

## Annual Report for 2006 of the INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS (IUGG)

### INTRODUCTION

Established in 1919, the International Union of Geodesy and Geophysics (IUGG) is the international organization dedicated to advancing, promoting, and communicating knowledge of the Earth system, its space environment, and the dynamical processes causing change. Through its constituent Associations, Commissions, and services, IUGG convenes international assemblies and workshops, undertakes research, assembles observations, gains insights, coordinates activities, liaises with other scientific bodies, plays an advocacy role, contributes to education, and works to expand capabilities and participation worldwide. Data, information, and knowledge gained are made openly available for the benefit of society – to provide the information necessary for the discovery and responsible use of natural resources, sustainable management of the environment, reducing the impact of natural hazards, and to satisfy our need to understand the Earth's natural environment and the consequences of human activities. IUGG Associations and Union Commissions encourage scientific investigation of Earth science and especially interdisciplinary aspects. Each Association establishes working groups and commissions that can be accessed by using the links on our website. The web site, available in English and French, can be found at <http://www.IUGG.org>.

### MEMBERSHIP

By their very nature, geodetic and geophysical studies require a high degree of international co-operation. IUGG is critically dependent on the scientific and financial support of its member Adhering Bodies. The list of present and past IUGG Adhering Bodies is published annually in the IUGG Yearbook, which is posted on the web site and is available from the Secretariat. Each Adhering Body establishes a National Committee for IUGG, and names Correspondents to each Association (as appropriate). During 2006, the Union had 67 Member Adhering Bodies. Several members were in observer status because they were in arrears of dues payment. Nine Adhering Bodies were in Associate Member status. Associate Members do not pay dues and may not participate in Council meetings, vote, or hold office. However, beginning with the General Assembly in 2007, Associate Members may attend the Council meetings as listeners. New member country applications are being actively encouraged.

### STRUCTURE

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 by the Adhering Body of their respective countries as their representatives for each Council meeting. The Council is convened at each quadrennial General Assembly. A Bureau, an Executive Committee and a Finance Committee administer IUGG affairs 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 officers of IUGG are listed on the IUGG web site.

The Union brings together 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 assemblies and sponsor scientific symposia, often in partnership with one another. 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. All Earth scientists, worldwide, are eligible to participate in IUGG and Association assemblies, workshops, and symposia, although only scientists from member countries with dues paid may serve as officers.

#### Associations

The seven International Associations are listed below, and short reports on their 2006 activities are included here. Additional information about each Association is given on their web sites, which can be accessed from the IUGG web site.

- International Association of Geodesy (IAG)
- International Association of Geomagnetism and Aeronomy (IAGA)
- International Association of Hydrological Sciences (IAHS)
- International Association of Meteorology and Atmospheric Sciences (IAMAS)
- International Association for the Physical Sciences of the Oceans (IAPSO)
- International Association of Seismology and Physics of the Earth's Interior (IASPEI)
- International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)

#### Union Commissions, Committees, and Working Groups

Owing to the interactive nature of the subject fields addressed by the Union's Associations, a number of Union Commissions have been established that promote the study of particular interdisciplinary topics. In 2006, the following bodies were active:

- Commission on Geophysical Risk and Sustainability (GeoRisk)
- Commission on Mathematical Geophysics (CMG)
- Committee on the Study of Earth's Deep Interior (SEDI)
- Commission on Cryospheric Sciences (UCCS)

#### GENERAL ASSEMBLIES OF THE UNION

General Assemblies have been held since 1922 and, since 1963, at 4-year intervals. These assemblies provide an extraordinary opportunity for Earth scientists from around the world to gather and share expertise, research data, and results. Past IUGG General Assemblies are listed in the IUGG Yearbook and on the web site. The next General Assembly will be held in Perugia, Italy, 2-13 July 2007. Invitations to host the 2011 General Assembly were accepted according to the guidelines for proposals posted on the IUGG website. The IUGG Council, at their 2007 meeting in Perugia, will make the final selection among the invitations that were received.

#### OTHER SCIENTIFIC MEETINGS

Each Association organizes its own scientific assembly in the 4-year interval between Union General Assemblies in order to report scientific progress and conduct Association business. Associations sometimes meet jointly with the purpose of promoting

interdisciplinary science. Topical and regional symposia and workshops are organized on other occasions by the Associations to provide opportunity for geodesists and geophysicists worldwide to discuss their respective methodologies, results and hypotheses and to plan collaborative research projects. The symposia, often held in less-visited, geophysically interesting locales, are intended to be attractive to the younger scientists from the developing countries of the world.

## IUGG ACTIVITIES IN 2006

### Administration

- Membership

By vote by correspondence of the regular members of the IUGG, the Democratic Republic of Congo was accepted as a regular member of IUGG in Category One. However, until dues are paid, D.R. Congo remains in Associate status. The Adhering Body is the Centre de Recherche en Geophysique (CRG), and officers of the National Committee are Prof. N. Zana (President), J.M. Waku (Vice President), and R. L. Lubiku (Secretary General).

By vote by correspondence of the regular members of the IUGG, Ghana was accepted as a member of IUGG in Associate status. The Adhering Body is the CSIR Water Research Institute, and the President of the National Committee is Dr. B.K. Kortatsi. The Vice-President is Mr. Mawuli A. Akoto, the Secretary is Dr. W.E.I. Andah, and the Treasurer is Dr. S. Osae.

By vote by correspondence of the regular members of the IUGG, Bolivia was accepted as a new member of IUGG in Associate status. Bolivia had previously been a member of IUGG from 1960 to 2000. The Adhering Body is the Academia Nacional de Ciencias de Bolivia, and the President of the National Committee is Dr. José Luis Tellería-Geiger. The Vice-President is Estela Minaya, and the Secretary General is Dr. Rudolfo Ayala.

In 2006, Armenia and Nigeria became regular members of IUGG. Armenia had become a member in 2000 but had remained in Associate Status until now. Owing to an inability to pay dues, Nigeria had fallen into Observer status, and then Associate status in 2003. We are pleased to welcome Albania and Nigeria as voting members of IUGG. Scientists from both countries are now eligible to hold office in IUGG and all of our Associations.

- Meetings

From 16-18 October 2006, the IUGG Bureau met in Melbourne, Australia, at the invitation of the Australian Academy of Sciences. Prof. Michael Hamlin, Chair of the IUGG Finance Committee, attended the Bureau meeting during discussions of financial matters. We very much appreciated the hospitality of the Melbourne Convention + Visitors Bureau, the Melbourne Exhibition and Convention Centre, and Melbourne Ambassador Tom Beer. Items of discussion included the current state of arrangements of the 2007 General Assembly; the International Lithosphere Programme (now positioned as a Joint Scientific Program of IUGG and IUGS); the Union Commissions; ICSU matters including the Regional Offices, the suspended Grants Programme, and the strategic initiative on data and information; IUGG Membership and the 2008-2011 budget; and reaching out to young scientists and developing countries, with an emphasis on Africa.

Following the meeting on October 19, IUGG President Uri Shamir delivered the 2007 CSIRO Priestly Lecture, a series of annual lectures begun in 1995 in honor of Bill Priestley, founding Chief of CSIRO's former atmospheric research division. His topic was Water: Management under Uncertainty and Risk.

- Preparations for the 2007 General Assembly

Several important committees were appointed and initiated their work during 2006.

The Nominations Committee accepted candidates for IUGG Officers and the Finance Committee for 2007-2011. The deadline for nominations was 30 September 2006, and a preliminary ballot was circulated in October. Members of the Committee are Dr. Soren Gregersen (Denmark), Chair, Prof. Attia Ashour (Egypt), Prof. Robert Duce (USA), and Prof. Seiya Uyeda (Japan).

The Statutes and By-Laws Committee accepted proposals for modifications to the IUGG Statutes and By-laws. The deadline to receive proposals was 1 November. Members of the Committee are Dr. David Kerridge (U.K.), Chair, Dr. Jean-Pierre Barriot (France), Dr. Priscilla Grew (USA), and Dr. Ronald Stewart (Canada).

The Committee that will accept proposals for Resolutions to be considered by the IUGG Council at the 2007 General Assembly was announced. Members are Prof. Masaru Kono (Japan), Chair, Prof. Dr. Huw Davies (Switzerland), Dr. Pierre Hubert (France), and Prof. Zev Levin (Israel).

The 2005 IUGG Executive Committee agreed that a committee should be appointed to evaluate all proposals to host the 2011 IUGG General Assembly. The deadline to receive proposals was 31 December 2006. Member of the Site Evaluation committee are Dr. E. Robert Engdahl (USA), Chair, Prof. C.C. Tscherning (Denmark) and Prof. Kathryn Whaler (U.K.)

