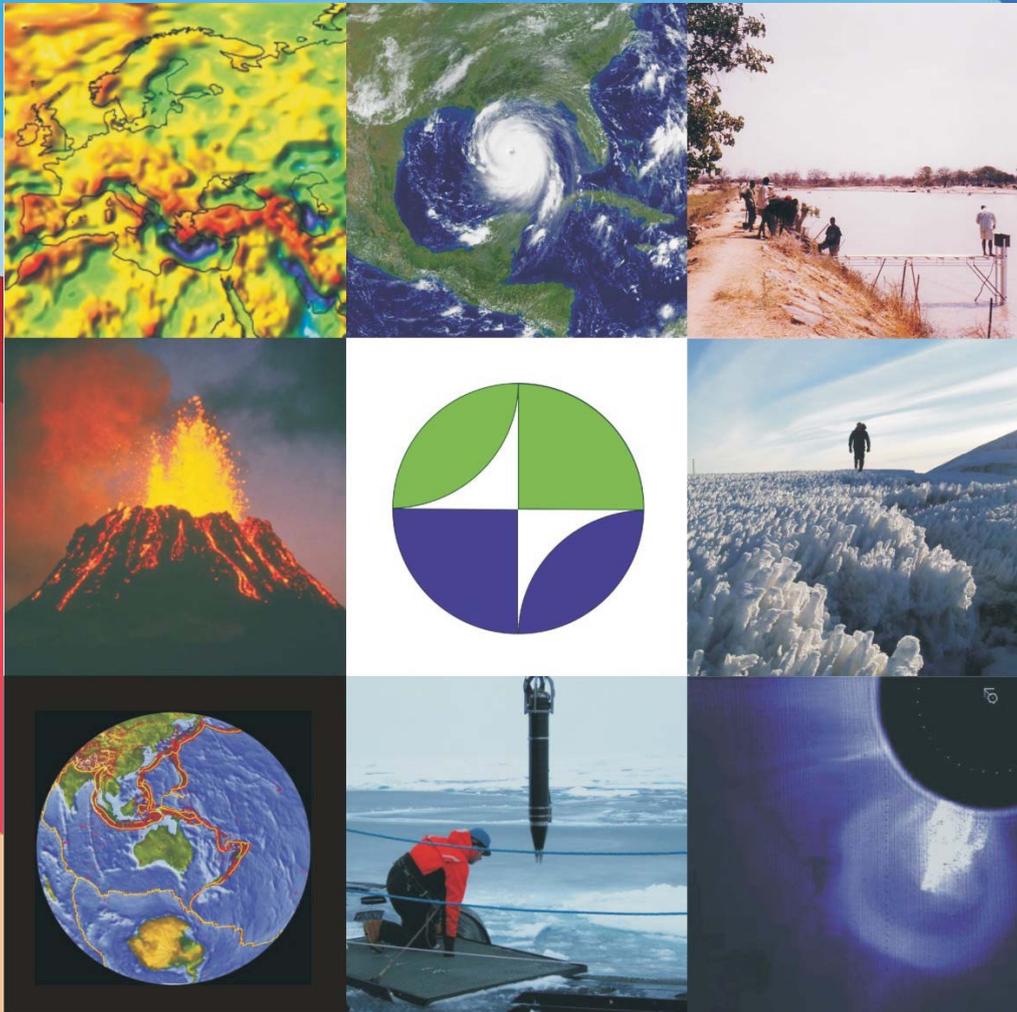




International Union of Geodesy and Geophysics (IUGG)
Union Géodésique et Géophysique Internationale (UGGI)

ANNUAL REPORT 2012





**INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS
UNION GEODESIQUE ET GEOPHYSIQUE INTERNATIONALE**

**IUGG Annual Report
2012**

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IUGG Annual Report 2012

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INTRODUCTION

Established in 1919, the International Union of Geodesy and Geophysics (IUGG) is the international, non-governmental, non-profit 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.

IUGG is one of 31 scientific unions adhering to the International Council for Science (ICSU). ICSU provides a global forum for scientists to exchange ideas and information and to develop standard methods and procedures for all fields of research. IUGG brings expertise on Earth studies from researchers in its International and Inter-Association Commissions. As a member of ICSU, IUGG strongly supports its policy of non-discrimination by affirming the rights and freedom of scientists throughout the world to engage in international scientific activity without limitation by such factors as citizenship, religion, creed, political stance, ethnic origin, race, color, language, age or gender.

IUGG has initiated and/or 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 International Hydrological Decade (1965-74), the Geodynamics Project (1972-79), the Global Atmospheric Research Programme (1967-80), the International Lithosphere Programme, the World Climate Research Programme, the International Decade for Natural Disaster Reduction, Integrated Research on Risk Disasters, the International Heliophysical Year (2007-2009), the Electronic Geophysical Year (2007-2008), the International Year of Planet Earth (2007-2009), and the International Polar Year (2007-2008). These programs have set a model for international, interdisciplinary cooperation. Representing all geophysical disciplines, IUGG is involved in the projects and programs related to climate change, global warming, and related environmental impacts.

IUGG supported and supports initiatives by ICSU, especially those in which Earth sciences have a role to play. IUGG cooperates with the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the study of hydrological (through IAHS) and oceanographic (through IAPSO) research; with the World Meteorological Organization (WMO) to promote studies in atmospheric sciences and meteorology (through IAMAS) as well as in hydrology (through IAHS). Together with the International Civil Aviation Organization (ICAO) and WMO, IUGG promotes the studies, the monitoring and the modelling of volcanic ashes (through IAMAS and IAVCEI). IUGG also cooperates with the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) in the studies related to seismology (through IASPEI), hydroacoustics, atmospheric transport modelling, and meteorology. In addition, IUGG places particular emphasis on the scientific problems of economically less-developed countries by sponsoring activities relevant to their scientific needs, e.g. Geosciences in Africa, eGY in Africa, Water Resources, Health and Well-Being etc.

The website, available in English and French, can be found at <http://www.IUGG.org>.

GENERAL INFORMATION

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 in the IUGG Yearbook and posted on the web site. Each Adhering Body establishes a National Committee for IUGG, and names Correspondents to each Association (as appropriate). During 2012, the Union had 70 Member Adhering Bodies. Several members were in observer status because they were in arrears of dues payment. Five Adhering Bodies were in Associate Member status. 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 country where the IUGG Secretariat is located is expected to provide administrative support for Union affairs.

Associations

The Union brings together eight 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.

The eight International Associations are listed below, and short reports on their 2012 activities are included here. Additional information about each Association is given on their web sites, which can be accessed from the IUGG website.

- International Association of Cryospheric Sciences (IACS)
- 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

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 problems. In 2012, the following bodies were active:

- Commission for Data and Information (UCDI)
- Commission on Geophysical Risk and Sustainability (GRC)
- Commission on Mathematical Geophysics (CMG)
- Commission on the Study of the Earth's Deep Interior (SEDI)
- Commission on Climatic and Environmental Changes (CCEC)
- Working Group on History

Inter-Unions Commission

The International Lithosphere Program, guided by the Scientific Committee on the Lithosphere (SCL), was established in 1980 as the Inter-Unions Commission on the Lithosphere (ICL) by the International Council for Science (ICSU), at the request of IUGG and the International Union of Geological Sciences (IUGS). The name was formally changed to the Scientific Committee on the Lithosphere in 1999. According to Decision 8.4 from the 2005 ICSU General Assembly, ICSU decided "to withdraw ICSU sponsorship from SCL/ILP and to recommend that responsibility would then 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-Unions body.

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 most recent General Assembly was held in Melbourne, Australia, 27 June–8 July 2011. The next IUGG General Assembly will take place in Prague, Czech Republic, 22 June–2 July 2015.

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.

PUBLICATIONS

The IUGG publishes an annual Yearbook that lists the organizational structure and officers of each body within the Union. The Yearbook is posted on the IUGG website: <http://www.iugg.org/publications/yearbooks/>. The Union also distributes an electronic newsletter (the IUGG E-Journal) monthly to Adhering Bodies and National Committees. Each Association manages its own publications.

IUGG OFFICERS FOR 2011-2015

IUGG Bureau

President:	Harsh Gupta	INDIA
Vice-President:	Michael Sideris	CANADA
Secretary General:	Alik Ismail-Zadeh	GERMANY/RUSSIA
Treasurer:	Aksel Hansen	DENMARK
Members:	Isabelle Ansorge	SOUTH AFRICA
	Pierre Hubert	FRANCE
	Kenji Satake	JAPAN

IUGG Executive Committee

IUGG Bureau members		
Immediate Past President:	Tom Beer	AUSTRALIA
IACS President:	Ian Allison	AUSTRALIA
IAG President:	Chris Rizos	AUSTRALIA
IAGA President:	Kathy Whaler	UK
IAHS President:	Gordon Young	CANADA
IAMAS President:	Athéna Coustenis	FRANCE
IAPSO President:	Eugene Morozov	RUSSIA
IASPEI President:	Domenico Giardini	SWITZERLAND
IAVCEI President:	Ray Cas	AUSTRALIA

IUGG Finance Committee

Chair:	David Collins	UK
Members:	Zoltan Hajnal	CANADA
	Jan Krynski	POLAND
	David Rhoades	NEW ZEALAND

Association Presidents and Secretaries General

International Association of Cryospheric Sciences

President:	Ian Allison	AUSTRALIA
Secretary General:	Andrew Mackintosh	NEW ZEALAND

International Association of Geodesy

President:	Chris Rizos	AUSTRALIA
Secretary General:	Hermann Drewes	GERMANY

International Association of Geomagnetism and Aeronomy

President:	Kathy Whaler	UK
Secretary General:	Mioara Manda	FRANCE

International Association of Hydrological Sciences

President:	Gordon Young	CANADA
Secretary General:	Christophe Cudennec	FRANCE

International Association of Meteorology and Atmospheric Sciences

President:	Athéna Coustenis	FRANCE
Secretary General:	Hans Volkert	GERMANY

International Association for the Physical Sciences of the Oceans

President: Eugene Morozov RUSSIA
Secretary General: Johan Rodhe SWEDEN

International Association of Seismology and Physics of the Earth's Interior

President: Domenico Giardini SWITZERLAND
Secretary General: Peter Suhadolc ITALY

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

President: Ray Cas AUSTRALIA
Secretary General: Joan Martí SPAIN

Union Commission Officers

Union Commission for Data and Information (UCDI)

President: Peter Fox USA
Secretary: Adelina Geyer SPAIN

Union Commission on Geophysical Risk and Sustainability (GRC)

President: Kuniyoshi Takeuchi JAPAN
Secretary: Diana Greenslade AUSTRALIA

Union Commission on Mathematical Geophysics (CMG)

President: Yehuda Ben-Zion USA
Secretary General: Claudia Pasquero ITALY

Union Commission on Studies of Earth's Deep Interior (SEDI)

President: Satoru Tanaka JAPAN
Secretary General: Michael Bergman USA

Inter-Unions Commission: International Lithosphere Program (ILP)

President: Sierd Cloetingh THE NETHERLANDS
Secretary: Magdalena Scheck-Wenderoth GERMANY

IUGG BUREAU AND EXECUTIVE COMMITTEE MEETING

The IUGG Bureau meeting was held in Freudenstadt, Germany, from 29 September to 1 October 2012. The next IUGG Bureau and Executive Committee meetings will take place in Prague, Czech Republic, in September 2013.

MESSAGE FROM THE PRESIDENT



Over the years the importance of geosciences is increasing. We need to learn more about the mysteries of Planet Earth. In spite of scientific and technological developments, the impact of natural disasters on the mankind is ever increasing. Recently, on 11th April, 2012 two earthquakes of Mw 8.6 and 8.2 occurred with an interval of 2 hours and 10 minutes close to the epicenter of the disastrous Mw 9.2 Sumatra earthquake of December 26, 2004 in the Indian Ocean. The 2004 earthquake had generated the most deadly tsunami ever experienced by mankind claiming about 250,000 human lives. Being predominantly strike-slip motion earthquakes, the 11th April earthquakes did not generate a big tsunami. However, such large strike slip earthquakes were never recorded before in the oceans. What would be effect of

these earthquakes on the complex and not well understood stress field is a new puzzle to be handled. This is just an example. There are similar problems seeking solutions in all disciplines of geo-sciences and IUGG is responsive and addresses such intriguing issues.

It has been recognized that earthquakes repeat near the places where they had occurred earlier. Developing earthquake scenarios and sharing it with public can be very useful and educative. An earthquake scenario was developed for India's capital, New Delhi for a magnitude Mw 8 earthquake occurring some 200 km away from Delhi. Fortunately, populous Delhi (population 16.7 million in 2011 census) does not have a history of a great or a large earthquake. However, the Himalayan earthquake belt, which has experienced several Mw ~8 earthquakes, lies just 200 km away. Such an earthquake occurring just 200 km from Delhi could be very destructive. While developing the scenario, soil conditions, the typology of the houses, and population density were kept in mind. A mega mock drill was carried out on February 15, 2012 for this hypothetical Mw 8 earthquake occurring at 11:30. The entire government machinery, schools, hospitals and public were involved. This exercise showed the vulnerability of the Delhi and weakness of the rescue and response machinery and played a very important role in sensitizing the Politicians and the Government. The interest of public and particularly students was very encouraging. Similar exercises for a repeat of the Kangra earthquake of Mw 7.8 in 1905 and the Shillong earthquake of Mw 8.4 in 1897 are planned.

The office of the IUGG Secretariat is now located at the GFZ German Research Centre for Geosciences, Potsdam, Germany. I welcome Dr. Franz Kuglitsch as the Executive Secretary/Assistant Secretary General of IUGG.

I welcome the Kingdom of Saudi Arabia as a new member of IUGG.

During 2012, there were important conferences organized by three IUGG Union Commissions: Mathematical Geophysics (in Edinburgh, UK, in June), SEDI (in Leeds, UK, in July) and GeoRisk (in Orange, California, USA, in December).

2013 is an important year as IUGG Scientific Associations shall be organizing scientific assemblies. A joint assembly of IACS and IAMAS will be held at Davos, Switzerland; IAVCEI shall meet at Kagoshima, Japan; IAHS-IAPSO-IASPEI will hold a joint assembly at Gothenburg, Sweden; IAGA shall meet at Merida, Yucatan, Mexico; and IAG shall meet at Potsdam, Germany. These assemblies provide an excellent opportunity to exchange views, look at the latest developments in our disciplines and find the way forward. Joint assemblies also provide opportunities to look at issues holistically. I sincerely hope that all the Associations shall make an extra effort to involve the youngsters.

I am grateful to the IUGG Bureau, the Executive Committee, the Secretariat and several individuals for their continued hard work and support to IUGG related activities during 2012.

Harsh Gupta

MESSAGE FROM THE SECRETARY GENERAL



The year 2012 was another successful and remarkable year in the history of the International Union of Geodesy and Geophysics (IUGG). The Union was involved in various activities and showed its strength in international cooperation and science promotion.

- IUGG established the Union Commission on Climatic and Environmental Change to promote scientific understanding of climatic and environmental change, to boost research in reducing uncertainties in climate and environmental models, and to define criteria for collaborative trans-disciplinary research on climate and environmental change. This will provide an all-Union perspective on climatic and environmental change and make available the knowledge and insights developed through scientific research to the benefit of society and planet Earth.
- IUGG established the Working Group on History of Earth and Space Sciences to raise the historical consciousness of the Union Members and to spearhead the effort to commemorate the IUGG's 100th anniversary (to be celebrated in 2019).
- The Kingdom of Saudi Arabia became an IUGG Member.
- The International Association of Hydrological Sciences celebrated its 90th birthday.
- Three Union Commissions of IUGG held conferences: CMG on mathematical geophysics (Edinburgh, UK, 18-22 June), SEDI on structure of the Earth and deep interior (in Leeds, UK, 1-6 July), and GRC on Extreme Natural Hazards and Their Impacts (in Orange, USA, 8-11 December).
- IUGG signed a Memorandum of Agreement with the Cambridge University Press to publish a series of works entitled "Special Publications of the International Union of Geodesy and Geophysics". The series will be composed of high-quality books, which will review the present state-of-the-art developments, discoveries and/or perspectives in Earth and space sciences.
- IUGG co-sponsored (US\$ 50,000 in total) 15 scientific meetings (workshops, symposia, conferences) worldwide and six science education events. IUGG awarded five grants (US\$ 80,000 in total) to support scientific projects of importance to the international geophysical and geodetic community, which will explore new scientific ideas and develop future international initiatives.
- IUGG continued to strengthen the cooperation with other International Scientific Unions and multi-disciplinary bodies of the International Council for Science (ICSU) as well as with the World Meteorological Organization (WMO), the United Nations Education, Science and Culture Organization (UNESCO), the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), the American Geophysical Union (AGU), the Asia-Oceanic Geosciences Society (AOGS), the European Geosciences Union (EGU), and some other international and intergovernmental organizations. Particularly, IUGG participated in the GeoUnions Joint Board Meeting (Istanbul, Turkey). IUGG co-sponsored the IRDR-IUGG joint workshop on FORIN (Forensic Investigation of Disaster).
- IUGG endorsed the International Year of Deltas (IYD). The IYD calls for developing an effective paradigm of basic research in service to society that demonstrates the power of research to improve conditions in these focused hotspots of vulnerability and change: deltas around the world.
- The IUGG Bureau met in Lauterbad, Germany, in October to discuss the Union business and activities in 2013. The IUGG Secretariat moved to Potsdam, Germany and is hosted by the GFZ.

The IUGG Bureau and Secretariat thank the Adhering Bodies and National Committees, Union Associations and Commissions as well as all individuals who helped to strengthen an international cooperation in Earth and space sciences for the benefit of society.

Alik Ismail-Zadeh

IUGG ACTIVITIES

IUGG SECRETARIAT

Office of the IUGG Secretariat

By the end of 2012, the office of the IUGG Secretariat moved from Karlsruhe to Potsdam, Germany. On the request of the IUGG officers, in June 2011 the GFZ German Research Centre for Geosciences in Potsdam expressed its willingness to host the office of the IUGG Secretariat and to provide a position for the IUGG Executive Secretary (ES). IUGG thanks the GFZ-Potsdam for the arrangement and financial support of the Secretariat.

The IUGG Bureau appointed Dr. Franz Kuglitsch as the new ES of the Union. Dr. Kuglitsch will manage the IUGG Secretariat at the GFZ and work under supervision of the IUGG Secretary General and the IUGG Bureau implementing decisions of the IUGG Council and Executive Committee.

From 2007 until 2012 the office of the IUGG Secretariat was located at the Karlsruhe Institute of Technology (KIT; former Karlsruhe University). IUGG is very grateful to KIT for providing the office for the Secretariat.

IUGG Yearbook for 2012

The 2012 Yearbook has been available on the IUGG website since January 2012 (<http://www.iugg.org/publications/yearbooks/yearbook2012.pdf>). The IUGG website maintains the directory of the Union and the Association officials as well as the archive of IUGG memberships and General Assemblies.

IUGG Annual Report for 2011

The IUGG Annual Report summarizes the activities of the Union, IUGG Associations and Union and Inter-Unions Commissions for 2011. The 2011 IUGG Annual Report is posted on the following website: <http://www.iugg.org/publications/reports/report2011.pdf>. The report was printed together with the 2012 IUGG Yearbook and was mailed to the Adhering Organizations, National Committees, International partners, and major libraries in May 2012.

IUGG web-page

The IUGG website <http://www.iugg.org>, in English and French, was fully redesigned, maintained and permanently updated in 2012.

IUGG Electronic Journal

The E-Journal, an informal newsletter, was published monthly and distributed on the first day of each month, keeping IUGG Member National Committees informed about the activities of IUGG, its Associations and Commissions, and the actions of the IUGG Secretariat. The journal also publishes feature articles, news from ICSU, the GeoUnions, IUGG scientific programs and co-sponsored scientific meetings, information about awards and honors bestowed on IUGG scientists as well as obituaries, and a meeting calendar (<http://www.iugg.org/publications/ejournals/>).

German Research Foundation's sponsorship of the IUGG Secretariat

The German National Committee for Geodesy and Geophysics (NKGG) applied for a grant from the German Research Foundation (DFG) to support the position of the Assistant Secretary General and to assist with business trips of the Secretary General for the years 2012-2013. The DFG awarded the travel grant to the Secretary General and a grant to hire the Assistant Secretary General. IUGG is very thankful for this generous support from DFG

IUGG BUREAU MEETING

The IUGG Bureau met in Lauterbad, Germany, from 29 September to 2 October. At the annual meeting the Bureau considered several important topics related to scientific development, science promotion, recognition, and education. The Bureau approved the guidelines on affiliated membership, fellowship and honorary membership, the Gold Medal of the Union, and the Early Career Scientist Award. The Bureau considered membership issues related to Albania, Armenia, D.R. Congo, Ghana, Monaco, Morocco, and Saudi Arabia, and how to strengthen contacts with IUGG Members. The Bureau also considered possibilities related to involvement of early career scientists in IUGG/Associations activities as well as the interactions between industry and academia. The activities of the Union Commissions and Union Committees were reviewed, and the formation of the Union Working Group on History of Geodesy and Geophysics was endorsed. The Bureau reviewed the activities of the International Lithosphere Program, the Grants Programme, the Science Education Programme, and the Special Publication Programme. The celebration of the 100th anniversary of IUGG in 2019 was discussed. The Bureau considered the cooperation with the International Council for Science (ICSU), with ICSU's scientific unions (particularly with the GeoUnions) and ICSU's interdisciplinary bodies (particularly with new scientific programs IRDR and WDS), as well as with the intergovernmental bodies: UNESCO, WMO, ICAO, GEO/GEOSS and some others. The reports of the President, Secretary General, Treasurer and Chair of the Finance Committee were presented and approved. The Bureau welcomed the new Executive Secretary of IUGG at the last day of the meeting.



*The IUGG Bureau (from left to right): A. Ismail-Zadeh (Secretary General), D. Collins (Chair, Finance Committee, guest), H. Gupta (President), I. Ansoorge (Member), P. Hubert (Member), M. Sideris (Vice President), A. Hansen (Treasurer), S. Oswald (Assistant Secretary General), and K. Satake (Member), Freudenstadt, Germany, October 2012
(photo: F. Kuglitsch).*

NEW IUGG REGULAR MEMBER: THE KINGDOM OF SAUDI ARABIA

On 23 July 2012, an application for admission of the Kingdom of Saudi Arabia to IUGG as a regular member (Category 2) was received from the King Abdulaziz City for Science and Technology (KACST). The IUGG Executive Committee welcomed this application, and it was placed before the IUGG Adhering Bodies in regular status for a vote by correspondence. The vote is now complete, and the application was accepted (32 affirmative). According to the IUGG Statutes and By-Laws, the membership of Saudi Arabia is provisional until the next meeting of the IUGG Council in Prague, Czech Republic, 2015, when a final vote will be taken.

The officers of the Saudi National Committee are Tariq Alkhalifah (President) and Khalid Aldamegh (Secretary General). Correspondents to the Associations are Abdullah Arrajehi (IAG), Abdulaziz Al-Bassam (IAHS), Saad Mohalfi (IAMAS), Abdul Nasser Alkotab (IAPSO), Khalid Aldamegh (IASPEI), and Mohammed Rashad Hassan Moufti (IAVCEI).

THE INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES IS NINETY

Landmarks in the world of water – memorable attributes and events that are noted and quoted – often tend to focus on large physical features like the River Amazon and the Niagara Falls. Alternatively they consist of extremes such as the Pakistan floods of 2010 and the successive droughts in the Horn of Africa. But there are others that are less immediately recognizable which do not often hit the headlines, such as the start of international initiatives, for example the International Hydrological Programme (IHP) in 1975 and the Millennium Development Goals in 2000. Predating these happenings was the launch of the International Branch (or Section) of Scientific Hydrology at the Rome General Assembly of the International Union of Geodesy and Geophysics (IUGG) in 1922, later to become the International Association of Scientific Hydrology (IASH). This note commemorates the 90 years since that event. It highlights some of the main achievements of what is now the International Association of Hydrological Sciences (IAHS) – the foremost international learned society dealing with the pressing problems of water resources: floods, droughts, water pollution, erosion and so on, together with the science and technology to address them.

IAHS was founded in 1922 at a small gathering of scientists and engineers from about half a dozen European countries – probably none of those present would have called themselves a hydrologist. What was in the minds of these delegates when they established the Branch and in the thoughts of those who made it into the Association in 1930 is not recorded in the proceedings. However, there is little doubt that they would be amazed at the extent and depth of the Association's activities as the 21st century unfolds. At the beginning the Association's assemblies attracted less than 100 participants with little activity in the years intervening. Now, with 10 Commissions and three working groups, one being on PUB (Prediction in Ungauged Basins), nearly 100 affiliated national bodies and some 5,500 individual members, IAHS is a vibrant international community of hydrologists. Furthermore the Association shares activities in a number of fields: with several IUGG Commissions, with some of the other seven Associations in the IUGG family, and also with a number of associations outside IUGG. These include the International Association of Hydrogeologists (IAH) and the International Association of Hydro-Environment Engineering and Research (IAHR). These linkages demonstrate that IAHS has a broad base for its science activities. And, of course, there is also the intergovernmental world where IAHS has interests in common with several UN bodies; particularly with the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Meteorological Organization (WMO), the International Atomic Energy Agency (IAEA) and also with UN Water. Indeed IAHS, through the efforts of Prof. L. J. Tison (Secretary General, 1948-1971), helped launch the UNESCO and also the WMO programmes in hydrology. Prof. Tison is recognized as one of the three "fathers" of the International Hydrological Decade (IHD), which preceded the IHP, and he was very influential in establishing the WMO Commission on Hydrological Meteorology, the forerunner of today's Commission on Hydrology. These and other facts and figures are captured on the Association's website <http://www.iahs.info>, together with a wealth of information about its current activities.

That there have been so many changes over the 90 years of the Association's existence, which facilitate its business, we tend to forget them. The ease of travel nowadays allows meetings to take place virtually anywhere on the planet, whereas they were all in Europe during the early years of the Association. Over the last decade IAHS and its Commissions have convened six to eight conferences a year on particular subjects, in addition to the Scientific Assemblies and General Assemblies within IUGG Assemblies. The tradition of publishing "Red Books", which commenced in 1924 at the Madrid General Assembly, has continued to the present with Pub. No. 356 (Erosion and sediment yields in the changing environment) being the most recent. Sediment dynamics, land subsidence, forest hydrology, isotopes, groundwater management – these are amongst the themes of recent proceedings. In addition there is the "Special Publications" Series (Blue Books), the Benchmark Series and the Hydrological Sciences Journal. Commencing in 1953 and originally published three times a year as the Bulletin of IASH, it became the Hydrological Sciences Journal in 1982 and now appears eight times a year with more than 1,000 pages per volume. These publications can be ordered at the Association's online bookshop while members have free online access to the Journal and the whole archive covering the period 1924 until 2004. Key to the success of the Association's publication program is the IAHS Press. The Press was established at Wallingford, UK, in 1972, and it probably produces now more scientific publications dealing with hydrology and water resources than any other publisher.

The different forums offer room for discussion, review, publication and dissemination of the results of research, and they help to direct efforts to areas where problems are proving more intractable. They stimulate educational outreach and the transfer of knowledge, which can be applied in planning, development and management of water resources, particularly through the IAHS Task Force for Developing Countries (TFDC). TFDC manages the program for the free distribution of the Journal, Red Books and other publications to more than 70 libraries in some 50 developing countries, which has been underway since 1991. It has also been very successful in obtaining funds from a considerable number of donors to support the attendance of members from these countries at IAHS gatherings. To recognize outstanding contributions to the science and to international hydrology, along with UNESCO and WMO, IAHS awards the International Hydrology Prize annually and the Tison Award to young scientists for recording their innovative research in one of the Association's publications.

Peering into the past through the prism of the science to predict and forecast future events has a well-established methodology in hydrology, whereas the means for predicting the path of the science itself remain rudimentary. Nevertheless the Association has, on several occasions, taken a glimpse at what the coming years may hold. For example, the "Water for the Future Symposium" in Rome, Italy, 1987, looked at the Thrust of Thought in Contemporary Hydrology and New Techniques in Data Capture. Twice since 1982 the minds of a selection of the younger members of IAHS have been exercised to probe the future. Most recently, the Hydrology 2020 Working Group reported its findings (Hydrology 2020. An integrating science to meet world water challenges, Edited by T. Oki, C. Valeo and K. Heal, IAHS Pub. No. 300, 2006). In a similar way, the PUB initiative kicked off in 2002 aimed at a future where the *ultimate goal* in hydrology would be achieved – the hydrological prediction of ungauged basins and reduction of the associated uncertainty. The results of the PUB Decade were examined and evaluated at the Symposium held recently in Delft, The Netherlands, from 23 to 25 October, 2012, which also celebrated the 90th anniversary of IAHS. In addition there was discussion and debate on the call announced earlier in the year for an innovative science initiative to take the Association forward from 2013 into the decade leading to its 100th anniversary. This "Visionary Session" on the next hydrological decade sparked a number of ideas and possible themes which will be refined into a plan to be put to the Association at the Scientific Assembly in Gothenburg, Sweden, next year. (Received from J. C. Rodda)

NEW IUGG UNION COMMISSION ON CLIMATIC AND ENVIRONMENTAL CHANGES

An adequate scientific understanding of climate change itself as well as its impacts on the environment and society requires a very broad interdisciplinary approach. As such, the advancement of the scientific understanding of climate and climate change, from the basic physics and chemistry to aspects affecting vulnerability, impacts, mitigation and adaptation measures, provides an ideal topic for a new Union Commission, with the remit of promoting the IUGG objectives through the coordination of research on climatic and environmental change, and especially the development of targeted efforts to serve society with the scientific knowledge being gained through research. Such a remit transcends the internal resources available to any single Union Association and thus needs to involve multiple Union Associations, coordinated by a new Commission that brings together in a synergy of ideas the problems and approaches from various Associations related to the topics of the commission. By coordinating and integrating the climate-related activities within the Union, IUGG will gain visibility and bring the Union's research expertise to bear on some of the most challenging and important environmental and societal challenges of the 21st century. This is timely because ICSU and the International Group of Funding Agencies for Global Change Research (IGFA) proposed a new international program entitled "*Future Earth: Research for Global Sustainability*". A new IUGG Union Commission on Climatic and Environmental Change would provide the mechanism to link with the new emerging effort of ICSU as it seeks greater collaboration on an increasing range of subject areas.

