

IUGG Annual Report 1999  
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Secretary General

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## INTRODUCTION

The International Union of Geodesy and Geophysics (IUGG), an international non- governmental organization established in 1919, is one of the scientific Unions grouped within the International Council of Scientific Unions (ICSU).

IUGG is dedicated to the scientific study of the Earth and the applications of the knowledge gained by such studies to the needs of society, such as mineral resources, reduction of the effects of natural hazards and environmental preservation.

The Union is a purely scientific organization. Its objectives are the promotion and co-ordination of physical, chemical and mathematical studies of the Earth and its environment in space. These studies include the shape of the Earth, its gravitational and magnetic fields, the dynamics of the Earth as a whole and of its component parts, the Earth's internal structure, composition and tectonics, the generation of magmas, volcanism and rock formation, the hydrological cycle including snow and ice, all aspects of the oceans, the atmosphere, ionosphere, magnetosphere and solar-terrestrial relations, and analogous problems associated with the Moon and other planets. Union activities embrace studies of the Earth by artificial satellites and other techniques for deploying instruments at high altitude.

The IUGG has initiated and vigorously supported collaborative efforts that have led to highly productive world-wide interdisciplinary research programs, such as the International Geophysical Year (1957-58), the Upper Mantle Project (1964-70), the Geodynamics Project (1972-79), the Global Atmospheric Research Programme (1970-80) and the International Lithosphere Programme (1981- ). These programs have set a model for international interdisciplinary co-operation. One major contribution has been the creation, through ICSU, of the World Data Center system, from which the data gathered during these major programs are available to research workers everywhere.

The IUGG co-operates with UNESCO in the study of natural catastrophes. It is also represented on the ICSU Committee for Science and Technology in Developing Countries, and gives particular emphasis to the scientific needs of the Third World (e.g. Geodesy in Africa, International Water Resources, etc...).

The Union also co-sponsors the Federation of Astronomical and Geophysical Data Analysis Services (FAGS) and is a partner with other Unions of ICSU in Inter-Union Commissions.

The official languages of the Union are English and French; the internet site is [www.iugg.org](http://www.iugg.org).

## MEMBERSHIP

By their very nature, geodetic and geophysical studies require a high degree of international co-operation as well as effective central co-ordination. During 1999, the Union had 75 Member Countries. However, the number of member countries may change from one General Assembly to the next due to new applications or because some countries must unfortunately be expelled for non-payment of dues during several years. Several countries, being in serious arrears of payment, are in observer status. During the 1999 IUGG General Assembly, a new category of membership, Associate Membership, was approved. Associate Member countries must establish a National Committee for IUGG but do not pay dues. Associate Members may attend all IUGG scientific and social activities, but may not participate in Council meetings.

## VITAL STATISTICS

### Structure

The Union comprises seven semi-autonomous Associations, each responsible for a specific range of topics or themes within the overall scope of the Union's activities and each with a sub-structure. The Associations convene their own general assemblies and sponsor particular symposia, often in partnership with one another, and, like the Union, are managed by a Bureau and Executive Committee whose members are elected during their General Assemblies. Within its own discipline each Association is responsible for determining its own program of investigations and for supporting the activities of its own component parts. The Union and the Associations publish information bulletins of meetings of the Associations and of symposia sponsored by the Associations.

These seven International Associations and their sub-components are shown below:

### International Association of Geodesy (IAG/AIG)

#### Sections:

Positioning

Advanced Space Technology

Determination of the Gravity Field

General Theory and Methodology

Geodynamics

#### Services:

International GPS Service

International Gravimetric Bureau (BGI - affiliated with FAGS)

International Geoid Service

International Center for Earth Tides (ICET - affiliated with FAGS)

International Earth Rotation Service (IERS - affiliated with FAGS)

Permanent Service for Mean Sea Level (PSMSL - affiliated with FAGS)

Bureau International des Poids et Mesures

International Association of Geomagnetism and Aeronomy (IAGA/AIGA)

Divisions:

Internal Magnetic Fields  
Aeronomic Phenomena  
Magnetospheric Phenomena  
Solar Wind and Interplanetary Magnetic Field  
Geomagnetic Observatories, Surveys and Analyses

Inter-Divisional Commissions:

History  
Developing Countries

Service:

International Service of Geomagnetic Indices (ISGI - affiliated with FAGS)  
International Association of Hydrological Sciences (IAHS/AIHS)

Divisions:

Surface Water (ICSW)  
Groundwater (ICGW)  
Continental Erosion (ICCE)  
Snow and Ice (ICSI)  
Water Quality (ICWQ)  
Water Resources Systems (ICWRS)  
Remote Sensing (ICRS)  
Atmosphere-Soil-Vegetation Relations (ICASVR)  
Tracers (ICT)

Service:

World Glacier Monitoring Service  
International Association of Meteorology and Atmospheric Sciences (IAMAS/AIMSA)

Divisions:

Atmospheric Chemistry and Global Pollution (ICACGP)  
Atmospheric Electricity (ICAE)  
Climate (ICCL)  
Clouds and Precipitation (ICCP)  
Nucleation and Atmospheric Aerosols  
Dynamic Meteorology (ICDM)  
Meteorology of the Middle Atmosphere (ICMA)  
Planetary Atmospheres and Their Evolution (ICPAE)  
Polar Meteorology (ICPM)  
Ozone (IOC)  
Radiation (IRC)  
International Association for the Physical Sciences of the Ocean (IAPSO/AISPO)

Divisions:

Sea Ice  
Mean Sea-Level & Tides  
International Heat Flow (joint with IAVCEI and IASPEI)  
Cooperation with Developing Countries  
Tsunami Commission (Joint with IASPEI and IAVCEI)

Services:

Permanent Service for Mean Sea Level (PSMSL - affiliated with FAGS)  
IAPSO Standard Seawater Service  
International Association of Seismology and Physics of the Earth's Interior (IASPEI/AISPIT)