- Publications

In December, the 2007 Yearbook was published that lists the organizational structure and officers of each body within the Union. The Yearbook was printed and mailed to all Member Adhering Bodies and relevant persons and organizations, and was posted on the IUGG web site. The Secretariat distributed the IUGG E-Journal monthly to Adhering Bodies and National Committees, plus an extra issue in September to promote nominations for IUGG Officers and the Finance Committee

### IUGG Grants

Each year, IUGG co-sponsors symposia and meetings appropriate to our disciplines of study. \$20,000 (USD) is allocated annually to assist meetings, and especially to support the attendance of young scientists and scientists from developing countries. In 2006, IUGG supported the following meetings:

- Cities on Volcanoes 4, Quito, Ecuador, 23 – 27 January 2006
- eGY Planning Meeting, Boulder, Colorado, USA, 1 – 2 March 2006
- BALWOIS Conference On Water Observation and Information Systems for Decision Support, Ohrid, Macedonia, 23-26 May 2006
- Symposium on Extreme Natural Events and Societal Implications (EuroScience Open Forum 2006), Munich, Germany, 15 – 19 July 2006
- 36th COSPAR Scientific Assembly, Beijing, China, 16 – 23 July 2006

- 1st International Symposium of International Gravity Field Service (IGFS), Istanbul, Turkey, 28 August – 1 September 2006
- 18th Electromagnetic Induction Workshop, Barcelona, Spain, 17-21 September 2006
- 3rd IAGA/ICMA Workshop on Vertical coupling in the Atmosphere-Ionosphere System, Varena, Bulgaria, 18-22 September 2006
- 6th General Assembly of Asian Seismological Commission Symposium On the Earthquake and Tsunami Disaster Preparedness and Mitigation, Bangkok, Thailand, 7 – 10 November 2006
- 5th FRIEND Conference on Water Resource Variability: Processes, Analyses, and Impacts, Havana, Cuba, 27 November – 1 December 2006

By action of the 2005 IUGG Executive Committee, an “Opportunity Fund” designated in 1999 to support proposals for inter-Association initiatives that particularly benefit developing countries was suspended for 2006-2007 in order to build a reserve of \$50,000 that could be used to seed a potential major project in Africa.

### ICSU

The International Council for Science, formerly known as the International Council of Scientific Unions (ICSU), was created on 11 July 1931. IUGG was one of the original Unions of ICSU and has continued to participate in its programmes. 2006 marked the 75<sup>th</sup> anniversary of ICSU and several activities were planned to celebrate the occasion. On 4 July, the French Académie des Sciences organized an afternoon of science lectures relating to ICSU programmes and strategic priorities. Dr. Alik Ismail-Zadeh represented IUGG on that day. An ICSU congress for young scientists – “Strengthening International Science for the Benefit of Society” was announced for April 2007 and IUGG nominated a number of young scientists to attend this event. Three were selected: Kate Heal (U.K.), Laura Sanchez (Colombia), and Thomas Molg (Switzerland). We look forward to a report on their experience at the 2007 General Assembly.

ICSU has decided to create a number of Regional Offices. The Regional Office in Africa was the first one, established in 2004. In September 2006, Dr. Uri Shamir attended the Second Consultative Forum of the Regional Office for Africa (ROA) in Johannesburg and Pretoria. The ICSU Regional Office for Asia and the Pacific was established in 2005, and in 2006, the inaugural meeting of the Regional Office for South America was held in Panama City. Dr. Luiz Paulo Fortes, Chairman of the Brazilian National Committee for IUGG, represented IUGG at that meeting. The Regional Offices have the task of dealing with issue that have regional relevance and of engaging local scientists, in collaboration with the international scientific community.

The Federation of Astronomical and Geophysical Data Analysis Services (FAGS) has been an Interdisciplinary Body (IB) of ICSU since 1956. IUGG funding for FAGS has been \$12,000 USD per year for several years. This funding is most commonly used for outreach to scientists in developing countries and is fully utilized with no overhead being extracted from the receiving services. At the 2005 ICSU General Assembly, a recommendation to eliminate FAGS as an ICSU IB was not accepted and it was decided “To extend ICSU’s sponsorship of FAGS for a period of 3 years, during which the FAGS panel will continue to fulfill its role of coordination among the Services, while ICSU

examines integration of this function within its activities in data and information.” A FAGS meeting was organized on 29-30 March 2006 at the Paris Observatory with the Service Directors, the Unions and the ICSU Representative in order to re-consider the future of FAGS given the new situation. During this meeting, it was decided to prepare a proposal for building a new federation of services in order to adapt to the modern astronomical and geophysical services, the ICSU WDC system evolution and the current ICSU strategic plan. This work is in progress. Part of the future strategies for FAGS will be how to secure the necessary resources to support the coordination roles and those inter-service activities that are outside the scope of the individual services budgets. The FAGS Website, with links to all of the FAGS services, is <http://www2.kms.dk/fags/index.html>

Science for Health and Well-Being (SHWB) is an initiative of the ICSU Unions that been under development since 2002. It expects to marshal expertise from the natural, social, behavioral, and engineering sciences to attain new insights into the research and policies that affect people while being mindful of the obvious and intimate links to environmental systems. IUGG has been one of the several Unions, under the leadership of the International Union of Biological Sciences, which has supported this initiative. A Steering Committee has been formed to take this initiative forward, and Dr. Claire Horwell, Director of the International Volcanic Health Hazard Network, has agreed to be the IUGG representative to the Steering Committee. We look forward to being an active partner in this truly inter-disciplinary effort.

The International Science Panel on Renewable Energies (ISPRES) is a joint development of the International Council of Science (ICSU), the International Council of Academies of Engineering and Technological Sciences (CAETS), and the Renewable Energy Policy Network. Two IUGG scientists have been selected for this Panel, serving from 2006-2008. They are Andrew Blakers, of the Australian National University in Canberra, and Arni Snorrason, of the Iceland Hydrological Service in Reykjavik. The ISPRES will provide strategic guidance for renewable energy Research & Development efforts worldwide. The Panel's focus will extend from basic scientific research to issues of technology development, demonstration, and deployment.

#### Additional Union Activities

The GeoUnions Consortium is a "cluster" of Unions within the ICSU family that focus on the geosciences. Present membership consist of the following seven Unions: IAU (International Astronomical Union), IGU (Geography), INQUA (Quaternary Research), ISPRS (Photogrammetry and Remote Sensing), IUGS (Geological Sciences), IUGG (Geodesy and Geophysics), IUSS (Soil Sciences). In order to take advantage of overlapping scientific expertise, a joint Science Program was agreed on the topics of Cities and Megacities, Desertification, Groundwater, Hazards, Health, and Polar science. The GeoUnions also support the IUGG initiatives on Geosciences in Africa and the electronic Geophysical Year. There is considerable overlap between the 10 science topics of the International Year of Planet Earth (IYPE) and the GeoUnions science programs. In addition, ICSU has strategic priorities in Natural and Human-Induced Environmental Hazards, and Science for Health and Well-being. It is hoped that each programme will be enhanced by cross-collaboration and communication. A meeting of representatives of 3 GeoUnions and IYPE (International Year of Planet Earth) was held

in Maputo, Mozambique, on 6 July 2006. Items of discussion included relations among the various Unions and ICSU, GeoUnion science team activities and their integration with IYPE scientific themes, and other administrative issues. One outcome of the meeting was the development and issue of a statement of concern regarding a perceived deficiency in communication and transparency between the Executive office of the International Council of Science and its Unions. The GeoUnions will meet again in April 2007 in Rome in conjunction with the mid-term ICSU Unions meeting.

The International Lithosphere Program (ILP) had been an Interdisciplinary Body of ICSU since 1980. At their General Assembly in October 2005, ICSU withdrew sponsorship of ILP and recommended that responsibility should shift to IUGG and IUGS. Since that time, IUGG and IUGS have reaffirmed the ILP mission and have collaborated to re-define ILP as an inter-Union body. New Terms of Reference were approved by both Unions and new members of the ILP Bureau were appointed for 2006-2010.

The Electronic Geophysical Year (eGY, [www.egy.org](http://www.egy.org)) is an ICSU-endorsed programme of the International Union of Geodesy and Geophysics (IUGG). Initiated by the International Association of Geomagnetism and Aeronomy (IAGA), eGY expects to mobilize the science community to achieve a step increase in making past, present, and future geoscientific data readily, rapidly, conveniently, and openly available. eGY provides the international framework and a target for stimulating and coordinating activities to make this happen. eGY focuses on themes of electronic data location and access, permission and release of data, conversion of data into modern digital form, data preservation, capacity building, particularly in developing countries, and outreach. Promoting the development of a network of virtual observatories is a central feature of eGY. The eGY will begin on July 1, 2007, fifty years after the beginning of the IGY. Opening ceremonies will be held in Perugia, Italy, in conjunction with the IUGG General Assembly.