Considering the proposal from the initiative group led by IUGG Past President Tom Beer, and taking importance of the scientific topics into account, the IUGG Executive Committee decided to establish the Union Commission on Climatic and Environmental Change (CCEC) in order (i) to promote the advancement of the scientific understanding of climatic and environmental change, (ii) to boost research in reducing uncertainties in climate and environmental models, (iii) to define criteria for collaborative trans-disciplinary research on climate and environmental change, (iv) to fulfill the objectives of IUGG and its associations, (v) to provide an all-Union perspective on climatic and environmental change, and (vi) to make available the knowledge and insights developed through scientific research to the benefit of society and planet Earth, including considerations of the science of global change, related vulnerability and impacts, and potential responses.

The IUGG Executive Committee appointed 14 experts to compose the Executive Committee of CCEC: Tom Beer (Australia) as Chair of the Commission, Jianping Li (China) as Vice Chair, Keith Alverson (USA) as Secretary-Treasurer, and 10 members of the committee representing Union Associations: Ian Allison (Australia, IACS), Michael Sideris (Canada, IAG), Tonie van Dam (Luxembourg, IAG), Eigil Friis-Christensen (Denmark, IAGA), Dan Rosbjerg (Denmark, IAHS), Makoto Taniguchi (Japan, IAHS), Michael MacCracken (USA, IAMAS), Guoxiong Wu (China, IAMAS), Lawrence Mysak (Canada, IAPSO), Setsuya Nakada (Japan, IAVCEI), Stephen Self (USA/UK, IAVCEI), and a co-opted member Serhat Sensoy (Turkey, WMO Commission for Climatology).

NEW IUGG UNION WORKING GROUP ON HISTORY

Historical awareness enriches our lives generally as human beings and enables us to relate the personal and scientific struggles and triumphs of our predecessors to our own day-to-day challenges and to maintain perspective. The historical awareness also enables one to connect dots across time. In short, a good grounding in the history of thought in various fields of Earth and space sciences can help us to do our science "better, faster and cheaper."

In November 2012, the IUGG Executive Committee formed a new Working Group on History (WGH) to raise the historical consciousness of the Union Members. The main focus of the WGH would be to sponsor joint/interdisciplinary sessions at IUGG General Assemblies as well as history sessions at Scientific Assemblies of the Union Associations. The numbers of dedicated historical sessions and historical talks in scientific sessions across all associations will be metrics of our success. The WGH

intends to play a role in helping to preserve IUGG and Union Association histories by providing a focal point for history within the IUGG. The WGH will spearhead the effort to commemorate the IUGG's 100th anniversary. A special focus of the Working Group will be the observance of the IUGG's centennial in 2019 for which plenary sessions devoted to a review of progress in the various disciplines are envisioned as well as special publications on history of geodesy and geophysics.

The WGH Executive Committee is comprised of two co-chairs, Ed Cliver (USA, IAGA) and Hans Volkert (Germany, IAMAS), the representative(s) of the Union Associations, and two advisors, historians Ron Doel (USA, Florida State University) and Greg Good (USA, Center for the History of Physics).

IUGG AND THE INTERNATIONAL YEAR OF DELTAS

Several distinguished geoscientists proposed the year 2013 to be designated as the International Year of Deltas (IYD) (i) to increase the awareness of and the attention to the value and vulnerability of deltas worldwide, (ii) to promote and enhance international and regional cooperation at the scientific, policy, and stakeholder levels, and (iii) to focus and accelerate a comprehensive research agenda toward understanding and modeling these complex socio-ecological systems as the cornerstone of ensuring preparedness in protecting or restoring them in a rapidly changing environment. The IYD calls for developing an effective paradigm of basic research in service to society that demonstrates the power of research to improve conditions in these focused hotspots of vulnerability and change: deltas around the world. The IYD is proposed as a year of awareness, a year of focus, and a year for launching a 10-year committed initiative, in intellect and resources worldwide, toward practical and goal-oriented efforts to comprehensively address the predictive understanding of these vulnerable systems and to use this understanding to protect and restore them.

The IYD initiative group approached IUGG with a request to endorse and co-sponsor the International Year of Deltas. The International Association of Hydrological Sciences (IAHS) and the International Association for the Physical Sciences of the Oceans (IAPSO) were very supportive of the initiative. Considering the importance of scientific research on deltas for the benefit of society and the enthusiasm of leading experts in the field to promote the scientific activity, the IUGG Executive Committee endorsed unanimously the IYD proposal. IUGG appointed two liaison persons, Gordon Young (Canada) of IAHS and Gerardo Perillo (Argentina) of IAPSO, to the Scientific Committee of the International Year of Deltas. More information on IYD can be found at: <http://www.iyds-2013.org/>

IUGG SPECIAL PUBLICATION SERIES

IUGG signed a Memorandum of Agreement with the Cambridge University Press to publish a series of works entitled "Special Publications of the International Union of Geodesy and Geophysics" (hereinafter the Series). The Series will be composed of high-quality books, which will review the present state-of-the-art developments, discoveries and/or perspectives in Earth and space sciences around the world. The first volume of the series will be the work entitled "Extreme Natural Hazards, Disaster Risks and Societal Implications" based on the results of the ENHANS Project (<http://www.enhans.org>) led by IUGG and supported by several international, national, and intergovernmental organizations.

The Editorial Board consists of the Editor-in-Chief (IUGG Secretary General) and eight Board Members (Association Secretaries General). In addition, an Advisory Board of the Series has been appointed to supplement the regional and subject expertise of the Editorial Board and to provide advice to it on the topics of possible volumes and potential editors of the volumes. More information can be found at: <http://www.iugg.org/publications/special/>

IUGG GRANT PROGRAMME

The IUGG Grants Programme aims to support projects of importance to the international geophysical and geodetic community to explore new scientific ideas and develop future international initiatives. The total amount of funds allocated to the projects is US\$ 80,000. For 2012-2013, IUGG awarded the following projects:

- Capacity and collaboration building in southeast Africa towards the implementation of sustained ocean and climate observations (Lead Applicant: IAPSO; Supporting Applicants: IAMAS, SCOR/IAPSO/WCRP WG 136, and American Geophysical Union).
- Monitoring crustal deformation and the ionosphere by GPS in the Caribbean (Lead Applicant: IASPEI; Supporting Applicants: IAG and IAGA).
- Extension of Intermagnet Russian Segment: Prospects and Challenges: Phase II (Lead Applicant: IAGA; Supporting Applicants: IAG, UCDI, and the Russian National Committee for IUGG).
- Forensic Investigations of Disasters – FORIN (Lead Applicant: IUGG Union Commission GeoRisk Commission; Supporting Applicants: IAHS and IRDR).
- Detailed Geoid Model in Africa (Lead Applicant: IAG; Supporting Applicants: IASPEI).

Report on the IUGG project “Predicting volcanic ash dispersal combining field, experimental and meteorological data into super-computational numerical simulations”

The main target of the granted project was to improve the forecasting of the dispersal of fine ash from explosive volcanic eruptions. The project is part of an ongoing collaboration among Italian, Spanish and Mexican researchers for the study of ash dispersal from three selected volcanoes, Somma-Vesuvius (in Italy), Fuego de Colima and Popocatepetl (both in Mexico), in the case of an explosive eruption of any intensity and magnitude. The main aim of the collaboration is to forecast the concentration of different size ash particles at ground level and in the atmosphere. This is a crucial variable impacting human and animal health, water supply and infrastructure. To date, this is an issue that has been approached only for very small eruptions and with simplified models valid at scales smaller than few hundreds of kilometers. Moreover, except for the potential impact on air traffic managed by Volcanic Ash Advisory Centers, effects of fine ash are poorly addressed by present-day mitigation plans. The achievement of the main target has been pursued following three main cross-integrated research lines: (i) collection and comparison of field data; (ii) laboratory analyses and experiments; and (iii) numerical modeling. At present, the results of research lines 1-3 have been merged into large-scale 3D numerical simulations of volcanic ash dispersal at Somma-Vesuvius using super-computational facilities. Similar protocols are being developed for the Colima volcano, for which only preliminary numerical simulations are available. These outputs represent a step forward in the current research in volcanology and civil protection strategies in the study areas.

The grant supported research on ash dispersal mainly at the Colima and Somma-Vesuvius volcanoes, and the IUGG support is acknowledged in three published and two submitted papers in international journals:

- Caron B., G. Siani, R. Sulpizio, G. Zanchetta, M. Paterne, R. Santacroce, E. Tema, and E. Zanella (2012), Late Pleistocene to Holocene tephrostratigraphic record from the Northern Ionian Sea, *Marine Geology*, 311-314, 41-51, doi: 10.1016/j.margeo.2012.04.001.
- Sulpizio R., A. Folch, A. Costa, C. Scaini, and P. Dellino (2012), Hazard assessment of farrange volcanic ash dispersal from a violent Strombolian eruption at Somma-Vesuvius volcano, Naples, Italy: Implications on civil aviation, *Bulletin of Volcanology*, 74, 9, 2205-2218, doi:10.1007/s00445-012-0656-3.
- Roverato M., L. Capra, and R. Sulpizio (2012), First evidence of hydromagmatism at Colima Volcano (Mexico), *Journal of Volcanology and Geothermal Research*, 249, 197-200, doi:10.1016/j.jvolgeores.2012.10.012.

- Sulpizio R., M.C. Alçiçek, G. Zanchetta, and L. Solari, Recognition of the Minoan tephra in Acigöl Basin, Western Turkey: implications for inter-archive correlations and fine ash dispersal, *Journal of Quaternary Research*, submitted.
- Sulpizio R., G. Zanchetta, B. Caron, P. Dellino, D. Mele, B. Giaccio, D. Insinga, M. Paterne, G. Siani, A. Costa, G. Macedonio, R. Santacroce, Volcanic ash hazard in the Central Mediterranean assessed from geological data, *Bulletin of Volcanology*, submitted.

The granted project has provided significant steps forward into the comprehension and forecast of ash dispersal during explosive volcanic eruptions. The use of field, laboratory, and meteorological data as input parameters for numerical simulations were merged together, providing an interdisciplinary approach to the study of volcanic ash dispersal. The outputs of these papers represent tools of paramount importance for volcanic hazard managements in densely populated areas such as the Central Mediterranean and Western Mexico. (Received from R. Sulpizio)

Report on the IUGG Project “Capacity and collaboration building in southeast Africa towards the implementation of sustained ocean and climate observations”

The Chapman Conference on the Agulhas System and its Role in Changing Ocean Circulation, Climate, and Marine Ecosystems was held in Stellenbosch, South Africa, from 8-12 October 2012. The conference generated a great deal of excitement among participants, particularly African scientists, some of whom had not previously attended an international conference. The conference attracted 108 participants from 20 different countries. 35 came from seven different African countries and 27 were PhD students. They covered the fields of ocean and climate modeling, physical and biological oceanography, marine ecology, paleoceanography, meteorology, and marine and terrestrial paleoclimatology.

Growing interest in the Agulhas system is related to its leakage of warm and salty waters from the Indian Ocean into the Atlantic via Agulhas rings. Paleoclimate data and simulations suggest that changes in Agulhas leakage are related to changes in the Atlantic meridional overturning circulation (AMOC) and the global climate. The conference was organized into four thematic sessions: the state and dynamics of the Agulhas system under present and past boundary conditions; the effects of the system on regional weather, ecosystems, and fisheries; the mechanisms that link the Agulhas to changes in ocean circulation and climate; and the impact of the system on the AMOC and the global climate. The Agulhas system was shown to have significant impacts on marine ecosystems, largely due to mesoscale eddies and dipoles, which propagate southwestward from the source regions of the Agulhas Current. These eddies affect the distribution of plankton and top predators, facilitate connectivity between remote ecosystems, and may impact the strength of the annual Natal sardine run. The Agulhas Return Current was shown to help maintain and guide the southern hemisphere storm track, which feeds into the polar front jet and Mascarene High, affecting regional weather and rainfall over Africa. Most climate models perform poorly in the Agulhas region: retroflexion is too early and the Agulhas ring corridor in the Atlantic too narrow. As a consequence there is too little mixing of Agulhas waters into the AMOC and the so-called salt advection feedback is not simulated well. The development of coupled climate models with high-resolution oceans is ongoing to address some of these issues. Observational evidence for the global effects of Agulhas leakage comes from paleo-proxies from marine sediment cores, which show peaks in leakage just prior to each glacial termination. Further study is proceeding (e.g. GATEWAYS program) to resolve variability on multi-centennial time scales.

A major recommendation from the conference is to develop sustained observations of the Agulhas system. The Western Indian Ocean Sustainable Ecosystem Alliance (WIOSEA) could serve as an integrating framework for the cooperation of international and regional scientists towards sustained observations. Capacity building and training of regional technicians and scientists are essential, and the conference was an important contribution towards that goal. The conference was realized jointly by the SCOR/WCRP/IAPSO (Scientific Committee on Oceanic Research / World Climate Research Program / International Association for the Physical Sciences of the Oceans) Working Group 136 on

the Climatic Importance of the Greater Agulhas System. The conference was co-sponsored by AGU, IAPSO, IUGG, Intergovernmental Oceanographic Commission (IOC), U.S. National Science Foundation, National Oceanic and Atmospheric Administration (NOAA), Nature Publishing Group, Scientific Committee on Oceanic Research (SCOR), and several other institutions. (Received from L. Beal, W. de Ruijter, A. Biastoch, and R. Zahn)

SCIENTIFIC MEETINGS CO-SPONSORED BY IUGG

IUGG co-sponsors symposia and workshops appropriate to our disciplines of study and supports the participation of early-career scientists and scientists from developing countries. For 2012, IUGG supported the following meetings (the name of the supporting IUGG Associations is indicated in brackets):

- International summer school/workshop in glaciology, McCarthy, Alaska, USA, 10-20 June (IACS).
- Workshop on measurement and uncertainty assessment of glacier mass balance, Tarfala, Sweden, 9-11 July (IACS).
- Workshop on Vertical Datum Unification, Bogotá, Colombia, 10-14 December (IAG).
- 21st Electromagnetic Induction Workshop, Darwin, Australia, 25-31 July (IAGA).
- 2012 International EMSEV meeting, Shizuoka, Japan, 30 September-4 October (IAGA).
- 3rd STAHY International Workshop, Tunis, Tunisia, 1-2 October (IAHS).
- Symposium “Completion of the IAHS Decade on Prediction in Ungauged Basins”, Delft, The Netherlands, 23-25 October (IAHS).
- International Conference on Clouds and Precipitation, Leipzig, Germany, 28 July-3 August (IAMAS).
- International Radiation Symposium (IRS) 2012, Berlin, Germany, 6-10 August (IAMAS).
- ICDM Workshop 2012 “Dynamics and Predictability of High-impact weather and Climate Events”, Kunming, China, 6-9 August (IAMAS).
- Comparative Climatology of Terrestrial Planets, Boulder, Colorado, USA, 25-28 June (IAMAS).
- 33rd General Assembly of the European Seismological Commission and Young Seismologists Training Course, Moscow, Russia, 19-24 August (IASPEI).
- 9th General Assembly of the Asian Seismological Commission 2012, Ulaanbaatar, Mongolia, 17-20 September (IASPEI).
- IUGG GRC Conference “Extreme Natural Hazards and Their Impacts”, Orange, California, USA, 11-14 December (IUGG Commission on Geophysical Risk and Sustainability).
- 39th COSPAR Scientific Assembly, Mysore, India, 14-22 July (IAGA, IAMAS).

For 2013, IUGG will support the following meetings:

- School “Impact of solar variability on climate”, Thessaloniki, Greece, 11-15 March (IAMAS).
- 4th International Workshop on Hydro-Ecology (HydroEco 2013), Rennes, France, 13-16 May (IAHS).
- Reconciling observations and models of elastic and viscoelastic deformation due to ice mass change, Ilulissat, Greenland, 30 May-2 June (IAG).
- 19th CNAAC Conference, Fort Collins, Colorado, USA, 24-28 June (IAMAS).
- Workshop “Measurement Problems in Ice Clouds”, Zurich, Switzerland, 5-6 July (IAMAS).
- International Tsunami Symposium, Fethiye-Gocek, Turkey, and Rhodes, Greece, 22-26 July (IASPEI-IAPSO).
- Facets of Uncertainty: 5th EGU Leonard Conference; Hydrofractals '13; Statistical Hydrology - STAHY '13, Kos, Greece, 17-19 October (IAHS).

In addition to the awards, the IUGG Bureau agreed to allocate travel grant awards to all Association Scientific Assemblies.

SCIENTIFIC MEETING REPORTS

Report on the Indo-U.S. Workshop on Intraplate Seismicity

The Workshop was held at the Institute of Seismological Research, Gandhinagar, Gujarat, India from 15 to 18 January 2012. The major scientific topic of the meeting was to take stock of intraplate seismicity studies in India and USA and to identify future research directions to study this least understood phenomenon. A number of speakers presented results from the analysis of data collected in the Kachchh region (a district of Gujarat) since the 2001 Bhuj earthquake. The results of these studies have important implications for the eastern/central United States, which experiences similar infrequent intraplate earthquakes but has not experienced a large earthquake in recent times. IUGG President Harsh Gupta was invited to present the latest views on reservoir-triggered earthquakes and the plans for deep drilling at Koyna.

Many results of significant scientific importance were presented during the workshop including the following: (i) A large amount of vertical deformation is likely to cause seismicity in the Kachchh region; (ii) viscoelastic stress perturbation due to the 2001 Bhuj earthquake triggered seismicity at a distance of about 200 km for a decade (as observed in the Kachchh and Saurashtra regions); (iii) compelling evidence for the presence of active faults by 3D satellite imagery and trenching in Kachchh; (iv) several models of the regional deformations (e.g., wedge-fault model, crest-trough model, uplift model); (v) deep crustal earthquakes in rift valleys of Kachchh and Narmada can be explained as a response to stress/strain localizations around the mafic high density / high velocity bodies. Fractured and fluid-filled low velocity zones within the bodies act as asperities or earthquake nucleation zones; and (vi) in intraplate regions, aftershocks of large earthquakes can be observed for hundreds of years.

The workshop recommended investigation of the causes of vertical uplift in Kachchh; development of a ground motion prediction equation (GMPE) of India; analysis of strong motions in Kachchh; development of two arrays, viz. the Kachchh Lithosphere Investigation and Kachchh Crustal Imaging Array to decipher details of the regional crustal structure; and preparation of a high-resolution aeromagnetic map of Gujarat. During the workshop potential collaborative projects were formed to further investigate key questions about intraplate earthquakes, including which regions are most at risk of damaging earthquakes, the average long-term rate of large earthquakes in different regions, and the overall scientific framework to explain why intraplate earthquakes occur. More than 100 delegates attended the workshop. The Indian participants were from 25 institutions throughout the country. There were 50 oral presentations and 25 poster presentations. The poster presentations were judged, and the top five were awarded prizes. The workshop was supported by the Indo-US Science & Technology Forum (IUSSTF), New Delhi, and coordinated by B. K. Rastogi (India) and S. E. Hough (USA). (Received from B. K. Rastogi)

Report on the G-EVER1 Workshop

The first Workshop of Asia-Pacific Region Global Earthquake and Volcanic Eruption Risk Management (G-EVER1) was held at the Geological Survey of Japan in Tsukuba, Japan, 22-24 February 2012. The target of this workshop was to increase international collaboration between geohazard institutes and organizations in the Asia-Pacific region to advance natural sciences and to discuss how to reduce risks from natural disasters, such as earthquakes, tsunamis and volcanic eruptions. 152 participants from twelve countries attended and 56 national and international institutes supported this workshop. IUGG, IASPEI and IAVCEI co-sponsored the workshop.

The workshop was composed of four parts, including sessions on (i) Recent earthquakes and volcanic eruptions, (ii) Report of Asia-Pacific region, (iii) Database and risk management, and (iv) Group discussion on the database and risk assessment-management. In total, 35 oral and 25 posters were presented. In the first session, there were three presentations on volcanic eruptions, including the 1991 Pinatubo eruption in Philippines (by Chris Newhall), the 2010/11 Eyjafjalljökull eruption in Iceland (by Sue Loughlin) and the 2011 Shinmoedake eruption in Japan (by Hiroshi Shinohara), and four presentations on earthquakes and tsunamis, including the 2004 Sumatran and the 2011 Tohoku earthquakes (by Kenji Satake), paleotsunami studies in Japan (by Yukinobu Okamura), the strong

motion observation system in China (by Xiao Jun Li) and the disaster process after the 2011 Tohoku earthquake (by Norio Maki). In the second session (Report of the Asia-Pacific region), results of recent studies and observations on volcanoes and earthquakes were presented from representatives of eight countries, including Korea, Taiwan, the Philippines, Vietnam, Thailand, Indonesia, New Zealand and Japan.



Group photos of the participants of G-EVER1 workshop, Tsukuba, Japan, February 2012 (photos: S. Takarada).

In the third session, 12 presentations on geohazard databases and risk management were presented. For the volcanic hazard, such as the VHub (by Greg Valentine), the monitoring system of the volcanic ash eruptions in the north Pacific (by John Eichelberger), the activity of EOS and WOVodat (by Chris Newhall), some case studies on volcanic crisis (by Bruce Houghton), VOGRIPA and GVM (by Sue Loughlin) and activities of COV in IAVCEI and DEVORA in New Zealand (by David Johnston) were introduced. For the seismic hazard, topics such as the PAGER system of USGS (by David Wald), extreme seismic hazards (by Alik Ismail-Zadeh), activities of GEM (Ross Stein), the IISSE Earthquake Catalog (by Tatsuhiko Hara), the GEO GRID Disaster Response Application (by Masashi Matsuoka) and the National Seismic Hazard Map of Japan (by Hiroyuki Fujiwara) were presented. In discussions, participants were separated into two groups, working on the theme ‘database’ and ‘risk management-assessment’. After the group discussion, there was a general discussion in which the conclusion of each group discussion was reported and several recommendations, including the establishment of a consortium of the Asia-Pacific region, developing a hub site, and the convening of the G-EVER workshop every two years, were proposed.

After the workshop, from 24-25 February, participants joined the field trip to Mount Fuji and the Izu area, to explore the volcanic products and the tsunami defense system along the Suruga Bay and the 1930 surface faulting along the Tanna fault. (Received from S. Takarada)

Report on the ICDM2012 Workshop “Dynamics and Predictability of High-Impact Weather and Climate Events”

The International Commission on Dynamical Meteorology (ICDM), one of the 10 Commissions of the International Association of Meteorology and Atmospheric Sciences (IAMAS), held its workshop “Dynamics and Predictability of High-Impact Weather and Climate Events” during 6-9 August 2012, in Kunming, China. The workshop featured a series of 23 invited lectures from international scientists working on synoptic and climate dynamics. The lectures covered many aspects of the variability of the atmospheric circulation, including the Monsoon systems, the El Niño-Southern Oscillation, the Arctic & Antarctic Oscillations, tropical & extra-tropical cyclones, and extreme events associated with those circulation systems, among others. It also addressed the predictability on a wide range of timescales, from weather prediction to seasonal and decadal climate prediction. The workshop received 185 abstracts, and more than 140 participants from 27 countries attended the workshop.



Participants of the ICDM-2012 Workshop, Kunming, China, August 2012. Names of the participants (in the photo) can be found on the website: <http://icdm2012.csp.escience.cn> (photo: T. Long).

The workshop was organized by the State Key Laboratory of Numerical Modelling for Atmospheric Sciences and Geophysical Fluid Dynamics (LASG) which is part of the Institute of Atmospheric Physics (IAP) of the Chinese Academy of Sciences (CAS). The co-chairs of the Science Organizing Committee were Jianping Li of LASG/IAP and Richard Swinbank of the UK MetOffice (ICDM President). Wansuo Duan and Ruiqiang Ding (both from IAP) co-chaired the Local Organizing Committee. The workshop was co-sponsored by several international and Chinese organizations, including IUGG, IAMAS, the weather (WWRP) and climate (WCRP) research programmes of the World Meteorological Organization (WMO), the Chinese Association of Science and Technology (CAST), the National Nature-Science Foundation of China (NSFC), CAS, LASG, the Nanjing University, and the Chinese National 973 Program. The consensus of the participants was that the workshop was successful and exciting. It provided an unusual platform for exchanges between the climate and weather research communities, and promoted research on high-impact weather events, climate dynamics and predictability. The ICDM plans to follow up this successful workshop with further expert meetings in future. (Received from J. Li and R. Swinbank)

Report on the training workshop in glaciology

A training workshop in glaciology was held in McCarthy, south central Alaska, from 10-20 June 2012. The workshop aimed to equip early stage PhD students with tools to address the expanding challenges in quantifying and modeling rapid changes in glaciers and ice sheets occurring in response to a warming climate. A major goal of the workshop was also to offer a valuable platform for international networking.

27 graduate students representing 26 universities from 11 countries spent 10 days in the small village of McCarthy, situated in the heart of the Wrangell Mountains and adjacent to a number of easily accessible glaciers. Students came from a wide range of educational backgrounds such as geography, geology, mathematics, physics and engineering. Many of the students are enrolled at universities where glaciology courses are not offered at all. Hence, the workshop provided an opportunity for these students to obtain a holistic education in a wide range of glaciological topics that reaches beyond the scope of their graduate thesis work. The workshop provided a comprehensive overview of the physics of glaciers and current research frontiers in glaciology. Topics included glacier mass balance, meteorology, hydrology, glacier dynamics, ice-ocean interactions, glacier geology, geophysical methods, inverse modeling, and remote sensing of glaciers and ice sheets. A focus was on modeling and quantitative glaciology.



Walking on the Root Glacier (photo: A. Pope).

The workshop's format followed the one of a similar event in 2010. It included morning presentations followed by computational exercises in the afternoon. In addition, each student worked on a glaciology computer project as a member of a small team guided by an instructor, and presented their results in a 'mini' student conference at the end of the course. At an early stage of the course students presented their own research in poster sessions. A one-day excursion to the Kennicott glacier and a short excursion to the pro-glacial field of the glacier provided hands-on experience of a glacial environment, and gave students an opportunity to learn techniques of field data collection. A number of evening activities rounded off the program, including two public lectures at the Kennicott National Historic Landmark by two of the external instructors that were attended by over 100 locals and tourists. Course material including lecture presentations, written summaries, and exercises are currently posted on a dedicated webpage (<http://glaciers.gi.alaska.edu/courses/summerschool2012>). Hence, the material will reach an audience beyond the participants of the summer school.

A major characteristic of the workshop was that almost all instructors stayed for the entire period, offering plenty of opportunity for interaction with the students during and outside of the formal instruction period. In addition to six faculty members from the University of Alaska, four invited lecturers participated. Students became acquainted with a number of established scientists in different fields in glaciology. Hence, the course offered a valuable platform for international networking between students and instructors and among the students themselves, thereby fostering future collaborations. This was generally perceived as a major asset of the workshop. The workshop location contributed to the networking through the very special atmosphere at McCarthy. Students camped close to the village, while meals were provided by the Wrangell Mountains Center, the location at which all course activities were conducted.

Most participants also participated in the symposium of the International Glaciological Society on “Glaciers and ice sheets in a warming climate” held in Fairbanks, Alaska, following immediately the McCarthy course. The timing of both events was deliberately chosen to facilitate course participants to attend both events. Overall, the course received highly positive evaluations. Participants left with a firmer background in glaciology and a great network of contacts. The Workshop was supported by IUGG via IACS. (Received from R. Hock)

Report on the Workshop “Measurement and Uncertainty Assessment of Glacier Mass Balance”

The World Glacier Monitoring Service (WGMS) in collaboration with Stockholm University organized a workshop on measurement and uncertainty assessment of glacier mass balance from 9 to 11 July 2012 in Tarfala, Sweden. The workshop built on the results and experience of earlier workshops in Tarfala in 1998 (Fountain et al., *Geografiska Annaler* 81A(4), 461–465, 1999) and Skeikampen, Norway in 2008 (*Annals of Glaciology* 50(50), 2009), with a focus on the re-analysis of glacier mass balances including a (standardized) uncertainty assessment. The meeting was held at the Stockholm University, Tarfala Research Station, in northern Sweden, and brought together 17 representatives of the leading research groups currently working on these issues. The major aims of the workshop were to discuss methods and to identify and quantify related uncertainties of mass balance measurements from the ground, air and space, as well as to provide best practices for the homogenization, validation and re-calibration of (long-term) observational series (re-analysis of glaciological and geodetic mass balance series). These goals are based on the following research questions:

- What are sources of potential errors of glacier mass balance measurements, and how are these potential errors considered by glaciological and geodetic methods?
- How can the related uncertainties be quantified?
- What are typical values (ranges) for the systematic and stochastic uncertainties?
- What are the consequences for the comparison of glaciological and geodetic mass balances?
- What are related consequences for the interpretation of glacier mass balance results as indicators of climate change, fresh water resources, and contributors to sea level change?