Controlled Source Seismology  
Earthquake Hazard and Prediction  
International Heat Flow (joint with IAVCEI and IAPSO)  
IASPEI/IAVCEI Commission on Physical and Chemical Properties of Materials of the Earth's Interior  
Commission on Practice  
Geodynamics and Tectonophysics  
International Decade for Natural Disaster Reduction  
Wave Propagation  
European Seismological Commission  
Asian Seismological Commission  
Federation of Digital Broadband Seismograph Networks (with ICL)  
Committee for Developing Countries  
International Commission on Earth Sciences in Africa  
Committee on Education  
International Ocean Network  
IASPEI/IAVCEI Committee on Volcano Seismology  
International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI/AIVCIT)

Explosive Volcanism  
Mitigation of Volcanic Disasters  
World Organization of Volcano Observatories (WOVO)  
Chemistry of Volcanic Gases  
Volcanogenic Sedimentation  
Large-Volume Basaltic Provinces  
Volcanism and the Earth's Atmosphere  
Remote Sensing  
Granites  
Volcanic Lakes  
IAVCEI/IASPEI Commission on Physical and Chemical Properties of Materials of the Earth's Interior  
Volcanic Seismology  
Arc Volcanism  
Ocean Island Volcanism  
International Heat Flow (joint with IASPEI and IAPSO)  
Inter-Association Commissions and Committees  
Owing to the interactive nature of the subject fields managed by the Union's Associations, a number of Inter-Association Commissions have been established which serve the Union and the international geophysical community by promoting the study of particular interdisciplinary problems:

Committee on Mathematical Geophysics (CMG)  
Study of the Earth's Deep Interior (SEDI)  
Tsunami Commission (Joint IASPEI - IAVCEI - IAPSO Commission)  
In addition, IUGG and the International Union of Geological Sciences (IUGS) operate the Scientific Committee on the Lithosphere (SCL) within ICSU.

General Assemblies of the Union

General Assemblies have been held since 1922 and, since 1963, at 4 years intervals. The most recent General Assembly, our 22nd, was held 19-30 July, 1999, on the campus of the University of Birmingham, Birmingham, United Kingdom. The next General Assembly will be held in Sapporo, Japan in July, 2003.

The seven Associations of IUGG meet at these General Assemblies and organize separate or inter-Association symposia. The Union itself arranges lectures of high general interest, and interdisciplinary Symposia.

Each IUGG National Committee, which functions as a non-governmental entity in its relations with IUGG, is represented at the General Assemblies of the Union by delegates appointed by its adhering body. During these assemblies, policies governing the Union are agreed on, research programs requiring international participation are formulated and coordinated and plans are drawn for their execution. The scientific results of programs in progress are discussed at the numerous symposia, Commission and Working Group meetings and other gatherings of scientists that are held during these assemblies.

#### Other Scientific Meetings

Each Association organizes its own scientific assembly in between general assemblies of the Union. These are very important venues where scientific progress is reported and Association business is conducted. Associations may sometimes meet jointly with the purpose of promoting interdisciplinary science.

The numerous topical and regional symposia and workshops organized on other occasions by the Associations, together with the general assemblies, provide opportunity for geodesists and geophysicists from the majority of the countries of the world to discuss their respective methodologies, results and hypotheses and to plan collaborative research projects. The symposia, often held in non-urban locales, are intended to be particularly helpful to the younger scientists from the developing countries of the world.

#### ORGANIZATIONAL MATTERS

Responsibility for directing the Union's affairs is vested in the IUGG Council by the Statutes and Bylaws. The IUGG Council consists of the Council Delegates, who are designated for each Council meeting by their adhering body as the of their respective country. A Bureau, an Executive Committee and a Finance Committee administer the IUGG between Council meetings. The Executive Committee has the particular responsibility of overseeing the scientific programs of the Union. There is no permanent Secretariat; the National Committee of the Secretary General is expected to provide administrative support for Union affairs.

The Bureau of the Union is composed of the following officers, elected July, 1999:

President M. Kono (Japan)

Vice-President U. Shamir (Israel)

Secretary General J.A. Joselyn (USA)

Treasurer A.W. Hansen (Denmark)

Members J. Chen

H. Gupta

V. Shannon (China)

(India)

(South Africa)

The Executive Committee consists of the Bureau, the past President of the Union (P. Wyllie, USA) and the Presidents of the seven Associations, namely:

IAG F. Sanso' (Italy)

IASPEI B. Kennett (Australia)

IAVCEI S. Sparks (U.K.)

IAGA D. Kerridge (U.K.)

IAMAS H.C. Davies (Switzerland)

IAHS J.C. Rodda (U.K.)

IAPSO P. Rizzoli (USA)

The Finance Committee is composed of:

President A.F. Spilhaus (USA)

Secretary P. Pinet (France)

Members V.K. Gaur

E. Groten

M.J. Hamlin (India)

(Germany)

(U.K.)

ACTIVITIES IN 1999

Administration

The Bureau, the Executive Committee and the Council each met several times during the two-week period (July 19-30) of the General Assembly in Birmingham. A total of 41 National Delegates presented their credentials for the Council meetings; 3 of the represented countries were in Observer Status (in arrears of payment of dues) and were not eligible to vote. All actions are reported in detail in the Assembly Comptes Rendus, available both in printed form and on a CD-ROM125

Actions of the Council:

Membership:

The Membership Category of Russia was reduced from 10 to 6.

New membership becomes effective the first year that dues are paid.

Albania was ratified as a Member subject to payment of dues.

Substantial Changes in the Statutes and By-Laws:

The procedures for election of IUGG officers were improved to make nominations more open.

The Membership Category of "Associate" was created. Associate Members must fulfill all of the requirements for regular Membership but they do not pay dues and are not permitted to attend Council meetings. However, Associate Member Countries and National Committees are listed in the IUGG Yearbook and receive all IUGG communications.

Finance and Budget:

The Council affirmed that grants for participation in IUGG activities may be given to any scientist without regard status of his or her country.

The Budget for 1999-2003 was adopted.

Venue of the XXIII IUGG General Assembly:

Sapporo, Japan, was selected as the venue of the next General Assembly, to be held in July, 2003.

Future Meetings of the Bureau

The IUGG Bureau will meet in Boulder, Colorado in 2000, followed by an informal meeting of the Executive Committee. A regular meeting of the Executive Committee will take place in 2001.