## ACTIVITIES OF THE UNION COMMISSIONS

The following reports illustrate the impressive range of activities within each Union Commission as well as their dedication to supporting science within developing countries. Most Union Commissions have a web site where more information can be found.

### IUGG Committee on Mathematical Geophysics (CMG)

The principal activity of the CMG is to sponsor a biennial conference on theoretical geophysics. The 26th International Conference on Mathematical Geophysics was held in June 4–8, 2006 near Tiberias, Israel on the Sea of Galilee. The conference theme was “Coupling in Earth Systems: Solids, Fluids, Life.” Marc Spiegelman was replaced as CMG Secretary by Claudia Pasquero (USA)

Daniel H. Rothman, CMG Chair

### IUGG Union Commission on the Study of the Earth’s Deep Interior

SEDI; <http://www.sedigroup.org>

The tenth SEDI symposium was held in Prague, The Czech Republic, from 9th - 14th, July 2006, with approximately 150 participants. Jonathan Aurnou gave the Zatman lecture, and Julien Aubert, Keith Koper, and Jonathan Mound won Doornbos prizes for

outstanding research on the deep Earth by a young scientist. The meeting centered on the structure and chemistry of the core and lower mantle, core-mantle interactions, the geodynamo and core dynamics and thermodynamics, D" and mantle convection, and the interiors of other bodies in the solar system.

SEDI is committed to promoting the interests and activities of young researchers. In addition to supporting student travel, the SEDI Union Commission also supports two awards for young researchers. The Doornbos Memorial Award is given to two or three young researchers at each meeting. SEDI has also initiated the Zatman Lecture to honour the memory of Dr. Stephen Zatman, a dynamic and innovative young researcher who was tragically killed in an automobile accident in 2002.

SEDI will participate in the IUGG General Assembly in 2007. Dave Loper and Phillipe Cardin are co-convenors of special session JS11, entitled Planetary Dynamos: theory, models, observations and experiments. SEDI also serves the scientific community by distributing information about upcoming meetings, funding opportunities and openings for academic positions.

Bruce Buffett, Chair of SEDI

#### IUGG Commission on Geophysical Risk and Sustainability

GeoRisk; <http://www.iugg-georisk.org/>

The IUGG Commission on Geophysical Risk and Sustainability (IUGG GeoRisk Commission), established by the IUGG Bureau in August 2000, is dedicated (i) to promoting scientific studies applied to the reduction of risk from natural hazards in an increasingly urbanized world and sustainability and (ii) to reducing death and destruction from natural and technological hazards by providing hazards data and information to emergency managers, policy-makers, scientists and the general public in the most timely and effective manner as possible.

The GeoRisk Commission organized and endorsed a number of scientific meetings in 2006 including the following.

- The IUGG CMG and GeoRisk Commission joint Special Session on Mathematical Aspects of Geohazard Research, 5 June 2006, Sea of Galilee, Israel. The scientific sessions were focused on non-linear dynamics of the lithosphere, predictions of extreme natural events and limitations of the predictability; mathematical descriptions of physical phenomena associated with geohazards; mathematical and numerical modeling of extreme natural events; and quantitative analysis and compilations of geophysical data related to geohazards.
- The third joint symposium of the IUGG GeoRisk Commission and European Association for Promotion of Science and Technology was held in Munich, Germany, during the EuroScience Open Forum from July 15th to 19th 2006. The meeting's major topics were extreme natural events and humanitarian disasters, a role of geoscience in preventive disaster management of catastrophic natural events, integrated global observation strategy for disaster reduction, prediction of extreme natural events, disaster risk management from an insurance perspective, and relationship between disaster risk management and governance. The symposium was followed by a press briefing where more than 30 representatives of European media agencies were present.



- The third International Conference on Early Warning: From Concept to Action was held from 27-29 March 2006 in Bonn, Germany. The conference addressed a broad community comprising scientists, national and international governmental and non-governmental bodies. The Conference Program included three main topics: “Multi-hazard Approaches”, “Mega- Events”, and “People, Politics and Economics”. The IUGG GeoRisk Commission's contribution was to shape the scientific and technical programs of the Conference participating in the International Advisory Board (H. Gupta) and the Program Committee (G. Tetzlaff, Secretary General of the IUGG GeoRisk Commission) and delivering scientific presentations (R. Singh, Vice-President of the Commission).

The GeoRisk Commission also contributed to the following International Conferences and Symposia:

- IOC/UNESCO International Workshop on Post-Disaster Assessment and Monitoring of Changes in Coastal, Ocean, and Human Systems in the Indian Ocean and Asian Waters
- OECD Global Science Forum Workshop on Earthquake Science and its Contribution to Society, 1–2 June 2006, Potsdam, Germany
- 11th International Symposium on Natural and Human Induced Hazards and 2nd Workshop on Earthquake Prediction
- 36th COSPAR Scientific Assembly
- General Assembly of the Asian Seismological Commission and Symposium "Earthquake and Tsunami Disaster Preparedness and Mitigation", Bangkok, Thailand, 7-10 November 2006.
- International Conference on Global Change, Islamabad, Pakistan, 13-17 November 2006.

In 2007, the Commission will organize a workshop on natural and human-induced hazards and disasters in Africa, to be held in Kampala, Uganda, 21-22 July 2007.

Funding has been allocated from IUGG (\$2,000) for this workshop.

The Commission web master is Mr. D. Krupsky. The text of most lectures, presentation, and statements can be found on the website. Additionally, the webcyclopedia at <http://www.iugg-georisk.org/webcyclopedia/index.html> continues to collate information. The presentations, given at several meetings organised by the Commission during 2005 or at meetings where Commissioners delivered invited talks, have been incorporated into the webcyclopedia. The Commission continues to search for an editor for the project.

Alik Ismail-Zadeh, Chair of GeoRisk

#### Union Commission of Cryospheric Sciences (UCCS)

UCCS; <http://www.cryosphericsscience.org>

The first event organized by the newly formed UCCS was the International Symposium on Cryospheric Indicators of Global Climate Change, held in Cambridge, UK, 21–25 August 2006, which was co-organized by the International Glaciological Society (IGS) and the WCRP core project Climate and Cryosphere (CliC). The symposium attracted an in IGS history unprecedented large number of attendees as well as abstracts. A total of 224 delegates attended the meeting, 292 abstracts were submitted

before the symposium, and by the time of the symposium some 111 talks and 105 posters were scheduled and approximately 80 papers were finally submitted for the proceedings volume to be published in the *Annals of Glaciology* 46. The symposium was the first organized by the IGS where parallel sessions had to be organized in order to accommodate all talks. During the symposium, Prof. Richard Alley was awarded the IGS Seligman Crystal. In an effort to spotlight the younger generation of scientists and also raise awareness for UCCS, we decided to award two students attending the meeting for best poster and best talk. An awards committee consisting of Prof. Atsumu Ohmura, Prof. Peter Jansson, Assoc. Prof. Regine Hock and led by Prof. Jon Ove Hagen scrutinized the talks and posters and awarded the best talk to Peter Kuipers Munneke from the University of Utrecht, the Netherlands, for his presentation: “A model for studying Antarctic snow surface albedo under clear and cloudy conditions”. The best poster presentation award was given to Matthias Huss from ETH Zurich, Switzerland titled: “Retreat scenarios of Unteraargletscher, Switzerland, using a coupled ice-flow mass-balance model“. This award, which we intend as a recurring event, consisted of a USD 100 cash prize and diploma signed by the UCCS President Georg Kaser and the head of the awards committee, Vice President Jon Ove Hagen.

As an active participant in the IUGG General Assembly, UCCS will co-sponsor a number of workshops, listed below by host Associations. UCCS conveners are given in square brackets.