The workshop included keynote presentations as input for the subsequent discussions on how to tackle the issues mentioned above. These covered uncertainties and problems related to the direct glaciological method, re-analysis of long-term mass balance series and homogenization methods, and co-registration and bias correction of elevation data. Newly available techniques such as airborne laser-scanning as well as statistical tools to assess the quality of mass balance series were discussed, too. As a final outcome of the workshop, a joint publication in a peer-reviewed journal (“The Cryosphere”) will be made available as soon as ready. It includes a review based on the expertise of the workshop participants working with long-term monitoring mass balance programmes, supplemented with recommendations. The setting of the venue greatly supported the spirit of intensive and constructive discussions during the two workshop days and the excursion day to the renowned and best-investigated Storglaciären, with its long-term monitoring mass balance series. The workshop was “A Marcus Wallenberg Symposium” sponsored by the Marcus Wallenberg Foundation for International Cooperation in Science and co-sponsored by IUGG through IACS as well as by the International Glaciological Society (IGS). (Received from M. Zemp)

Report on the 16th International Conference on Clouds and Precipitation

The International Commission on Clouds and Precipitation (ICCP), which is one of the commissions of IAMAS, held its 16th International Conference on Clouds and Precipitation in Leipzig, Germany, from 29 July to 4 August 2012 (see <http://iccp2012.tropos.de/> or the ICCP webpage: <http://iccp-iamas.org>). Over 670 abstracts were submitted and over 500 people from 34 countries attended the conference. This large number of participants reflects the importance of cloud research in dealing with some of the pressing issues of climate change, weather forecasting and water availability. The importance of this research topic was highlighted recently by the IPCC (International Panel on Climate Change) by identifying clouds as the largest uncertainty in climate prediction. Changing cloud

characteristics due to interactions with aerosols have played an important role in the discussions. In addition, many other topics such as the effects of clouds on climate, ice nucleation in clouds, bio-aerosols and their role in cloud processes were among the topics discussed.



Left: Robert Knollenberg during his acceptance speech. Right: John Latham (right) receiving his award from Zev Levin, President of ICCP (photos: Z. Levin).

The program consisted of 13 sessions with oral and poster presentations in each. The sessions included: (i) Basic cloud and precipitation physics; (ii) Warm boundary layer clouds; (iii) Convective clouds (including cloud electrification); (iv) Mixed phase clouds (including Arctic stratus, mid-level clouds); (v) Cirrus clouds; (vi) Orographic clouds; (vii) Mesoscale cloud systems (including severe storms); (viii) Aerosol-cloud-precipitation-interactions; (ix) Clouds and climate (including radiative properties of clouds); (x) Ice nuclei and cloud condensation nuclei; (xi) Cloud and precipitation chemistry; (xii) Measurement techniques of cloud and precipitation properties; (xiii) Applications of cloud and precipitation physics. In addition, a special panel discussion was conducted dealing with geoengineering, its scientific and ethical issues. As part of this discussion, a survey was conducted to learn about the participants' attitude regarding operational versus geoengineering practices. Preliminary analysis indicates that most people favor the continued research efforts but oppose starting operational geoengineering practices before the risks of such operations are clearly understood. During the conference a special award was given to Robert Knollenberg in recognition of his pioneering work in developing the electro-optical spectrometers that revolutionized the measurements of cloud microphysical properties. Knollenberg gave an acceptance speech discussing his personal history as a scientist and encouraging young scientists to take risks when they are young and to consider opportunities in the private industry as an effective path to accomplish innovation.

John Latham was awarded the ICCP Honorary Member in recognition of many years of outstanding scientific contributions to cloud physics and cloud electrification. As part of the acceptance ceremony, Latham gave an after dinner speech with an interesting and humorous look at the way scientists often forget to mention similar works that took place many years prior. Five awards were given to the best posters by students and postdocs.



Three of the five students receiving the best poster award with Robert Shaw (left), the Chairman of the Award Committee (photo: Z. Levin).

The ICCP elected new officers and eleven new members replacing those that completed two terms. The new officers are: Andrea Flossmann (France), President; Robert Rauber (USA), Vice President; and Darrel Baumgardner (Mexico), Secretary. Manchester (UK) was chosen as the site for the next International Conference on Clouds and Precipitation that will be held in summer 2016. (Received from Z. Levin)

Report on the 33rd General Assembly of the European Seismological Commission

The unique geographical position of Russia gave an opportunity for scientists from Europe and Asia to participate in the 33rd General Assembly of the European Seismological Commission (ESC; <http://www.esc2012-moscow.org>), an IASPEI commission. 548 participants including 66 students from 51 countries (including 28 European countries) representing five continents joined the Assembly. This manifests that the Assembly motto “*Seismology without Boundaries*” proved its value to the full. The scientific program of the Assembly was built according to the major topics of seismology. 845 scientific presentations were given (490 oral and 355 poster presentations) at 39 symposia. Some symposia were organized in cooperation with the Seismological Society of America (SSA) and the Asian Seismological Commission (ASC), another IASPEI commission. Four eminent seismologists gave plenary lectures: Koshun Yamaoka (Japan) on the impacts of the 2011 Tohoku earthquake on seismology and hazard assessments; Ezio Faccioli (Italy) on the recent evolution and challenges in the seismic hazards assessment of the Po Plain region, Northern Italy; Tatiyana Yanovskaya (Russia) on the surface wave tomography for upper mantle studies; and Rajender Chadha (India) on triggered earthquakes.

The year 2012 is the 60th anniversary of ESC. It is also the 150th anniversary of the birth of academician Boris Galitzin, one of the pioneers of Russian and global seismology, theoretician and inventor of the electrodynamic seismograph. On this event, the Assembly’s Organizing Committee published a booklet presenting the scientific life of Boris Galitzin. Also the 2012-2014 seismological calendar (from the 33rd ESC GA to the 34th) was published to present the history of Russian seismology. It contains unique maps and documents, brief biographies of Imperial Russian, Soviet, and modern Russian seismologists.

A press conference dedicated to the ESC General Assembly was held on 21 August at RIA Novosti, one of the main Russian news agencies. The participants of the press conference were Alexey Zavyalov (Russia), Chairman of the Local Organizing Committee of the Assembly and ESC Vice-President; Mariano Garcia Fernandez (Spain), ESC Secretary General; Peter Suhadolc (Italy), IASPEI Secretary General; Alik Ismail-Zadeh (Russia/Germany), IUGG Secretary General; Rajender K. Chadha (India), ASC Secretary General; and Alexey Malovichko (Russia), Director of the Geophysical Survey of the Russian Academy of Sciences (GSRAS).

As an accompanying event, the 9th International Young Seismologists Training Course “Modern

Methods of Seismological Data Processing and Interpretation” was held from 25 to 30 August in GSRAS in Obninsk. 36 people representing 15 countries participated in the Training Courses.



Participants of the 9th International Young Scientist Training Course “Modern Methods of Seismological Data Processing and Interpretation”, Obninsk, Russia, August 2012 (photo: A. Malovichko).

The organization of the 33rd General Assembly received financial support from IUGG, IASPEI, the Russian Academy of Sciences, the Ministry of Education and Science of the Russian Federation, the Russian Foundation for Basic Research, and several commercial organizations and cultural centers. The 34th General Assembly of the European Seismological Commission will be held in Istanbul, Turkey, 24-29 August 2014. This Assembly will be the second to be held jointly with the General Assembly of the European Association of Earthquake Engineering. (Received from A. Zavyalov)

Report on the 2012 EMSEV meeting on Electromagnetic Studies of Earthquakes and Volcanoes

The scientific meeting of the Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes, EMSEV took place from 30 September to 3 October 2012. It was organized and hosted by the Tokai University at Gotemba, Japan, next to the 3,776 m high and active volcano Fuji-yama. This meeting was supported by three IUGG Associations (IAGA, IASPEI and IAVCEI). For three days, more than 75 participants from 13 countries, including 10 young scientists, presented their latest results at plenary oral and poster sessions. Papers were organized within five different sessions: (i) electric, magnetic, and electromagnetic phenomena associated with active processes: earthquakes, tsunamis, volcanoes, active fault movements, landslides, and geothermal activities, (ii) electromagnetic imaging based on land and space monitoring techniques, (iii) pre-seismic, co-seismic and post-seismic phenomena related to the lithosphere-atmosphere-ionosphere coupling using multi-parametric observations to ensure reliable interpretation, (iv) generation mechanisms of electromagnetic signals related to active processes: theoretical and laboratory studies, and (v) seismic, geodetic and electromagnetic studies related to the off Tohoku M9 earthquake and tsunami on 11 March 2011.

The discussions showed that reliable observations of abnormal electromagnetic variations may be recorded before earthquakes and volcanic eruptions. They may be observed with the magnetic or electric field in ground-based stations, with regional disturbances of broadcast radio emissions in the atmosphere, and with electromagnetic, electronic and plasma changes in the ionosphere, and by infrared anomalies detected by satellites as well. Different mechanisms at the origin of these signals were formulated (e.g., heat or/and gas release, ionization of the air, transfer of electric charges, etc.). And

for the first time, several laboratory measurements were discussed in depth to provide a basis for physical mechanisms.

The meeting was followed by a general discussion concerning EMSEV activities in developing countries. In volcanology, EMSEV formed in 2004 a co-operative program on Taal volcano with the Philippines Institute of Volcanology and Seismology (PHIVOLCS). At present, this international cooperation involves teams from Japan, France, USA, Greece, Italy, and Belgium. A report on the state of the cooperation, discussions of problems encountered and the latest results were presented during the EMSEV meeting. It was pointed out that EMSEV has a primary responsibility to help PHILVOLCS to monitor the volcano. On active faulting, the EMSEV working group started a new cooperative research effort with Kyrgyzstan (Bishkek Research Station) in 2011. At this site an active electrical resistivity experiment using an extremely high power magnetohydrodynamic (MHD) generator is being used to induce earthquakes, and some outstanding research on the relation between EM phenomena and electrical resistivity changes with earthquakes has been accomplished during the last past 30 years. A formal cooperation agreement between EMSEV and the Bishkek Research Station was signed in 2011. The purpose of this agreement is to provide scientific and technical interaction between the two partners during a four-year collaborative research on active faults and physical processes generating earthquakes in Central Asia, to promote new investigations with electromagnetic and other geophysical methods, and to enhance data processing and analyses. The agreement will promote the development of scientific relations between the participants for solving fundamental problems on the generation of earthquakes and the ways to monitor and mitigate them along different active faults of the Central Asian continental lithosphere.

The minutes of the 15th EMSEV Business Meeting can be found on the EMSEV website (<http://www.emsev-iugg.org/emsev/>). The next EMSEV meeting will be held in Poland in 2014. (Received from J. Zlotnicki)

Report on the Statistical Hydrology Topical Workshop (STAHY'12)

The workshop “Statistical Methods for Hydrology and Water Resources Management” (STAHY'12) organized by the International Commission on Statistical Hydrology (ICSH) of the International Association of Hydrological Sciences (IAHS) was held in Tunis, Tunisia, 1-2 October 2012. 56 people from 17 countries attended the workshop; 17 talks and 31 posters were presented. The main topics were: (i) regional frequency analysis and modeling, (ii) estimation of extremes, (iii) reservoir management, multivariate flood statistics and its practical use, and (iv) rainfall simulation and disaggregation models and non-stationarity in hydrologic observations. The workshop was opened by messages from the local committee (Emna Gargouri, ICSH Vice-President), the University Rector (Chiheb Bouden), the IAHS President (Gordon Young), the ICSH President (Salvatore Grimaldi), the IAHS representative (Zoubeida Bargaoui), and the Chair of the IAHS Task Force on the new Scientific Decade (Alberto Montanari). Two invited lectures were held, “Non-Stationarity frequency analysis of hydrological variables” by Taha Ouarda and “Gumbel distribution, ARMA, copulas – The importance of stochastic tools for water management” by Andreas Schumann. A round table was held in memory of the legacy of Vít Klemeš to hydrological sciences. It was moderated by Demetris Koutsoyiannis (Hydrological Science Journal Editor). Gordon Young, Henny Colenbrander (former IAHS Secretary General), and Alberto Montanari (President-elect, International Commission on Water Resources Systems, ICWRS-IAHS) presented aspects of the life of Vít Klemeš. In addition, a video message from Christine Klemeš (Vít's granddaughter) was presented. Alberto Montanari talked about the IAHS Decade 2013-2022: a Perspective on the Research Challenges in Hydrology for the next 10 years. All the participants delivered interesting presentations underlined by a rich discussion. The poster session was characterized by video interviews posted on the website of ICSH (<http://www.stahy.org>). (Received from S. Grimaldi and E. Gargouri)

Report on the Workshop “eGYAfrica – better Internet connectivity for research and education institutions in Africa”

The eGYAfrica Awareness and Planning Workshop was held in Nairobi, Kenya, 26-28 October 2012. The workshop was co-sponsored by the International Council for Science (ICSU) and IUGG/UCDI. The Workshop brought together scientists and teachers, who share a common desire to improve Internet access in research and education institutions in Africa. The workshop brought together 27 participants from 13 countries to review progress in eGYAfrica and NREN (Research and Education Network) development in Africa, introduce newcomers to eGYAfrica, prepare a work plan for the next period (approximately two years), and expand the network of national eGYAfrica groups. The number of national eGYAfrica groups has expanded from five to 12 as a result of the Workshop. Given the rapid increase in Internet capability in Africa following the installation of undersea fibre-optic cables linking Africa to the rest of the world, the need for eGYAfrica was examined. The unanimous view was that eGYAfrica is still very much needed and provides a valuable mechanism for staff in research and education institutions to voice their concerns about their Internet needs. The comprehensive range of presentations by delegates forms an excellent statement about the status of Internet developments in various parts of Africa. Sharing of such information is emerging as a useful role for eGYAfrica. For the first time the scope of the Workshop was expanded to include Secondary Schools. This proved successfully that some Secondary schools have better Internet access than universities.

Guidelines for the establishment of national eGYAfrica focus groups have been developed and posted on the website. Focus group contacts have been established that are starting to operate in Cote d'Ivoire, DR Congo, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Uganda, and Zimbabwe. Suitable contacts have been identified for Algeria, Burkina Faso, D.R. Congo, and South Africa. We will be placing increasing importance on establishing these national groups as they are the key to engagement with decision makers and delivery of eGYAfrica outcomes.

The *PingER project* (<http://www-iepm.slac.stanford.edu/pinger/>) to measure Internet performance in Africa provides objective information about Internet performance and is a valuable reality check on exaggerated claims. eGYAfrica is proving to be a fertile environment for securing more PingER sites in Africa. For example, Malawi is expected to become a much-needed PingER host. Dr. Les Cottrell, who runs the project, participated in the Nairobi Workshop.

NREN developments in Africa. A National Research and Education Network (NREN) is a specialised internet service provider dedicated to supporting the needs of the research and education communities within a country. Dr. Francis Tusubira, CEO of Ubuntunet, participated in the Nairobi Workshop. Membership of the UbuntuNet Alliance, a regional REN (RREN) that has the support of the Association of African Universities (AAU), has grown from five NREN in 2005 to 14 member NREN today. West and Central Africa were lagging behind on research and education networking. In 2006, when the AAU established a REN Unit, there was one single REN in this region. Today, through the stakeholders' commitment and AAU's effort, five NREN have been established in the region, and a West and Central African Research and Education Network (WACREN) has been established. With the Arab Scientific and Research Education Network (ASREN) covering Northern Africa, all African countries are now covered by at least a regional REN. Many countries are about to establish their NREN, a good number of them with the support of the AAU. The African REN Forum (AfREN) is now an annual rendezvous for REN stakeholders in Africa and beyond to network and exchange experiences.

Dr. Peter Fox, Chair of the IUGG Union Commission for Data and Information, participated in the Nairobi Workshop and proposed to explore possibilities within the African Geospace Society to establish an informatics group to deal with data and information issues and to link to eGYAfrica. Strong links have developed with IUGS's GIRAF program in Africa. Dr. Anna Nguno, a member of GIRAF, is the new secretary of eGYAfrica. We communicate regularly with IGIRGEA. The eGYAfrica Committee is of the view that eGYAfrica is too small and would be more effective if it functioned within the framework of a larger, well-established group. The two outstanding candidates are the Association of African Universities, and ICSU's Regional Office for Africa. These avenues are being explored. Initial responses have been positive.

Major outcome of the workshop:

- Expansion of participating countries from five to 12.
- New opportunities for PingER project to measure the Internet performance in Africa.
- Emerging role for eGYAfrica in providing information and NREN developments.
- Training scientists to sensitize decision makers for better Internet capabilities at working places.
- Reinvigoration of eGYAfrica with new officers and a clear work plan.

More information about eGYAfrica and the Workshop (e.g., program, participants, presentations) can be found on the eGYAfrica website (<http://egy.org/egyafrika.php>).

Report on the IUGG GRC Conference on Extreme Natural Hazards and Their Impacts

The Union Commission on Geophysical Risk and Sustainability (GRC) of IUGG is dedicated to promoting scientific studies applied to the reduction of risk from natural hazards. The Commission discusses various aspects of natural hazards and organizes scientific meetings highlighting information and impacts of all kinds of natural hazards occurring around the world. At the GRC business meeting held in Melbourne, Australia in 2011 it was decided to host the First GRC Conference on Extreme Natural Hazards and Their Impacts on the Chapman University campus, Orange, California, USA. The Conference was held from 8 to 11 December 2012, attended by 77 participants from 20 countries. Representatives from numerous international and national agencies (ESA, GEO-GEOSS, IRDR, NASA, NOAA, USGS, UNEP and academic institutions attended this conference.

58 papers were presented in 12 technical sessions. The presentations covered different natural hazards (earthquakes, volcanoes, landslides, tsunamis, floods, droughts, dust events). The topics covered physical processes, impacts, hazards evaluations, damage assessment and mitigation to early warning aspects. An account of loss of life and property due to historical and recent natural disasters was presented. The impacts of natural hazards are a serious concern in developing countries e.g., Asia and South Africa. A special session on FORIN (Forensic Investigations of Disasters) dealing with the integration of methods and approaches for quantitative evaluation and deep understanding of disasters was the main attraction of the four-day conference.

A panel discussion on the topic “Disaster Risks: Communication between Science and Society” was held on 10 December. The panel discussed the problem of communication between science and society related to natural hazards and disaster risks. The Conference was sponsored by IUGG, AGU Natural Hazards Focused Group, IRDR, NASA, IAHS, GEO and Chapman University. For more detail on the Conference (e.g., the detailed agenda, presentation materials, photos) please visit the conference website <http://www1.chapman.edu/~rsingh/GeoRisk2012/>. (Received from R. P. Singh)



Participants of the IUGG GRC Conference on Extreme Natural Hazards and Their Impacts, Orange, California, USA, December 2012 (photo: R. Singh).

NATIONAL COMMITTEES FOR GEODESY AND GEOPHYSICS: REPORTS

Report on the meeting of the Indonesian National Committee of Geodesy and Geophysics

The meeting of the Indonesian National Committee of the IUGG (NCI) took place recently at the Indonesia Institute of Science (LIPI) in Jakarta, Indonesia. The meeting was hosted by the Indonesian Geospatial Information Agency (BIG) (the former Bakosurtanal) and was held on 25 July 2012. The Committee reviewed the past activities and progress in terms of the NCI-IUGG strategic plan and looked closely at current and future challenges via a mix of interactive working groups, task force meetings, projects and networking opportunities.

Various issues were addressed during the meeting, including (i) the revitalization of IUGG activities in Indonesia; (ii) the discussion on an initiative to write a “grand design“ in terms of a new NCI-IUGG program (conducted partially and directed by each institute’s policy and interest); (iii) the improvement of the scientific communication and discussions among scientists from different fields of Earth sciences; and (iv) facing new challenges in the future such as an operational tsunami warning system. In the past, Indonesian research activities reported by the NCI to the IUGG General Assembly were usually limited to *science aspects* but were not reaching the *problem solving* status, which is important for the society. Thus, a better coordination and collaboration is required between the different disciplines of IUGG. Most of the activities are designed to produce publications at national and international levels. However, it was also considered that there is still a lack of attention paid to seize issues on policy recommendations and to tackle the impact of environmental changes.

Three lectures were delivered at the meeting. Dr. Asep Karsidi, BIG Chairman, expressed his message about the existing needs to revitalize the activities of the NCI-IUGG. Asep Karsidi emphasized the role of BIG to become an institution in charge of the provision of national spatial data and the Indonesian Geoportal (Ina-Geoportal) to support the provision of various thematic maps, including those of hazard monitoring and geophysics. Dr. Iskandar Zulkarnain stressed that the NCI-IUGG does not have so far a “grand design“ related to geodetic and geophysical research. He emphasized that there must be a strong commitment by all related institutions for joint research and the necessity to initiate regional meetings at regular intervals. Prof. Dr. Harald Schuh, Vice-President of the International Association of Geodesy (IAG), talked about Global Geodetic Observing System (GGOS) of the IAG and about its impact on national and regional reference frames. Also he discussed the problems related to geodetic very long baseline interferometry (VLBI) and its future perspectives. GGOS is a main activity conducted by the IAG to provide the infrastructure needed to do geodetic monitoring of the Earth system and global change. A global geodetic observing system is necessary, because we live on a dynamic planet and everything is moving constantly; this requires monitoring and modeling the shape of the Earth continuously with respect to a stable reference frame. VLBI is one of the geodetic space techniques using radio telescopes that observe very distant radio sources; the VLBI technique is indispensable to realize and maintain the International Terrestrial Reference Frame (ITRF) and to connect it to the International Celestial Reference Frame (ICRF). Harald Schuh strongly conveyed his message that it is of great importance for Indonesia to participate in the international VLBI program as part of the Global Geodetic Observing System, GGOS. (Received from P. Manurung)



At the meeting of the Indonesian National Committee for IUGG, Jakarta, Indonesia, July 2012 (photo: P. Manurung).

International cooperation in geodesy in the South American region

On 7 November 2012, at 16:35:46 UTC (10:35:46 local time) a strong earthquake (magnitude 7.4) shook the area located at the southern part of Guatemala, close to the city Champerico. The epicentre was estimated at 13.977°N and 91.876°W and the hypocenter at a depth of about 24 km. To estimate the crustal deformation caused by the earthquake, daily positions of continuously operating stations of the geodetic reference frame of the Americas (SIRGAS) and the Guatemalan geodetic network were computed between November 4 and 10. This processing includes reference stations of the International GNSS Service (IGS) located in North America, the Caribbean, Asia/Oceania and South America as fiducial points. The comparison of pre-seismic and post-seismic station positions shows the largest displacement (43 mm in S-W direction) at station COAT (Coatepeque) and the second largest movement (17 mm in S-W direction) at station HUEH (Huehuetenango). Movements larger than 6 mm were also detected at stations BARI (Huehuetenango), CHIQ (Chicaman), GUAT (Guatemala City) and COTZ (Santa Lucia Cotzumalguapa). The vertical displacements are in the order of the station position uncertainty, and therefore they are not significant.

These computations were carried out by the SIRGAS Analysis Centre at DGFI (Deutsches Geodätisches Forschungsinstitut) and are based on the observation data provided by the Instituto Geográfico Nacional (IGN) of Guatemala, the Instituto Nacional de Estadística y Geografía (INEGI) of Mexico, the Instituto Geográfico Agustín Codazzi (IGAC) of Colombia, the Dirección General de Catastro y Geografía (DGCG) of Honduras, and the IGS (International GNSS Service, www.igs.org). (Received from L. Sánchez)



Horizontal displacements of the SIRGAS Reference Frame estimated after the 2012-11-07 Guatemala M7.4 earthquake.

REPORTS OF IUGG LIAISON OFFICERS

Report of the IUGG Liaison Officer to the Intergovernmental Oceanographic Commission (IOC/UNESCO)

The Fourth Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM-4) was held in Yeosu, Republic of Korea, from 23 to 31 May 2012. JCOMM is an intergovernmental body of technical experts acting under the coordination of the World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO and is supported by a Joint Secretariat. It was established in 1999 to provide a mechanism for the international coordination of oceanographic and marine meteorological observation, data management and services. The Commission combines the expertise, technologies and capacity building abilities of the meteorological and oceanographic communities, is co-chaired by a meteorologist and an oceanographer, and acts under the overall direction of a Management Committee headed by the two Presidents. The Commission is organized into three Programme Areas: Observations, Data Management, and Services and Forecasting Systems. Each Programme Area is, in turn, managed by a Coordinator, supported by a small coordination group, with specific activities being undertaken by designated teams or panels of experts. JCOMM sessions are intergovernmental meetings where Member States are actively represented by official delegates from the respective national oceanographic or meteorological communities. Representatives of other international bodies are invited to attend the sessions as Observers.

The Commission's sessions were organized into three parts: an Opening ceremony and JCOMM Activity Reports on 23 May, a Scientific and Technical Workshop entitled "Improving marine and ocean data products from science and society: the role of the JCOMM" on 24-25 May, and Business Sessions from 28 to 31 May. 150 participants from 47 Member Delegations and four International Organizations including IUGG attended the meeting.

The Opening Ceremony was presided by JCOMM's Co-President Peter Dexter and included welcoming and keynote speeches by public and scientific Authorities. During the Ceremony, certificates were awarded to Vasily Smolyanitsky (Russia), David Meldrum (UK), and Henri Savina (France) for outstanding services to WMO and IOC. Certificates were also awarded to the two new WMO-IOC Regional Marine Instrumentation Centres (RMICs) based in Tianjin, China and Mississippi, USA, which were established by WMO's 16th Congress and the 26th IOC Assembly in 2011. The RMICs are a concept which grew out of a Pilot Project for the integration of marine meteorological and other appropriate oceanographic observations into the WMO Integrated Global Observing System (WIGOS). The Coordinators and/or experts of the Coordination Groups reported the main activities within the JCOMM Program Areas.

A Scientific and Technical Workshop entitled "Improving Marine and Ocean Data and Products for Science and Society: the Role of JCOMM" was held on 24 and 25 May 2012. The Workshop comprised two keynote addresses, 24 oral science/technology presentations and 26 posters. Oral and poster presentations covered a wide spectrum of JCOMM's interests. Particular focus was directed towards new synergies between observing systems (both *in situ* and satellite), the development of enhanced modeling capabilities coupled to extended observational networks, and the increasing availability of better tools for climate forecasting and disaster management. The Workshop also recognized the dangers of over-dependence on sophisticated but unverified models, and emphasized the need to continue to devote time and effort to the understanding of the underlying physics.

The Business sessions were dedicated to the definition and organization of the strategy and work program for the period 2013-2016, the establishment of groups and expert teams, and the nomination and election of the JCOMM Co-Presidents. The Commission accepted that, to accomplish its objectives and those of WMO and IOC, it needed to cooperate with a number of programmes and bodies of the latter two organizations, as well as other external organizations (see JCOMM-4/Doc.11 at <http://www.jcomm.info/jcomm4doc>). It was noted that working relationships were already in place with some of such organizations, and future collaboration could be established with other international organizations including IUGG. On the last day of the Meeting the Commission elected Mr. Johan Stander (South Africa) as its Co-President for meteorology and Mrs. Nadia Pinardi (Italy) as its Co-President for oceanography. Subsequently, it established the groups and expert teams that were to work within the three Programme Areas (Observations, Data Management, and Services and Forecasting Systems), adopting a project oriented approach, wherever possible, to address specific, clear and time-defined activities. (Received from S. Sparnocchia, IUGG Liaison to IOC)

Report of the IUGG Liaison Officers to the World Meteorological Organization (WMO)

The Session of the Executive Council (EC-64) was held in Geneva, Switzerland, from 25 June to 3 July 2012. IUGG was represented at the session by its Liaisons Dr. Arthur Askew of IAHS, Dr. Arnau Folch of IAVCEI, and Dr. Hans Volkert of IAMAS. Dr. Askew was able to attend the meeting every day. Dr. Folch and Dr. Volkert attended the meeting for a couple of days and attended the parts that were of particular interest to their respective Associations.

Progress with the World Weather Research Programme (WWRP) was reported, which was of interest to IAMAS, but there was no requirement to intervene in the debate. Dr. Volkert took advantage of being at the EC-64 to meet Michel Béland (President of WMO's Commission of Atmospheric Sciences), Deon Terblanche (Director of WMO's Department of Atmospheric Research), and Geir Braathen (WMO officer overseeing the Global Atmospheric Watch - GAW) and discussed the planning of scientific meetings of mutual interest such as DACA-13 (scheduled for July 2013 in Davos, Switzerland) and the WWRP/THORPEX Open Science Conference (scheduled for August 2014 in Montréal, Canada).

There were a number of references to items such as the Antarctic Treaty, the Global Cryosphere Watch, a new WWRP Polar Prediction Project and the Antarctic Observing Network. It was noted that, after the 2010 Eyjafjallajökull eruption in Iceland, atmospheric physicists have made substantial progress in monitoring and forecasting volcanic ash clouds, and that Meteorological Services have been co-operating very actively with local volcanologists and volcano observatories since. The ash

concentration thresholds for flight safety have been a matter of debate within the ICAO International Volcanic Ash Task Force (IVATF), which has delivered its final recommendations after the 4th IVATF meeting (Montréal, Canada, 13-15 June 2012).

Under the item on aeronautical meteorology, the main interest for Dr. Folch was the proposal to amend the terms of reference of the WMO/IUGG Volcanic Ash Scientific Advisory Group (VASAG). The approved terms of reference, as revised, are presented below. The VASAG was created during the 5th WMO Volcanic Ash Workshop (Chile, 22-26 March 2010), shortly before the Eyjafjallajökull crisis. From 18 May 2010 on, the VASAG was integrated within the Atmospheric Science Sub-group of the IVATF. Following from IVATF's last meeting, the VASAG will continue its activity in close collaboration with the ICAO International Airways Volcano Watch Operations Group (IAVWOPSG) and will form the scientific committee of the 6th WMO Workshop on Volcanic Ash (Indonesia, 25-29 March 2013). New ICAO regulations require that all meteorologists who brief airline pilots must be certified as being competent for the task, which requires that experts be trained to conduct certification procedures. The deadline for such procedures to be completed is drawing near and many Meteorological Services, particularly in Africa, have yet to be checked. There is considerable concern as to what will happen if ICAO's regulations are not fulfilled in time and steps are being taken to find a temporary solution to this problem.

There were no major items of importance to note as regards the Hydrology and Water Resources Programme, except that plans are still in hand to convene the session of the WMO Commission for Hydrology in Geneva, Switzerland, from 6 to 14 November 2012.