Science

The scientific program of the General Assembly consisted of four Union Lectures, seven Union Symposia, and 49 joint symposia arranged among the seven Associations and the Inter-Association and Inter-Union Commissions and Committees. There were 110 Symposia convened by the Associations in their areas of specialization. There were 4052 registrants from 89 countries. Grants to assist participation to 566 persons totaled 230,000 British pounds. The Keynote Speech was presented by Rt Hon. Michael Meacher MP, Minister of the Environment for the United Kingdom.

The Resolutions of the XXII General Assembly addressed the following topics:

International geodetic and geophysical monitoring systems and the free and unrestricted transfer of data;  
Protection of the Global Navigation Satellite Systems radio frequency spectrum;  
Geosciences and Society;  
International monitoring system for the Comprehensive Test Ban Treaty;  
Support of the international climate and global change programs;  
Responsibilities associated with hosting a General Assembly;  
Appreciation for the organization and arrangements for the XXII General Assembly.

#### Activities of the Associations

The following reports, prepared by the Secretaries General of the Associations (shown below), have been edited for the sake of brevity. These reports illustrate the impressive range of activities within each Association as well as their dedication to supporting science within developing countries. Each Association has an internet site where much more information can be found.

#### International Association of Geodesy (IAG)

[www.gfy.ku.dk/~iag](http://www.gfy.ku.dk/~iag)

##### (1) Central Bureau activities.

The Bureau publishes a bi-monthly newsletter, printed in the Journal of Geodesy. The newsletter includes a listing of all geodetic publications provided by the IAG Bibliographic Service. It also includes updates to the Geodesists Handbook and meeting reports. The central bureau maintains the IAG home-page, and updates a database of addresses.

##### (2) The Executive Committee (EC).

The EC had several meetings. At the first one, held 23 and 23 March 1999 in Paris, the main item was the preparation of the IUGG/IAG General Assembly. During the IUGG/IAG General Assembly in August, the EC established new Special Study Groups (SSG) and elected their presidents. It also appointed representatives of IAG to external bodies. The new EC had a meeting 29/30 November in Como, Italy. Here the working programs of the SSG, Commissions and Special Commissions were approved. A new Committee for the Developing Countries was established.

During the IAG General Assembly in Birmingham the Council had meetings where the new EC was elected, the auditors reported on the accounts, and a new budget was approved. The Council adopted a number of resolutions and approved the proposal that a special committee should be established to review the IAG structure. An account of the administrative meetings will be published in the Geodesists Handbook, to be published in the spring of 2000.

##### (3) Symposia and meetings.

###### (3.1) IUGG/IAG General Assembly.

The biggest event was the IUGG/IAG General Assembly in Birmingham, 18 - 30 July 1999. This meeting is considered too long, so IAG has reduced its own program to only 4+3 weekdays. This program covered presentations of reports and scientific papers for the 5 IAG Sections, and a symposium "Geodesy beyond 2000 - The challenges of the first decade". All reports have been published in "Travaux de l'Association Internationale de Geodesie", on a CD-ROM. A few copies will be made available in print. Selected scientific papers will be published in the IAG Symposia Series, published by Springer Verlag. National reports were distributed at the general assembly. However many were available on electronic form, and are now available through links to the IAG home-page. IAG also took part in a number of inter-association symposia, and several IAG committees had meetings during the assembly as well.

###### (3.2) Other meetings.

Conference on technical aspects of maritime boundary delineations and delimitation including

UNCLOS articles 76 (ABLOS), Sept. 9-10 1999, Monaco.  
GPS 99, 18-22 Oct. 1999 in Tsukuba, Japan.

(4) Educational Activities.

The 3rd Geoid School was held in Milano, Feb. 15-19 1999. The next one will take place in Malaysia in February, 2000. An Educational Working Group was established at the EC meeting in November to improve the coordination of educational activities.

(5) Services.

The International GPS Service elected a new directing board. Several members of directing boards of the other services have changed due to the elections in Birmingham.

(6) Coordination with organizations within surveying, cartography and remote sensing.

IAG has been a member of the International Union of Surveying and Mapping. This organization dissolved in the fall of 1999. New ways of facilitating cooperation are being considered. [C.C. Tscherning (Denmark)]

International Association of Geomagnetism and Aeronomy (IAGA)

[www.ngdc.noaa.gov/IAGA](http://www.ngdc.noaa.gov/IAGA)

The main activity for 1999 was the participation in XXII IUGG General Assembly, July 18 - 30, 1999 in Birmingham, UK. A scientific highlight of the meeting, the first union lecture on "MARS AND THE SEARCH FOR LIFE ELSEWHERE," was presented by IAGA Member, Dr. Edward C. Stone (USA). 915 of the participants representing 60 countries registered an affiliation with IAGA. IAGA hosted 67 symposia addressing diverse topics from the Earth's interior to the Sun and beyond. Approximately 900 papers were presented in these symposia. IAGA co-sponsored 27 Inter-Association Symposia and Workshops including those on scientific live issues such as the working of the geodynamo, space weather, climate change and electromagnetic effects associated with volcanoes and earthquakes. Approximately 1,250 papers were presented in these joint symposia. An Inter-Association Commission with participation by IASPEI and IAVCEI was established on Electromagnetic Studies of Earthquakes and Volcanoes. IAGA members co-convened 3 of the 7 Union Symposia. With support of the local organizing committee, travel grants were issued to 119 deserving participants, or 17% of the applicants.

The General Assembly was used to establish international agreements on models and guidelines. The International Geomagnetic Reference Field for 2000 was issued in November 1999. The revised international exchange format for geomagnetic data was agreed upon and will be issued in January 2000. The Polar Cap (PC) index of geomagnetic activity in the polar region, which is also an indirect measure of the interplanetary magnetic field, was officially sanctioned. In addition, IAGA resolved to encourage collaborative programs to mark the 50th anniversary of the International Geophysical Year.