#### IAIG

- Observations of the Cryosphere from Space [Isabella Velicogna, Konrad Steffen]

#### IAHS

- Interactions between snow, vegetation, and the atmosphere
- Climate-Permafrost-Hydrology Interactions: The impact of changing climate on cold regions hydrology [Philip Marsh; Lev Kuchment, Tingjun Zhang, Oliver Frauenfeld; Tetsuo Ohata]
- Debris Transport in Glaciers [Michael J. Hambrey]
- Natural ice microstructures [Jean-Bruno Brzoska, Martin Schneebeli; Ed Adams; Pierre Etchevers; Charles Fierz]

#### IAMAS

- Ice cores and Climate [Dorthe Dahl-Jensen]
- Glacier fluctuations in the Asian High Mountains [Claudio Smiraglia; Olga Solomina; Jiawen Ren; Mandira Shrestha; Christoph Mayer]
- Consequences of Large Scale Circulation Variability on Snow and Ice Extent
- Snow Avalanches – Field Observations and Modelling [Karl Kleemayr; Andi Schaffhauser; Betty Sovilla; Guido Luzi; Margarita Eglit]
- Extraterrestrial Ice [Manfred Lange; Ralf Greve]

#### IAPSO

- Arctic Glaciers and Ice Caps Mass Balance/Calving [Jon-Ove Hagen; Johannes Oerlemans; Julian Dowdeswell; Jacek Jania; Andrey Glazovski]
- Life in icy environments: interactions between the biology and chemistry of ice [Martyn Tranter; John Prisco]

#### IAVCEI

- Ice –Volcano Interactions [Ben Brock; Andrés Rivera]

During the past year, ideas for a joint assembly meeting with International

Association of Meteorology and Atmospheric Sciences (IAMAS) and the International Association for the Physical Sciences of the Oceans (IAPSO) in 2009 have materialized. The assembly will take place in Montreal; planning is still in initial stages.

All Bureau members including the Past President Gerry Jones met for three days in Karthaus, South Tyrol, in the Italian Alps in order to discuss the present and intermediate state of UCCS and its possible transition into the International Association of Cryospheric Sciences in an extended way. In October 2006, a regular bureau meeting was hosted at WMO by Dr. Vladimir Ryabinin of the WCRP. Among other guests, IPA President Jerry Brown attended the meeting and provided a much appreciated update on IPA and joint IPA/UCCS activities, present and future.

The joint IPA-UCCS working group GAPHAZ has continued its strong activity. GAPHAZ ran a successful workshop during the EGU 2006 Assembly in Vienna and plans a similar session for the 2007 Assembly. Proceedings from a similar workshop in 2005 are in press in *Global and Planetary Change*. A database on glacier and permafrost disasters is also in progress with first data published in an internet-based data base.

UCCS nominated Dr. Thomas Mölg from the University of Innsbruck as an IUGG representative to an ICSU Young Scientist's Conference. Dr. Mölg was selected to participate at the YSC in April 2007.

The new UCCS web site is hosted at CIRES, Boulder Colorado (where the IUGG site is also hosted) with the kind assistance and support of CIRES Director Dr. Konrad Steffen and associates at CIRES.

Peter Jansson, UCCS Secretary/Treasurer

### **ACTIVITIES OF THE ASSOCIATIONS**

The following reports, edited from more lengthy reports prepared by the Secretaries General of the Associations, illustrate the impressive range of activities within each Association as well as their dedication to supporting science within developing countries.

#### **International Association of Geodesy**

<http://www.iag-aig.org>

##### Central Bureau activities

The central bureau has prepared the EC meetings. It also keeps the database with individual member payments and the accounts related to the IUGG allocation.

##### The Executive Committee (EC)

The EC had a meeting ( <http://www.gfy.ku.dk/~iag/ec06.htm> ) in Vienna, Austria in connection with the EGU General Assembly.

##### Communication and Outreach

The Branch publishes a monthly newsletter and maintains the IAG home page. The individual members only, have access to certain parts of the information using a password. The traditional "School on the determination and use of the geoid" took place in Copenhagen, Denmark 19-23 June 2006.

##### Coordination with organisations within surveying, cartography and remote sensing

The IAG president participated in a meeting of the Joint Board of the Mapping Societies.

### Participation in Group on Earth Observation, GEO

IAG has participated actively in the establishment of the GEO objectives and the 10-Year Implementation Plan. The chief delegate is Prof. M.Rothacher, Germany.

### Meetings

- 3rd IAG Symposium for Geodetical and Structural Engineering and 12th FIG Symposium on Deformation Measurements, May 22-14, Baden, Austria.
- VI Hotine-Marussi Symposium of Theoretical and Computational geodesy: Challenge and role of modern geodesy. 29 May - 2 June 2006, Wuhan, PR China.
- International Workshop "Height systems, geoid and gravity of the Asia-Pacific", June 6-8, 2006, Ulaanbaatar, Mongolia.
- Understanding Sea-level rise and variability WCRP Workshop, 6-9 June 2006, Paris, France (IAG Sponsored).
- EUREF 16 Symposium, June 14-17, 2006. Riga, Latvia.
- AFREF Ttechnical Workshop, 9-13 July 2006, Cape town, South Africa.
- International Workshop on quality improvement and coastal-land applications of satellite altimetry, July 21-22, 2006, Beijing, PR China.
- "Gravity Field of the Earth" - 1st Int. Symposium of the IGFS, 28 Aug.-1 Sep. 2006, Istanbul, Turkey.
- XIII Assembly of the Wegener Project, 4-7 Sept, 2006, Nice, France.
- Geodetic Reference Frames GRF2006, 9-13 October 2006, Munich, Germany.

### Services

The services functions as usual in an excellent way. The establishment of a Satellite Radar Altimetry service is in progress in cooperation with IAPSO.

C.C.Tscherning, IAG Secretary General

### **International Association of Geomagnetism and Aeronomy**

<http://www.IUGG.org/IAGA>

The year 2006, between the year of the Xth IAGA Scientific Assembly and the year of the XXIVth IUGG General Assembly, has been dominated by preparations for the IUGG 2007 General Assembly in Perugia and by efforts associated with the starting up of the Electronic Geophysical Year initiative (eGY). The Executive Committee met in Beijing in July and decided to propose a change of its composition and to present a number of IAGA awards, among many other things. Several IAGA-sponsored topical meetings were held during the year. IAGA News 43, containing primarily information about the IAGA programme at the IUGG 2007 in Perugia and reports of EC actions, was distributed widely in December of 2006.

Preparations for the XXIVth IUGG General Assembly: IAGA will hold its General Assembly during the first week of IUGG 2007 in Perugia, i.e. between July 2 and July 7 in accordance with the decision to reduce the length of the IAGA assemblies from two weeks to one that was taken by the Conference of Delegates in Toulouse. The IAGA-led scientific programme consists of 57 symposia, of which 3 are Union symposia, 12 are

joint symposia with other Associations, and 42 are IAGA-only symposia. A full set of business meetings is also being planned for Perugia, where new leaders will be appointed at all levels of IAGA and planning will start for the scientific programme of the XI IAGA Scientific Assembly in Sopron, Hungary in 2009.

IGY+50 and eGY: The 50-year anniversary of IGY will be celebrated by IUGG and IAGA in Perugia. IAGA is one of the main sponsors of eGY and strongly supports the International Heliophysical Year (IHY). A lot of effort has gone into preparations for these projects. The official launch of eGY will take place in Perugia. The US National Science Foundation has become a major sponsor of eGY, in addition to IAGA and IUGG. The IAGA-led programme for Perugia includes four half-day sessions dealing with the IGY+50, eGY, and IHY. Other Associations within IUGG are also holding sessions related to IGY+50 themes. A public event on this subject will take place on Saturday 7th July 2007.

Global Science Commons: IAGA, largely through eGY, has lent strong support to international efforts to move towards a global (geo)science commons. The President attended the 20th CODATA Conference in Beijing in October as IUGG's observer. CODATA is taking a lead role in realising ICSU's vision for a modern data, information, and services environment that will serve our scientific needs for the future.

IAGA medals and awards: The IAGA Medal for Outstanding Long Service was awarded by the IAGA Executive Committee to Toyohisa Kamei of the World Data Center for Geomagnetism in Kyoto for his invaluable service to the community since 1979 on the production of the AE and Dst geomagnetic indices. This award recognises outstanding long service in a field of activity of any of the IAGA Divisions (not only Division V) by a scientist who might otherwise receive little recognition.

The decision in Toulouse to establish an IAGA Young Scientist Presentation Award was implemented in 2006. The award is given to selected young scientists who have made outstanding contributions, in terms of both their personal scientific contribution and excellence of presentation, at topical meetings for which IAGA is a major sponsor. The three first awards of this kind were presented to Anna Khanukhina (Russia), Annika Seppälä (Finland), and Tracy Moffat-Griffin (United Kingdom). The award consists of support to participate in the next IAGA Assembly (an economy class air ticket, waiving of registration fee, and a USD 200 contribution to hotel and subsistence costs).

The EC decided not to pursue an additional Outstanding Young Scientist Award that was planned in Toulouse because of the great problems associated with making a fair selection.

To add balance to the small list of IAGA awards, the EC decided to prepare the case for the establishment of a new medal for outstanding scientific services to IAGA. The aim is to recognise persons who have given exceptional service to IAGA and IAGA science, but who are well-known, prominent scientists and, therefore, do not qualify for the Outstanding Long Service Medal.