The EC-64 coincided with the 20th anniversary of the Global Climate Observing System, of which ICSU is a sponsor. Dr. Steven Wilson, the Executive Director of ICSU, was unable to participate in the celebrations, and so Dr. Askew took his place and made a couple of brief statements on his behalf. The Global Framework for Climate Services (GFCS) will take center stage for all meetings of the EC and Congress for the next few years. It was by far the major item under discussion at this EC meeting. It is being planned as an international multi-agency program with inputs from every existing program of WMO, with the possible exception of aeronautical meteorology. The whole program is an effort to focus attention and resources on the day-to-day provision of climate data, analyses and projections in support of disaster risk reduction and socio-economic development. Most of the contents are not new, but the packaging is, and that is an important distinction. It is proposed that the GFCS be overseen by an Intergovernmental Board for Climate Services having the same status as a WMO Technical Commission. Only the Congress can establish such a body and so the first ever Extraordinary Congress will be held in Geneva, Switzerland, from 29 to 31 October 2012 for this purpose.

Dr. Michel Jarraud, WMO Secretary-General, reported on his visit to the Rio+20 Conference in Brazil. He noted that the Millennium Development Goals (MDGs) are to be replaced by a set of Sustainable Development Goals (SDGs), which must now be developed. He also mentioned that UNEP has once again tried - and failed - to obtain independent status as a full UN agency instead of just a UN Programme under the General Assembly.

The theme for next year's World Meteorological Day - 23 March 2013 - will be "Watching the Weather – celebrating 50 years of the World Weather Watch".



Plenary hall during the WMO EC-64, Geneva, Switzerland, June 2012 (photo: H. Volkert).



Arnau Folch & Arthur Askew in the IUGG seat, Geneva Switzerland, June 2012 (photo: H. Volkert).

Terms of Reference of the WMO-IUGG Volcanic Ash Scientific Advisory Group (VASAG)

- I. The Volcanic Ash (VA) Scientific Advisory Group (VASAG) established under the auspices of the WMO and IUGG, shall comprise geophysical and meteorological scientists. The VASAG shall confirm or elect two co-chairs at each meeting and will be supported by the WMO Secretariat. Requests for membership or observer status on the VASAG will be decided upon by the co-chairs in consultation with the Secretariat.
- II. The task of the VASAG shall be to address requests for specific advice or assistance from the ICAO IAVWOPSG and/or other relevant stakeholders.
- III. The VASAG shall use appropriate scientific groups, networks, contacts and other opportunities to gather and document scientific advice from the international science community. Responsibilities and delivery deadlines will be set and documented in line with IAVWOPSG requirements.
- IV. The VASAG shall meet at the discretion of the co-chairs in consultation with the Secretariat (preferably at least every 18 months) but in any case in conjunction with the WMO International Scientific Workshop on Volcanic Ash (currently held every three years).
- V. The VASAG shall provide a report to each IAVWOPSG meeting.

(Received from A. Askew, H. Volkert, and A. Folch, IUGG Liaisons to WMO.)

Report of the IUGG Liaison Officer to the ICSU Scientific Committee on Antarctic Research (SCAR)

The Scientific Committee on Antarctic Research (SCAR) is an ICSU Interdisciplinary Body. As of March 2012, it had 31 Full National Members, five Associate National Members and nine ICSU Union Members, including IUGG. Delegates' Meetings are held every two years. As the IUGG Delegate Ian Allison (President, IACS) attended the SCAR meeting which was held in Portland, Oregon, USA, 23-25 July 2012. Other ICSU Unions that were represented by Delegates were IAU (astronomy), INQUA (Quaternary sciences), IUBS (biological sciences), IUGS (geological sciences), and IUPS (physiological sciences). The Delegates' Meeting was held over three days, with documents and working papers for most agenda items provided via the SCAR members' website well in advance of the meeting. The first and last days were plenary sessions: the second day broke into two sessions considering science, and administration and finance issues. The Delegates' meeting was held following business and planning meetings of SCAR disciplinary Scientific Standing Groups (SSGs) [on Life Sciences, Physical Sciences and Geosciences] (13-15 and 20 July) and their subsidiary groups (13-15 July) and the SCAR Open Science Conference (16-19 July). These are discussed below. Science project reports and proposals originating from the meetings were submitted to the Delegates for discussion, decision and approval.

The highest level of collaborative science supported by SCAR is the "SCAR Research Programme (SRP)". These programmes advance scientific questions that are expected to require sustained efforts

by international teams of researchers for six to eight years, and thus define SCAR activities well into the future. SRP proposals are developed within the subsidiary groups after wide consultation within the community, and are subject to extensive external review. SCAR can only financially support a limited number of SRPs. At this meeting, five new SRPs were submitted for approval, replacing two former SRPs that have concluded and two that will soon finish. All five new proposals were approved, although this will necessarily limit the funding available to each. The new programmes of most relevance to IUGG are *Antarctic Climate Change in the 21st Century (AntClim21)*, *Past Antarctic Ice Sheet Dynamics (PAIS)*, and *Solid Earth Responses and Influences on Cryospheric Evolution (SERCE)*. Details of these, and two further SRPs dealing with ecosystems, are available on the SCAR website (<http://www.scar.org>). Reports from the SRPs that have concluded (or soon will do so), were reviewed by Delegates. Reports of the broader scientific activities of the disciplinary SSGs were also reviewed by Delegates.

The interaction between SCAR and the ICSU Union Members was briefly discussed. It was generally agreed that these have improved over the last few years; and IUGG, IAU, INQUA, IUBS and IUPS each highlighted possible areas of future cooperation with SCAR. IUGG has one of the stronger Union interactions with SCAR, although there is scope for closer links. The present collaboration is mostly at an Association level (e.g., IACS has a three-party MoU on collaboration with SCAR and IASC [International Arctic Science Committee] and there is a draft multi-party MoU to coordinate the organization and planning of symposia, conferences and workshops of several cryospheric organizations [including IACS and SCAR]). The new IUGG Union Commission on Climatic and Environmental Change is one area where broader collaboration could be fruitful. The SCAR relationship with ICSU has also improved considerably over the last few years. Jointly with IASC, SCAR highlighted the importance of the poles in Earth System Science at the last ICSU General Assembly.

There has been considerable progress with the Southern Ocean Observing System (SOOS), an initiative evolving from the International Polar Year 2007-2008 (IPY), sponsored and supported by SCAR and SCOR (Scientific Committee on Oceanic Research), and of relevance to IAPSO. The Southern Ocean forms a vital connection between the major ocean basins and the upper and lower layers of the global ocean; and strongly influences global climate, biogeochemical cycles and the functioning of the ecosystem. A SOOS International Project Office has been hosted by Australia (with additional funding by Antarctic New Zealand), and an Initial Science and Implementation Strategy has been published. Also evolving from IPY, SCAR and IASC established a Bipolar Action Group (2008-2012) that has considered scientific opportunities common in the Arctic and Antarctic. This group considers not only science ideas but also opportunities for promoting the next generation of polar scientists, suggestions for more effective science coordination and data management and ideas for better communicating the importance of the Polar Regions for Planet Earth. Delegates recommended that these activities should be continued, but in a more advisory role utilizing teleconferencing and email communication.

The SCAR Executive Director presented the concept of an International Polar Initiative (IPI) to Delegates. This developed from a proposal for an International Polar Decade that would sustain the legacy of IPY 2007-2008. Discussions within the scientific community and funding agencies indicated that the Polar Decade concept needed to be re-thought and re-drafted. To facilitate this, a Concept Note Steering Group was formed with representatives from ICSU (represented by Ian Allison), SCAR, IASC, ESF European Polar Board, Arctic Monitoring and Assessment Programme, Association of Polar Early Career Scientists, International Arctic Social Science Association, IOC, WMO, University of the Arctic and UNEP. The resultant IPI discussion draft is available at <http://www.iasc.info/index.php/home/initiatives/22>. The SCAR Sub-Committee on Antarctic Data Management (SCADM) has developed the SCAR Data and Information Management Strategy (DIMS) and developed the Antarctic Master Directory (AMD). The Antarctic Data Management System consists of a network of National Antarctic Data Centres and the AMD, coordinated by SCADM. It is the world's largest repository of Antarctic data set descriptions and is hosted by NASA's Global Change Master Directory.

SCAR continues to actively re-establish its role as primary source of scientific advice to the Antarctic Treaty System. SCAR provided five Working Papers, seven Information Papers and one Background Paper on subjects such as alien species in Antarctica, Tsunami risks, Antarctic Conservation Biogeographic Regions, Anthropogenic sound in the Southern Ocean, SOOS and climate and environmental change in the Antarctic to the 2012 Antarctic Treaty Consultative Meeting and the Meeting of the ATS Committee for Environmental Protection. The SCAR/COMNAP (Council of Managers of National Antarctic Programmes) Fellowship programme provides modest funding (US\$ 7,000-12,000) to enable early career Antarctic scientists to work in institutions outside their home country. This is a key capacity building activity of SCAR. In 2012, three SCAR Fellowships, one Joint SCAR-COMNAP Fellowship, and one COMNAP Fellowship were awarded.

J. López-Martínez (Spain) was elected as the new SCAR President and K. Lochte (Germany) and B. Storey (New Zealand) were elected as the two new Vice Presidents. Y.-D. Kim (Korea) and S. Marensi (Argentina) continue as the other Vice Presidents. M. C. Kennicutt II remains on the Executive Committee for two years as Past President and was awarded Honorary Membership of SCAR by unanimous agreement of the Delegates. The 33rd SCAR Delegates' Meeting will be held in Auckland, New Zealand in August-September 2014. Malaysia was selected to host the 2016 meetings.

Meetings of SCAR subsidiary groups

The disciplinary Scientific Standing Groups - on Life Sciences, Physical Sciences and Geosciences - are the principal planning and collaborative committees within SCAR. SCAR Scientific Research Programmes are developed by Programme Planning Groups fostered by one or more SSGs. But the SSGs also oversee a considerable number of other subsidiary groups that deal with *ad hoc* and ongoing Antarctic science projects. The SSGs, and many of the subsidiary groups, met in Portland before the Delegates' Meeting. Ian Allison attended the Workshop of the Ice-Sheet Mass Balance and Sea Level project (ISMSS; 14 July), which was co-sponsored by IACS. ISMASS, an Expert Group of the SCAR Physical Sciences SSG, was originally established in 1993, with a focus on determining the best techniques and required measurements for estimating the status of the Antarctic Ice Sheet. It is now clear, from several independent satellite techniques that both the Antarctic and Greenland ice sheets have lost mass and contributed to sea level rise over the last 20 years. A number of papers presented at the Workshop highlighted these changes. The focus of ISMASS has thus shifted to improving prognostic ice sheet models (including processes and boundary conditions), and the project is now co-hosted by IASC to include Greenland. The Workshop concluded that the ISMASS project should continue, but with new Terms of Reference (ToR) and a new Steering Committee. Limited SCAR funding for this activity will be provided through the Physical Sciences SSG. The workshop determined that ISMASS should have stronger links with the community studying the present and future contribution to sea level change from glaciers outside the ice sheets, although the ISMASS activities should not directly include glacier work. IACS undertook to provide this connection through its links with the glacier community, and its lead role in the Steering Group of the Global Terrestrial Network for Glaciers (GTN-G).

Also Ian Allison attended a planning meeting of the Antarctic Sea Ice Processes and Climate (ASPeCt) project (13-14 July), another long-time Expert Group of the Physical Sciences SSG. The focus of this project is shifting to include interactions between sea ice physical processes and marine ecosystems.

SCAR Open Science Conference

The fifth SCAR Open Science Conference on “*Antarctic Science and Policy Advice in a Changing World*” was held in Portland over 4 days (16-19 July), with over 1,000 participants. It covered a broad and multi-disciplinary range of scientific sessions, with plenary sessions each morning focusing on high-level overarching themes: Antarctic Conservation Challenges in a Century of Change; Past, Present and Future Climate Evolution; and Evolution and Biodiversity in Antarctica. More information can be found at the conference web page: <http://scar2012.geol.pdx.edu>. (Received from I. Allison, IUGG Liaison to SCAR)

Report of the IUGG Liaison Officer to the Consultative Committee for Time and Frequency (CCTF)

The Consultative Committee for Time and Frequency (CCTF) is one of the consultative committees of the International Committee for Weights and Measurements (CIPM). Its domain includes all aspects related to time and frequency. In addition to national delegates, CCTF members include representatives of some international organizations. This is the case for IUGG, as well as the International Astronomical Union (IAU) and the International Union for Radio-Sciences (URSI).

The 19th meeting of CCTF was held at the Bureau International des Poids et Mesures (BIPM), Sèvres, France on 13-14 September 2012. Among the numerous activities discussed during this meeting, some are of more direct connection to IUGG and are briefly reported here. A strong and fruitful cooperation has been established between CCTF and the International GNSS Service (IGS) through the *IGS Working group on clock products* presently chaired by Ken Senior. Several connections also exist with the International Earth Rotation and reference systems Service (IERS). The first is about the *IERS Conventions*, the BIPM Time section being part of the IERS Convention product center, together with the US Naval Observatory (USNO).

The second is about the *International Terrestrial Reference System (ITRS)* which is the terrestrial reference system recommended by IUGG for all its activities (IUGG Resolution 2 adopted in Perugia, Italy in 2007). Following a resolution of CCTF, the CIPM recommended in 2011 to use ITRS for all metrological activities (Resolution 9 of the 24th meeting of the CGPM). As ITRS is adopted as the recommended system by various communities beyond geosciences, the issue of its governance is now raised with some urgency, with the objective to ensure quality and access for ITRS and its realizations. The third topic is related to the *redefinition of UTC and the determination of UT1*. As conclusion of lengthy discussions held during the meeting, CCTF adopted a specific recommendation which summarized the overall opinion of the committee. In particular, it is proposed to establish a joint CIPM-IUT-R working group on UTC. Also the availability of UT1 estimations by IERS was recognized. The International Telecommunication Union (ITU) has recently sent a letter to IUGG (as well as several other international organizations) related to UTC. The recommendation adopted by the CCTF will help IUGG to define the content of the answer. (Received from Claude Boucher, IUGG Liaison Officer to CCTF)

Report of the IUGG Delegate to the CODATA Conference and General Assembly

The 23rd International CODATA Conference “Open Data and Information for a Changing Planet” was held in Taipei, China, 28-31 October 2012. The event was hosted by the Academia Sinica. Major topics of the Conference included (i) the best practices and future directions in data sharing, (ii) planet under pressure: data challenges from local to global, (iii) what do we mean by open access to data?, and (iv) ethics of data in sciences. About 50 oral and poster sessions were organized during the conference. For the first time CODATA Task Group activities were presented at a dedicated public session (normally this topic is on the General Assembly agenda). The session was attended by a big number of participants, which demonstrated common interest to the subject being an essential part of CODATA operation.

Keynote speakers and high-level participants at the Conference included Yuan Tseh Lee (ICSU President, Nobel Laureate), Geoffrey Boulton (Chair, Royal Society’s Science Policy Advice Group), Sálvamo Briceño (Chair, Science Committee of the Integrated Research on Disaster Risk – IRDR), David Carlson (former Director of the International Polar Year), Chen Hesheng (Director, Beijing Electron Positron Collider National Laboratory), Ovid Tzeng (Panel member of the European Research Council, Fellow of the Association for Psychological Science), Der-Tsai Lee (President of National Chung Hsing University). Professor Michael F. Goodchild was selected as the CODATA Prize Award recipient for 2012.

The 28th General Assembly of CODATA (1-2 November) followed the Conference. The highlights of the General Assembly are listed:

- Three new national members were accepted – Finland, Mongolia and Czech Republic.
- By the voting results it was decided that a Working Group on Early Career Scientists should be set up.
- The General Assembly decided on the formation of a Working Group to address ethical issues in data science.
- By the voting results constitutional changes regarding membership were agreed. The changes include introduction of two new kinds of membership: Affiliate Member and At-Large Member.
- The General Assembly of CODATA voted for all existent Task Groups (TGs) to continue and the following new TGs were approved: Linked Open Data for Global Disaster Risk Research; Advancing Informatics for Microbiology; and Mining Space and Terrestrial Data for Improved Weather, Climate and Agricultural Predictions.
- The General Assembly decided to move the Data Science Journal (DSJ) to an established open access publisher to increase the visibility of the Journal and CODATA.
- The CODATA General Assembly accepted the invitation from India to hold the next CODATA Conference in 2014 in New Delhi, India. It was agreed that the World Data System Conference and CODATA Conference will be merged.
- Sara Graves was elected Secretary General, and John Broome was elected Treasurer of CODATA. (Received from A. Soloviev, IUGG Delegate to the 2012 CODATA General Assembly)

IUGG PROMOTES EDUCATION IN GEOPHYSICS AND GEODESY

IUGG and ICTP decided to enhance geophysical and geodetic education and science collaboration and signed a Memorandum of Understanding to promote educational programs related to geodesy and geophysics for the next quadrennium (2012-2015). Among other points, the agreement encourages collaboration in the organization of advanced schools/workshops in geodesy and geophysics in ICTP or in economically less developed countries, by the development of diploma courses related to Earth and space sciences and by the dissemination of information on educational and scientific meetings.

In 2012 IUGG awarded five grants to support workshops and training schools organized by the Abdus Salam International Centre for Theoretical Physics (ICTP, Trieste, Italy) as recommended by the IUGG Committee on Capacity Building and Education and in accordance with the Memorandum of Understanding between IUGG and ICTP. The following events were co-sponsored by IUGG:

- I. Workshop on Science Applications of GNSS in Developing Countries (11-27 April).
- II. Workshop on Atmospheric Deposition: Processes and Environmental Impacts (21-25 May).
- III. Targeted Training Activity: El Nino Southern Oscillation Monsoon in the Current and Future Climate (30 July - 10 August).
- IV. Workshop on Geophysical Data Analysis and Assimilation (29 October - 3 November).
- V. Workshop on the Cooperative Experience for Integrating Land and Water Resources Management in Latin America (Maceio, Brazil, 13-17 August).

Founded in 1964 by the late Nobel Laureate Abdus Salam and co-sponsored by UNESCO, IAEA, and the Italian government, the Abdus Salam International Centre for Theoretical Physics - ICTP (www.ictp.it) seeks to accomplish its mandate by providing scientists from developing countries with the continuing education and skills that they need to enjoy long and productive careers. ICTP has been a major force in stemming the scientific brain drain from the developing world. The impact of ICTP extends well beyond the Centre's facilities to virtually every corner of the Earth. The Earth System Physics (ESP) Section of ICTP studies a wide spectrum of the Earth system, from its fluid components (oceans and the atmosphere) to the planet's interior.

INTERNATIONAL COUNCIL FOR SCIENCE (ICSU) AND IUGG

IUGG Secretary General met the ICSU Executive Director

On 4 July 2012, IUGG Secretary General Dr. Alik Ismail-Zadeh met the ICSU Executive Director Dr. Steven Wilson in the ICSU Secretariat in Paris, France. The topics of the meeting agenda included an introduction to IUGG and its Union Scientific Associations; the relationship of IUGG with ICSU; the GeoUnions Joint Board and the GeoUnions Joint programs; the ICSU Grant Programme; specific ICSU programs of interest to IUGG, namely disaster risk research (IRDR), climate research (WCRP), data and information (WDS), and sustainability (Future Earth); the International Year of Deltas; visa problems; and some other topics.

After a brief introduction to IUGG and its eight scientific associations, it was stated that IUGG considers that the strength of ICSU is in its scientific unions and in its interdisciplinary bodies (created because of active involvements of the unions). We value ICSU because the Council (i) promotes a multi- and trans-disciplinarily approach to science, (ii) provides a platform for cooperation with other Scientific Unions and National Members, Interdisciplinary bodies and Associates of ICSU, which would be more difficult otherwise; and (iii) on behalf of its members, speaks about topics related to global science, sustainability and society. Since 2008 the IUGG relationship with the ICSU Secretariat has developed very well. Information from the ICSU Secretariat reaches IUGG and its Associations: we are informed about the ICSU calls, nominations, new programs and initiatives. IUGG's relationship with several ICSU Interdisciplinary bodies is also well developing, although sometimes there is a lack of scientific communication between IUGG and some of the bodies. IUGG would appreciate more transparency in the work of the ICSU regional committees and offices. The ICSU Grant Programme is of great importance to IUGG as it provides a possibility to initiate new truly inter- and trans-disciplinary research initiatives. As an example, the recent ICSU co-sponsored ENHANS project was a big success.

The IUGG Secretary General expressed a concern regarding ICSU's deliberation on the IUGG proposal on disaster risk assessment (*see E-Journal, vol. 11, no. 10A, 17 October 2011; Section 6. IRDR and Assessment of Disaster Risk*). So far, there has been no action reported about the decision of the ICSU General Assembly on this topic. It was mentioned that IUGG expects more involvements of geoscientists in the Future Earth programme. Dr. Ismail-Zadeh highlighted a new scientific initiative called the "International Year of Deltas" supported by several ICSU Scientific Unions and interdisciplinary bodies (<http://www.iyds-2013.org/content/sponsors>). IUGG proposes ICSU to introduce a recognition program to honor eminent scientists who contributed to international research cooperation. Recent refusals of visa applications of scientists to attend scientific meetings were also discussed along with the IUGG proposal on how ICSU could contribute to resolving visa problems. Both Dr. Wilson and Dr. Ismail-Zadeh expressed their readiness to continue the open dialog in future. Dr. Ismail-Zadeh also met Dr. Carthage Smith (Deputy Executive Director), Dr. Howard Moore and Dr. Gisbert Glaser (Senior Advisers), Ms. Tish Bahmani Fard (Assistant Executive Director), and Ms. Rohini Rao (Administrative Officer).

ICSU Committee for Strategic Planning and Review (CSPR)

Tom Beer (IUGG Immediate Past President), *Vijay Dimri* (President of the Indian National Committee for Geodesy and Geophysics) and *Hubert Savenije* (President of the Dutch National Committee for Geodesy and Geophysics and IAHS President-Elect) were appointed as members of the ICSU Committee for Strategic Planning and Review (CSPR). The Committee coordinates the development of proposals for major new scientific initiatives by ICSU and advises the Executive Board of ICSU on priorities for such initiatives. CSPR also reviews the activities carried out by ICSU's Interdisciplinary Bodies, advises the Executive Board on the future course of these activities, and oversees the ICSU Grants Programme.

ICSU Scientific Committee on Urban Health and Wellbeing

Luuk Rietveld (Professor of Drinking Water & Urban Water Cycle Technology of the Delft University of Technology, The Netherlands) was nominated by IUGG/IAHS as a member of the ICSU Scientific

Committee on Urban Health and Wellbeing and was appointed by ICSU to the Committee. This international scientific program, approved by the ICSU 30th General Assembly in Rome, Italy, in 2011, proposes a new conceptual framework for considering the multi-factorial nature of both the determinants and the manifestations of health and wellbeing in urban populations.

ICSU GEOUNIONS

The GeoUnions (GUs) consortium was set up in 2004 as an informal forum of the leaders of the ICSU Scientific Unions dealing with Earth, space and planetary sciences in order to promote geosciences worldwide and to coordinate their activities. The consortium is comprised of the International Astronomical Union (IAU), the International Geographical Union (IGU), the International Union for Quaternary Research (INQUA), the International Society for Photogrammetry and Remote Sensing (ISPRS), the International Union of Geodesy and Geophysics (IUGG), the International Union of Geological Sciences (IUGS), the International Union of Soil Sciences (IUSS), and the International Union of Radio Science (URSI).

GeoUnions Business Meeting

The Joint Board of GeoUnions met in Istanbul, Turkey, from 27 to 29 April to coordinate scientific activities of the unions, exchange ideas and promote scientific research of common interest. The meeting was organized by Orhan Altan (President of the International Society for Photogrammetry and Remote Sensing – ISPRS, and an Executive Board Member of ICSU, a representative of the GeoUnions cluster) with support from the Istanbul Technical University. On 27 April, the Rector of the University Prof. M. Şahin held a reception in honor of the leaders of the GeoUnions attending the meeting. He presented educational and scientific activities of the university and discussed the ways of strengthening international cooperation in Earth and space sciences.

The representatives of the GeoUnions updated each other on the activities for the time since the last meeting in Rome, Italy, September 2011, and discussed joint actions of the GeoUnions, namely the VALID project (<http://www.un-spider.org/VALID-stakeholder-assessment-1>) led by ISPRS and UN-SPIDER, the ENHANS project (<http://www.enhans.org>) led by IUGG, and the International Year for Global Understanding (<http://global-understanding.info/>) led by the International Geographical Union (IGU). On behalf of the initiators of the new program entitled “International Year of Deltas” (<http://www.iyds-2013.org/>) supported by IGBP, IUGG, IAHS, and IAPSO, Alik Ismail-Zadeh (IUGG Secretary General) presented the initiative, and the GeoUnions discussed their potential involvements in this scientific program. The GeoUnions also discussed the role of the Unions in ICSU committees and interdisciplinary bodies and in the ICSU Regional Scientific programs. Special emphasis was given to the role of the GeoUnions in the new ICSU program “Future Earth: Research for Global Sustainability” (<http://www.icsu.org/future-earth>). It is recognized that the new program is a key area for the GeoUnions of ICSU, and that the GeoUnions should be actively involved in it. They discussed their involvements in observing systems like GCOS, GOOS, GTOS, GGOS, and GEO/GEOSS, and updated each other on the activities in geoscience education, and on data and information, including their involvement in the ICSU World Data System (WDS) and ICSU Committee on Data for Science and Technology (CODATA). Finally the GeoUnions discussed how they could be involved in setting up the agenda of the ICSU Union meeting in Paris in 2013. As an interim measure Ron Abler (IGU President) was elected as Chair and Alik Ismail-Zadeh (IUGG Secretary General) as Vice Chair of the Joint Board of GeoUnions up to and including the next GeoUnions meeting in Paris in 2013.

ACTIVITIES OF THE UNION ASSOCIATIONS

The following reports, prepared by the Secretaries General of the eight Associations of IUGG:

International Association of Cryospheric Sciences (IACS)

International Association of Geodesy (IAG)

International Association of Geomagnetism & Agronomy (IAGA)

International Association of Hydrological Sciences (IAHS)

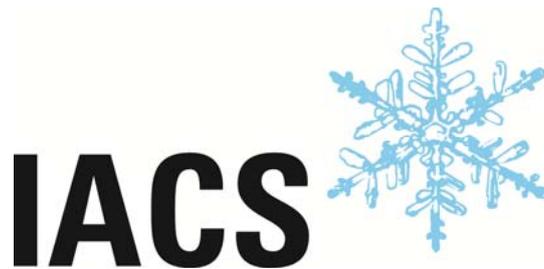
International Association of Meteorology & Atmospheric Sciences (IAMAS)

International Association of the Physical Sciences of the Oceans (IAPSO)

International Association of Seismology & Physics of the Earth's Interior (IASPEI)

International Association of Volcanology & Chemistry of the Earth's Interior (IAVCEI)

The reports illustrate the impressive range of activities within each Association as well as their dedication to supporting science within developing countries.



International Association of Cryospheric Sciences (IACS)

www.cryosphericosciences.org

INTRODUCTION

The International Association for Cryospheric Sciences (IACS) is the Association of the International Union of Geodesy and Geophysics (IUGG) that is concerned with snow and ice science and which provides expert advice on cryospheric issues to governmental and non-governmental organizations. The objectives of IACS are to:

- Promote studies of cryospheric subsystems of the Earth and solar system.
- Encourage research in the above subjects by members of the cryospheric community, national and international institutions and programmes, and individual countries through collaboration and international co-ordination.
- Provide an opportunity on an international basis for discussion and publication of the results of the above research.
- Promote education and public awareness on the cryosphere, and facilitate the standardization of measurement or collection of data on cryospheric systems and of the analysis, archiving and publication of such data.

ADMINISTRATION

The business of IACS is managed by a Bureau of elected officers. IACS held its most recent bureau meeting from 12-14 November 2012 in Sanya, China. In attendance were BMs Ian Allison (President), Charles Fierz (President-Elect), Olga Solomina (Vice President), Cunde Xiao (Vice President), Cecilie Rolstad Denby (Head, Glaciers and Ice Sheets), and Hiroyuki Enomoto (Head, Marine and Freshwater ice). Andrew Mackintosh (Secretary General) attended via Skype, and remaining bureau members provided input in advance of our meeting. The meeting was opened by Prof. Qin Dahe, Chair of Chinese National Committee for IACS (Chinese Academy of Sciences). IACS facilitates the transfer of research methods and explores new avenues in cryospheric science through Standing Groups and Working Groups devoted to a theme or subject and composed of experts in the particular field of study. The currently active Working Groups (WG) of IACS are the WG on 'Flow law for polycrystalline ice' (2010-2014) and the newly established WG 'From quantitative stratigraphy to microstructure-based modeling of snow' (2012-2016). The WG on Glacier Mass Balance Terminology and Methods successfully completed its 4-year term in 2012, culminating in the publication of the "Glossary of Glacier Mass Balance and Related Terms", published by the International Hydrological Programme of UNESCO. The current Standing Groups (SG) are the Joint commission on Volcano-Ice Interactions (with the International Association of Volcanology and Chemistry of the Earth's Interior - IAVCEI), the SG on Glacier and Permafrost Hazards in Mountains (GAPHAZ, a joint SG with the International Permafrost Association IPA) and the Steering Committee of the Global Terrestrial Network for Glaciers (GTN-G).

ACTIVITIES

The following includes a description of the meetings sponsored by IACS in 2012, as well as a list of IACS representation at international scientific meetings:

IPICS Open Science Conference

IACS co-sponsored the open science conference of the International Partnerships in Ice Core Sciences (IPICS), held in Giens, France, from 1-5 October 2012. The local organizing committee was led by Jerome Chappellaz (Le Laboratoire de Glaciologie et Géophysique de l'Environnement, Grenoble, France). The meeting attracted 230 scientists from 23 nations, including participants from other fields who wished to learn about recent advances in ice core science. This was the first major meeting dedicated to ice cores since the International Symposium on Ice Cores and Climate held in Kangerlussuaq, Greenland in 2001. The programme followed the main scientific objectives of IPICS (<http://www.pages-igbp.org/ipics>). It covered the questions of climate variability at different time scales (from million years to the last 2,000 years), biogeochemical cycles, dating, as well as ice dynamics. New frontiers and new methodologies were also the focal point of specific sessions. Over the five days of the conference, all 230 attendees gathered for single plenary sessions, combined with long poster sessions designed for efficient networking.