IAGA News No. 30, which focused on activities during the XXII IUGG General Assembly, was published in October 1999. The Web site has been an effective mechanism to disseminate information and news in a timely manner. IAGA's ICSU Grant for 1999 was used to support efforts to design and produce a new informational Brochure and Poster. IAGA applied for and received an ICSU grant for Year 2000 to support INTERMAGNET efforts to modernize and standardize global observations of the magnetic field.

Dr. Nguyen Thi Kim Thoa invited all delegates to the 9th Scientific Assembly of IAGA to be held jointly with IASPEI in Hanoi, Vietnam in August 2001.



## IAGA Co-Sponsored Symposia and Workshops

In 1999 IAGA co-sponsored the following symposia and workshops:

"First International Workshop on Long-term Changes and Trends in the Atmosphere," February 16-19, 1999 at the Indian Institute of Tropical Meteorology, Pune, India.

"The 2nd TIGER (Thermosphere/Ionosphere Geospheric Research) Symposium," June 9-10, 1999 at the S.I. Vavilov State Optical Institute, St. Petersburg, Russia.

### Executive Committee Meetings

Executive Committee meetings were convened by Dr. M. Kono, IAGA President, on July 17th and 26th during the IAGA General Assembly in Birmingham, UK with all members in attendance. The following actions are noteworthy:

Approved the revised IAGA Statutes and By-Laws for submission to the Conference of Delegates.  
Approved the recommendations of the Nominations Committee for submission to the Conference of Delegates.

Approved the Financial Committee's report for 1997 and 1998.

Approved budgets for 1999, 2000 and 2001.

Appointed Dr. Herbert W. Kroehl (USA) to fill the remaining term of the office of Secretary General vacated by Dr. Jo Ann Joselyn.

Accepted the proposal for a new inter-Association Commission with IASPEI and IAVCEI concerning 'Electromagnetic Studies of Earthquakes and Volcanoes.

Declined an invitation to co-sponsor the International Journal of Geomagnetism and Aeronomy published by AGU.

Approved financial support for 9 co-sponsored symposia and workshops in 2000 and sponsorship for one symposium without funding. They are

"Space Weather: Progress and Challenges in Research and Applications," March 20-24, 2000, Clearwater, Florida USA

"Fifth International Conference on Substorms," in May, 2000, St. Petersburg, RUSSIA

"IX IAGA Workshop on Geomagnetic Observatory Instrument, Data Acquisition and Processing," (In Honor of the 100th Anniversary of the Observatory), June 12-18, 2000, Hubanovo, SLOVAKIA

"The 7th Biennial Castle Meeting on New Trends in Geomagnetism," June 19-25, 2000, Castle Moravany, SLOVAKIA

"Space Storms and Space Weather Hazards," June 19-29, 2000, Heraklion, Crete, GREECE

"33rd COSPAR Assembly," July 16-23, 2000, Warsaw, POLAND

"Lower Atmosphere Effects on the Ionosphere and Upper Atmosphere," July 25-28, 2000, Prague, CZECH REPUBLIC

"15th Electromagnetic (EM) Workshop," August 19-26, 2000, Cabo Frio, BRAZIL

"The First S-RAMP Conference," October 2-6, 2000, Sapporo, JAPAN

"SPARC Second General Assembly," November 6-10, 2000, Mar del Plata, ARGENTINA

### IAGA Conference of Delegates

The Conference of Delegates meetings were convened by Dr. M. Kono, IAGA President, on July 19th and 28th during the IAGA General Assembly in Birmingham, UK. Twenty-four accredited delegates answered roll call on the 19th and thirty-four answered on the 28th. Thirty-nine member countries sent delegates with appropriate credentials. The Conference approved the minutes of the 1997 Conference of Delegates, the 1999 Report of the Finance Committee, and discussed and approved the actions of the Executive Committee since the 8th IAGA Scientific Assembly in Uppsala Sweden. The new nominating and election procedures designed to promote diversity in member and discipline participation proposed by the Nominations Committee were adopted. Revised Statutes and By-Laws designed to remove internal ambiguities and inconsistencies with

IUGG Statutes and By-Laws were approved. New officers and members of the Executive Committee were elected.

IAGA Resolutions in an Abbreviated Form:

IAGA recommends that national and international agencies support efforts and initiatives to develop collaborative programs. These are directed towards studies of the physics and dynamics of solar-terrestrial and solar-planetary systems during the period 2003 to 2008 to mark the 50th anniversary of the IGY and to act as a springboard for future research.

IAGA urges National Committees to take the initiative in their respective countries to ensure free access to databases created for or by scientific activities and to advise, if necessary, appropriate authorities to take legislative action to ensure free access policies for scientific databases.

IAGA urges action to be taken to start suitable magnetic observations at Pevek or a nearby site in Siberia as soon as possible.

IAGA recommends that support be given to the creation of a permanent space patrol for monitoring solar ionizing radiation (EUV and soft X-ray) for investigating the physics of the upper atmosphere and for space weather forecasting radiations.

IAGA requests that the Academy located in Taipei (China/Taipei) urge the appropriate agency to continue observations by setting up a new observatory and to continue to operate Lunping Observatory until an appropriate period of parallel observations has been completed. [H. Kroehl (USA)]

International Association of Hydrological Sciences (IAHS)  
[www.wlu.ca/~wwwiahs/](http://www.wlu.ca/~wwwiahs/)

In 1999, IAHS focussed on the General Assembly at Birmingham. However, convening of meetings, publishing proceedings of symposia and conferences and production of the Hydrological Sciences Journal and Newsletters of the Association continued to be major activities.

IAHS Symposia at Birmingham:

All proceedings have all been published in the "Red Book" series, see below.