The composition of the IAGA Executive Committee (EC): At the initiative of the President, the EC discussed ways of modifying the composition of the EC to create

greater opportunities to bring younger persons into the Committee without increasing the total number of members and, therewith, the cost. The EC recommends that the position of past-President be eliminated and the number of Vice-Presidents be reduced from two to one. In the view of the EC, this would have no major drawbacks and would have the advantage that two new persons, hopefully younger and representing presently poorly represented sectors of IAGA activities, could be added. The matter will be brought to the Conference of Delegates in Perugia for a decision.

IAGA sponsored topical meetings in 2006: IAGA sponsored 9 topical meetings in 2006 at a total cost of USD 13 000.

Bengt Hultqvist, IAGA Secretary General

### **International Association of Hydrological Sciences**

<http://iahs.info>

2006 has been the year between our Scientific Assembly (Foz do Iguaçu, Brazil, 3-9 April 2005) and the IUGG General Assembly (Perugia, Italy, 2-13 July 2007). Nevertheless this year has not been blank at all and has been very busy and fruitful for the Association. The Prediction of Ungauged Basins (PUB) IAHS initiative continued to develop especially through the constitution of national groups. Jeff Mc Donald leads this Working Group which has now a permanent Secretariat hosted by the International Water Management Institute (IWMI) in Colombo (Sri Lanka) and launched its Web Site. The Hydrology2020 Working Group led by Taikan Oki finished his work, published in a Red Book (IAHS Publ. 300) and presented in different places (Delft, The Netherlands, in June during a devoted Symposium, and IHP Council, Paris, France, in July).

During 2006, many scientific events have been organized, sponsored or supported by IAHS and its Commissions and Working Groups. Among them we would like to quote the following:

- International Workshop on Isotopic Effects of Evaporation (Pisa, Italy, 3-5 May 2006)
- MODFLOW and More 2006: "Managing Ground-Water Systems" (Golden, CO, USA, 21-24 May 2006)
- BALWOIS 2006 (Ohrid, FYR Macedonia, 23-26 May 2006), Anniversary Conference on the occasion of the 50th anniversary of the foundation of IAH and the 150th anniversary of Darcy's Law (Dijon, France, 30 May - 3 June 2006)
- Hydrological Sciences for Managing Water Resources in the Asian Developing World (Guangzhou, China, June 8-10 2006)
- Sediment dynamics and the hydromorphology of fluvial systems (Dundee, Scotland UK, 3-7 July 2006),
- 7th International Conference on Hydroinformatics (Nice, France, 4-8 September 2006)
- HydroEco2006 ; International Multidisciplinary Conference on Hydrology and Ecology, The Groundwater/Ecology Connection (Karlovy Vary, Czech Republic, 11-14 September 2006)
- BIOHYDROLOGY 2006; Impact of biological factors on soil hydrology (Prague, Czech Republic, 20-22 September 2006)

- ERB2006, Uncertainties in the ‘monitoring-conceptualization- modelling’ sequence of catchment research (Luxembourg, 20-22 September 2006)
- 8th Conference on Limestone Hydrogeology (Neuchâtel, Switzerland, 21-23 September 2006)
- 3rd Symposium on Integrated Water Resources Management: Reducing the vulnerability of societies against water related risks at the basin scale (Bochum, Germany, 26-28 September 2006)
- XXIII Conference of Danubian Countries on Hydrological Forecasts and Hydrological Water Management Bases (Belgrade, Serbia, September 2006)
- The 5<sup>th</sup> World FRIEND Conference : Water Resources Variability - Processes, Analysis and Impacts (Havana, Cuba, 27 November - 1 December 2006)
- 7th International Workshop on Precipitation in Urban Areas : Extreme Precipitation, Multisource Data Measurement and Uncertainty (St. Moritz, Switzerland, 7-10 December 2006)

In 2006 IAHS Press published six issues of the Hydrological Sciences Journal. We are happy to note that the Impact Factor (IF) of the Hydrological Sciences Journal increased to more than 1.6 among the best Water related Journals. Three issues of the IAHS Newsletter have also been published and widely disseminated free of charge, both as hardcopies and on the Web. IAHS Press also published 8 Red Books:

- Hydrology 2020 : An Integrating Science to Meet World Water Challenges, Edited by Taikan Oki, Caterina Valeo & Kate Heal, IAHS Publ. 300.
- Sustainability of Groundwater Resources and its Indicators, Edited by Bruce W. Webb, Ricardo Hirata, Eduardo Kruse & Jaroslav Vrba, IAHS Publ. 302.
- Predictions in Ungauged Basins: Promises and Progress, Edited by Murugesu Sivapalan, Thorsten Wagener, Stefan Uhlenbrook, Erwin Zehe, Venkat Lakshmi, Xu Liang, Yasuto Tachikawa & Praveen Kumar, IAHS Publ. 303
- Calibration and Reliability in Groundwater Modelling : From Uncertainty to Decision Making, Edited by M. F.P. Bierkens, J.C. Gehrels & K. Kovar, IAHS Publ. 304.
- Frontiers in Flood Research / Le point de la recherche sur les crues, A joint IAHS / IHP-UNESCO publication, Edited by Ioulia Tchiguirinskaia, Khin Ni Ni Thein & Pierre Hubert, IAHS Publ. 305.
- Sediment Dynamics and the Hydromorphology of Fluvial Systems, Edited by John S. Rowan, Robert W. Duck & Alan Werritty, IAHS Publ. 306.
- Large Sample Basin Experiments for Hydrological Model Parameterization: Results of the Model Parameter Experiment – MOPEX, Edited by Vazken Andréassian, Alan Hall, Nanée Chahinian & John Schaake, IAHS Publ. 307.
- Climate Variability and Change : Hydrological Impacts, Edited by Siegfried Demuth, Alan Gustard, Eduardo Planos, Fred Scatena & Eric Servat, IAHS Publ. 308

The IAHS TFDC (Task Force for Developing Countries) continued its action and distributed free of charge all IAHS publications (Hydrological Science Journal and the Red Books) to more than 60 selected Universities and Research Institutions of Africa, Asia, South- America and Eastern Europe.

The close cooperation of IAHS with UNESCO, WMO and the World Water Council continued. IAHS attended the CHy AWG meeting in Melbourne and the WMO Executive Council in Geneva. We attended the IHP Bureau meeting in Delft and the IHP Council in Paris. We held, with UNESCO, the 8th Kovacs Colloquium (Paris, 30 June-1st July 2006) the theme of which was “Frontiers in Flood Research”. We also participated in the activities of the UNESCO-WMO International Flood Initiative. IAHS was also very active in the preparation and organization of special events during the 4th World Water Forum held in Mexico (March 2006).

P. Hubert, IAHS Secretary General

### **International Association of Meteorology & Atmospheric Sciences**

<http://www.IAMAS.org>

The key IAMAS activities in 2006 were the planning of the IAMAS General Assembly in Perugia, 2-13 July, 2007, the finalizing of the Report by the International Aerosol-Precipitation Assessment Group, IAPSAG, the Circular letter to the National IUGG Committees, and the proposal for Statute changes to the National IUGG Committees. Other activities rounded out the year 2006,

#### The Scientific Program for the IUGG (IAMAS) Assembly in Perugia, 2-13 July, 2007.

The IAMAS scientific program for the Perugia Assembly was “set in stone” in September 2005. Since then it has been fleshed out and a schedule of the symposia was put together and adapted on the advice given by the IAMAS Commission Presidents and Secretaries, and the Conveners. A symposia schedule has been arranged which should only require minor shifts, as might be necessitated by the actual number of abstracts received. This will permit participants to select shorter periods for stays and potentially reduce expenses. The Joint Symposia led by IAMAS (with other Associations) will be arranged within not more than four parallel sessions. Up to four additional parallel sessions will accommodate the IAMAS Inter-Commission Symposia as well as the Commission symposia. One additional parallel session will be necessary in the second week for the IAMAS-sponsored Symposia of the Union Commission of Cryospheric Science, UCCS.

Two special IUGG events have been planned by IAMAS, one for a presentation of the 4th IPCC Report, 4AR, and one for the presentation of the IUGG/WMO IAPSAG Report. IAPSAG is the International Aerosol-Precipitation Assessment Group. In continuation of the “Sushi” Lunch Lectures of Sapporo 2003, the “The Mona Lisa Code” Lunch Lectures into the Mysteries of the Atmosphere have been set up. Many world leaders in their fields of expertise have agreed to present their visions.

Circular Letter to the National IUGG Committees. A circular letter was sent in December with the proposed Agenda for the administrative assembly, the symposia schedule, and information about how the detailed scientific program can be obtained.