Ice-volcano interaction conference in Anchorage, Alaska USA

IACS co-sponsored the 'Third International Conference on Volcano-Ice Interactions on Earth and Other Planets', held at the U.S. Geological Survey office in Anchorage, Alaska, USA between 18-22 June 2012, organized by the Joint IAVCEI/IACS Commission on Volcano-Ice Interactions. The purpose of the conference was to bring together scientists with a common interest in volcano-ice interactions and to highlight recent studies and eruptions at snow- and ice-clad volcanoes. IACS was pleased to sponsor two students (Lidmila Kuksina from Kamchatka, Russia and Matteo Roverato from Mexico), who would otherwise have not been able to attend.

International Conference on Cryosphere: Changes, Impacts and Adaptation

IACS co-sponsored this international conference held between 10-12 November 2012 in Sanya, China. The conference examined the state-of-the-art of cryospheric research and provided a forum to discuss ongoing research efforts, as well as providing an opportunity to widen communication among interested researchers and to highlight important research results, especially across central Asia. The 2012 IACS bureau meeting was held immediately after this event.



The International Conference on Cryosphere: Changes, Impacts and Adaptation, was held in the beautiful tropical location of Sanya, China, November 2012. The conference was sponsored by IACS and six IACS bureau members attended. An IACS bureau meeting was held over two days immediately after this conference.

IUGG/IACS support for workshops and summer schools in glaciology

From 9-11 July 2012, the World Glacier Monitoring Service (WGMS) organized a workshop on measurement and uncertainty assessment of glacier mass balance. The workshop was sponsored in part by an IUGG small grant awarded on behalf of IACS. The meeting was held at the Stockholm

University, Tarfala Research Station, in northern Sweden, and brought together 17 representatives of the leading research groups currently working on these issues. The major aims of the workshop were to discuss methods and to identify and quantify related uncertainties of mass balance measurements from the ground, air and space, as well as to provide best practices for the homogenization, validation and re-calibration of (long-term) observational series (re-analysis of glaciological and geodetic mass balance series). Cecilie Rolstad-Denby attended as an IACS representative in her role as the chair of the GTN-G advisory board.

University of Fairbanks Glaciology Summer School, McCarthy, Alaska, USA

A training workshop in glaciology was held in McCarthy, south central Alaska, from 10-20 June 2012. The summer school was sponsored (in part) by a small grant from IUGG awarded on behalf of IACS. The workshop aimed to equip early stage PhD students with tools to address the expanding challenges in quantifying and modeling rapid changes in glaciers and ice sheets occurring in response to a warming climate. 27 graduate students representing 26 universities from eleven countries spent ten days in the small village of McCarthy, situated in the heart of the Wrangell mountains and adjacent to a number of easily accessible glaciers. The workshop provided a comprehensive overview of the physics of glaciers and current research frontiers in glaciology.

Meeting of IACS Standing Group ‘Global Terrestrial Network for Glaciers’ (GTN-G) Executive Board

GTN-G is the framework for the internationally coordinated monitoring of glaciers and ice caps in support of the United Nations Framework Convention on Climate Change (UNFCCC). The network, authorized under the Global Climate/Terrestrial Observing System (GCOS, GTOS), is jointly run by the World Glacier Monitoring Service (WGMS), the U.S. National Snow and Ice Data Center (NSIDC), and the Global Land Ice Measurements from Space initiative (GLIMS). The Steering Group of GTN-G has been made a Standing Group (ongoing tenure) of IACS. The GTN-G executive board met on 24 April during the 2012 EGU General Assembly in Vienna, Austria. The meeting consisted of Cecilie Rolstad-Denby (IACS, Chair of the Advisory Board), Michael Zemp (WGMS, chair of the Executive Board Meeting in Vienna), Martin Hoelzle (WGMS), Frank Paul (WGMS, GLIMS), Tobias Bolch (GLIMS), Bruce Raup (GLIMS/NSIDC), and Richard Armstrong (NSIDC). In this meeting, Cecilie Rolstad-Denby took over from Julian Dowdeswell as the Chair of the GTN-G advisory board.

Representation at international scientific meetings

During 2012, IACS provided representation in several meetings. This included a CliC Scientific Steering Group meeting in Innsbruck, Austria in March, IASC and SCAR delegate meetings in April and July respectively, a GTN-G Executive Board Meeting during the EGU General Assembly in Vienna, Austria (22-27 April 2012, more information provided above), and in November 2012 in Vienna, Austria, and the first implementation meeting of CryoNet, a future network of Cryospheric measurement sites within the framework of the World Meteorological Organization initiative Global Cryosphere Watch. Finally, IACS signed jointly with ten other organizations a Memorandum of Understanding to better co-ordinate their outreach efforts. A first meeting took place during the AGU Fall Meeting in December 2012. Ian Allison, IACS President, provided representation for ICSU within a Steering Group of scientists from organizations with polar interests who will undertake initial concept planning for a possible new long-term polar science initiative.

SCAR Medal for International Scientific Coordination to IACS President Ian Allison

Dr. Ian Allison was awarded the Scientific Committee on Antarctic Research (SCAR) International Coordination Medal at the SCAR meeting in Portland, Oregon, USA in 2012. Ian's significant international achievements bring distinction and esteem to the IACS office. More information, including a citation about Ian and his response, is available at <http://www.scar.org/awards/>

FUTURE ACTIVITIES

Change in leadership

Dr. Charles Fierz will become IACS President at the forthcoming Davos Atmosphere and Cryosphere Assembly (DACA-13), and Ian Allison will become Immediate Past President.

DACA-13, a major IACS event

The joint IAMAS/IACS Assembly ‘DACA-13’ (the Davos Atmosphere and Cryosphere Assembly 2013) <http://www.daca-13.org/welcome.html> will be held in Davos, Switzerland from 8-12 July 2013. The theme of the conference is *Air, Ice and Process Interactions*, and it will comprise 20 self-contained symposia, most of them containing several topical sessions, focused atmospheric and cryospheric topics, and numerous joint atmosphere-cryosphere symposia/sessions. The planning phase for this Assembly is essentially complete, and we are currently finalizing the detailed scientific programme. The abstract deadline closed on 4 February 2013 and more than 1,000 submissions were received. In addition to the symposia, central elements of the conference will include keynote presentations by four world-leading experts: Ronald B. Smith (Yale), Valérie Masson-Delmotte (LSCE Paris), Thomas Stocker (University of Bern) and Georg Kaser (University of Innsbruck), and extended poster sessions. Furthermore, a range of scientific excursions and trips will be offered to allow participants to enjoy the surrounding alpine environment.

IACS sponsorship of forthcoming meetings

IACS will co-sponsor the following scientific meetings in 2013:

- The IACS WG ‘From quantitative stratigraphy to microstructure-based modeling of snow’ will hold its first meeting entitled ‘Snow grain size workshop; measurement and applications’ between 2-5 April 2013 in Grenoble, France.
- The IGA symposium on ‘Reconciling observations and models of elastic and viscoelastic deformation due to ice mass change’ to be held from 30 May-2 June 2013 in Ilulissat, Greenland.
- The meeting ‘Physics, Chemistry and Mechanics of Snow’ will be held from 22-28 September 2013 in Yuzhno-Sakhalinsk, Sakhalin Island, Russia.
- The World Glacier Monitoring Service will hold a summer school on ‘Mass Balance Measurements and Analysis’ from 2-7 September 2013, in Zermatt, Switzerland.

Submitted by
Ian Allison, IACS President
Charles Fierz, IACS Elected President
Andrew Mackintosh, IACS Secretary General



International Association of Geodesy (IAG)

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

INTRODUCTION

Geodesy is the discipline that deals with the measurement and representation of the Earth's geometry and physics including its temporal variations. The history of IAG traces back to 1862, when the Prussian General Johann Jacob Baeyer initiated the "Mitteleuropäische Gradmessung". Its mission is the advancement of geodesy by furthering geodetic theory through research and teaching, by collecting, analysing, modelling and interpreting observational data, by stimulating technological development and by providing a consistent representation of the time-dependent figure, rotation, and gravity field of the Earth.

The IAG is structured in four Commissions, the Inter-Commission Committee on Theory (ICCT), fifteen International Scientific Services, the Global Geodetic Observing System (GGOS), and the Communication and Outreach Branch (COB). The Commissions are subdivided in Sub-commissions, Projects, Study and Working Groups. The ICCT investigates overall geodetic problems in Joint Study Groups with the Commissions. The Services provide scientific products employing Operation, Data and Analysis Centres. The GGOS provides the observations needed to monitor, map and understand changes in the Earth's shape, rotation and mass distribution, as well as the global reference frame for measuring and consistently interpreting key global change processes based on the products of the Services. The COB provides communication, public information and outreach links, in particular via the monthly Newsletter and the IAG Website (<http://www.iag-aig.org>).

The administration of IAG is supervised by the Council and operated by the Executive Committee, the Bureau and the Office. The Council consists of delegates appointed by the adhering bodies; the Bureau is formed by the IAG President, Vice-President and Secretary General; and the Executive Committee includes the Bureau and other members elected by the Council; the Office is to assist the Secretary General. The detailed programme of IAG is published in the quadrennial Geodesist's Handbook, and reports are given in the bi-annual Travaux de l'AIG.

ADMINISTRATION

IAG Council

The IAG Council meets mainly during the IUGG General Assemblies. In the interim time the Council is informed by the Secretary General on current activities. Main topics in 2012 were the celebration of IAG's 150th anniversary and the IAG publications (IAG Symposia series, *Journal of Geodesy*).

IAG Executive Committee (EC)

The IAG EC held a meeting on the occasion of the AOGS – AGU (WPGM) Joint Assembly in Singapore in August 2012. Most important topics were the reports of all IAG components (Commissions, ICCT, Services, GGOS, COB) and the preparation of the IAG Scientific Assembly to

be held as the official celebration of IAG's 150th anniversary in Potsdam, Germany, 1-6 September 2013.



Johann Jacob Baeyer, Founder of the IAG



Memorial in Berlin Müggelheim

IAG Bureau

The IAG Bureau held monthly teleconferences for the day-to-day decisions. The IAG President, the Vice-President and the Secretary General represented IAG in various scientific meetings (see below) and gave oral presentations particularly with regard to the 150th anniversary.

ACTIVITIES

Scientific Assemblies, Symposia and Meetings

Important meetings of IAG components and IAG sponsored meetings were in 2012:

- IGS Workshop on GNSS Biases, Bern, Switzerland, 18-19 January 2012.
- IVS VLBI2010 Workshop on Technical Specifications (TecSpec), Bad Kötzting/Wetzell, Germany, 1-2 March 2012.
- 7th IVS General Meeting "Launching the Next-Generation IVS Network", Madrid, Spain, 12-13 March 2012.
- Symposium and Workshop on PPP-RTK and Open Standards, Frankfurt, Germany, 12-14 March 2012.
- IERS Global Geophysical Fluids Center (GGFC) Workshop, Vienna, Austria, 20 April 2012.
- EUREF 2012 Symposium, Saint Mandé, France, 6-8 June 2012.
- IGS Analysis Center Workshop, Olsztyn, Poland, 23-27 July 2012.
- IAG Symposium at the AOGS-AGU (WPGM) Joint Assembly, Singapore, Singapore, 13-17 August 2012.
- International Symposium on Space Geodesy and Earth System (SGES2012), Shanghai, China, 19-20 August 2012.
- WEGENER 2012 Symposium, Strasbourg, France, 17-20 September 2012.
- 17th International Symposium on Earth Tides and Earth Rotation (ETS 2012), Cairo, Egypt, 24-28 September 2012.
- 20 Years of Progress in Radar Altimetry, Venice, Italy, 24-29 September 2012.
- IDS Workshop, Venice, Italy, 25-26 September 2012.
- 7th IAG-IHO ABLOS Conference, Salle du Ponant, Monaco, 3-5 October 2012.
- European VLBI Network (EVN) Symposium, Bordeaux, France, 9-12 October 2012.
- Workshop on Reflectometry using GNSS and Other Signals, Prudue University, West Lafayette, Indiana, USA, 10-11 October 2012.
- International Symposium on Gravity, Geoid and Height Systems GGHS 2012, Venice, Italy, 10-12 October 2012.

- SIRGAS Meeting 2012, Concepción, Chile, 29-31 October 2012.
- International VLBI Technology Workshop, Westford, Massachusetts, USA, 22-24 October 2012.
- International Technical Laser Workshop “Satellite, Lunar, and Planetary Laser Ranging: Characterizing the Space Segment”, Frascati, Italy, 5-9 November 2012.

Schools organized by IAG

- GNSS School, Hong Kong, China, 14-15 May 2012.
- International Summer School on Space Geodesy and Earth System, Shanghai, China, 21-25 August 2012.
- SIRGAS School on Real Time GNSS Positioning, Concepción, Chile, 24-26 October 2012.

IAG Office

Main activities of the IAG Office in 2012 were the publication of the Geodesist’s Handbook with the complete program of IAG, and the preparation of IAG’s 150th anniversary. Travel grants were assigned to young scientists for participating in symposia. The individual IAG membership was regularly updated. IAG Council and EC meetings were prepared. Detailed minutes for the participants and meeting summaries were published in the Internet and in the IAG Newsletters.

Communication and Outreach Branch (COB)

The publication of the Geodesist’s Handbook, the monthly Newsletters (online and in the Journal of Geodesy) and the maintenance of the IAG website were the main activities of the COB. The IAG Newsletter is sent to the IAG members, to the Presidents and Secretaries General of the IUGG Associations, and to the members of the Joint Board of Geospatial Information Societies (JBGIS). A meeting of the COB Steering Committee was held in Budapest, Hungary, 19-20 November 2013.

Commissions and Inter-Commission Committee

The four IAG Commissions and the Inter-Commission Committee on Theory (ICCT) are maintaining their individual websites (all accessible via the IAG website). Several sub-components (Sub-Commissions, Working and Study Groups) held their own symposia and workshops in 2012 (see above: EUREF, SGES, WEGENER, ETS, GGHS, SIRGAS).

Services

The 15 IAG Services are maintaining their own websites (all accessible via the IAG website) and data servers. They held their regular administrative meetings (Coordinating Board, Directing Board or Governing Board, respectively) and organized their own symposia and workshops (see above: IGS, IVS, IERS, IDS, IGFS).

Global Geodetic Observing System (GGOS)

In 2012, GGOS established its new structure including the Consortium composed by representatives of the Commissions and Services, the Coordinating Board as the decision-making body, the Executive Committee, and the Science Panel. The outreach is done by the GGOS Portal, websites (www.ggos.org), brochures and books. GGOS is representing IAG in the Group on Earth Observation (GEO) and contributes to the GEO Work Plan and GEO System of Systems (GEOSS). A strategic retreat was held in Frankfurt, Germany, 26-28 June, and meetings of the GGOS Consortium and the Coordinating Board took place in Vienna, Austria, on 27 April 2012, and in San Francisco, California, USA, on 1 December 2012.

Cooperation with other Organizations

IAG maintains close cooperation with several organizations outside IUGG. In 2012 meetings with the Advisory Board on the Law of the Sea (ABLLOS, together with IHO), Group on Earth Observation (GEO, with IAG as a participating organization), International Standards Organization (ISO, with IAG represented in TC211 Geographic Information / Geomatics), Joint Board of Geospatial Information Societies (JBGIS), United Nations Offices for Outer Space Affairs (UN-OOSA, with participation in

Space-based Information for Disaster Management and Emergency Response, UN-SPIDER, and International Committee on Global Navigation Satellite Systems, ICG) were organized.

Publications

The monthly issues of the Journal of Geodesy, the proceedings of the IAG Assembly “Geodesy for Planet Earth” (IAG Symposia Series Vol. 136) and the proceedings of the VII Hotine-Marussi Symposium on Mathematical Geodesy (IAG Symposia Series Vol. 137) were the main publications in 2012.

Awards, anniversaries, obituaries

In 2012, a total of 11 travel awards were granted to young scientists (not older than 35 years) for participating in four symposia.

An obituary was written and published in the IAG Newsletters for former IAG President Klaus-Peter Schwarz (Canada).

FUTURE ACTIVITIES

The most important activity for the next year is related to the celebration of the 150th anniversary of IAG with the culmination in the IAG Scientific Assembly 2013 in Potsdam, Germany, 1-6 September. The three principal themes of IAG’s Global Geodetic Observing System, namely (i) the Unified Height System, (ii) Geohazards Monitoring and (iii) Sea Level Change will be the focus of the scientific work in the coming years. The IAG Services will continue providing their products for use in science and practice, and for the benefit of the society in general. IAG Commissions and Services will hold their own and actively participate in IUGG and other interdisciplinary symposia and meetings.

IAG will continue its strong cooperation with other international scientific bodies, e.g., the Joint Board of Geospatial Information Societies (JBGIS), the Fédération Internationale des Géomètres (FIG), the International Astronomical Union (IAU), the International Hydrographic Organization (IHO), the International Standards Organization (ISO), the United Nations Office of Outer Space Affairs (UNOOSA), the Committee on Space Research (COSPAR), the Group on Earth Observation (GEO), the American Geophysical Union (AGU), the Asia Oceania Geosciences Society (AOGS), and the European Geosciences Union (EGU).

Submitted by
Hermann Drewes, IAG Secretary General



International Association of Geomagnetism and Aeronomy (IAGA)

www.iugg.org/IAGA/

INTRODUCTION

IAGA, the International Association of Geomagnetism and Aeronomy (AIGA - Association Internationale de Géomagnétisme et d'Aéronomie) is one of the eight Associations of the International Union of Geodesy and Geophysics (IUGG). It is a non-governmental body funded through the subscriptions paid to IUGG by its Member Countries. IAGA has a long history and can trace its origins to the Commission for Terrestrial Magnetism and Atmospheric Electricity, part of the International Meteorological Organization which was established in 1873.

IAGA is the premier international scientific association promoting the study of terrestrial and planetary magnetism, and space physics. IAGA is concerned with the understanding and knowledge that result from studies of the magnetic and electrical properties of:

- the Earth's core, mantle and crust
- the middle and upper atmosphere
- the ionosphere and the magnetosphere
- the Sun, the solar wind, the planets and interplanetary bodies

ADMINISTRATION

IAGA is organized in five Divisions and three Inter-divisional Commissions, each led by a Chair and a Co-Chair. Each Division/Commission may form Working Groups in given specialized topics and elects officers to run the business of the Working Groups. During the 25th IUGG General Assembly in Melbourne, Australia, in 2011, IAGA renewed its officers. More details on the IAGA Scientific Structure, the Divisions, Commissions and Working Groups can be found on the following website: http://www.iugg.org/IAGA/iaga_pages/science/sci_structure.htm.

IAGA is administered by the Executive Committee on behalf of IUGG Member Countries in accordance with the Association's Statutes and By-Laws. IAGA communicates with Member Countries through National Correspondents nominated by appropriate national bodies. Member Countries are represented at IAGA Assemblies by accredited Chief Delegates who may vote on matters, according to the voting rules set out in the Statutes and By-Laws, at meetings of the Conference of Delegates. Information on the EC members and National Correspondents can be found using the link mentioned before.

ACTIVITIES

In 2012 IAGA supported a wide range of workshops and meetings that have involved many scientists from economically less-developed countries, and early career scientists.

Executive Committee (EC) meeting

The IAGA EC meeting was organized on 28 April 2012 at Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Vienna, Austria. The EC would like to thank ZAMG and Barbara Leichter for hosting this meeting. Administrative and scientific matters were discussed. The outcomes of this one-day meeting are available on the IAGA website.

IAGA Memory

All previously published IAGA Newsletters have been scanned and now available on the IAGA website (http://www.iugg.org/IAGA/iaga_pages/pubs_prods/public_relation.html).

Sponsored Topical Meetings

IAGA sponsored the following eight topical meetings during 2012:

- 13th International Symposium on Equatorial Aeronomy Workshop, 12-16 March, Paracas, Peru.
- 15th Workshop on Geomagnetic Observatory, instruments, data acquisition and processing Workshop, 4-14 June, San Fernando, Spain.
- 33th Castle Meeting on Paleo, Rock and Environmental Magnetism, 17-23 June, Zvolen, Slovak Republic.
- 39th Scientific Assembly of the Committee on Space Research, 14-22 July, Mysore, India.
- 21st EM Induction Workshop, 25-31 July, Darwin, Australia.
- 5th VLF/ELF Remote Sensing of Ionospheres and Magnetospheres (VERSIM) workshop, 3-6 September, Sao Paulo, Brazil.
- 7th IAGA/ICMA/CAWSES Workshop on Long Term Changes and Trends in the Atmosphere Workshop, 11-14 September, Buenos Aires, Argentina.
- 4th International High Energy Particle Precipitation in the Atmosphere (HEPPA) Workshop, 9-12 October, Boulder, Colorado, USA.

Publications

One of the most important achievements of IAGA in recent years was to publish, with Springer, a series of five books (front covers in the image below), summarizing the state of science of the IAGA five divisions. As well as providing useful reference texts, the receipts to IAGA from Springer for this venture were used to support scientists attending the last Scientific Assembly in Sopron, Hungary, in 2009.



Front covers of the five volumes describing the state-of-the-art of IAGA science, one for each Division of the Association

The IAGA Newsletter No. 49 was distributed at the end of December 2012. It can be downloaded on the IAGA website (www.iugg.org/IAGA). Among other things, reports from topical meetings co-sponsored by IAGA can be found there.

Preparations for IAGA2017

During the IUGG General Assembly in Melbourne, Australia, in 2011, the IAGA EC agreed to explore holding a joint Scientific Assembly with IAMAS and IAPSO in 2017 since there are significant areas of scientific overlap. The IAGA Secretary General Mioara Mandea represented IAGA at the Paris meeting of the three Associations, at which preliminary discussions took place. It became clear that there is a strong commitment in organizing a joint Assembly. Shortly, a call for bids will be sent and a site evaluation committee will be nominated.

FUTURE ACTIVITIES

The 12th Scientific Assembly will take place in the colonial city of Merida in Yucatan, Mexico, 24-31 August 2013. The scientific program includes 55 symposia covering all scientific fields of IAGA. Two Association Lectures, for all participants, will be given in the mornings of Tuesday and Thursday: “*A survey of geomagnetic field variations over the past 10 thousand years: evolutionary trends from the dipole to the South Atlantic Magnetic Anomaly*” by Cathy Constable (Scripps Institution of Oceanography, UCSD) and “*The three-satellite geomagnetic field mission, Swarm*” by Eigil Friis-Christensen (National Space Institute, Technical University of Denmark). Descriptions of the symposia and information about abstract submission, registration, visa, hotels and many other things can be found in the Second Circular from the Local Organizing Committee at the IAGA 2013 website: <http://www.geociencias.unam.mx/iaga2013/>.

Submitted by
Mioara Mandea, IAGA Secretary General



International Association of Hydrological Sciences (IAHS)

<http://iahs.info>

INTRODUCTION

The International Association of Hydrological Sciences (IAHS) promotes the study of all aspects of hydrology through discussion, comparison, and publication of research results and through the initiation of research that requires international cooperation. IAHS Press publishes the Hydrological Sciences Journal, the Red Book Series, the Benchmark Paper series, and other specialized publications. IAHS maintains strong connections with the International Hydrological Programme of UNESCO, with the Hydrology and Water Resources Programme of the World Meteorological Organisation (WMO), with UN-Water as well as with other UN-partners and NGOs.

The following International Commissions and working groups of IAHS initiate and conduct conferences, symposia, workshops, courses, publications and research programs:

- International Commission on Continental Erosion (ICCE)
- International Commission on the Coupled Land-Atmosphere System (ICCLAS)
- International Commission on Groundwater (ICGW)
- International Commission on Remote Sensing (ICRS)
- International Commission on Snow and Ice Hydrology (ICSIH)
- International Commission on Statistical Hydrology (ICSH)
- International Commission on Surface Water (ICSW)
- International Commission on Tracers (ICT)
- International Commission on Water Quality (ICWQ)
- International Commission on Water Resources Systems (ICWRS)
- Working Group on Precipitation
- Working Group on Education and capacity building

ADMINISTRATION

The main event of 2012 has been the IAHS 90th Anniversary Conference which took place in Delft Technical University, Delft, The Netherlands, 23-25 October. The Bureau met in Delft on 22 and 26 October, hosted by UNESCO-IHE. An anniversary brochure has been produced, available at www.iahs.info.

The close cooperation of IAHS with UNESCO, WMO, the UN-Task Force on Water and Climate and the UN-Water Group continued. IAHS officers attended the 14th Intergovernmental meeting of the WMO Commission of Hydrology, the 20th Intergovernmental Council of the UNESCO International Hydrology Programme, and the annual steering committee of UN Water.

Extensive preparations were made for the next IAHS Assembly to be held in Gothenburg, Sweden, 22-26 July 2013. This assembly is jointly organized with IAPSO and IASPEI.

ACTIVITIES

The 90th Anniversary Conference focused on the closure of the IAHS Scientific Decade 2003-2012 on “PUB – Prediction un Ungauged Basins” and was a great success. Several publications are in preparation to consolidate the outcomes of the Decade. More details were given by the IUGG E-Journal of December 2012 and February 2013, respectively on the Anniversary and the PUB Decade.



IAHS 90th Anniversary Conference, Delft Technical University, Delft, The Netherlands, October 2012 (photo: C. Cudenne)

A deep and inclusive process has been followed during 2012 in order to shape the 2013-2022 Scientific Decade, finally called “Panta Rhei – Everything flows”. Under the chairmanship of an officer designated by the Bureau, supported by a task force and by IAHS officers, the worldwide consultation and the synthesis were mainly based on an online blog (see www.iahs.info) and some key physical meetings during 2012 Conferences (EGU General Assembly, Vienna, Austria, April; Stahy Conference, Tunis, Tunisia, October; EGU Leonardo Conference, Torino, Italy, November – see below). A dedicated workshop was held in Nanjing, China, 10-12 May, hosted by Hohai University. The third day of the Anniversary Conference was also dedicated to mature the scientific plan of the Decade. A publication to communicate the scientific agenda towards the community is in preparation.

The Anniversary Conference also included a much attended Prize Ceremony, which can be podcasted from www.iahs.info. Kuni Takeuchi (Japan) was awarded the IAHS-UNESCO-WMO International Hydrology Prize. David Love (Zimbabwe) and Gerald Corzo-Perez (Colombia & The Netherlands) received the Tison Award for young scientists for their paper “*Rainfall interception-evaporation-runoff relationships in a semi-arid catchment, Northern Limpopo basin, Zimbabwe*” by five authors, published in the Hydrological Sciences Journal. Funds from Taylor and Francis, TU Delft, UNESCO-IHE and IUGG allowed provision of the Tison Award amount, banquet, drinks, and grants for delegates from developing countries and invited speakers.

In addition to the Delft conference, many scientific events were organized, sponsored or supported by IAHS and its Commissions and Working Groups in 2012, including:

- International Workshop on Hydrometry, Manaus, Brazil, 7-9 May.
- International Conference on Groundwater in Fractured Rocks, Prague, Czech Republic, 21-24 May.
- Balwois Conference on Water, Climate and Environment, Ohrid, Macedonia, 28 May -2 June.
- ICCE International Conference on Wildfire and Water Quality: Processes, Impacts and Challenges, Banf, Alberta, Canada, 11-15 June.

- 10th International Conference on Hydroinformatics HIC2012, Hamburg, Germany, 14-18 July.
- Nordic Water 2012, Oulu, Finland, 13-15 August.
- Session on Artificial Tracers and Environmental Isotopes in Karst Aquifers at IAH Congress, Niagara Falls, Canada, 16-23 September.
- HydroPredict2012: International Interdisciplinary Conference on Predictions for Hydrology, Ecology and Water Resources Management, Vienna, Austria, 24-27 September.
- 3rd STAHY Workshop on Statistical Methods for Hydrological Applications, Tunis, Tunisia, 1-2 October.
- International Symposium of ICCE, Chengdu, China, 11-15 October.
- 1st International Conference on Water Resources Engineering Technology in Iraq, Baghdad, Iraq, 17-18 October.
- 13th Waternet/WARFSA/GWP International Symposium on Integrated Water Resources Management, Johannesburg, South Africa, 2-4 November.
- Irish National Hydrology Conference, Tullamore, Ireland, 13 November.
- ICCE-MedFriend International Conference on Sediment Transport in Hydrological Watersheds and Rivers, Istanbul, Turkey, 14-16 November.
- EGU Leonardo Conference on Hydrology and Society, Turin, Italy, 14-16 November.
- 9th International Workshop on Precipitation in Urban Areas, Saint Moritz, Switzerland, 6-9 December.
- Session on Forensics at the 1st IUGG GRC Conference on Extremes Natural Hazards and Their Impacts, Orange, California, USA, 8-12 December.
- AHI Annual Convention Hydrocare2012, Dindigul, India, 11-12 December.

The biennial UNESCO-IAHS Kovacs colloquium was planned and fully prepared to be held at the UNESCO headquarter, Paris, France, in spring 2012, but was canceled due to financial reasons.

IAHS Publications

In 2012 IAHS Press published eight issues of the *Hydrological Sciences Journal*.