Hydrological Extremes: Understanding, Predicting, Mitigating  
Interactions between the Cryosphere, Climate and Greenhouse Gases  
Impact of land-use change on nutrient loads from diffuse sources  
Integrated Methods of Catchment Hydrology - Tracers and Remote Sensing  
Impacts of Urban Growth on Surface and Groundwater Quality  
IAHS Workshops at Birmingham:

Global Data Bases

Ecohydrology: Riverine Ecological Response to Changes in Hydrological Regime, Sediment Transport, and Nutrient Loading

Hydrology of Ice-Covered Rivers

Regionalization of Parameters of Hydrological and Atmospheric Landsurface Models

Interactions between surface and groundwater - quantity and quality

Inter-Association Symposium at Birmingham:

Ice sheets, oceans and the earth's shape: modern perspectives on sea level change

Other Meetings organized/sponsored by IAHS in 1999:

Conference on Arctic Plant Response to Climate Change; Integration of ITEX; East Lansing, USA, 5-9 January

Second Colloquium on Hydrology and Water Management in the Humid Tropics; Panama, 21-24 March

International Conference on Quality, Management and Availability of Data for Hydrology and Water Resources Management; Koblenz, Germany, 22-26 March  
Isotope Geochemistry models: Constraint of Groundwater Flow and Transport Dynamics; The Hague, The Netherlands, 19-23 April  
International Symposium on Isotope Techniques in Water Resources Development and Management; Vienna, Austria, 10-14 May  
International Conference on Drainage Basin Dynamics and Morphology; Jerusalem, Israel, 22-29 May  
International Symposium on the Learning Society and the Water Environment; Paris, France, 2-4 June  
Water 99 Joint Congress; Brisbane, Australia, 6-8 July  
Workshop on Scale and Variability Issues in the Soil-Hydrological System; Stockholm, Sweden, 25-27 August  
ModelCARE'99: International Conference on Calibration and Reliability in Groundwater Modelling - Coping with Uncertainty; Zurich, Switzerland, 20-23 September  
Civil and Environmental Engineering Conference - Year 2000, New Frontiers and Challenges; Bangkok, Thailand, 8-12 November  
Manaus'99: International Symposium on Hydrological and Geochemical Processes in Large-Scale River Basins; Manaus, Brazil, 16-19 November  
IAHS Publications in 1999

Six issues of the Hydrological Sciences Journal were published and three issues of the IAHS Newsletter were distributed. The following IAHS Red Books were published:

Regionalization in Hydrology; Edited by Bernd Diekkrüger, Mike J. Kirkby & Ulrich Schröder [IAHS Publication no. 254 (published October 1999); ISBN 1-901502-80-5; 260 + xii pp.; price £41.50]

Hydrological Extremes: Understanding, Predicting, Mitigating; Edited by L. Gottschalk, J.-C. Olivry, D. Reed & D. Rosbjerg [IAHS Publication no. 255 (published July 1999); ISBN 1-901502-85-6; 314 + x pages; price £46.50]

Interactions between the Cryosphere, Climate and Greenhouse Gases; Edited by Martyn Tranter, Richard Armstrong, Eric Brun, Gerry Jones, Martin Sharp & Mark Williams [IAHS Publication no. 256 (published July 1999); ISBN 1-901502-90-2; 282 + x pages; price £42.50]

Impact of Land-Use Change on Nutrient Loads from Diffuse Sources; Edited by Louise Heathwaite [IAHS Publication no. 257 (published July 1999); ISBN 1-901502-95-3; 272 + viii pages; price £42.50]

Integrated Methods in Catchment Hydrology-Tracer, Remote Sensing and New Hydrometric Techniques; Edited by Chris Leibundgut, Jeff McDonnell & Gert Schultz [IAHS Publication no. 258 (published July 1999); ISBN 1-901502-01-5; 284 + xii pages; price £43.00]

Impacts of Urban Growth on Surface Water and Groundwater Quality; Edited by J. Bryan Ellis [IAHS Publication no. 259 (published July 1999); ISBN 1-901502-06-6; 438 + x pages; price £59.00]

Special Blue Book Series:

The Hydrology of the Nile, J. V. Sutcliffe and Y. P. Parks [Special Publ. No. 5; ISBN 1-901502-75-9; 180 + xii pages; price £34.00]

Hydrology Prize and Tison Award 1999

The recipient of the 1999 International Hydrology Prize, in recognition of an outstanding contribution to science and awarded jointly with UNESCO and the WMO, was Dr Mark Meier, USA.

The 1999 Tison Award (made to a young scientist in recognition of an outstanding contribution to hydrology) was made to Dr Dag Lohmann of Germany. [G.J. Young (Canada)]

International Association of Meteorology and Atmospheric Sciences (IAMAS)  
www.iamas.org

#### IUGG99 General (Scientific) Assembly in Birmingham

The scientific program of the IUGG General Assembly in Birmingham, UK, 18-30 July 1999 was finalized in 1999. It contained 40 IAMAS-led and 14 co-sponsored Inter-Association Symposia (~ 8 parallel for two weeks). Brian Hoskins (UK), former President of IAMAS, gave a Union Lecture on "Variability of Weather and Climate". IAMAS was also heavily involved in two Union Symposia. About 1500 abstracts were submitted and close to 780 scientists registered under IAMAS. IAMAS grants were awarded to 83 scientists from 31 countries [out of about ~650 applications] for a total of US \$28 845. [This compares to a regular annual IAMAS budget of \$25 000]. Countries awarded more than \$1000 were: Russia (18, total \$6390), China (9, total \$3730), India (6, total \$2420), Uganda (1, \$1600), Bulgaria (4, total \$1585), Zambia (1, \$1300), and Paraguay (2, total \$1020). There were other substantial grants from UNESCO and the UK DFID distributed. Awarding the grants was the most stressful part of IUGG99.

#### IAMAS Administrative Matters, Birmingham.

The IAMAS Bureau met three times in Birmingham, the Executive Committee and the Assembly of National Representatives met twice. The IAMAS Statutes were revised. The main change reflects the creation of a nomination Committee for the IAMAS Bureau and Executive Committee. Based on the recommendations by such a body, chaired by Prof. Hoskins (UK), with Profs. Taylor (Canada) and Matsuno (Japan) as members, Prof. Huw Davies (Switzerland) was elected President of IAMAS, Dr. Rit Carbone (USA) and Prof. Bob Vincent (Australia) were elected Vice Presidents. Prof. Guoxiong Wu's (China) term as Member at Large was extended for another four year term, while Dr. Leonard A. Barrie (Canada), Jean-Louis Fellows (France), Prof. Igor Mokhov (Russia), and Prof Akimasa Sumi (Japan) were newly elected. Prof. Bob Duce (USA) will serve as the Past President.