IAMAS Statutes and Changes of Statutes. The French version of the IAMAS Statutes was finalized during 2006 and now contains all the Statute changes decided in Birmingham in 1999. The IAMAS EC in Beijing, 2005, established a Committee for the



consideration of Statute changes: Prof. Wu Guoxiong (chair) IAMAS VP, Dr. John Turner, Deputy Secretary General, Dr. Keith Alverson, President ICCL, Prof. Roland List, SG and Dr. Mike MacCracken, President (ex officio). The outcome was the proposal of the permanent position of “Deputy Secretary General”. Due to a previous mistake in naming the Assistant SG “Secrétaire Générale Adjoint”, “adjoint” normally used for “deputy”, I have also suggested to change “Secrétaire Générale Adjoint” into “Sous-Secrétaire Générale”. The addition in the Statutes will require a renumbering of the articles.

Assessment of Effect of Pollution on Precipitation. The Joint IUGG/WMO International Aerosol-Precipitation Science Assessment Group, IAPSAG, under the leadership of Prof. Zev Levin, Chair, Israel, and Prof. William R. Cotton, USA, as the VP, accomplished a substantial expansion and rewriting of the Report. This was followed by the thoughtful input of a Review Committee under the leadership of Dr. George Isaac, Canada. These issues were discussed in October 2006 in a WMO/IUGG/IAMAS sponsored meeting near Toulouse, France. Shortly after the end of the year the Report will be finalized. It is an incredible document of 483 pages and pays tribute to the high level input by many scientists. This Report will not only be extremely useful, it will be an important and excellent text for teaching at the graduate level. The completion of this Herculean task could not have been so successful if it were not for the dedication and rigor of Prof. Zev Levin and Prof. Bill Cotton. Worth mentioning is the sad fact that three of the key authors died during the writing period: Prof. Peter Hobbs (honorary chair), and Drs. Yoram Kaufman and Brian Ryan.

IAMAS Representation. IAMAS President Dr. MacCracken was involved in outreach activities (IAMAS newsletter, encouraging participation of IAMAS scientists in the IPCC review process). He continued to serve on the SCOR Executive Committee and interacted with the SCOR program office, participated in the annual meeting held in Concepción, Chile, and continued to serve as the SCOR liaison to the Joint Scientific Committee of the WCRP and to the SOLAS/INI Review of Anthropogenic Nitrogen Impacts on the Open Ocean. He is now serving as liaison to the new Working Group 129 on Deep Ocean Exchanges with the Shelf, which SCOR has organized with IAPSO.

Dr. Deon Terblanche represented IAMAS/IUGG at the WMO Assembly of the Commission for Atmospheric Sciences in Cape Town, South Africa.

Prof. Roland List represented IUGG at the WMO Executive Council meeting in Geneva and had other discussions with the GEOSS Secretariat about possible IAMAS membership and participated in the IAPSAG process.

IAMAS Web site/Newsletter. Deputy SG Dr. John Turner and Dr. Gareth Marshall, both from the British Antarctic Survey, deserve the credit for the IAMAS Webpage and the continuation of the Newsletter. .

Finances. The 2006 funding of IAMAS consisted of two components. The “standard” annual contribution by IUGG was ~ \$ 29 000, whereas the income from capital interest was only \$8000 due to a much more restrained investment strategy. The resulting increase in assets was \$ 20 700, producing total assets at year’s end of ~\$273 000. This

is a welcome result considering that in 2007 ~\$ 40 000 will be handed over to the Commissions [for supporting scientists from needy countries] for the upcoming quadrennial accounting period, while the total conference costs for Perugia are budgeted to be \$70 000. This figure includes grant support of \$60 000 for participants from needy countries. As usual, Dr. MacCracken, President, and Dr. John Turner, Deputy Secretary General, were fully supported by their home institutions, the US National Science Foundation and the British Antarctic Survey, respectively. The SG was partially supported by Environment Canada and the Canadian National Sciences and Engineering Research Council through his personal grants. All these organizations deserve our thanks.

The SG owes particular thanks to Dr. JoAnn Joselyn, IUGG SG, who was always available to provide guidance. The collaboration with the Program Chair of the Perugia Assemblies 2007, Prof. Paola Rizzoli, is a stimulating pleasure. The IAPSAG contributors were fabulous! I also gratefully acknowledge the continuous help I have received by the President and the DSG.

Roland List, IAMAS Secretary General

### **International Association for the Physical Sciences of the Oceans**

<http://www.IUGG.org/IAPSO>

IAPSO's Commission on Mean Sea Level and Tides, and the Permanent Service for Mean Sea Level, co-sponsored the Workshop, "Understanding Sea-Level Rise and Variability," held in Paris, France, in June, 2006. The Workshop was organized by the World Climate Research Program (WCRP) and hosted by the Intergovernmental Oceanographic Commission of UNESCO. 163 scientists from 29 countries attended the workshop bringing together all relevant scientific expertise with a view towards identifying the uncertainties associated with past and future sea level rise and variability, as well as the research and observational activities needed for narrowing these uncertainties. The WCRP issued a summary report of the workshop.

The IAPSO Standard Seawater Service continued its operations under an agreement between IAPSO and Ocean Science International, Ltd. (OSIL).

IAPSO continued its joint activities with ICSU's Scientific Committee for Oceanic Research (SCOR). A new Working Group on Deep Ocean Exchanges with the Shelf was organized, and was approved by SCOR as SCOR/IAPSO Working Group WG129. They will hold a working group meeting in conjunction with IUGG2007. Activities of other working groups continued. IAPSO/SCOR Working Group WG121, "Ocean Mixing," will meet during IUGG2007. The IAPSO Executive Committee reviewed proposals for other new Working Groups.

Several of IAPSO's activities underpin the climate projections of the Intergovernmental Panel on Climate Change (IPCC), the fourth report of which was issued in 2007. IAPSO's support of work on sea level is an obvious contribution. Without the activities of the Standard Seawater Service, IPCC would be unable to infer changes in precipitation over the oceans. The outcomes of the Working Groups on Ocean Mixing and on the Equation of State of Seawater are likely to influence the climate models used in IPCC's 5th Assessment due in 2014.

Planning continued for symposia to be held at the IUGG2007 General Assembly in July 2007. Final summaries were prepared on proposed symposia content, and convenors were identified. The symposia were listed on the IUGG2007 Web page and a proposed schedule was prepared. A call for papers was distributed to oceanographers worldwide.

Additional revisions were prepared to the IAPSO Statutes and By-Laws incorporating comments and suggestions received by representatives of the Adhering Bodies at the IAPSO business meeting in Cairns, Australia, in 2005. The revisions were transmitted to the IAPSO representatives of the Adhering Bodies for final approval, and formal adoption will be an agenda item at IAPSO's 2007 business meeting.

A call for nominations for the IAPSO Executive Committee was sent out to the Adhering Bodies. Some emphasis was placed on obtaining participation from developing countries, and nominations for new members include nominations received from Adhering bodies in Turkey, Chile, South Africa, and Argentina. The Nominations Committee will prepare a formal slate of candidates for the election to be held in 2007.

A general call for nominations was sent out for the Prince Albert I Medal. The Awards Committee will identify a recipient of the medal to be awarded during IUGG2007.

The IAPSO Secretariat continued maintenance of the Web page, and handled general correspondence.

Fred Camfield, IAPSO Secretary General

### **International Association of Seismology & Physics of the Earth's Interior**

<http://www.IASPEI.org>

#### Report on income

IUGG Allocation: \$26,577.00 received from IUGG as yearly allocation to IASPEI.

Other Grants: \$3,000.00 was received from an IUGG grant, which was forwarded by IUGG directly to Asian Seismological. Commission.

#### Miscellaneous:

2461.21	Investment & reserves interests
119.09	Bank interests
1579.93	Exchange gains on euro account
\$4160.23	Total

#### Report on expenditures and activities

##### Administration

- IASPEI Bureau expenses Potsdam meeting 4600.02
- Secretary general travels 2179.13
- President travels 0.00
- Bank charges TS 601.34
- US Tax return costs 415.00
- Miscellanea administration 99.30
- Total \$7894.79

#### Symposia And Scientific Meetings

Support of international conferences and workshops related to IASPEI activities: A

number of workshops, conferences and activities were supported, principally to allow attendance of scientists from less-developed countries. A total of 21,600 USD have been spent for such activities listed below.

International Heat Flow Commission 6th International Meeting "Heat Flow and the Structure of the Lithosphere". The meeting was organized, under the auspices of the International Heat Flow Commission of the IASPEI and of the Academy of Sciences of the Czech Republic by the Geophysical Institute (Dept. of Geothermics), Academy of Sciences of the Czech Republic, and held at the Castle Bykov, Czech Republic, from June 5 to June 10, 2006. The scope of the meeting and its basic organization follows the successful and well-proved tradition of the five previous meetings held at Liblice (1982), Bechyne (1987 and 1991), Trest (1996) and Kostelec (2001). The meeting was attended by 70 participants from many countries. IASPEI provided \$1,500 that was used to pay travel and accommodation for young scientists from countries where funds are otherwise difficult to find. A detailed report has been provided by David Chapman, chair of the IHFC.