IAHS Press also published the following seven Red Books, one Special publication – Blue Book, and one Book in the “Benchmark Papers in Hydrology” Series:

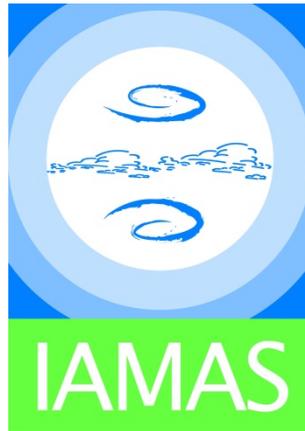
- Hydrological cycle and water resources sustainability in changing environments. Edited by L. Ren *et al.*, IAHS Publication 350.
- Weather radar and hydrology. Edited by R.J. Moore *et al.*, IAHS Publication 351.
- Remote sensing and hydrology. Edited by C. Neale *et al.*, IAHS Publication 352.
- Revisiting experimental catchment studies in forest hydrology. Edited by A. Webb *et al.*, IAHS Publication 353.
- Wildfire and water quality: Processes impacts and challenges. Edited by M. Stone *et al.*, IAHS Publication 354.
- Models – Repositories of knowledge. Edited by S.E. Oswald *et al.*, IAHS Publication 355.
- Erosion and sediment yields in the changing environment. Edited by A. Collins *et al.*, IAHS Publication 356.
- Changes in flood risk in Europe. Edited by Z.W. Kundzewicz, IAHS Special Publication 10.
- Isotope hydrology. Edited by P. Aggarwal *et al.*, IAHS Benchmark 8.

The *IAHS TFDC* (Task Force for Developing Countries) continued its work and distributed all IAHS publications (*Hydrological Science Journal* and the Books) free of charge to more than 60 selected universities and research institutions in Africa, Asia, South-America and Eastern Europe. Three issues of the *IAHS Newsletter* were published and widely digitally disseminated. The *90th Anniversary brochure* included contributions from all the commissions and working groups, and was widely disseminated in hard copy and digitally.

FUTURE ACTIVITIES

The main activity in 2013 is the IAHS-IAPSO-IASPEI Joint Assembly in Gothenburg, Sweden, 22-26 July 2013. From 2013-2022 IAHS will focus on the new Scientific Decade "Panta Rhei – Everything flows". This is discussed under "Activities".

Submitted by
Christophe Cudennec, IAHS Secretary General



International Association of Meteorology and Atmospheric Sciences (IAMAS)

<http://www.IAMAS.org>

INTRODUCTION

IAMAS is the specialized association of the International Union of Geodesy and Geophysics (IUGG) that deals with all aspects of the gaseous envelope around the Earth and other planets. The main research work is carried out, coordinated and communicated in IAMAS' ten International Commissions (IC), which are in alphabetical order the:

- International Commission on Atmospheric Chemistry and Global Pollution (ICACGP)
- International Commission on Atmospheric Electricity (ICAE)
- International Commission on Climate (ICCL)
- International Commission on Clouds and Precipitation (ICCP)
- International Commission on Dynamical Meteorology (ICDM)
- International Commission on the Middle Atmosphere (ICMA)
- International Commission on Planetary Atmospheres and their Evolution (ICPAE)
- International Commission on Polar Meteorology (ICPM)
- International Ozone Commission (IOC)
- International Radiation Commission (IRC)

All ICs, and IAMAS as a whole, play a leading role in the global coordination, communication and discussion of the latest research through organizing and participating in a wide range of scientific meetings that are open to all scientists.

ADMINISTRATION

The Bureau and Executive Committee did not change during 2012, except for the handovers in the *ex-officio* membership. The new commission presidents are Andrea Flossmann (France) for ICCP and Werner Schmutz (Switzerland) for IRC. The Bureau met on 16 November 2012 at the LESIA laboratory, Observatoire de Paris, Paris, France. A day before the meeting, the Bureau met members of the French National Committee and colleagues of IAGA and IAPSO to discuss the plans for a joint General Assembly in 2017. Anja Schilling, the project manager for the upcoming Davos Atmosphere and Cryosphere Assembly (DACA-13), Davos, Switzerland, briefed the participants about the planning status and further steps.

During the year, Bureau members cooperated closely via e-mail and phone calls. In April, the President and the Secretary General met during the EGU General Assembly in Vienna, Austria inter

alia to arrange the Bureau Meeting in November. The Secretary General participated in the major meetings of the commissions ICCP (Leipzig, Germany, July) and ICDM (Kunming, China, August).

The IAMAS Publication Series No.2, entitled “International Ozone Commission: History and activities”, appeared in August. Issue 13 of the IAMAS newsletter was published in December (editor: Scott Hosking; cf., www.IAMAS.org/NewsLetters). The IAMAS website (www.IAMAS.org) was regularly updated and received about 100,000 hits during 2012.

ACTIVITIES

The primary activity of the Secretary General during 2012 was representing IAMAS and its commissions in the planning phase for DACA-13, the next General Assembly jointly organized with IACS. Specific input was provided during two personal visits of Swiss colleagues in Davos and Malans, Switzerland, and by joining several teleconference meetings of the Swiss National Organization Committee.

In the following, brief reports from IAMAS commissions are presented. The full commission reports will be posted on www.IAMAS.org/Reports. The information is also available on the respective commissions’ websites. A brief statement concerning the liaison to SCOR (Scientific Committee on Oceanic Research) and to WMO (World Meteorological Organization) concludes the report. All commissions will be represented at DACA-13. ICMA will also contribute to the IAGA General Assembly in Merida, Mexico.

IAMAS-ICACGP (www.icacgp.org)

The commission was involved in the organization and scientific program of the 12th IGAC Open Science Conference “Atmospheric Chemistry in the Anthropocene” in Beijing, China, 17-21 September 2012 (<http://www.igac2012.org/>). During the event a regular business meeting of the commission was held.

IAMAS-ICAE (<http://icae.jp>)

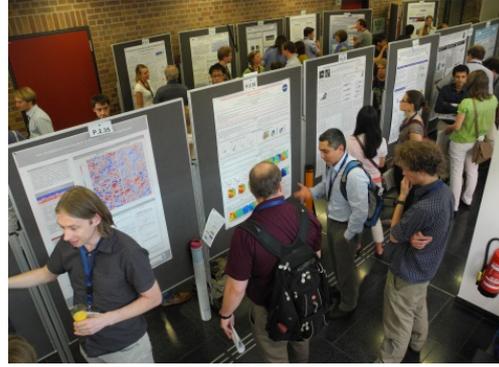
The commission (i) compiled and released Volume 23 of their regular and detailed newsletter (2 issues), (ii) held a preparatory meeting for the “15th International Conference on Atmospheric Electricity” scheduled for 2014 in Oklahoma, USA, (iii) contributed to the organization of sessions at DACA-13, and (iv) organized the special issue ‘Atmospheric Electricity’ in the research journal *Atmospheric Research*.

IAMAS-ICCL (www.iccl-iamas.net)

Alongside with an international workshop of ICDM, plans were consolidated about the ICCL Expert Assessment workshop “Decadal climate variability and cross-scale interactions” to be held in Beijing, China in April 2013 (<http://iccl2013.csp.escience.cn/>). The commission also contributed to support the new IUGG Union Commission on Climatic and Environmental Change (CCEC; cf., <http://ccec-iugg.org/>) and to convene symposia at DACA-13.

IAMAS-ICCP (www.iccp-iamas.org)

The commission held its quadrennial 16th International Conference of Clouds and Precipitation with more than 500 participants in Leipzig, Germany (<http://iccp2012.tropos.de/>). Two awards and five student prizes were distributed. Regular elections brought into office: Andrea Flossmann as the president, Robert Rauber as the vice-president, and Darrel Baumgardner as the secretary.



ICCP “16th International Conference of Clouds and Precipitation” in Leipzig, Germany, August 2012.
 Left: Roland List (IAMAS Secretary General, 1995-2007) and Zev Levin (outgoing ICCP president) exchanging views. Right: lively poster discussion in the foyers (photos: H. Volkert).

IAMAS-ICCP/CNA

The Committee on Nucleation and Atmospheric Aerosols was engaged with the preparation of its 19th “International Conference on Nucleation and Atmospheric Aerosols” (www.icnaa.org), to be held in Fort Collins, Colorado, USA from 24 to 28 June 2013.

IAMAS-ICDM (<http://icdm.atm.ucdavis.edu/ICDM.html>)

The international workshop “Dynamics and Predictability of High-Impact Weather and Climate Events” was held Kunming, China, 6-9 August 2012 (<http://icdm2012.csp.escience.cn>). Some 140 colleagues attended the meeting involving 24 invited lectures, oral and poster presentations. A group photo of the participants including their names is available at www.iamas.org/meetings/ICDM2012-GroupNames.pdf.

At the regular business meeting five new members were elected. The next international workshop is being jointly planned with ICPM to be held in Norway during spring or summer of 2014.

IAMAS-ICMA (www.icma-iamas.org)

The international workshop “Stratospheric sudden warming and its role in weather and climate variations” held in Kyoto, Japan, 22-24 February 2012, (<http://www-mete.kugi.kyoto-u.ac.jp/Kyoto2012/>) was co-sponsored by ICMA. More than 100 people (including 50 foreign scientists) attended the meeting. A detailed meeting report was presented by the SPARC-newsletter No. 39 and can be downloaded at www.sparc-climate.org/publications/newsletter. Furthermore two focused workshops will be supported in 2013, one in Thessaloniki, Greece, the other in Leeds, UK (www.iamas.org/meetings).

IAMAS-IO3C (<http://ioc.atmos.illinois.edu>)

The commission held its regular Quadrennial Ozone Symposium (www.cmos.ca/QOS2012) with more than 300 participants in Toronto, Canada, during the last week of August. Besides the broad ranging program, a lifetime achievement award for outstanding service on measurements was given to Archibald Asbridge (Canada). Copies of the IAMAS Publication Series No. 2 were distributed to the participants. On the “Ozone Day”, 16 September, the regular press statement on the “State of the ozone layer” was issued. The “Ozone Gray literature Recovery Effort – OGRE” was started by assembling relevant WMO-documents since 1981 at the website: http://acdb-ext.gsfc.nasa.gov/Documents/O3_Assessments.

IAMAS-ICPAE (www.atm.ox.ac.uk/icpae)

The commission actively contributed to sessions at major international conferences, e.g. EGU General Assembly 2012 in Vienna, Austria; COSPAR-12 in Mysore, India; AOGS-2012 in Sentosa Island, Singapore. Two joint symposia are planned for DACA-13.

IAMAS-ICPM (www.icpm-iamas.aq)

In July 2012, the commission organized a well-attended workshop on “Atmospheric Model Parameterization in the Polar Regions”. For DACA-13 contributions are focused on two joint symposia.

IAMAS-IRC (www.irc-iamas.org)

The commission held its quadrennial International Radiation Symposium with some 530 participants in Berlin, Germany, 6-10 August 2012 (www.irs2012.org). The *Gold-Medal-Award* was presented to Robert Levy and the *IRC-Young-Scientist-Award* to Kuo-Nan Liou. At the business meeting new officers were elected for the 2012-2016 period: Werner Schmutz (Switzerland) for president; Byung-Ju Sohn (Republic of Korea) for vice-president; Peter Pilewski (USA) for secretary.

Reports of IAMAS liaisons to other organization

SCOR: Athena Coustenis attended the SCOR General Meeting in Halifax, Nova Scotia, Canada, 21-23 October 2012. She introduced the broad variety of research bundled in the ten IAMAS commissions and identified the closest links to ocean issues within ICACGP via programmes as SOLAS (Surface Ocean Lower Atmosphere Study) and IGBP (International Geosphere-Biosphere Programme). She also took on an active role in reviewing proposals about new SCOR working groups.

WMO: Hans Volkert attended the regular Executive Committee meeting of WMO in Geneva, Switzerland, for two days in June, joining his fellow IUGG-liaisons Arthur Askew (for hydrology) and Arnau Folch (for volcanic ash). More details about the meeting can be found in the Liaison Reports of this Annual Report (p. 33). He also accepted an invitation to join the Management Group of WMO’s Commission of the Atmospheric Sciences. In this context “The World Weather Open Science Conference” is being planned to be held in Montreal, Canada, in August 2014.

FUTURE ACTIVITIES

The major event in 2013 will be the Davos Atmosphere and Cryosphere Assembly (DACA-13) jointly held by IAMAS and IACS in Davos, Switzerland, from 8-12 July. 21 symposia will address a broad variety of topics under the general heading “Air, Ice and Process Interactions”. About 800 oral and 400 poster presentations have been submitted. All posters will be displayed for the entire 5-day-event and discussed during five poster sessions without competition of oral presentations in the mid-afternoon.

Regarding the Scientific Assembly in 2017, the Executive Committees of IAGA, IAMAS and IAPSO agreed to hold a triple-association joint assembly. Bids were invited from national committees. Their ranking and the final decision are scheduled during the separate assemblies in summer 2013.

Submitted by
Athéna Coustenis, IAMAS President
Hans Volkert, IAMAS Secretary General



International Association for the Physical Sciences of the Oceans (IAPSO)

<http://iapso.iugg.org>

INTRODUCTION

The International Association for the Physical Sciences of the Oceans (IAPSO) has the prime goal of "promoting the study of scientific problems relating to the oceans and the interactions taking place at the sea floor, coastal, and atmospheric boundaries insofar as such research is conducted by the use of mathematics, physics, and chemistry." IAPSO works mainly through (i) biennial scientific assemblies, (ii) working groups, (iii) commissions, (iv) services, and (v) website information. Of special importance to IAPSO is the involvement of scientists and students from developing countries in the oceanographic activities.

IAPSO maintains formal liaison with other scientific commissions and committees. These include the ICSU's Scientific Committee on Oceanic Research (SCOR), and UNESCO's Intergovernmental Oceanographic Commission (IOC). For more information see <http://iapso.iugg.org/>.



A Conductivity, Temperature and Depth (CTD) cast in Bransfield Strait, Antarctica (photo: V. Morozov).

ADMINISTRATION

The IAPSO office got installed at Gothenburg University, Sweden in July 2007. Since then, the day-to-day business has been managed by the Secretary General (SG) Johan Rodhe. The Bureau of IAPSO includes the President, Eugene Morozov (Russia), the Past President, Lawrence Mysak (Canada), the SG Johan Rodhe (Sweden), and the Treasurer, Fred Camfield (USA). In 2012, all IAPSO discussions were maintained by means of e-mail communication. The SG is responsible for the IAPSO website.

ACTIVITIES

The main activity of the Bureau and the Executive Committee (EC) was the planning of the Joint IAHS-IAPSO-IASPEI Assembly “Knowledge for the Future” that will be held from 22-26 July 2013 in Gothenburg, Sweden. The Local Organization Committee (LOC) has regularly met with its chair Professor David Turner, dean of the Faculty of Science, Gothenburg University. The Scientific Programme Committee (SPC) includes Professor Leif Andersson (Chair), Gothenburg University and the Royal Academy of Sciences, IAHS SG Christophe Cudennec, IAPSO SG Johan Rodhe and IASPEI SG Peter Suhadolc. Johan Rodhe was co-opted to the LOC meetings. 11 IAPSO-only symposia and eight joint symposia have been organized. The expected number of participants is 1,000–1,500. Until the submission deadline, 4 February 2013, about 1,600 abstracts have been submitted. Assembly website: <http://iahs-iapso-iaspei2013.com/>. Congrex is the official congress organizer.

In November 2012, IAPSO SG Johan Rodhe and IAGA SG Mioara Mandea were invited to the IAMAS Bureau meeting in Paris, France to discuss a possible IAGA-IAMAS-IAPSO Joint Assembly in 2017. Isabelle Ansoorge (IAPSO Vice President and IUGG EC Member) was invited to present Cape Town, South Africa as a possible venue. It was decided to ask the respective EC for approval of such a Joint Assembly. In January 2013 this was approved. An Association-joint call for letter of intent to arrange such an Assembly has been sent to all National Correspondents. This is necessary to ensure that the choice of venue will be an open process.

SCOR/IAPSO Working Groups

The IAPSO SG and Vice-President attended the annual meeting of the SCOR in Halifax, Canada in October 2012. The SCOR meetings review the progress of current SCOR Working Groups (WG), evaluate proposed new WGs, and decide which WGs to fund. A number of international SCOR-related scientific programs were discussed. Details can be found on the SCOR website (www.scor-int.org). Two new SCOR WGs, out of seven proposals, were approved: WG 141 on “Sea-Surface Microlayers” and WG 142 on “Quality Control Procedures for Oxygen and Other Biogeochemical Sensors on Floats and Gliders”.

The work within the joint SCOR/IAPSO WGs is an important part of the IAPSO activity (cf. <http://iapso.iugg.org/>). A WG is usually formed of a maximum of 10 members from different countries to deliberate on a narrowly focused topic and to publish a report in a peer-reviewed journal or book, manual, database etc. WGs are expected to complete their tasks in four years or less.

The following SCOR WGs, co-funded by IAPSO, have published important books and/or special journal issues:

SCOR/IAPSO WG 127 “The Thermodynamics and Equation of State of Seawater” (Chaired by Trevor J. McDougall) had finished its tasks and was reorganized into a Joint SCOR/IAPSO/IAPWS Committee on the Properties of Seawater.

SCOR/WCRP/IAPSO WG 136 (Co-chaired by Lisa Beal and Arne Biastoch): “The Climatic Implications of the Greater Agulhas System” organized a conference on “The Agulhas system and its role in changing Ocean Circulation, Climate, and Marine Ecosystems”. It was held in Stellenbosch, South Africa, 8-12 October 2012. The conference generated great excitement among the participants - particularly among regional scientists who have never attended an international conference before. The conference attracted 108 participants from 20 countries. 35 came from seven African countries and 27 were PhD students. They covered the fields of ocean and climate modelling, physical and biological oceanography, marine ecology, paleoceanography, meteorology, and marine and terrestrial paleoclimatology. IUGG supported the Conference financially.

IAPSO Commissions and Services

- The Commission on Mean Sea Level and Tides (CMSLT), hosted by the Proudman Oceanographic Laboratory, UK. President: Gary T. Mitchum. Website: <http://www.psmsl.org/>.
- The IAPSO/IASPEI/IAVCEI Tsunami Commission. Chair: Dr. Vasily Titov. Website: www.iaspei.org/commissions/JCT.html.
- The Permanent Service for Mean Sea Level, hosted by Proudman Oceanographic Laboratory, UK. Contact: Dr. Lesley Richard. Website: <http://www.psmsl.org>.
- The IAPSO Standard Seawater Service, hosted by OSIL, Havant, Hampshire, UK. Director: Paul Ridout. Website: <http://www.osil.co.uk>.
- The IASPEI/IAPSO/IAGA International Ocean Network (ION). Chair: Yoshiyuki Kaneda. IAPSO Representative: Dr. Satheesh C. Shenoi. Website: <http://msg.who.edu/ION/index.html>.

The working groups, commissions and services report to IAPSO. These reports are posted on the IAPSO website (<http://iapso.iugg.org/working-groups>).

Prince Albert I Medal

IAPSO and the Monaco Royal Family established the Prince Albert I Medal for excellence research in physical and/or chemical oceanography. The award is given every two years and the ceremony is held during the Assemblies. In 2012, Professor Arnold L. Gordon from Lamont-Doherty Earth Observatory, USA, was selected as the winner of the Prize 2013 for “his outstanding work on ocean dynamics”.

Eugene LaFond Medal

This Medal, created in honour of Eugene LaFond (former SG of IAPSO), is awarded to a scientist from a developing country for an outstanding oral or poster presentation at an IAPSO Assembly. IAPSO forms a special committee at each Assembly to select the winner.

FUTURE ACTIVITIES

The main activity in 2013 is the IAHS-IAPSO-IASPEI Joint Assembly in Gothenburg, Sweden 22-26 July 2013. This is discussed under “Activities”. The main activity after that is related to the IUGG General Assembly 2015 in Prague, Czech Republic and the Association Assembly in 2017. This is also discussed under “Activities”. The main activities besides the assemblies are the work within the SCOR/IAPSO working groups. No WGs are funded after 2012. Currently, the next call for WG proposals is out and will be discussed at the SCOR meeting in New Zealand in November 2013.

Submitted by
Eugene Morozov, IAPSO President
Johan Rodhe, IAPSO Secretary General



International Association of Seismology and Physics of the Earth's Interior (IASPEI)

<http://www.iaspei.org>

INTRODUCTION

The International Association of Seismology and Physics of the Earth's Interior (IASPEI) is the leading international association promoting the studies of the structure and the geodynamical processes in the Earth's interior. IASPEI achieves its goals through scientific meetings, assemblies and international research initiatives and by fostering international cooperation especially in the countries which are in the process of working towards full scientific development.

During the inter-assemblies years, IASPEI's regional commissions organize their own general assemblies. In 2012, IASPEI activities were directed towards the joint IAHS-IAPSO-IASPEI 2013 Scientific Assembly in Gothenburg, Sweden, and the preparation of the IASPEI Symposia and the IASPEI-led Inter-Association Symposia. Several scientific meetings have been sponsored by IASPEI and multiple projects continued.

ADMINISTRATION

Executive Committee & Bureau meetings

The IASPEI Bureau has met during the EGU General Assembly 2012 in Vienna, Austria. Important questions on financial and business matters have been answered by the members of the Bureau and Executive Committee.

Changes in administration

Following the resolution passed at the General Assembly in Melbourne, Australia, 2011, the Latin American and Caribbean Seismological Commission (LACSC) of IASPEI was formed at a meeting during the Seismology Symposium of the Geological Congress of Peru in Lima, Peru, on September 24, 2012. Marcelo Sousa de Assumpcao, member of the IASPEI Executive Committee, attended the meeting and took an active role in the LACSC formation process.

Other matters

The IASPEI website, hosted by the British Geological Survey (BGS) in Edinburgh, UK, has been updated regularly, mainly with the help of the IASPEI webmaster Alice Walker.

Six IASPEI Newsletters have been sent to subscribers. The Newsletters are also available for download at the website.

ACTIVITIES

Scientific Assemblies, Workshops/Symposia etc.

The *European Seismological Commission (ESC)* held its 33rd General Assembly in Moscow, Russia, from 19 to 24 August 2012, on the premises of the Russian Academy of Sciences. 548 people from 51 countries participated in the Assembly. The Assembly motto "*Seismology without Boundaries*" proved its value to the full. In the framework of the 10 topics into which the scientific program of the

Assembly was built, there were 39 scientific symposia with 845 scientific presentations – 490 oral and 355 poster presentations. Some symposia were organized in cooperation with the Seismological Society of America and with the Asian Seismological Commission. In the week following the ESC General Assembly, the 9th International Young Seismologists Training Course “Modern Methods of Seismological Data Processing and Interpretation” was held in Obninsk, Russia. 10 lecturers gave a series of presentations to 19 female and 17 male participants from 15 countries. All of them were very satisfied with the course and received personal certificates of attendance.

The *Asian Seismological Commission (ASC)* held its 9th General Assembly in Ulaanbaatar, Mongolia, from 17 to 20 September 2012, under the motto “International Scientific Cooperation for Prevention and Mitigation of Seismic Disaster”. About 300 scientists (115 foreign) from 20 countries participated in the conference and gave 87 oral and 50 poster presentations. The excellent premises were kindly provided by the Mongolian Government. The opening session was held in the Mongolian Parliament. The Young Scientist Training Course was sponsored by the Young Scientist grant of the Deputy Prime Minister of Mongolia and IASPEI. Eight foreign and 11 Mongolian participants joined the course.



Participants of the 9th General Assembly of the Asian Seismological Commission, Ulaanbaatar, Mongolia, September 2012 (photo: D. Davaadorj).

Activities of Association Commissions, Working Groups, Divisions, Services etc.

Global Earthquake Model (GEM)

IASPEI President and GEM Foundation Governing Board member Domenico Giardini, attended several Board meetings on behalf of IASPEI in 2012. The GEM *global risk assessment initiative* is progressing well and several projects have already been accomplished, among which the ISC-GEM global instrumental catalogue describes more than 20,000 homogenized seismic events covering 110 years.

IASPEI New Manual of Seismological Observatory Practice, 2nd edition (NMSOP-2) on the Web

Since March 2012, large parts of the updated and significantly amended 2nd edition of the IASPEI New Manual of Seismological Observatory Practice (NMSOP-2) are freely accessible on the Internet. With some 2,000 pages of texts and figures, plus linked sources of information, NMSOP-2 is the largest seismology E-book available to date. The first printed edition (NMSOP-1), elaborated by an international working group of the IASPEI Commission of Seismological Observation and

Interpretation (CoSOI) and other contributors under the conceptual guidance and editorship of Prof. Dr. Peter Bormann, was published in 2002 by the GFZ German Research Centre for Geosciences, Potsdam, Germany. NMSOP-1 is used already in more than 100 countries as a standard for seismological practice, national and international training courses, teaching and research. NMSOP-1 has been published also in Chinese and has been partially translated into Russian, Indonesian and Turkish. Under the umbrella of CoSOI and with Peter Bormann (GFZ) as editor, 73 authors (from Australia, Japan, Taiwan, USA and 15 European countries) and 70 peer-reviewers from 20 countries have contributed to the success of NMSOP-2 since 2006. Most of the original 13 NMSOP-1 chapters have been revised significantly and five new subject areas have been added. All chapters can be found and downloaded on the NMSOP website maintained by the GFZ. The NMSOP-1 and NMSOP-2 websites are also linked on the websites of IASPEI (<http://www.iaspei.org/projects/NMSOP.html>) and the International Seismological Centre (<http://www.isc.ac.uk/standards/>).

IASPEI has sponsored the following workshops/symposia held in 2012:

- *ECGS 2012: Earthquake source physics on various scales*. This workshop was organized by the European Center for Geodynamics and Seismology and held at the Alvisse Parc Hotel in Luxembourg City, Luxembourg, 3-5 October 2012.
- *Latin American Seismology Symposium*. Held in Lima, Peru, 23-26 September 2012. At this symposium, the Latin American and Caribbean Seismological Commission (LACSC) was formed.

Scientific Programs, Projects, Publications

The International Digital Earthquake Archives (IDEA) project of the Committee for Preservation of World-wide Standard Seismographic Network (WWSSN) and Historical Seismograms (also called simply *Seismoarchives: Seismogram Archives of Significant Earthquakes of the World*), is continuing under the guidance of Willie Lee. The Incorporated Research Institutions for Seismology (IRIS) are archiving the scanned seismograms.

The IUGG-funded IASPEI/International Seismological Centre (ISC) joint Project *Networking of world seismologists (Improving Geophysical Science Link to the Society during Natural Extreme Events, Especially in Developing Countries)* is almost completed. IASPEI and ISC are developing and maintaining a worldwide catalogue of seismologists and geophysicists willing to serve as a contact person in countries with and without affiliation to IUGG.

IASPEI has set up a Scientific Advisory Board (SAB) for the GEM project *Global Instrumental Earthquake Catalogue* under the leadership of ISC. The catalogue will be published in early 2013.

Several publications are available from the IASPEI Secretariat. Upon request, IASPEI distributes free copies of its following publications to institutional libraries in less developed countries.

- IASPEI: Cooperation for Better Understanding of the Earth
- International Handbook of Earthquake and Engineering Seismology (Part A and B)
- New Manual of Seismological Observatory Practice

FUTURE ACTIVITIES

- IAHS, IAPSO, IASPEI Joint 2013 Assembly in Gothenburg, Sweden, 22-26 July 2013: Knowledge for the Future. Website: <http://iahs-iapso-iaspei2013.com/>.
- GEM Global Components: IASPEI will review their results, setting the new standards for global seismology, including the ISC-GEM global instrumental catalogue (mentioned above), the new collections of active faults (GEM Faulted Earth), the new global historical catalogue and database, the global model of geodetic strain rates and the tectonic-based GMPE global selection.
- In 2014 three regional commission assemblies will be held:
 - LACSC will hold its first General Assembly in Bogota, Colombia.

- The European Seismological Commission will organize the 34th General Assembly in Istanbul, Turkey from 24-29 August 2014. This Assembly will be the second to be jointly held with the General Assembly of the European Association of Earthquake Engineering.
- The venue of the next ASC will be in Manila, Philippines, in 2014.

Submitted by
Peter Suhadolc, IASPEI Secretary General & Treasurer



International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)

<http://www.IAVCEI.org>

INTRODUCTION

At the First General Assembly of IUGG (Rome, 1922), the *Section de Vulcanologie* became one of the constituent sections of the Union. This name was changed into *Association Internationale de Vulcanologie* at the Fourth General Assembly (Stockholm, 1930). It took its present name at the Moscow General Assembly (1971).

The IAVCEI is the primary international focus for research in volcanology and for efforts to mitigate volcanic disasters. Scientists also participate in IAVCEI research in closely related disciplines, such as igneous geochemistry and petrology, geochronology, volcanogenic mineral deposits, and the physics of the generation and ascent of magmas in the upper mantle and crust. Work is carried out in the following special Commissions:

- Arc Magmatism
- Chemistry of Volcanic Gases
- Cities on Volcanoes
- Collapse Calderas
- Explosive Volcanism
- Kimberlites
- Large Igneous Provinces
- Monogenetic Volcanism
- Statistics in Volcanology
- Tephra Hazard Modelling
- Volcanic Lakes
- Volcanogenic Sediments
- The International Volcanic Health Hazard Network (IVHHN)
- World Organization of Volcano Observatories

ADMINISTRATION

IAVCEI Executive Committee (EC) activities

- Informal meeting of EC members (Ray Cas, Steve Self, Joan Martí, Adelina Geyer) who attended the 4th International Workshop on Collapse Calderas, Bolsena, Italy, 23-29 September 2012, to discuss IAVCEI matters and future plans.
- Revision of IAVCEI finances, funding support, potential funding sources and strategies.
- Informal meeting of EC members (Joan Martí, Hugo Delgado) who attended the Cities on Volcanoes 7 meeting, Colima, Mexico, 18-23 November 2012, to discuss IAVCEI matters and future plans.

- Continuation of the revision of the IAVCEI Commissions and Working Groups, still to be fully completed, conducted by the two Vice-Presidents and approved by the EC, in which active commissions have been identified and several inactive commissions have been deactivated.
- Completion of the revision and renewal of the Editorial Board of the Bulletin of Volcanology.



Participants of the 4th International Workshop on Collapse Calderas, Bolsena, Italy, September 2012 (photo: V. Acocella).

ACTIVITIES

Members

In 2012 the number of IAVCEI individual members was 1,831, 79 of them being Life Members, 1,382 non-donor members, and 379 donor members.

Website

The IAVCEI website (<http://www.iavcei.org/>) has been updated and includes new sections.