IAMAS2001 will take place in Innsbruck, 10-18 July, 2001. The scientific program was discussed in Birmingham and themes and symposia were suggested by the IAMAS Executive Committee and refined later in the year.

The IAMAS financial records for the period 1995-1998 showed average IUGG allocations of \$24630/a, with an additional income component of \$10660/a of "head taxes" charged at the IUGG95 Boulder and the IAMAS97 Melbourne meetings. These head taxes were fully transferred into travel support for IAMAS and IAMAS Commission assemblies. Administrative charges were an average of \$2200. The cost incurred during the Toronto tenure for 1997 and 1998 were reduced to \$550 total due to Canadian institutional support. The books were scrutinized by Profs. Ron Stewart and Michael Kuhn. On 31.12.1998 they show reserves of \$79 010.59, mostly necessary for the organization of IUGG99 in Birmingham.

#### The Alliance for Capacity Transfer (ACT)

The Alliance for Capacity Transfer is a project of the World Meteorological Organization, WMO, IUGG and the University Corporation for Atmospheric Research, UCAR, has received a UNESCO grant of \$30 000 from ICSU for 1999. This allowed IAMAS, the IUGG agent for ACT, to assemble proposals to prospective donors and to build up a small Web management group.

An information document on the Progress and Status of ACT by IUGG (IAMAS) was submitted to WMO Congress XIII in May 1999. It was presented by the Secretary General of IAMAS who also

serves as IUGG's manager of ACT and represents IUGG in WMO and in the World Climate Research Program, WCRP], and was well received.

ACT has been presented to all IAMAS bodies and was endorsed at all levels. But it became clear that input from the developing world is needed in the design of the different parts of the project. That process is being started now. In 1999 \$29,941.68 were spent from the IUGG grant of \$30 000, in addition to other resources. All the costs incurred in the past in relation to ACT have been carried by IAMAS.

#### Expressions of Appreciation

Special thanks are due to the outgoing President, Prof. Bob Duce, who's enthusiasm and leadership was greatly appreciated. Particularly memorable was his work on the upgrade of the Statutes and the way he passed them through EC and the IAMAS Assembly. Prof. Peter Hobbs (USA), was VP for 8 years, and the EC Members at Large stepping down after 8 years of service, were Profs. Taroh Matsuno (Japan) and Albert Chernikov (Russia), Dr. Marie-Lise Chanin (France) and Past President, Prof. Brian Hoskins (UK). They all deserve our applause. Last, but not least, there is a need to recognize the Presidents and Secretaries of the 10 Scientific Commissions of IAMAS and their Commission members. They were the basis of the great success of IUGG99, they will be the main contributors to the organization of IAMAS2001 in Innsbruck. [R. List (Canada)]

International Association for the Physical Sciences of the Ocean (IAPSO)  
[www.olympus.net/IAPSO/](http://www.olympus.net/IAPSO/)

During 1999, the principal activity of the International Association for the Physical Sciences of the Oceans (IAPSO) was participation in the IUGG General Assembly in Birmingham, UK, reported in detail on the IAPSO Web page. The portions of the abstract books related to IAPSO led symposia and joint symposia, and joint symposia led by other Associations in which IAPSO participated, are now posted on the IAPSO Web page. In conjunction with the General Assembly, IAPSO held two meetings of its Executive Committee and one plenary business meeting with national delegates at which new IAPSO officers were elected.

Three IAPSO Commissions met at Birmingham, the Commission on Sea Ice; the Commission on Mean Sea Level and Tides; and the Commission on Cooperation with Developing Countries. The Tsunami Commission, jointly sponsored with IASPEI and IAVCEI, also met in Birmingham. The Executive Committee voted in favor of disestablishing the IAPSO Commission on Natural Marine Hazards and supporting an Inter-Association Commission on Natural Hazards in its place. The Executive Committee also was in favor of supporting several other new Inter-Association Commissions.

Activities of the Permanent Service on Mean Sea Level (sponsored by IAPSO), and IAPSO's Standard Sea Water Service (operated by Ocean Scientific International) continued in 1999.

Planning continued for a Joint IAPSO/IABO Assembly in Mar del Plata Argentina in October 2001. A Program Committee was established to prepare the final technical program for that Assembly and to obtain convenors and co-convenors. IAPSO has joined with IAG to support a week-long workshop in Brazil in 2000, with a follow-up workshop proposed in conjunction with the 2001 Assembly in Argentina. Discussions were also initiated in regard to the site for an Assembly in 2005.

The IAPSO Secretariat continues to respond to various inquiries for information. [F.E. Camfield (USA)]

International Association of Seismology and Physics of the Earth's Interior (IASPEI)  
[www.seismo.com/iaspei/](http://www.seismo.com/iaspei/)

#### Scientific Meetings:

An International Workshop on Tomographic Imaging of 3D Velocity Structures and Accurate Earthquake Location (PAPHOS99) was held at Cyprus, July 5-9, 1999. The Workshop was a continuation of the Shalhevet Freier Workshop on Advanced Methods in Seismic Analysis held at Israel, January 12-15, 1998. The PAPHOS99 workshop was sponsored by IASPEI and organized by the Cyprus Geological Survey (CGS) and the Geophysical Institute of Israel (GII). A particular aim was to provide more accurate location strategies for the benefit of 3D imaging and for regional monitoring under the Comprehensive Test Ban Treaty. More detailed information on the workshop program can be found on the homepage of the PAPHOS99 workshop ([www.gii.co.il/paphos99/paphos.php](http://www.gii.co.il/paphos99/paphos.php)). Proceedings of the workshop will be published as a special issue of *Physics of the Earth and Planetary Interiors*.

The 22nd General Assembly of IUGG and the 30th General Assembly of IASPEI were held at the University of Birmingham, Birmingham, U.K., from 18-30 July 1999. The IUGG General Assembly was attended by over 4,000 scientists, more than 500 of whom were affiliated with IASPEI. About 5,700 abstracts were submitted of which 989 were presented in oral and poster sessions of 17 IASPEI-led symposia and workshops. A full report on the General Assembly can be found on the IASPEI Home Page. Major items of business accomplished at the Assembly were: (1) Election of IASPEI officers and appointment of Association Representatives and Commission Chairs for the 1999-2003 period; and (2) Development of the IASPEI scientific program for the 31st General Assembly of IASPEI, to be held jointly with IAGA in Hanoi, Vietnam, 18-30 August 2001.