EMSEV Activities. IASPEI grants EMSEV \$500 yearly support for their activities. The EMSEV report follows the reports of the Associations.

European Seismological Commission Young Seismologist Training Course 2006. \$5,000 USD was used to support the ESC Young Seismologist Training Course held before the ESC General Assembly in Geneva, September 2006. The ESC, with the financial support of IASPEI, has sponsored six training courses for Young Seismologists in order to expose them to data acquisition, processing techniques, empirical evaluation of site effects, earthquake location and their uncertainties, and moment tensor inversion, under the tutorship of many established seismologists throughout Europe and the World. The 2006 ESC Training Course on "Seismic Hazard and Risk Assessment" was organized at ETH-Zurich, Switzerland, from September 11 to 14, 2006, following the European Conference on Earthquake Engineering and Seismology, a joint event of the 30th ESC General Assembly and the 13th European Conference on Earthquake Engineering, held in Geneva. This course was addressed not only to young seismologists but also to young engineers. The four-day course was attended by about 40 participants. In response to a positive report on the training course, the ESC Bureau commended the lecturers and organizers and endorsed a proposal to hold a seventh training course before the next General Assembly in Hersonissos, Crete (Greece), September 2008.

Asian Seismological Commission 2006 General Assembly. The ASC General Assembly was held in Bangkok, Thailand, 6-8 November 2006. The conference was hosted by the Thai Meteorological Department in the Siam City Hotel. About 250 participants attended the conference, with highlights on seismic hazard and tsunami research including early warning. Two field trips were arranged: one to the Srinagarind Dam (NW Thailand) and a post-field trip to the tsunami-hit areas around Phuket. The next general assembly will be held in Tsukuba (Japan) in 2008. A total of \$14,600 was used to support the ASC 2006 General Assembly from IASPEI/IUGG funds. In particular, \$11,000 was wired directly by IASPEI, and \$3,000, an IUGG grant, was wired directly by IUGG. Finally, \$600 was granted to one Indian and one Iranian scientist for support of their participation to the Assembly.

IDEA (International Digital Earthquake Archives) Accounts (Project of the Committee for Preservation of WWSSN and Historical Seismograms: "SeismoArchives: Seismogram Archives of Significant Earthquakes of the World", under construction at the IRIS DMC)

Carryover 2005: \$14516.06

Receipts

- \$1,650.00 Donations (checks and bank transfers)
- \$ 1,650.00 Total received

Expenditures

- \$3,173.29 One Ronsin invoice (4801-IN) paid
- \$5,680.00 7 payments to Pauline Curriel for her work with SeismoArchives
- \$ 8,853.29 Total paid

Carryover 2006\$ 7,312.77

DOORNBOS FUND accounts

Carryover 2005\$14516.06

Receipts

- \$961.30 Investment interests
- \$961.30 Total received

Expenditures

- \$256.80 Investment costs
- \$500.00 Aubert: memorial prize
- \$756.80 Total paid

Carryover 2006 \$21,246.06

Peter Suhadolc, IASPEI Secretary General and Treasurer

**International Association of Volcanology and Chemistry of the Earth's Interior**

<http://www.IAVCEI.org>

IAVCEI ended the year with over 700 paid individual members, the third highest number yet. Thirty-nine members have chosen to become Life Members, including three members who were awarded Life Membership as Honorary Members in 2003-4. The IAVCEI web page is frequently revised and updated. The volcano listserver administered by Arizona State University remains the official IAVCEI listserver. It has >2700 people listed, which far exceeds the IAVCEI membership. Thus we hope to further boost the membership in IAVCEI. Two issues of the newsletter "IAVCEI News" were mailed to members in 2006.

Several highly successful meetings were held in 2006. The Cities on Volcanoes 4 meeting was held in January in Quito, Ecuador with 550 participants. IAVCEI also sponsored or co-sponsored several workshops including the International Workshop on Continental Basaltic Volcanism in Guangzhou, China in May with 150 attendees and a Walker Symposium on Ice-Volcano Interactions in Iceland in June with 98 attendees.

No medals or awards were given in 2006.

The next IAVCEI General Assembly has been scheduled for August 2008 and will be held in Reykjavik, Iceland. The first circular was printed and distributed in December 2006.

One meeting of the IAVCEI Executive Committee was held in 2006, in December in San Francisco.

Preparations are well under way for what is sure to be a successful IUGG meeting in July 2007 in Perugia. Oded Navon attended a planning meeting for the Electronic Geophysical Year, to be held 2007-2008.

Officers of IAVCEI for 2003-2007 are:

President	Oded Navon (Israel)
Vice-President	Jocelyn McPhie (Australia)
Vice-President	Toshitsugu Fujii (Japan)
Secretary-General	Steve McNutt (USA)
Members of Executive Committee	
Anita Grunder (USA)	
Renato Solidum (Philippines)	
Hugo Moreno (Chile)	
Christophe Komorowski (France)	
Past President	Steve Sparks (UK)
Editor Bull Volc	John Stix (Canada)

A nominations committee was formed in 2006 to determine qualified candidates for IAVCEI officers for the term July 2007 to July 2011. The committee was chaired by former IAVCEI president Grant Heiken and completed its work in early January 2007. The election will be a true contested election, with 3 candidates for the SG position and 3 for two vice-president positions. The election will be held in spring 2007 by mail vote of IAVCEI individual members and national correspondents.

IAVCEI sold several educational products in 2006. Two videos on 1) understanding volcanic hazards and 2) reducing volcanic risk were produced professionally under contract with IAVCEI. Over 40 videos were sold in 2006. We note that video sales are down somewhat as DVD becomes the preferred format. We plan to produce the IAVCEI videos in DVD format some time soon. Also, a volcano calendar for 2007 was produced by IAVCEI members and was printed and marketed by a professional calendar company. Over 8,000 calendars were sold and an additional 800 were distributed by IAVCEI to various scientific, educational, and governmental organizations. IAVCEI received a small royalty payment (1 percent) for the calendars.

IAVCEI now has tax exempt status with the IRS. This status is important so that contributions may be received with a tax benefit to contributors. 2006 was our second most successful year yet with regards to fundraising; over \$4,000 was raised with the largest portion being proceeds from the sale of books previously owned by IAVCEI member George P.L. Walker.

2006 was a moderately active and productive year for IAVCEI. We hope to build on the success of the 2006 Workshops and the forthcoming 2007 IUGG meeting to assure the scientific and financial health and vitality of IAVCEI in the future.

Steve McNutt, IAVCEI Secretary General

IASPEI/IAGA/IAVCEI Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV) <http://www.emsev-iugg.org/emsev/>

In 2006, EMSEV played a major role in workshops/symposia held in Taipei, Toulouse, Singapore, Beijing, Agra and San Francisco. A field study on Taal Volcano, Philippines has been continued. There are 35 regular EMSEV members and well over 200 corresponding members are enlisted in EMSEV mailings.

Activities in 2006 included the following meetings:

- International Workshop iSTEP (integrated Search for Taiwan Earthquake Precursors), Taipei, Taiwan organized by J-Y Liu, March 2006.
- First DEMETER Workshop at Toulouse, France, organized by M. Parrot, June 2006.
- Session “Seismo-Electromagnetics : Lithosphere – Atmosphere Ionosphere Coupling”, convened by M. Hayakawa, J.Y. Liu and R. Singh, at AOGS (Asia Oceania Geoscience Society), Singapore, July 2006.
- Session “Observation, Methodology, and Theory of Electromagnetic Signals Associated With Earthquakes”, convened by Q. Huang, D. Ouzounov, L. Telesca, and T. Nagao, at WPGM (Western Pacific Geophysics Meeting), Beijing, July 2006.
- International Workshop on Electromagnetic Studies Related to Earthquakes and Volcanoes (IWEMSEV-2006), organized by Birbal Singh
- 2006 EMSEV Business Meeting, Agra, India, November 2006. This was the major activity of the year 2006. It was an extremely well organized and fruitful meeting
- Session “Observation, Validation, and Theory of Electromagnetic Signals Associated With Earthquakes”, convened by D. Ouzounov, S. Pulinets, M. Parrot and P. Taylor, at Fall AGU, San Francisco, December 2006.

The project on Volcano Taal as an IUGG Inter-association Initiative was continued by field studies by the staff of PHIVOLCS (Philippine Institute of Volcanology and Seismology). Preliminary analysis of these measurements indicates signs of shallow magma activity. Although plans were made for French and Japanese teams (led by J. Zlotnicki and Y. Sasai) to visit Philippines for joint field work of repeated magnetic, self-potential, degassing and temperature measurements and installation of monitoring stations on the volcano, hit of severe cyclone hindered the October 2006 visit. The visit is now postponed to January, 2007. The 2006 budget will be used during the next field work to support PHIVOLCS teams on the field. Soundings equipment will be let to PHIVOLCS to carry on their own further investigations before the 2007 campaign. One paper on magnetic observation has been published (Harada et al., 2005) and a second article on multi parameters observations has been submitted (Zlotnicki et al.).

