Geoinformatics and Mathematical Geology - Preface to the IAMG '95 Special Issue -

According to the recent development of science and technology, a large amount and high quality of data have been obtained in geology and related sciences, and the more integrated processing of data and the more sophisticated models of geological phenomena were required. Geoinformatics is a boundary field between geology and information sciences, which examines the characteristics of geological data and develops new methodology and systems for their collection, management, processing and visualization. On the other hand, mathematical geology is a boundary field between geology and mathematics including statistics, which examines the structure of geological phenomena and processes, constructs their quantitative and statistical model, and applies them to the study of geological process, resource exploration, environmental preservation, natural hazard prevention, and others. Both fields are closely related, and they are even overlapped in some part. The one requires the other's help for its development, and the one's development will promote the other, and *vice versa*.

The International Association for Mathematical Geology (IAMG) decided at its Silver Anniversary Meeting (Prague, Czech Republic, 1993) to hold its annual conference in each year shifting the conference venue around the world, and the first one was held in Mont Tremblant, Canada in 1994. Many IAMG members consider it necessary to hold the conference in Asia, and the IAMG inquired the Japan Society of Geoinformatics about the feasibility of holding the 1995 annual conference in Japan. After long and careful discussion including financial problem, it was decided to invite the conference to Osaka, Japan, and the IAMG '95 Organizing Committee (Prof. Kiyoshi Wadatsumi, Chairman) was established in June 1994.

The 1995 Annual Conference of the International Association for Mathematical Geology (IAMG '95) was held on October 29 - November 02, 1995 at International House, Osaka, Japan. In relation with the supporting grant for the conference, it was organized under the name of the International Symposium for Geoinformatics, which was composed of one open lecture for citizen, six scientific sessions, and five tutorial workshops.

The open lecture for citizen entitled 'The Earth: its Environment, Resource and Hazard' was presented in order to communicate the correct understanding of the present situations of the Earth based on observed data and their analyzed results. The following six lectures were given with simultaneous translation between English and Japanese, together with the introduction by Professor K. Wadatsumi, Chairman of the conference and the concluding remarks by Dr. M. Ed. Hohn, President of the IAMG.

1. Dr. Hannes Thiergartner (Federal Agency for Special Tasks, Germany)
Geoinformatics in the urban ecological management.
2. Dr. Ryoabro Yamamoto (Professor Emeritus, Kyoto University, Japan)
Global warming and severe weather.
3. Dr. Richard B. McCammon (US Geological Survey, USA)
Global resource estimation - a spatial data perspective.
4. Prof. Zhao Pengda (China University of Geosciences, P. R. China)
Problems on Chinese mineral resources in 21st century.
5. Prof. Shigeo Aramaki (Nihon University, Japan)
Disasters produced by volcanic activity.
6. Prof. Kiyoshi Wadatsumi (Osaka City University, Japan)
Natural and social factors of earthquake hazard.

The following six scientific sessions were held on several current and important topics, and more than 90 papers were presented orally or in poster. The former four sessions were organized for mathematical methods in each specific topic, that is, environment, resource, hazard and urban geology. The fifth one was the 24th Geochronology session which was organized for general topics in mathematical geology. The last one was the special session on the Hanshin Earthquake which attacked the area near Kobe and Osaka on January 17, 1995, and it was organized as there are many important experiences and researches on information processing on the earthquake and its hazard. The posters of Session VI were opened for citizen during the conference.

Session I Mathematical method in environmental monitoring

Conveners: Dr. Ryoichi Kouda (Geological Survey of Japan)

Dr. Hannes Thiergartner (Federal Agency for Special Tasks, Berlin, Germany)

Session II Geostatistics for resource assessment and exploration

Conveners: Prof. Tetsuya Shoji (University of Tokyo, Japan)

Dr. Donald A. Singer (US Geological Survey, USA)

Session III Mathematical prediction and prevention of geological hazard

Conveners: Prof. Shuichiro Yokota (Kagoshima University, Japan)

Dr. Venkatesh Raghaven (Asia Consulting Engineering Co. Ltd., Japan)

Session IV Urban geology and its data processing

Conveners: Dr. Yoshinori Iwasaki (Geo Research Institute, Osaka, Japan)

Prof. Charles Ng (Hong Kong University of Science and Technology)

