEAU

Two short courses are planned at the **Centre de Geostatistique and Centre de Morphologie Mathematique, Fontainebleau, France**. One course, **Multivariate and Exploratory Methods in Geostatistics** will be held 13-17 September, 1993. The second course, **Models and Simulations of Random Structures**, will be held 20-24 September, 1993. For further information, please contact: **Secretariat, Centre de Geostatistique, 35, rue Saint-Honore, 77305 Fontainebleau, Cedex (France)**.

STUDENT TRAVEL GRANTS

Students planning to attend the **IAMG 25th Anniversary Meeting** at which they will make a presentation may apply for a travel award offered annually by IAMG. To apply, please contact **Dr. C. John Mann, Department of Geology, University of Illinois, Urbana, Illinois 61801**.

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