The 2006 IUGG and Association financial support for EMSEV is as follows:

Income:

- IUGG \$2,000 (for general EMSEV activities);
- IAGA \$2,000
- IASPEI \$500
- IAVCEI \$2,000
- Saved funds of 2005 (returned from Mexico meeting by S. Pulinets) \$800

Total = \$7,300

Outgo:

- EMSEV Agra Meeting \$3,000 (\$2,000 from IAGA + \$500 from IASPEI + \$500

from Pulinets saving) Actually, \$2,977 (\$3,000 – cashing commission \$ 23) was handed over to Birbal Singh on Nov. 20, 2006 in Agra.

- Work on Taal Volcano \$2,300 (\$2,000 from IAVCEI + \$300 from Pulinets saving) . Actually, \$2,283 (\$2,300 – cashing commission \$17) was handed over to Sasai in late September in Tokyo. However, this fund is left over to 2007 because the field campaign was postponed due to cyclone in the Philippines.
- Reserve for IUGG Meeting in Perugia \$2,000 (Funds from IUGG)

Total = \$7,300

In the year 2006, EMSEV was allocated a total of \$ 6,500 from IUGG and Associations. This was considerably less than \$10,200 of the year 2004, due largely to suspension of the IUGG “Inter-association initiative” funds and to our untimely submission of support requests. But it was slightly over \$6,000 of the year 2005. Considering the tight budget of IUGG and associations, we are grateful to their actions.

The main EMSEV activity in 2007 will be at the XXIV IUGG General Assembly, July 2-13, Perugia, Italy. We are planning an integrated EMSEV Symposium “PROGRESS IN ELECTROMAGNETIC STUDIES ON EARTHQUAKES AND VOLCANOES” consisting of four sessions:

- Session 1: “VOLCANIC STRUCTURE AND ACTIVITIES” Convenor: Viacheslav V. Spichak; Co-convenors: Jacques Zlotnicki, Yoichi. Sasai, Domenico Patella and Ciro Del Negro
- Session 2: “ELECTROMAGNETIC FIELDS ASSOCIATED WITH EARTHQUAKES AND ACTIVE FAULTING” Convenor: Malcolm Johnston; Co-convenors: Naoto Oshiman, and Antonio Meloni
- Session 3: “CRUSTAL INSTABILITIES AND EARTHQUAKE PRECURSORS” Convenor: Pier Francesco Biagi; Co-convenors: Masashi Hayakawa, Jann-Yenq Liu, Toshiyasu. Nagao
- Session 4: “SEISMO- ELECTROMAGNETIC STUDIES USING SPACE TECHNOLOGY” Convenor: Ramesh Singh; Co-convenors: Sergey Pulinets, Michael Parrot, Dimitar Ouzounov, and Valerio Tramutoli

EMSEV has continued to be the major player in the international and interdisciplinary research activity in the physics of pre-, co- and post-event EM phenomena related to earthquakes and volcanic eruptions. Through our investigations, some new aspects of the physics of fault failure and volcanic activity, particularly the role of fluids, friction, electrical charge generation during seismic and volcanic processes, are becoming clearer. Further integration of EM data with seismic, geodetic, hydrologic, geochemical and thermal data will improve our understanding of these processes. On active volcanoes (e.g., Miyake and Taal) electric, magnetic, thermal and SP-potential measurements have shown clear changes possibly associated with initial intrusions, final explosive eruptions and post-eruptive activity that reflect the physical processes within the volcanoes. On active faulting (e. g., San Andreas fault), observed co-seismic magnetic effects have been shown to scale with moment/magnitude deduced from source theory. Pre- and co-seismic EM signals in DC to VLF band have also been the target of intensive research not only in Greece and Japan, but also in countries including Russia, Taiwan, Mexico, India and China. In even higher frequency bands (VLF to VHF), pre-seismic transmission



anomalies of EM waves have been kept reported by scientists from many countries, including Japan, Russia, Taiwan and Armenia. Although some of reported anomalies were likely noise, some others were considered to strengthen the argument that pre-seismic disturbances in the regions of atmosphere/ionosphere and magnetosphere cause observed anomalies. Monitoring of these regions with land-based ionosondes, total electron concentration (TEC) derived from GPS data, and from satellites (notably DEMETER), has made substantial new results. Even some physical models have been put forward to explain these phenomena, collectively called Lithosphere-Atmosphere-Ionosphere (LAI) coupling. Although the geophysical community at large has not yet been fully convinced of these new aspects of EM phenomena, we are definitely making significant progress. This science covers a wide variety of disciplines beyond conventional geophysics/seismology/volcanology. To name a few, we are a conglomerate of experts in electrical engineering, radio science, space physics, solid state physics, physics of complex systems and critical state. Since these scientists still tend to speak in different languages, it remains most important to continue to further develop mutual understanding among them.

Seiya Uyeda, EMSEV Chair, with Malcolm Johnston and Jacques Zlotnicki

#### ADDITIONAL UNION MATTERS AND FUTURE PLANS

2006 brought with it the unfortunate loss of members of the IUGG community. Several Associations have reported the death of eminent scientists as listed below. Full obituaries appear on the Association web sites. We gratefully remember the life and work of these friends and colleagues.

IAGA	Dr. Paul Serson (Canada); Dr. Luiz Muniz Baretto (Brazil); Toyohisa Kamei (Japan)
IAMAS	Prof. Yoram Kaufman (USA), Prof. Peter Hobbs (USA), and Dr. Brian Ryan (Australia)
IASPEI	Prof. Yury Tyupkin (Russia); Joergen Hjelme (Denmark)

Among the positive news of 2005 is the wide variety of awards and honors that were bestowed upon members of the IUGG community. These included the following:

- Professor W. James Shuttleworth, Director of the University of Arizona (USA) Center for Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA), was awarded the International Hydrology Prize.
- Dr Özgür Kisi, Hydraulics Division, Erciyes University, Turkey, received the IAHS Tison Award.
- Professor Igor Shikolmanov, a committed and long-time active member of IAHS, shared the prestigious Tyler Prize with David Schindler, a professor of ecology at the University of Alberta (Canada).
- Roland Pail (Austria) won the IAG 2005 Young Author Award.
- Dr. Deon E. Terblanche and his team from the South African Weather Service were awarded the first Prize for Excellence in Advancing the Science and Practice of Weather Modification by the Department of Atmospheric Studies of the Ministry for Presidential Affairs of the United Arab Emirates.

- Paola Malanotte-Rizzoli, USA, Chair of the Scientific Programme Committee for the 2007 IUGG General Assembly, was elected a Fellow of the American Geophysical Union.
- Raymond Pierrehumbert, USA, Vice-Chair of the Union Commission on Mathematical Geophysics, was elected a Fellow of the American Geophysical Union.
- Dr. Harsh Gupta, IUGG Bureau Member, received the 'Padma Shri' Award by Dr. A. P. J. Abdul Kalam, President of Republic of India.
- Dr. Timothy Killeen (USA), Co-Chair of IAGA Working Group II-B: Thermospheric Dynamics, was elected President of the AGU. Other AGU officers with IUGG responsibilities include Jaime Urrutia Fucugauchi (AGU International Secretary and Delegate from Mexico to the Sapporo IUGG General Assembly); Catherine Constable (President-elect of the Section on Geomagnetism and Paleomagnetism and member of the SEDI Advisory Committee); Jeffrey Freymueller (President of the Section on Geodesy and IAG National Correspondent for the USA); and Walter Mooney (President of the Section on Seismology and Acting Chair of the IASPEI task group on Seismic Imaging of the Lithosphere).
- Professor Charles Vörösmarty of the University of New Hampshire USA, was appointed to the United States Arctic Research Commission.
- Roger Barry, director of NSIDC and the World Data Center for Glaciology, received the 2006 Goldthwait Polar Medal, given in recognition of his outstanding contributions to polar research.

The IUGG Bureau, Executive Committee and Council will meet during the course of the IUGG general Assembly in Perugia, Italy. IUGG is grateful to the Perugia 2007 Local Organizing Committee (Prof. Lucio Ubertini, Chair), the members of his staff including Dr. Salvatore Grimaldi and Arnaldo Pierleoni, and the General Assembly Scientific Programme Committee (Prof. Paola Rizzoli, Chair) for their hard work and dedication.

Jo Ann Joselyn, IUGG Secretary General