#### Education/Training Activities

*International Handbook of Earthquake and Seismology* Modern scientific investigations of earthquakes began in the 1880's, and the International Association of Seismology (IAS) was organized in 1901 to promote collaboration of scientists and engineers in studying earthquakes. With rapid advances in the 20th century, many branches of seismology developed and there is not an authoritative reference that summarizes our present knowledge about earthquake and engineering seismology. It is our hope that this Handbook will help to bridge the gap between seismologists and earthquake engineers and will be truly international in scope. The aims for the Handbook are to summarize the well established facts; to review relevant theories; to survey useful methods and techniques; and to document and archive basic seismic data. It will consist of about 84 chapters grouped into 10 parts, with 4 CD-ROMs containing materials to augment the printed chapters, and including a compilation of seismic data from around the world and a global earthquake database with software for displaying seismicity maps. Academic Press will publish the Handbook as a 1,200 page, 8 1/2 by 11-inch case bound volume in 2001 on the occasion of the 100th anniversary of IAS (the predecessor of IASPEI). Publication of this Handbook is under the auspices of the IASPEI Committee on Education. The Handbook is being edited by Willie Lee, Hiroo Kanamori and Paul C. Jennings, with an editorial advisory board of about 50 people.

#### New Manual of Seismological Observatory Practice

While there exist good text books and many university curricula on more general or theoretical, research-oriented aspects of seismology, there is a lack of job-related education, training and instruction material in the field of observational seismology. Although the last (1979) edition of the *Manual of Seismological Observatory Practice (MSOP)* is now available on the web ([www.seismo.com](http://www.seismo.com)), it covers analogue techniques only. Computer and communication technologies, as well as the availability of modern broadband sensors, have revolutionized seismological practice during the last two decades of the 20th century. This necessitates the elaboration of a new MSOP (NMSOP). It is currently under development as a web site. First

contributions are already available via [www.seism.com/msop/nmsop/nmsop.php](http://www.seism.com/msop/nmsop/nmsop.php). A hard copy version of the NMSOP is planned, complemented by an easy to update loose-leaf collection of job-related worksheets. The Manual will provide instructions, relevant formulae, programs, references data and sources needed for proper execution of the most important observatory tasks such as site selection, instrument installation and calibration, seismogram analysis, earthquake location, parameter determination, etc.. Manual chapters and worksheets may be used as training modules for observatory practice.

#### Activities Involving Developing Countries

As part of IASPEI's outreach effort, the publication transfer program of the Committee for Developing Countries makes available basic texts and publications on seismology and related earth sciences to institutions in need. The IASPEI Secretary-General serves as a clearing house. Requests for payment or reimbursement of reasonable shipping costs can be made to IASPEI.

#### Publications

IASPEI uses a bulk E-Mail System to broadcast announcements about forthcoming meetings and other information of interest to IASPEI members.

IASPEI continues development of its Home Page on the WorldWideWeb which contains organizational information, a publications list, meeting announcements and Internet connections and other information of interest to IASPEI scientists.

The IASPEI Secretariat with the assistance of Carl Kisslinger (Editor) has published a 26 page Brochure entitled "The International Association of Seismology and Physics of the Earth's Interior: Cooperation for Better Understanding of the Earth". Copies can be obtained from the IASPEI Secretariat.

The IASPEI Committee for Developing Countries circulates biannually from Hyderabad a Newsletter intended to provide a forum for exchanging news and views of geophysical importance among geoscientists, particularly from developing countries. Hard copy versions of this Newsletter are also distributed to those who do not have Internet addresses on the IASPEI Bulk E-Mail System.

Proceedings of various Symposia from the IASPEI 29th General Assembly in Thessaloniki, Greece were published in *Physics of the Earth and Planetary Interiors*, and *Tectonophysics* in 1999.

#### Special Projects

Global Seismic Hazard Assessment Program (GSHAP) was launched in 1992 by the International Lithosphere Program (ILP) with the support of the International Council of Scientific Unions (ICSU), and endorsed as a demonstration program in the framework of the United Nations International Decade for Natural Disaster Reduction (UN/IDNDR). GSHAP has now come to an end with the completion of the Global Seismic Hazard Map. The global map, printed by the USGS, combines the effort of more than 500 scientists, with 95 principal authors. A special volume of *Annali di Geofisica*, contains all reports and a folded copy of the map. All the results of the program, the regional reports and maps, and the global map can be found on the GSHAP site at <http://seismo.ethz.ch/GSHAP/>. The volume and the map are available free of charge, and will be globally distributed. Instructions to order volume and map are on the web.

In 1998 a five-year project under the International Geological Correlation Program (IGCP) of UNESCO, IGCP 428 "Climate and Boreholes", was begun. The project investigates the subsurface temperature anomalies induced by downward diffusing surface temperature variations and constructs models of palaeoclimatic ground temperature histories. The project involves most of the heat flow community and further extends the activities of the IHFC Working Group on

Reconstruction of Climate Change from Subsurface Temperature Data. The principal investigators are V. Cermak, H.N. Pollack and C. Clauser. In 1999 IGCP 428 co-sponsored a workshop on "Past Climate Change Inferred from the Underground Temperature Field", 14-17 March 1999, at Sinaia, Romania, at which 18 scientific communications were presented. Further, a project group meeting was arranged as part of the MC02 Symposium "Detection and Attribution of Climate Change" during the 22nd IUGG General Assembly at Birmingham, UK.

IASPEI continues its participation in STEND - System for Technology Exchange for Natural Disasters - an information exchange program aimed at increasing awareness of available technology. STEND is being developed by the World Meteorological Organization (WMO) in Geneva, Switzerland.

The IASPEI Seismological Software Library (SSL) includes the executable code, examples on floppy diskettes, and printed documentation.