Newsletters

Four issues of the newsletter "IAVCEI News" were published on the website, in 2012.

2012 Meetings, workshops and courses

The following meetings, workshops, and courses were (co-) organized or sponsored by one (or more) of the IAVCEI commissions in 2012:

- IAVCEI-IAS 4th International Maar Conference: A Multidisciplinary Congress on Monogenetic Volcanism 2012, Auckland, New Zealand, 20-24 February 2012.
Website: <http://www.cvent.com/events/4th-international-maar-conference/archived-8da8b43ec50c46f3ad4276879992c4aa.aspx>.
- 1st International Congress on Management and Awareness in Protected Volcanic Landscapes, Olot, Spain, 21-25 May 2012.
Website: http://www.volcandpark1.com/images/documents/abstracts_vp_2012.pdf.
- AGU Chapman Conference on Volcanism and the Atmosphere, Selfoss, Iceland, 11-15 June 2012.
Website: <http://www.agu.org/meetings/chapman/2012/bcall/program/index.php>.
- 4th International Workshop on Collapse Calderas, Vulcini, Italy, 23-29 September 2012.
Website: http://www.iavcei.org/documents/CCW2012_ABSTRACT_BOOK.pdf.
- EMSEV-2012, Gotenba, Japan, 1-5 October 2012. Website: <http://www.emsev-iugg.org/gotemba/>.
- Hopi Buttes Volcanic Field Workshop: Interpreting Maar-Diatreme Volcanism using base to top exposures, syn-eruptive surface deposits and country-rock strata, Flagstaff, Arizona, USA, 21-27 October 2012. Website: http://www.otago.ac.nz/geology/calendar/hopi_buttres_2012/index.html.
- Cities on Volcanoes 7, Colima, Mexico, 18-23 November 2012.
Website: <http://www.citiesonvolcanoes7.com>.



Eruption of the Colima Volcano on 6 January 2013 close to Colima, Mexico where the conference "Cities on Volcanoes 7" was held in November 2012 (photo: G. Reyes).

FUTURE ACTIVITIES

Forthcoming meetings, workshops and courses in 2013

- Basalt 2013, Cenozoic Magmatism in Central Europe, Görlitz, Germany, 24-28 April 2013. Website: www.senckenberg.de/basalt2013
- 8th Workshop on Volcanic Lakes, Aso volcano, Kumamoto and Noboribetsu, Japan, 25-31 July 2013. Website: <http://www.sc.u-tokai.ac.jp/ohbalab/English/CVL2013/index.html>.
- IAVCEI Scientific Assembly - 2013. Forecasting Volcanic Activity: Reading and translating the messages of nature for society, Kagoshima, Japan, 20-24 July 2013. Website: <http://www.iavcei2013.com>.
- IUGG-WMO Workshop on Ash Dispersal Forecast and Civil Aviation, Geneva, Switzerland, 18-20 November 2013. Website: <http://www.unige.ch/sciences/terre/mineral/CERG/Workshop2.html>.

Foreseen activities for 2013

- EC meeting during the IAVCEI Scientific Assembly, Kagoshima, Japan, 20-24 July 2013.
- Completion of the reorganization of IAVCEI Commissions.
- Publication of three IAVCEI newsletters.
- Completion of the revision of the state of the art of volcanology in developing countries. Identification of their main drawbacks and needs.
- Preparation of the Scientific Program for the IAVCEI General Assembly to be held in Prague, Czech Republic, in 2015, during the IUGG General Assembly.

Submitted by
Joan Martí, IAVCEI Secretary General

ACTIVITIES OF THE UNION COMMISSIONS AND INTER-ASSOCIATIONS WORKING GROUPS

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

Commission for Data and Information (UCDI)

INTRODUCTION

In 2008 the IUGG established the Union Commission on Data and Information (hereafter UCDI) to provide IUGG's eight Associations an entity to deal with data and information issues at the Union level and engage with similar bodies in other Unions and Societies.

The Commission provides a focused and sustainable organizational structure that supports and strengthens IUGG science through integrated scientific information activities in order to ensure the availability of modern data and information systems and services. These services are globally distributed, provide universal open access, and must be sustainable.

The UCDI objectives are to:

- provide a focus and single voice within IUGG, spanning all IUGG Associations and inter-Association bodies.
- connect IUGG and its scientists to other bodies/agencies/initiatives that have interest and responsibility on matters of geo-data.
- advocate and facilitate research and development in the growing field of informatics to improve data and information systems and practices.
- promote open access to data and adoption of inter- operable data sets.

ADMINISTRATION

Membership

UCDI continues to solicit informal membership/ expressions of interest for the Union Commission (http://www.iugg-ucdi.org/UCDI/UCDI_member2011.html).

UCDI has now the possibility to host members. On the UCDI website (<http://www.iugg-ucdi.org/UCDI/Home.html>) there is a form to become a member of the Union Commission.

This year the UCDI designed a survey to know state-of-the-art on data and information in the different IUGG Associations. A preliminary draft of the document is already defined and after some final modifications it will be released to the public via the UCDI webpage and the Association's mailing lists.

Executive Committee Meetings

The Executive Committee meetings were held during the EGU General Assembly 2012 in Vienna, Austria, 22-27 April 2012, and the AGU Fall Meeting 2012 in San Francisco, California, USA, 3-7 December 2012.

ACTIVITIES

2012 UCDI Science Meetings

eGYAfrica 2012: Better Internet Connectivity for Research and Education in Africa, 24-26 October 2012

Venue: Sentrim 680 Hotel Nairobi, Kenyatta Avenue, Nairobi, Kenya

Partners: Association of Africa Universities; International Council for Science - Regional Office for Africa; International Union of Geodesy and Geophysics – Geoscience in Africa

Sponsor: ICSU, UCDI

Convener: C. Barton, Co-Convener: P. Fox

Objectives:

The workshop brought together scientists and teachers who share a common desire to improve the internet access in research and education institutions in Africa. The meeting served to

- Raise awareness about the problem of the digital divide, its impact on the development in Africa, and the benefits of internet access.
- Review the status of internet and NREN (National Research & Education Network) development in Africa – progress, plans, and problems.
- Introduce newcomers to eGYAfrica.
- Review and revise the eGYAfrica strategy and work plan.
- Provide a focus for developing national action groups.
- Strengthen the network of people with common interest in reducing the digital divide and NREN development.
- Explore collaborative arrangements with other organizations and programs committed to reducing the digital divide in Africa.
- Identify funding opportunities and patrons.

Information about eGYAfrica and the Workshop (program, participants, presentations, and more) can be found on the eGYAfrica website (<http://egy.org/egyafrika.php>). The workshop brought together 27 participants from 13 countries to review the progress in eGYAfrica and the NREN (Research and Education Network) development in Africa, to introduce newcomers to eGYAfrica, to prepare a work plan for the next period (approximately two years), and to expand the network of national eGYAfrica groups. The number of national eGYAfrica groups has expanded from five to twelve as a result of the Workshop. Given the rapid increase in Internet capability in Africa following the installation of undersea fibre-optic cables linking Africa to the rest of the world, the need for eGYAfrica was examined. The unanimous view was that eGYAfrica is still very much needed and provides a valuable mechanism for staff in research and education institutions to voice their concerns about their Internet needs. The comprehensive range of presentations by delegates forms an excellent statement about the status of Internet developments in various parts of Africa. Sharing of such information is emerging as a useful role for eGYAfrica. For the first time, the scope of the Workshop was expanded to include secondary schools. This proved successful. Some secondary schools have better internet access than universities. New officers were appointed to serve for the next term.

Scientific sessions at EGU and AGU

During the last year, UCDI was present in two international conferences organizing sessions and promoting the work and aims of UCDI. The sessions were really successful with very interesting talks and discussion time:

- UCDI Session in EGU 2012 “Data Science/Informatics and Data Assimilation in Geosciences” (Convener: A. Geyer, Co-Convener: P. Fox)
- UCDI Session in AGU 2012 “Data Science/Informatics and Data Assimilation in Geosciences” (Convener: A. Geyer, Co-Convener: P. Fox)

2012 Science Project Developments

The Geophysical Center of the Russian Academy of Sciences in cooperation with IAGA submitted an application for an IUGG Grant for 2013. The project deals with the extension of INTERMAGNET Russian segment and the improvement of the Russian-Ukrainian geomagnetic data center operation. Such an activity fits quite well to the UCDI objectives and therefore we decided to indicate the UCDI as a supporting IUGG Commission.

2012 World Data System Participation

Ruth Neilan continues as an active member of the World Data System Scientific Committee. The volume from the first conference was released in January 2013, and is available from the Data Science Journal website. Many people from IUGG attended and contributed to this meeting.

2012 CODATA Meeting and General Assembly

UCDI/IUGG representative Anatoly Soloviev – IUGG delegate to the Assembly (also vice-chair of CODATA Task Group on "Earth and Space Science Data Interoperability") attended the meeting. His report can be found in this Annual Report (p. 38).

FUTURE ACTIVITIES

2013 Association Meetings

- IAVCEI Assembly special session (Geyer-Traver convener)

2013 Activities

- Executive committee meetings at the EGU General Assembly in Vienna, Austria, and the AGU Fall Meeting in San Francisco, California, USA.
- Planning for a 2014 Commission (UCDI) Assembly.
- Continued eGY Africa activities.
- Further Association meeting sessions are being planned.

Submitted by
Peter Fox, UCDI Chair

Commission on Geophysical Risk and Sustainability (GRC)

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

INTRODUCTION

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. This includes the integration of knowledge concerning environmental, social and economic processes. The fundamental scope of this Commission is to facilitate communications – between scientists via meetings, workshops and publications, as well as between scientists and decision makers, between scientists and the public, and between scientists and schools.

ADMINISTRATION

Membership

There were some minor changes to the membership list with John Labrecque replacing David Jackson as Vice-Chair and Ramesh Singh being elected as an Honorary Member. The current membership list is summarized below. Note that Paula Dunbar remains as Treasurer despite having completed two terms in this role. This is because a new Treasurer could not be found, despite the best efforts of the Executive Committee (EC). Ms Dunbar has agreed to remain in the role until a new Treasurer can be found.

Kuniyoshi Takeuchi	IAHS	Chair
Vladimir Kossobokov	IASPEI	Vice-Chair
John Labrecque	IAG	Vice-Chair
Diana Greenslade	IAPSO	Secretary
Paula Dunbar	IAPSO	Treasurer
Alik Ismail-Zadeh	IASPEI	Past Chair, Honorary Member
David Jackson	IASPEI	EC Member
David Boteler	IAGA	EC Member
Joan Marti	IAVCEI	EC Member
Servando de la Cruz Reina	IAVCEI	EC Member
Alan Thomson	IAGA	EC Member
Gerd Tetzlaff	IAMAS	Member
Hermann Drewes	IAG	Member
A. Jayawardena	IAHS	Member
Yevgeniy Kontar	IAPSO	Member
Susan McLean	IAGA	Member
Kosuke Heki	IAG	Member
Steve McNutt	IAVCEI	Member
Martin Funk	IACS	Member
Tom Beer	IAMAS	Honorary Member
Ramesh Singh	IASPEI	Honorary Member
Harsh Gupta	IASPEI	Advisory Board Member
Viacheslav Gusiakov	IAPSO	Advisory Board Member
Uri Shamir	IAHS	Advisory Board Member
Gordon McBean		Advisory Board Member

Business meetings

A Business meeting of the Commission was held at Sandhu Conference Center, Chapman University, Orange, California, USA on 10 December 2012. Eight members were present, including four members of the Executive Committee. Minutes of this meeting can be found on the Commission's website at <http://www.iugg-georisk.org/>

ACTIVITIES

First IUGG GRC conference

The First IUGG GRC Conference on "Extreme Natural Hazards and Their Impacts" was held from 8-11 December 2012 at the Chapman University, Orange, California, USA. The conference was co-sponsored by IUGG, IAHS, NASA, AGU, GEO, IRDR and Chapman University, and Professor Ramesh Singh of Chapman University was the Chairman of the Local Organizing Committee. The conference included a special FORIN seminar, co-sponsored by IUGG and the Integrated Research on Disaster Risk (IRDR) Programme of ICSU-ISSC-UNISDR. A total of 87 abstracts were received from 28 countries, from which 47 were selected to be presented in plenary as oral presentations. The conference included a panel discussion on the topic "Disaster Risks: Communication between Science and Society". Panelists were Salvano Briceno (Former Director, UNISDR; Chair, IRDR), Susan Hough (USGS), Kuniushi Takeuchi (Director, ICHARM) and Gezahegn Yirgu (Addis Ababa University, Ethiopia) and the discussion was moderated by Alik Ismail-Zadeh (Secretary General, IUGG).

Website

A mock-up of a new design for the GRC website has been produced and work is underway to transfer existing content to the new format.

FUTURE ACTIVITIES

Based on the success of the First IUGG GRC Conference on "Extreme Natural Hazards and Their Impacts", there was strong enthusiasm for a second GRC Conference, to be held in approximately two years. A request for proposals for hosting the next GRC conference will be announced.

Submitted by
Diana Greenslade, GRC Secretary

Commission on Mathematical Geophysics (CMG)

<http://www.iugg.org/about/commissions/cmg.php>

INTRODUCTION

The Commission on Mathematical Geophysics is a Union Commission of IUGG. Its aims to encourage exchange of ideas and information in all areas of geophysics, with emphasis on the application of mathematics, statistics and computer science to geophysical problems, and to promote the development and application of mathematical methods and appropriate theoretical techniques for the solution of problems across the complete spectrum of geophysical disciplines. The Committee is sponsored by all IUGG Associations.

The earliest incarnation of the present CMG Committee was as the Working Group on Geophysical Theory and Computers (WGGTC), which was founded by Vladimir Keilis-Borok. The first meeting of the WGGTC was held in Moscow and Leningrad in 1964 and the last in Moscow in 1971 with intervening meetings held once yearly. Subsequent to 1971 the group was re-structured as the present Committee on Mathematical Geophysics, which has met on a semi-annual basis since that time, beginning with a meeting in Banff (Canada) in 1972.

The schedule since 1986 has included the following sequence of major CMG sponsored conferences: Oosterbeek (The Netherlands, 1986), Blanes (Spain, 1988), Jerusalem (Israel, 1990), Taxco (Mexico, 1992), Villefranche (France, 1994), Santa Fe (USA, 1996), Cambridge (UK, 1998), Villefranche sur Mer (France, 2000), Torino (Italy, 2002), New York (USA, 2004), Sea of Galilee (Israel, 2006), Svalbard (Norway, 2008), Pisa (Italy, 2010), and Edinburgh (UK, 2012).

ADMINISTRATION

A meeting of the Executive Committee took place on 21 June 2012 at the University of Edinburgh, Informatics Forum, Edinburgh, UK. The meeting was attended by Yehuda Ben-Zion (President), Dan Rothman (Immediate Past President), Matthias Holschneider (rep. IAGA), Malcolm Sambridge (rep. IASPEI), Gordon Swaters (rep. IAPSO), Yulia Tchiguirinskaia (per request of Daniel Schertzer, rep. IAHS), and Ilya Zaliapin (rep. IUGG). The agenda Topics were: (i) Selecting local organizers for CMG 2014 and CMG 2016 meetings [proposals to conduct CMG2014 in Mexico and CMG2016 in Paris, France have been received]; (ii) General organization of CMG meetings; (iii) Selecting IUGG representative for the IMU-IUGG-IUTAM-ICSU MPE13 Workshop.

ACTIVITIES

The main activity organized by CMG in 2012 was the biennial Conference on Mathematical Geophysics that took place at the National Museum of Scotland in Edinburgh, UK during 18-21 June 2012. The conference participants represented institutions from 23 countries. There were 170 registered delegates, eleven invited speakers, and 50 student participants. The conference featured 70 talks across eight topical sessions (see below) and 110 posters in two sessions. A half-day field trip has been organized on the fourth day of the meeting. A business meeting of the CMG took place during the conference.

Local Organizing Committee: School of GeoSciences, University of Edinburgh

- Mark Naylor - (Conference Chair)
- Ian Main
- Andrew Curtis

Advisory Scientific Committees:

CMG members

- Yehuda Ben-Zion (CMG Chair)
- Claudia Pasquero (CMG Secretary general)
- Eli Tziperman (CMG Vice Chair)
- Daniel Rothman (Past Chair)

IUGG Representatives

- Shin-Chan Han (IAG representative)
- Matthias Holschneider (IAGA representative)
- Daniel Schertzer (IAHS representative)
- Dick Peltier (IAMAS representative)
- Gordon Swaters (IAPSO representative)
- Malcolm Sambridge (IASPEI representative)
- Augusto Neri (IAVCEI representative)

Program: The program included eight topical sessions.

1. Mathematics of planet Earth

Invited Speaker: Chris Jones, "Data Assimilation and Climate Research: do they work well together?"

Convener: Mary Lou Zeeman

2. Solving Geophysical Problems - *Monday*

Invited speakers: Malcolm Sambridge, "Geophysical inference using the wisdom of the crowd" and Finn Lindgren: "Stochastic uncertainty quantification for global climate data". Convener: Roel Snieder

3. Ocean processes: from small scale to global circulation - *Tuesday*

Invited speakers: Walter Munk, "Wind drag and ultra-gravity waves" and Carsten Eden: "Large- and mesoscale dynamics in the ocean". Convener: Henk Dijkstra (Utrecht University)

4. Earth system dynamics - *Tuesday and Wednesday*

Invited speakers: Dan Rothman, "Methanogenic Blow-up in the End-Permian Carbon Cycle" and Felix Ng "Wave structures in the firm of the Antarctic Ice Sheet". Conveners: Antonello Provenzale (Turin, Italy), Simon Mudd (Edinburgh, UK)

5. Crustal dynamics - *Thursday*

Invited speaker: Michel Campillo, "Noise, scattering and monitoring of seismic speeds in the crust".

Conveners: Yehuda Ben-Zion (University of Southern California), Andrew Bell (Edinburgh, UK)

6. Earth observation - *Thursday*

Invited speaker: Roel Snieder, "Auto focusing of waves". Convener: Andrew Curtis (Edinburgh, UK)

7. Rationalizing models with observations - *Friday*

Invited speaker: Tom Jordan, "Earthquake Forecasting: Posing the Problem and Evaluating Solutions".

Convener: Ian Main (Edinburgh, UK)

8. Mechanisms of Atmospheric-climate variability and change - *Friday*

Invited speaker: Prashant Sardeshmukh, "Random excitation of large scale atmospheric variations and extreme events". Convener: Brian Mapes (Miami, USA)

FUTURE ACTIVITIES

CMG is co-organizing a workshop on Mathematical Geophysics: “Mathematics of Climate Change, Related Hazards and Risks” from 29 July to 2 August, CIMAT, Guanajuato, Mexico. The workshop will be a part of the global program *Mathematics of the Planet Earth - 2013*.

CMG is co-organizing workshop “Dynamics of Seismicity, Earthquake Clustering and Patterns in Fault Networks” during 9-11 October 2013 as a part of global program *Mathematics of the Planet Earth 2013* at the Statistical and Applied Mathematical Sciences Institute (SAMSI), <http://www.samsi.info/>

CMG is working on organizing the next CMG biennial meetings in 2014 (Mexico) and 2016 (Paris, France).

Submitted by
Ilia Zaliapin, CMG Member Executive Committee
Yehuda Ben Zion, CMG Chair

Commission on the Study of the Earth's Deep Interior (SEDI)

<http://www.sedigroup.org>

INTRODUCTION

SEDI is an international scientific organization dedicated to the Study of the Earth's Deep Interior. The scope of SEDI includes the core and lower mantle, but interest may extend to the surface, for example, in the study of mantle plumes or dynamics of descending lithospheric slabs. The scientific questions and problems of interest to SEDI include: (i) the investigation of the origin, evolution, structure, geochemical and mineralogical composition of the inner core, outer core, mantle and crust (on a planetary scale), (ii) the investigation of core magnetohydrodynamics at all time scales, both from a theoretical point of view (dynamo theory, magnetohydrodynamic waves) and from an observational point of view (as provided by modern, historical, archeomagnetic and paleomagnetic data), and of more general fluid rotational dynamics that can affect the core (such as precessional effects and short time scale instabilities), (iii) the investigation of mantle dynamics, both from a theoretical point of view (solid state convection in the presence of complex rheology and phase transitions, role of plumes and descending slabs) and observational point of view (global 3D reconstruction of mantle convection from surface, seismological, geochemical and geodetic observations), (iv) the investigation of mechanical, electromagnetic, thermal and chemical interactions between the inner-core, core, mantle, crust and possibly outer layers on a planetary scale, particularly in view of a global understanding of the Earth as a globally interacting system, with special emphasis on investigation of interfaces (nature, shape, role), (v) The thermodynamics of the Earth and the investigation of its long-term thermal evolution.

Since 1987, SEDI has been a Union Committee of the International Union of Geodesy and Geophysics (IUGG). As such, it cuts across the traditional discipline-oriented bounds of the Associations of the IUGG [such as the International Association of Geodesy (IAG), the International Association of Geomagnetism and Aeronomy (IAGA), the International Association of Seismology and Physics of the Earth's Interior (IASPEI), and the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)] which normally study the Earth from a particular point of view. The intent of SEDI is to amalgamate all sources of data and all points of view to generate the most coherent and consistent picture of the workings of the Earth's deep interior.

ADMINISTRATION

SEDI is currently chaired by Satoru Tanaka (JAMSTEC, Japan), vice-chaired by Jonathan Aurnou (UCLA, USA), with Michael Bergman (Simon's Rock College, USA) acting as Secretary-General. It has about 600 members, as recorded on the email list used to broadcast information related to SEDI activities, upcoming meetings, funding opportunities, and academic openings.

ACTIVITIES

SEDI's main activity is the organization of a dedicated symposium every even year, and 2012 was no exception. The 13th SEDI symposium was held in University of Leeds, Leeds, UK, 1-6 July 2012. It was very successfully organized by a Local Organizing Committee led by Jon Mound (Chair), Rainer Hollerbach, Chris Jones, Phil Livermore, Sebastian Rost, and Stephen Stackhouse (University of Leeds). A website was set up and is still accessible at <http://sedi2012.leeds.ac.uk>.

About 180 participants attended the workshop, coming from twenty different countries (Australia, Belgium, Canada, China, Colombia, Czech Republic, Denmark, France, Germany, India, Iran, Ireland, Japan, Oman, Norway, Portugal, Switzerland, Turkey, UK and USA). As usual, the meeting was organized in eight sessions led by discussion leaders. This time each session involved one lead review talk and two shorter more focused talks, followed by ample time for discussion of posters and key

scientific issues. The eight sessions were: S1: Other Planets, S2: Inner Core – Structure, Dynamics & Composition, S3: Outer Core – Observations of Structure & Composition, S4: Outer Core – Modeling & Dynamics, S5: Experiments & Measurements in Deep Earth Research, S6: CMB – Structure, Dynamics & Composition, S7: Mantle – Observations of Structure & Composition, and S8: Mantle – Modeling & Dynamics.

Highlights of the meeting included the Zatman Lecture on “Stochastic core flow reconstruction over the observatory era” by Nicolas Gillet (University of Grenoble, France) and the awarding of the Doornbos Prizes for outstanding work by a beginning scientist to:

- Renaud Deguen (Johns Hopkins University, USA), for his particularly innovative contributions to understanding the dynamics and evolution of the inner core and its interactions with the surrounding fluid; and
- Chris Finlay (Technical University of Denmark, Denmark), for theoretical and applied contributions to understanding the nature and source of the geodynamo secular variation, and unselfish cooperation in research.

The proceedings of the 2012 SEDI meeting are now under review, and will be published in a special issue of *Physics of the Earth and Planetary Interiors*, edited by Chris Jones (University of Leeds, UK).

FUTURE ACTIVITIES

A business meeting was also held and attended by most of the participants. After some presentations, discussions and votes, it was agreed that the next (14th) SEDI workshop will be held in Japan, 3-8 August 2014.

Submitted by
Satoru Tanaka, SEDI Chair
Jonathan Aurnou, SEDI Vice-Chair
Michael Bergman, SEDI Secretary-General

Inter-Associations (IAGA/IASPEI/IAVCEI) Working Group on Electromagnetic Studies on Earthquakes and Volcanoes (EMSEV)

<http://www.emsev-iugg.org/emsev/>

INTRODUCTION

The Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV) focuses on the development of new research activities related to the physics of the Earth, volcanic and eruptive processes, electromagnetic (EM) and other geophysical phenomena related to dynamic processes leading to faults rupture and volcanic eruptions. EMSEV has about 290 members from IAGA, IAVCEI, and IASPEI. EMSEV's objectives are (i) the evaluation and the promotion of advanced studies in the electromagnetic field through international conferences, regional workshops, and peer-reviewed international publications, (ii) to actively contribute to the expansion of electromagnetic methods related to the study of earthquakes and volcanic eruptions, (iii) to organize international and regional workshops, and sessions at international meetings, and (iv) to participate in local educational programs.

ADMINISTRATION

The 15th business meeting was held during the last international EMSEV meeting in Gotemba, Japan on 3 October 2012. During the business meeting, it was decided to enlarge the EMSEV expertise by including new related fields of research. A new body, called *EMSEV collaborators*, was defined. This body is intended to include active scientists working on Natural Hazards of any field who are interested in broader geophysical knowledge. These collaborators are interested in participating in EMSEV activities, and contribute to the analysis of physical processes from their different perspectives. Therefore, EMSEV is now composed of an elected executive bureau, a nominated assembly of members and collaborators, and the community interested in electromagnetic phenomena, called corresponding members.

The bureau gathers twelve active researchers: J. Zlotnicki (Chair), M. J. S. Johnston (Vice Chair), and T. Nagao (Secretary). IAGA, IAVCEI, and IASPEI liaison members are J. Y. Liu, Y. Sasai, and M.J.S. Johnston, respectively, while IAGA WG1-2 corresponding liaison member is T. Harinarayana. Q. Huang (China), V. Lapenna (Italy), A. Meloni (Italy), V. Korepanov (Ukraine), and R. Singh (India-USA) are also bureau members. S. Uyeda is Past Chair of EMSEV.

The WG members are nominated (normally at EMSEV business meetings) for their expertise and scientific activity in the EM field or in related research fields. At this point, we have 32 working group members from 16 countries (China, France, Greece, India, Indonesia, Italy, Japan, Kyrgyzstan, Philippines, Poland, Romania, Russia, Taiwan, Turkey, Ukraine, and USA). The number of corresponding members exceeds 290. During the last business meeting, it was decided to organize the next EMSEV meeting in Europe in September 2014. Jan Blecki from Poland will be the chair of the organization committee. Annual reports, minutes of the business meetings and activities on the Working Group can be found on the EMSEV website (<http://www.emsev-iugg.org/emsev/>).

ACTIVITIES

In 2012, EMSEV was involved in several important international meetings and continued to support international cooperative studies.

EMSEV members organized sessions in the following international meetings:

- EGU General Assembly, Vienna, Austria, 22-27 April 2012 (3 sessions).
- ESC2012, 33rd General Assembly, Moscow, Russia, 19-24 August 2012.
- AOGS AGU (WPGM) Joint Assembly, Singapore, Singapore, 13-17 August 2012.
- AGU Fall Meeting, San Francisco, California, USA.
- IUGG GRC Conference, Extreme Natural Hazards and Their Impacts, Orange, California, USA.

The 2012 international EMSEV meeting took place from 30 September to 3 October 2012 and was organized and hosted by Tokai University in Gotemba, Japan, in a close vicinity of the 3,776 m high and active volcano Mount Fuji-yama. This meeting was supported by IAGA, IASPEI, and IAVCEI. More than 75 participants from 13 countries, including 10 early-career scientists, presented their latest results at both, plenary, oral and poster sessions over three days. Papers were organized within five different sessions, (i) Electric, magnetic, and electromagnetic phenomena associated with active processes: earthquakes, tsunamis, volcanoes, active fault movements, landslides, and geothermal activities, (ii) Electromagnetic imaging based on land and space monitoring techniques, (iii) Pre-seismic, co-seismic and post-seismic phenomena related to the Lithosphere-Atmosphere-Ionosphere Coupling using multi-parametric observations to ensure reliable interpretation, (iv) Generation mechanisms of electromagnetic signals related to active processes: Theoretical and laboratory studies, and (v) Seismic, Geodetic and Electromagnetic studies related to the off Tohoku M9 Earthquake and tsunami on 11 March 2011.

EMSEV activity on volcanoes

In Volcanology, EMSEV formed a cooperative program with The Philippines Institute of Volcanology and Seismology (PHIVOLCS), on Taal Volcano in November 2004 (<http://www.phivolcs.dost.gov.ph/>). At present, this international cooperation involves teams from Japan, France, USA, Greece, Italy, and Belgium. A report on the state of the cooperation, discussions of problems and the latest results were presented during the EMSEV 2012 meeting. It was pointed out that EMSEV has a primary responsibility to help PHIVOLCS to monitor the volcano. Field trips were conducted in February and March 2012 by groups from France, USA, and Japan with the collaboration from PHIVOLCS. In addition, new joint field work took place in December 2012 to repair and upgrade the telemeter network. During this time a new seismic crisis started on the volcano. The EMSEV project on Taal Volcano which now involves many teams from the international community in cooperation with PHIVOLCS clearly shows its effectiveness.

EMSEV activity related to Earthquake Processes

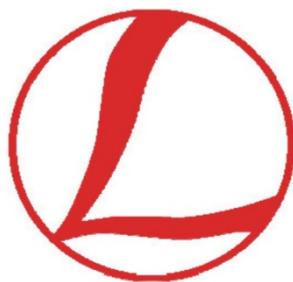
In 2011, the EMSEV working group started a new cooperative research program with the Bishkek Research Station of the Russian Academy of Sciences in Kyrgyzstan. In November 2011, teams from Japan, France and Greece visited the Bishkek Research Station. Later Japanese and French colleagues installed EM stations in the region. Joint data processing systems were implemented. A cooperative agreement between EMSEV and the Bishkek Research Station was signed during the first meeting. This agreement states: "The purpose of this Agreement is to provide scientific and technical interaction between the two sides during collaborative research on active faults and physical processes generating earthquakes in Central Asia, to promote new investigations with electromagnetic and other geophysical methods, and to enhance data processing and analyses. The Agreement will promote the development of scientific relations between participants for solving fundamental problems on the generation of earthquakes and ways to monitor and mitigate them along different active faults of Central Asian continental lithosphere". The Agreement is valid for a four-year period starting from November 2011. The first data issued from the collaboration was shown at the 2012 EMSEV meeting

and it was clear that the signal-to-noise ratio is good. The Japanese recording system recorded 170 GB of EM data in six months.