Session V Mathematical methods in geological sciences (24th Geochautauqua)

Conveners: Dr. Daniel F. Merriam (Kansas Geological Survey, USA)

Prof. Kaichiro Yamamoto (Koka Women's Jr. College, Japan)

Dr. Andrea Forester (Potsdam Geoinformation Center, Germany)

Session VI The Hanshin - Awaji Earthquake (Special session)

Conveners: Prof. Koichi Nakagawa (Osaka City University, Japan)

Dr. Akira Motohisa (Chuo Fukken Consultants Co. Ltd., Japan)

Dr. Muneki Mitamura (Osaka City University, Japan)

Six tutorial workshops were planned in the final circular, but one workshop was canceled because of the unexpected difficulty of the lecturer. The following workshops were successfully held on various mathematical methodologies and informational system in geology and related sciences, and the total number of participants of the workshops was 75.

WS -1 Geostatistics for pollution: do it yourself

Lecturers: Prof. Michel Maignan (University of Lausanne, Switzerland)

Prof. Mikhail Kanevski (Institute for Nuclear Safety, Russia)

WS -3 Slope stability dynamic system - an innovative new approach and method in slope stability study for better land slides hazard mitigation

Lecturer: Prof. Febri Hirnawan (Padjadjaran University, Indonesia)

WS -4 Introduction to geological mapping system

Lecturers: Mr. Hiroyuki Yamane (CRC Research Institute, Inc., Japan)

Mr. Tatsuo Sakakibara (CRC Research Institute, Inc., Japan)

WS -5 Introduction to the GRASS GIS with examples of hazard zonation mapping

Lecturers: Dr. Venkatesh Raghavan (Asia Consulting Engineering Co., Ltd., Japan)

Prof. Kiyoji Shiono (Osaka City University, Japan)

Prof. Shinji Masumoto (Osaka City University, Japan)

Dr. Masanori Sakamoto (Kokugakuin University, Japan)

WS -6 The Advanced visualization system (AVS, IDL, ENVI)

Lecturer: Mr. Shigeru Masunaga (Adamnet Ltd., Japan)

More than 180 participants attended the conference from 18 different countries and areas in the world (Argentina, Canada, China, Germany, Hong Kong, Hungary, India, Indonesia, Japan, Korea, Mexico, Philippines, Russia, Spain, Switzerland, Taiwan, USA, and Vietnam). It was the first international conference of the IAMG in Asia, and the majority of participants were from Asia including Japan. It is expected that the conference will promote the future development of mathematical geology and geoinformatics in Asia.

The Organizing Committee invited several keynote speakers from the world, and financially supported more than thirty participants from developing countries for their travel to attend the conference. The IAMG also supported two participants from developing countries by the IAMG grant. These supports were very valuable for calling excellent papers from developing countries.

The conference was sponsored by International Association for Mathematical Geology (Dr. Michael Ed. Hohn, President), and co-sponsored by Osaka City (Mr. Masaya Nishio, Mayor), Osaka City University (Prof. Kenjiro Yamamoto, President), Japan Society of Geoinformatics (Prof. Tetsuya Shoji, President), and Japan Society of Information and Knowledge (Prof. Shizuo Fujiwara, President).

The Organizing Committee wishes to express cordial thank to Osaka City University Foundation for the financial support, with which the conference could be held in very comfortable and gorgeous condition. Several members of Organizing Committee offered private funds, which were very helpful to fulfill the shortage of the conference expense. Japan Society of Geoinformatics kindly agreed to publish this special issue of *Geoinformatics* for the conference.

This special issue of *Geoinformatics* contains selected papers presented in the conference, all of which were critically reviewed by the referees, and arranged in the session order. I must state that Japanese abstract is indispensable for papers in ordinal issues, but Japanese abstract was excluded for all the papers in this special issue, as many authors are non Japanese and cannot prepare it.

Other papers presented in the conference may be published in ordinal and/or special issues of the three IAMG journals (*Mathematical Geology*, *Computers & Geosciences*, and, *Nonrenewable Resources*).

Finally, I hope the IAMG '95 Conference and this special issue will contribute further development of geoinformatics and mathematical geology in future.

Niichi Nishiwaki

Editor, IAMG '95 Special Issue

Vice Chairman, IAMG '95 Organizing Committee