Under the auspices of the Working Group on Personal Computers, a PC shareware library is being published on diskette, including files with short-form manuals of the programs. The Library provides for fast and wide distribution of geophysical programs and utilities, reduced or demonstration versions of geophysical software, and beta-versions of new programs to be included in future volumes of the SSL. [E.R. Engdahl (USA)]

International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)  
<http://www.iavcei.org>

IAVCEI completed a fourth year of individual membership with a paid membership of 552 members for 1999, the highest total to date. The top eleven countries in terms of memberships were the USA (178), Japan (69), Italy (57), Australia (44), the UK (43), Germany (37), New Zealand (27), Russia (23), Romania (22), France (21), and Mexico (16).

Approximately 200 IAVCEI members attended the IUGG meeting in Birmingham in July. Fully 85 percent of the IAVCEI scientific sessions were multi-disciplinary sessions co-sponsored with other associations. The number of attendees was lower than for typical association meetings, but the co-sponsored sessions allowed scientists from other disciplines to interact with volcanologists.

A new slate of officers was elected in the spring of 1999 and assumed their duties in July 1999 at the Birmingham IUGG meeting. In addition, the past president moved to a new role and a Deputy Sec.-Gen. was appointed:

IAVCEI has 14 active commissions. Three commissions had changes in leadership in 1999. All commissions are currently under review, a process to be formalized in July 2000 at the Bali meeting.

Preparation for the upcoming Bali meeting provided the first crisis for the new executive committee when political unrest and violence in nearby East Timor occurred in the early fall of 1999. Dozens of letters were received, some calling for moving the conference, some for outright cancellation, and many in support of the local Indonesian organizing committee. After careful consideration a decision was reached by the IAVCEI Executive Committee to proceed with the meeting. All letters received were answered individually, and a statement by the Executive Committee was added to the IAVCEI web page.

A new editor was appointed for IAVCEI's Bulletin of Volcanology. Tim Druitt (France) assumed duties in September 1999. He is in the process of selecting several new Associate Editors.



Additional goals include shortening the time of the review process and assuring production of the journal on a more regular schedule.

IAVCEI sold several educational products in 1999. Two videos on 1) understanding volcanic hazards and 2) reducing volcanic risk were produced professionally under contract with IAVCEI. Over 80 videos were sold in 1999. Also, a volcano calendar was produced by IAVCEI members and was printed and marketed by a professional calendar company. Over 3,800 calendars were sold and an additional 800 were distributed by IAVCEI to various scientific, educational, and governmental organizations. IAVCEI received a small royalty payment (\$137 US) for the calendars. [S. McNutt (USA)]

#### BRIEF REPORT ON USE OF 1999 ICSU GRANT AND UNESCO SUBVENTION

In 1999, IUGG was awarded a Category I UNESCO grant of \$30,000 and two Category II grants totaling \$11,000. Brief reports on these grants follow.

The Alliance for Capacity Transfer project was proposed by the International Association for Meteorology and Atmospheric Sciences (IAMAS) in cooperation with the Scientific Committee on Oceanic Research (SCOR). This activity, encompassing meteorological and atmospheric sciences including hydrology and oceanography, sought to stimulate and expand global collaboration and exchange of knowledge, experience, information, data, and software within and across the boundaries between National Meteorological and Hydrological Services, the university community, the scientific community at large and the private sector through the use of the Internet.

RECOVER (Remotely Controlled Monitoring of Vertical Crustal Movements at a Tide Gauge, a project of the International Association of Geodesy) received \$5000 from the US National Academy of Science. The original proposal for \$50,000 would have partially supported a test site in the Caribbean to monitor geophysical parameters including tides using GPS techniques, thus encouraging development in those countries. It is very important to initiate scientific cooperation in this area of the world, which could be much affected by a sea level rise or change in ocean current pattern. The awarded amount required that the activity be scaled back to a seminar/workshop in Barbados, where a permanent GPS station is already operational and where the potential and involvement of the local research institution in sea-level studies is such that future observational/research work might be initiated. This seminar is now planned for October, 2000. Speakers have been invited and the scientific program and meeting agenda are in preparation.

The International Association of Geomagnetism and Aeronomy received \$6000 from ICSU to support efforts to design and produce an informational Brochure and Poster. The Brochure and Poster illustrate global importance of IAGA's work and how it impacts human life daily through the high-technology applications now common in industrialized society. While the Brochure and Poster are largely visual, needed explanations are printed in English, French and Spanish. The Brochure will be useful for attracting young people to a scientific career by portraying the excitement and challenge of understanding both the basic science and predicting Earth's global magnetic field and ionized upper atmosphere, recently termed "space weather." The Brochure and Poster are expected to evolve into an internet site easily translated in multiple languages.

#### CONCLUSION AND FUTURE PLANS

The new IUGG Bureau elected in 1999 will meet in Boulder, Colorado on August 7-8, 2000. The Bureau meeting will be followed by an informal meeting of the Association Presidents and Secretaries-General in order to orient new officers and exchange information. Scientific planning will begin for the IUGG General Assembly in 2003.

The administrative records of the IUGG have been accumulating since 1919, the year IUGG began. They have been passed to successive Secretary-Generals in turn, but the volume of paper has

become difficult to handle. It is expected that a permanent repository will be found for these records, so that they can be preserved and will be accessible for scholars of the history of geoscience.

Special efforts will be undertaken to encourage new members and to re-establish relations with those countries whose membership has lapsed. A new IUGG Statute permits a category of Associate Members in the case that a country's adhering body cannot shoulder the financial responsibility of full membership.

A new IUGG Brochure will be designed and produced as a strategy to help recruit new members and promote Union activities.

Dates and places of the Scientific Assemblies of the Associations

IASPEI/IAGA : 2001, Hanoi (Vietnam)

IAVCEI : July 18-22, 2000, Bali (Indonesia)

IAMAS : July 10-18, 2001, Innsbruck (Austria)

IAHS : 2001, Maastricht (Netherlands)

IAPSO : 2001, Mar del Plata (Argentina) - jointly with IABO

Date and place of the 23rd Union General Assembly:

July 2003, Sapporo (Japan)