FUTURE ACTIVITIES (PLANNED)

In 2013, EMSEV will be involved in international meetings organized by EGU, AOGS, IAVCEI, IAGA, IASPEI, and AGU. In parallel, EMSEV will continue the collaboration in Philippines and Kyrgyzstan.

Submitted by
Jacques Zlotnicki, EMSEV Chair



THE INTER-UNIONS COMMISSION: International Lithosphere Program (ILP)

<http://sclilp.gfz-potsdam.de>

INTRODUCTION

The International Lithosphere Program (ILP) seeks to elucidate the nature, dynamics, origin and evolution of the lithosphere through international, multidisciplinary geoscience research projects and coordinating committees. The ILP is charged with promoting multidisciplinary research projects of interest to both the geological and geophysical communities. The ILP seeks to achieve a fine balance between: “addressing societal needs”, e.g., understanding natural catastrophes and other solid earth processes that affect the biosphere, providing information for improved resource exploration and environmental protection; and “satisfying scientific curiosity”. The ILP was established in 1980 by the International Council of Scientific Unions (ICSU) at the request of the International Union of Geological Sciences (IUGS) and the International Union of Geodesy and Geophysics (IUGG). According to the Terms of Reference published in 2008 and renewed in 2011, ILP is a body of IUGG and IUGS. ILP cooperates with IUGS and IUGG on the follow-up initiatives to the International Year of Planet Earth (IYPE); the ILP President was a member of the board of IYPE Corporation. In this context ILP was leading the IYPE theme Deep Earth, published in a special brochure and, in addition, is financially supporting IYPE. Now ILP takes again part in the forefront of development of new solid earth initiatives in research and its disseminations.

ADMINISTRATION

ILP has an international Bureau with members from several countries that meet annually to monitor the progress and to select new research programs and activities in close consultation with the representatives of National Committees. The Bureau is chaired by the President with support from the Secretary General.

The Bureau was restructured during the Bureau meeting in Vienna on 20 April 2009. Victoria L. Pease was elected as the new chairperson for the National Committees. During the Bureau meeting 2010 in Vienna, Austria, Sierd Cloetingh was re-elected as President and Prof. Hans Thybo was nominated as a new associate Bureau member.

Bureau Members

According to the ILP Terms of Reference (clause 12), “the ILP is administered by a Bureau of seven members. These include the President and the Secretary General, who are named by agreement between IUGG and IUGS; two members appointed by IUGG; two appointed by IUGS; and one member appointed jointly by IUGG and IUGS. At least one Bureau member will normally represent a developing country. The Past President may attend meetings with voice but without vote. In addition, the National Members may elect a representative invited to attend ILP Bureau meetings with voice but without vote, although they may choose to elect a regular member of the Bureau to represent their interests.”

The 2012 ILP Bureau membership is presented below:

President:	S. Cloetingh	The Netherlands
Secretary General	R. Oberhänsli (till Oct. 2012)	Germany
	M. Scheck-Wenderoth (since Nov. 2012)	Germany
Representative of IUGG	D. Jackson	USA
Representative of IUGG	K. C. Sain	India
Representative of IUGS	J. Charvet	France
Representative of IUGS	Y. Tatsumi	Japan
Joint Representative of IUGG and IUGS	A. Green	Switzerland
Chairperson – Committee of National Representatives:	V.L. Pease	Sweden

The ILP Secretariat is located at the GFZ German Research Centre for Geosciences in Potsdam, Germany and is headed by the Executive Secretary A. Rudloff (Germany).

ILP has several types of membership: Associate, Lifetime, and Honorary.

Associate Members:	J.-P. Burg	Switzerland
	H. Thybo	Denmark
	A. Morozov	Russia
	F. Roure	France
	M. Zoback	USA
	P. McKeever	UNESCO
Lifetime Members:	P. Ziegler	Switzerland
	M. von Knorring	Sweden
	H. Gupta	India
Honorary President	A. Green	Switzerland
ILP Fellow	J.F.W. Negendank	Germany

Bureau meeting of ILP, Vienna, Austria, 23 April 2012

The annual bureau meeting was held on the occasion of the EGU General Assembly. The minutes were distributed among the Bureau Members and are available on request.

IUGS Executive Committee (EC) meeting in Brisbane, Australia, 26 June-7 July 2012

The Secretary General of ILP attended the IUGS meetings held during the 34th IGC congress in Brisbane, Australia, and gave the report on ILP to the assembly: Roland Oberhänsli gave a short overview on the scientific achievements of ILP based on the above mentioned statements. The report was well accepted and besides the IUGS EC many delegates expressed their support for ILP and acknowledged its high visibility and strong scientific standing.

Roland Oberhänsli was nominated as candidate for IUGS presidency by many European countries and from the Middle East to allow for open elections. He was elected President of IUGS in Brisbane and left his position as SG in October 2012. By that time IUGS and IUGG accepted ILP proposition to appoint Magdalena Scheck-Wenderoth as new SG.

ACTIVITIES

In 2012, a large number of activities were organized under the auspices of ILP. The full reports of the Task Forces are available on request. ILP members organized and contributed to sessions at the EGU General Assembly in Vienna, Austria, in April 2012, at the 34th International Geological Congress 2012 in Brisbane, Australia, at the AGU Fall Meeting 2012 in San Francisco, USA, and to a number of other international workshops and conferences.

Task Forces & Coordinating Committees in the realm of major ILP themes:

I. Geoscience of global change

- TF 3: Bridging the gap from microseismicity to large earthquakes
- TF 10: The Unconventionals

II. Contemporary dynamics and deep processes

- TF 4: Continental Collisional Orogens: from Atomic Scales to Mountain Building
- TF 8: Tracking supercells through Earth history
- TF 9: DISC - Deep Into the Subduction Channel

III. Continental lithosphere

- TF 1: CALE - Circum Arctic Lithosphere Evolution
- TF 2: Volcanoes and society: environment, health and public outreach
- TF 3: Bridging the gap from microseismicity to large earthquakes
- TF 4: Continental Collisional Orogens: from Atomic Scales to Mountain Buildings
- TF 5: LAPBOX - The lithosphere-asthenosphere boundary depth paradox
- TF 6: Sedimentary Basins
- TF 7: 3D Geomechanical modelling of geodynamic processes in the lithosphere

IV. Oceanic lithosphere

- TF 1: CALE - Circum Arctic Lithosphere Evolution

Coordinating Committees

- TOPO-EUROPE
- TOPO-Central Asia
- DynaClim
- MEDYNA - Mantle Dynamics and Plate Architecture Beneath North Africa

EGU General Assembly, Vienna, Austria, April 2012

Several Task Forces organized sessions and special symposia:

- TF 1: Session and Keynote at EGU “Arctic Lithosphere”.
- TF 2: Sessions: “Volcanoes: Tectonics, Deformation, Geodesy”, “Physics and dynamics of magma ascent, emplacement, eruption and deposition in volcanic systems”.
- TF 5: “The lithosphere-asthenosphere boundary (LAB) depth paradox”.
- TF 6: “Basin Dynamics”.
- CC 1 TOPO-EUROPE: Union Symposium and ST/GM Session TOPO-EUROPE.
- CC MEDYNA: “Geodynamics of the Westernmost Mediterranean and Northwest Africa”.

Moreover, presentations of members of TF III, VII, CC TOPO-CENTRAL-ASIA were given in several sessions.

34th International Geological Congress, Brisbane, Australia, August, 2012

TF 6 has co-organized Theme 14 “Basin Formation and Continental Margin Processes” with around 140 in four sub-sessions.

AGU Fall Meeting, San Francisco, USA, December 2012

- TF 1: Session “Arctic Tectonics: From Basins to Mountain Belts”.
- TF 2: Sessions “Geoscientists in Geoheritage Sites”, “Calderas: Collapse Dynamics, Unrest and Resources Understanding Caldera Structure and Development II”, “Experimental Modeling of Volcanic and Magmatic Processes II”.
- TF 4: “From Deep to Shallow: Elemental Cycling Through UHP Metamorphism and Serpentinization I, II, III”.
- Other task forces present: CC TOPO-CENTRAL-ASIA, CC MEDYNA.

SESEH 2012 Sino-European Symposium on Environment and Health, Galway, Ireland, August 2012

- TF 2: Session 3 “Advanced Medical Mineralogy”.
- Session 6 “Advanced Medical Mineralogy Short Course”.

ILP TF members organized sessions at the following meetings:

- Annual meeting of the Seismological Society of America, San Diego, California, USA, April 2012.
- ECGS workshop on Earthquake Source physics on various scales, Luxembourg, Luxembourg, October 2012.
- Kashiwazaki Symposium on Seismic Monitoring of Nuclear Power Plants, Kashiwazaki, Japan.
- Geological Society of America Annual Meeting, Charlotte, NC, USA, November 2012.
- CC TOPO-EUROPE Young Scientists workshops, Bratislava, Slovak Republic; Utrecht, The Netherlands; Istanbul, Turkey.
- 3rd International Geoquas Workshop, Potsdam, Germany, August 2012.
- GEISER Workshop on Induced Seismicity, June 2012.
- 9th International Inkaba yeAfrica Workshop, Potsdam, Germany, November 2012.
- Workshop on Craton formation and destruction with special emphasis on BRICS Cratons, Johannesburg, South Africa, July 2012.
- Helmholtz Alberta Initiative – 3rd HAI workshop, Edmonton, Canada, May 2012.
- 4th BBSPA Kiev Upstream & Investments Workshop, Kiev, Ukraine, November 2012.
- AAPG GTW, Warsaw, Poland, May 2012.
- AAPG Hedberg Research Conference, Petroleum Systems: Modeling the Past, Planning the Future, Nice, France, October 2012.
- Bulgarian Energy Forum, Sofia, Bulgaria, December 2012.
- EAGE-European Unconventional Resources Conference & Exhibition, Vienna, Austria, March 2012.
- GEO2012, Middle East Geoscience Conference and Exhibition, Sanabis, Bahrain, March 2012.
- Geofluids Conference, Rueil-Malmaison, France, June 2012.
- Gordon Conference on Organic Geochemistry, Holderness, New Hampshire, USA, July 2012.
- IGEM Shale Gas Conference, Durham, UK, March 2012.
- International Conference GeoEnergy, Potsdam, Germany, October 2012.
- International Risk Governance Council Workshop, Zurich, Switzerland, November 2012.
- Meeting Scientific Committee for Sinopec Key Laboratory, Wuxi, China, April 2012.

- Reserve Estimation for Unconventional Resources, London, UK, February 2012.
- Shale Gas Environmental Summit, London, UK, October 2012.
- Shale Gas Workshop, Port Elizabeth, South Africa, February 2012
- Statoil Research Summit, Trondheim, Norway, April 2012.
- UGOS Unconventional Gas & Oil Summit, Warsaw, Poland, March 2012.
- UK Shale Gas Summit, London, UK, September 2012.
- World Shale Gas Asia, Singapore, Singapore, July 2012.

FUTURE ACTIVITIES

- IUGS EC Meeting Paris, 19-22 February 2013.
- Publications in *EOS*, *Episodes* and *Earth Science Reviews* are in preparation.
- Advertising for new support by national science foundations and the industry.
- Several sessions with TF and CC contributions at EGU General Assembly 2013, Vienna, Austria.
- Several workshops of individual task forces.
- ILP Bureau meeting during the EGU General Assembly in Vienna, Austria, 8 April 2013.

Submitted by
Sierd Cloetingh, ILP President
Magdalena Scheck-Wenderoth, ILP Secretary General
Alexander Rudloff, ILP Executive Secretary

IUGG FINANCIAL REPORT

INTRODUCTION

This report describes in the status of the IUGG finances for the year 2012, the first year of the IUGG quadrennium 2012-15. A final version of the report with more details will be sent to the Finance Committee and the Bureau. It will be included as background material for the Bureau meeting in Prague, Czech Republic in September 2013.

The 2012 budget was approved at the Council meeting in Melbourne, Australia, in July 2011. The price of 1 unit in 2012 increased to \$1,815 as compared to \$1,750 in 2011.

By the end of 2012 IUGG had 70 members representing 283 units. 7 members are Associate members. In 2012 Saudi Arabia was admitted as a new member.

On pages 95 and 96 one can see more details about memberships.

The membership dues are the economical basis for the activities of IUGG. Right now, the situation is stable (a relative large sum of money has accumulated over a longer period of time). At the Melbourne GA in 2011, the Council approved a budget spending a significant part of this surplus during 2012-2015.

However, there is an ongoing debate on the value for money regarding the memberships in scientific organizations like the IUGG. Therefore, IUGG must continue to focus on the membership issue in future.

The accounting is a cash flow system. Therefore, the 4-year accounting for the full budget period gives a more precise description of the financial status of the union than the individual accountings year by year.

The accounts of the treasurer's office are audited by a chartered auditor.

A student assists me with the keeping order in my files, writing letters etc. Since 2007 I have not had an Assistant Treasurer.

Content:

1. The summary of the IUGG accounts in US dollars for 2012 page 91
2. An overview of IUGG grants and allocations page 94
3. Membership information and statistics page 95

1) THE SUMMARY OF THE IUGG ACCOUNTS IN US DOLLARS FOR 2012

The balance of the IUGG accounting is now of the same size or bigger than one year's turnover.



SUMMARY OF IUGG ACCOUNTS 2012

US dollars	Accounts	Budget
RECEIPTS		
1. Membership Subscription	429.172,36	495.000,00
2. ICSU Grants	25.706,94	30.000,00
3. Assembly Surcharge	0,00	0,00
4. Sales of Publications	0,00	200,00
5. Miscellaneous		
a. Interest	0,00	12.500,00
b. Gain on exchange	8.361,41	
c. Other	0,00	
d. Associations, surcharge	0,00	
6. Total Receipts	463.240,71	537.700,00
7. Balance on 1/1 2012	876.640,50	766.600,00
8. Check Sum	1.339.881,21	1.304.300,00
EXPENDITURES		
11. Administration		
11.1 Personnel	18.085,56	20.000,00
11.2 Equipment	0,00	5.000,00
11.3 Supplies	0,00	5.000,00
11.4 Communications	12.496,85	8.000,00
11.5 Travel, Administration only	43.757,45	50.000,00
11.6 Miscellaneous	242,29	1.000,00
11.6a ENHANS	0,00	0,00
11.6b Associations, surcharge	58.384,09	0,00
11.7 Travel, representation	25,92	15.000,00
12. New initiatives		
12.1 Education and outreach	20.000,00	30.000,00
12.2 Science	57.000,00	30.000,00
13. General Assemblies		
13.1 Organization	0,00	0,00
13.2 Travel	0,00	0,00
14. Symposia	29.960,15	30.000,00
15. Annual allocations		
15.1 Annual allocations	181.463,87	240.600,00
16. Dues and Grants		
16.1 ICSU (new dues system in 2012)	24.935,73	25.000,00
17. ICSU grants		
17.1 eGY-Africa	7.879,16	30.000,00
18. Union activities		
18.1 GRC, SEDI, CMG, UCDI	24.000,00	18.000,00
18.2 Inter-Union Science (ILP)	15.000,00	15.000,00
18.3 Liaison Officers	13.289,20	30.000,00
18.4 International Scientific Programs	0,00	25.000,00
18.5 New commissions	0,00	5.000,00
19. Contries in need		
19.1 Travel Grants, General Assemblies	0,00	0,00
20. Fees		
20.1 Professional services	0,00	5.000,00
20.2 Bank fees	2.332,12	3.000,00
21. Contingencies	0,00	5.000,00
22. Loss on exchange	0,00	
23. Total Expenditures	508.852,39	595.600,00
24. Balance on 31/12 2012	831.028,81	708.700,00
25. Check sum	1.339.881,20	1.304.300,00
Check sum balance	0,00	

March 15, 2013

Aksel Walloe Hansen

USD/DKK	
Exchange rates: Line 8	5,76 =DEC 31, 2011
Line 22	5,62 =DEC 31, 2012
Other:	5,79
USD/EUR	
Line 8	0,77 =DEC 31, 2011
Line 22	0,75 =DEC 31, 2012
Other:	0,78

The summary of the IUGG accounts is in USD. It is the sum of three different accounts in USD, EUR and DKK with Danske Bank. In addition, IUGG also has a Mastercard account which is typically used for travelling. Since 2008 the EUR account allows European members to pay their dues directly in EUR and IUGG to do relevant transfers in EUR (several Associations have accounts in EUR).

NOTES - RECEIPTS

1, Membership subscription

Right now (March 25, 2013) IUGG has received payments equivalent to a total of 260 units for 2012. The total number of units was 285 for the year 2012. The amount paid in 2012 is slightly lower than anticipated in the budget.

2, ICSU grants

An ICSU grant was paid to IUGG in 2012, but only a small part was spent in 2012. The remaining part is expected to be spent in 2013. This line should be compared to line 17.1, eGY-Africa.

5.a, Interest

No interest was paid in 2012.

5.b, Gain on exchange

This line together with the corresponding line 22 is used to balance the accounts. In 2012 there was a significant gain on currency exchange rates. In 2011 there was a loss on exchange rates. The reason for this were large fluctuations in the exchange rates during the years.

NOTES – EXPENDITURES

11.1, Personnel

In 2012 IUGG paid a web master, based in Moscow, Russia, and a student assistant in Copenhagen, Denmark.

11.6b, Associations, surcharge

Every participant attending a General Assembly is paying a surcharge to their Association. The money was transferred to IUGG in 2011, but the major part was paid to the Associations in 2012.

12.2, Science

Two grants approved for 2012 have not been fully paid by the end of the year. The money will be paid in 2013.

15.1, Annual allocations to Associations

Only six Associations received their allocations for 2012. The money is installed when the financial report for the previous year is received. At the time of writing, one more Association received its allocation. One case is still pending.

The distribution percentages and the allocations used in 2012-2015 are shown here:

	%	2012
IACS	9,55	\$25,237
IAG	12,02	\$31,764
IAGA	16,46	\$43,497
IAHS	11,86	\$31,341
IAMAS	16,20	\$42,810
IAPSO	10,75	\$28,408
IASPEI	13,61	\$35,965
IAVCEI	9,55	<u>\$25,237</u>
		\$264,259

The IUGG contribution to WCRP used to be accounted for under this line, as an inter-association activity. As of 2012 it was put under line 18.4 “International Scientific Programs”. In 2012, however, the Bureau decided to put the IUGG contribution on hold.

The old inter-association support of EMSEV is now changed to an activity paid by only three Associations.

16.1, ICSU

In 2012, ICSU introduced a new financial system. IUGG is now paying dues to ICSU in band A category (the highest category).

17.1, eGY Africa

This project has been delayed and the remaining part of the grant money from ICSU is expected to be spent in 2013.

18.3, Liaison Officers

Liaison officer’s travel expenses were significantly smaller than expected in the budget.

18.4, International Scientific Programs

FAGS did not receive its annual allocation in 2012, just as in 2009-11. A new structure replaced the old one in 2009. There is still some uncertainty to which organization this money should be paid to.

2) AN OVERVIEW OF IUGG GRANTS AND ALLOCATIONS

IUGG is supporting science in different ways:

- i) Annual allocation to Associations, line 15 (see comments on page 92)
- ii) New initiatives, line 12
- iii) Smaller scientific meetings, line 14
- iv) Union activities, line 18

Here follow some main figures for the amounts allocated in 2012:

i) line 15.1 (2012 figures)		\$ 264,259
ii) Line 12 (new initiatives)		
5 grants were awarded for 2012-2013		
Total		\$ 80,000
iii) Line 14 (IUGG 2011 Symposia grants)		
12 grants were paid to association meetings		
Total		\$ 30,000
iv) Lines 18.1, 18.2 (Union Activities)		
18.1 GRC, SEDI, CMG	\$ 24.000	
18.2 ILP	\$ 15.000	
Total		\$ 39,000

3) SOME MEMBERSHIP INFORMATION AND STATISTICS

At the time of writing (March 25, 2013) IUGG has 70 members representing 283 units. Saudi Arabia is the latest member, being admitted in 2012. Seven members are in associate status and 16 paying members are in observer status.

The 16 members in observer status are:

In category 1

Ghana (2. year as observer)
Morocco (3. year as observer)
D.R. Congo (2. year as observer)
Monaco (2. year as observer)
Bulgaria (2. year as observer)
Iran (2. year as observer)
Romania (2. year as observer)
Vietnam (1. year as observer)
Macedonia (1. year as observer)
Indonesia (1. year as observer)
Colombia (1. year as observer)

In category 2

Nigeria (1. year as observer)
Pakistan (1. year as observer)

In category 3

Argentina (1. year as observer)
Greece (3. year as observer)
Philippines (3. year as observer)

In addition, another three members started 2010 as observers, but all of them have now paid their dues for 2012.

The 16 observer countries together represent 24 units (and a debt of US\$ 73,095 in total).

Both, Albania and Armenia are moved to A-membership with effect in 2013.

Morocco, D.R. Congo and Ghana are treated as an observer, because they did not pay dues in 2009-2011. The dues were paid by the Royal Society, UK for a period of 2-3 years. The future of their membership is uncertain. Recently, D.R. Congo approached IUGG in order to normalize the relationship to IUGG requesting an invoice.

Bosnia-Herzegovina and Monaco have informed IUGG that they want to terminate their membership of the union. Attempts are made to find a solution.

ADDITIONAL UNION MATTERS

Awards and Honors

In 2012, the American Geophysical Union (AGU) elected new Fellows. Among the Fellows elected this year, there are the following IUGG experts: **Michael Flasar** (NASA Goddard Space Flight Center, Greenbelt, Maryland, USA), Member of the IAMAS International Commission on Planetary Atmospheres and their Evolution (ICPAE); **Stephen Self** (U.S. Nuclear Regulatory Commission, Washington, D.C., USA), IAVCEI Vice President. Dr. Self was invited by the IUGG President to deliver a Union lecture at the XXV General Assembly in Melbourne, Australia, 2011; and **Thomas Stocker** (Physics Institute, University of Bern, Bern, Switzerland), Member of the Swiss National Committee for Geodesy and Geophysics.

The following members of the IUGG family were awarded Medals of the European Geosciences Union (EGU): **Vincent Courtillot**, former Member of the French National Committee for Geodesy and Geophysics, was awarded the 2012 Arthur Holmes Medal and Honorary membership of the EGU for his seminal contributions to geomagnetism and the geodynamics of mantle hotspots. **Peter Fox**, Chair of the IUGG Union Commission for Data and Information (UCDI), was awarded the 2012 Ian McHarg Medal of the EGU Earth and Space Science Informatics Division for his contribution to recognizing the fundamental importance of establishing informatics as a genuine discipline within the Earth Sciences.

For 2013 the following EGU medalists members were selected: **Harry Bryden** (Member of the IUGG Honours & Recognition Committee and members of the U.K. National Committee for Geodesy and Geophysics) to receive the 2013 Fridtjof Nansen Medal, for his distinguished research in oceanography; **John Burrows** (President of the Atmospheric Chemistry and Global Pollution, IAMAS/IUGG) to receive the 2013 Vilhelm Bjerknes Medal for his distinguished research in atmospheric sciences; and **Sierd Cloetingh** (President of the International Lithosphere Program) to receive the 2013 Arthur Holmes Medal for his exceptional international standing in Solid Earth Geosciences.

Ian Allison, IACS President, was awarded the 2012 SCAR Medal for International Scientific Coordination. “Dr. Ian Allison has been working in the area of Antarctic cryosphere for more than 40 years and participated in or led 25 research expeditions to the Antarctic.

Tom Beer, IUGG Immediate Past President, was selected to deliver an Axford Distinguished Lecture at the AOGS Assembly in Brisbane, Australia in 2013.

Anny Cazenave (2011 Union Lecturer at the XXVth General Assembly of IUGG) received the 2012 William Bowie Medal, the American Geophysical Union’s (AGU) highest honor, for her outstanding contributions to fundamental geophysics and for unselfish cooperation in research.

Priscilla Grew, former Chair of the U.S. National Committee for Geodesy and Geophysics, was elected as a Lifetime National Associate of the National Research Council of the National Academies.

Arnold L. Gordon (Columbia University, USA) was awarded the 2013 Prince Albert I Medal for his outstanding contribution in observational oceanography and in particular for his work in defining the physical processes in the Southern Ocean and Indonesian Throughflow.

Alik Ismail-Zadeh, IUGG Secretary General, delivered an Axford Distinguished Lecture entitled “Extreme geohazards, disaster risks and societal implications” at the Opening of the 2012 AOGS-AGU Joint Assembly. **Alik Ismail-Zadeh** was awarded an Honorary Fellowship of the Royal Astronomical Society.

Kenji Satake, IUGG Bureau Member, assumed the office of the President of the Asia Oceania Geosciences Society (AOGS) for the next two years at the closing ceremony of the AOGS-AGU Joint Assembly held in Singapore in August 2012.

Kuniyoshi Takeuchi (Chair of the IUGG Commission on Geophysical Risk and Sustainability) was awarded the 2012 International Hydrology Prize of the International Hydrological Program (IHP) of UNESCO, the World Meteorological Organization (WMO), and the International Association of Hydrological Sciences (IAHS) in recognition of his outstanding contribution to hydrology.

Kathy Whaler, IAGA President, was selected to deliver the 2012 Bullard Lecture of the American Geophysical Union. **Kathy Whaler** received the 2013 Price Medal of the Royal Astronomical Society for her distinguished career in geomagnetism and international leadership in geophysics. Her research has treated all aspects of the geomagnetic field, from the core, and its associated flow, through its passage through the mantle to the Earth's surface.

Gordon Young, IAHS President, was appointed the Executive Director of the Canadian Geophysical Union.

Guoxiong Wu (Immediate Past President of IAMAS) was awarded an Honorary Fellowship of the Royal Meteorological Society.

Jubilees



Peter John Wyllie, former President of IUGG (1995-1999), was honored by a Special Symposium at the Goldschmidt Conference in Davos, Switzerland (June 2009), followed by a Special Issue of the Journal of Petrology (July-August, 2011). This was formally devoted to: “Magma generation and evolution and global tectonics: A Symposium/issue in honor of Peter J. Wyllie for his life-long contributions by means of experimental petrology to understanding how the Earth works”. The 50th Anniversary of the Journal of Petrology in 2010, coincident with Wyllie's 80th birthday, was also celebrated at the Goldschmidt Conference.

This marked another coincidence, the publication by Wyllie (with O.F. Tuttle) of the first paper in the first 1960 issue of the Journal. Five years later he was briefly Managing Editor of the Journal (1965-1967), before becoming Editor of the Journal of Geology (1967-1983). Peter J. Wyllie is an eminent geoscientist and professor emeritus of the California Institute of Technology (CalTech), who contributed significantly to international cooperation in Earth sciences. He was Chairman (1976-1980) of the Commission on Experimental Petrology of the International Union of Geological Sciences (IUGS), President (1986-1990) of the International Mineralogical Association (Vice-President, 1978-86), and Vice President of IUGG (1991-95).



Vladimir Keilis-Borok, former President of IUGG (1987-1991), was honored by a Union session “Predicting Extreme Events in Natural and Socio-Economic Systems” at the 2011 Fall Meeting of the American Geophysical Union for his outstanding contribution to understanding complexity and nonlinear dynamics of the lithosphere and to prediction of natural and socio-economic extremes. This session was a part of the ENHANS project activity (<http://www.enhans.org>) and coincided with Volodya Keilis-Borok's 90th birthday. Vladimir Keilis-Borok is an eminent theoretical geophysicist, distinguished professor of the University of California at Los Angeles (UCLA), California, USA and the Founding Director of the Institute of

Earthquake Prediction Theory and Mathematical Geophysics at the Russian Academy of Sciences (RAS) in Moscow, Russia. He served as Founding Chairman of the IUGG Union Commission on Mathematical Geophysics (1964–1979), Vice President of IASPEI (1983–1987), IUGG Bureau Member (1983–1987), Executive Board Member of ICSU (1988–1991), Member of the Scientific Committee for the UN Decade for Natural Disasters Reduction (1990–1999), Member of the International Working Group on the Geological Safety of Nuclear Waste Depositories (1994–1997), and Member of the RAS Committee for International Security and Disarmament (1998–2000).



On 15 June **Karl Fuchs**, former President of the International Lithosphere Program (ILP, 1985-1990), was honored by a colloquium at the Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany for his outstanding contribution to seismology and study of the Earth's lithosphere on the occasion of his 80th birthday. ILP is charged with promoting multidisciplinary research projects of interest to both the geological (IUGS) and geophysical/geodetic (IUGG) communities. Karl Fuchs is professor emeritus of the Karlsruhe University, directed the Geophysical Institute of the university (1970–1997). He chaired the World Stress Map Project (1995-

2002). He served as President of the German Geophysical Society (1976-1978), Vice-President of the European Union of Geosciences (1983–1985), and member of the Advisory Board of the International Continental Drilling Program (ICDP, 1998–2003).



IUGG President **Harsh Gupta** received greetings from the Executive Committee on the occasion of his 70th Birthday. Harsh Gupta has been playing unique leadership roles in national and international scientific organizations (e.g., the Asian-Oceanic Geosciences Society, the Asian Seismological Commission, IASPEI, ICSU, ILP, IUGG, IUGS and several Indian scientific bodies), in education (as a Vice Chancellor of the Cochin University of Science and Technology), and in research management (as a Director of the Indian National Geophysical Research Institute in Hyderabad,

India).

As the Leader of the Third Indian Scientific Expedition to Antarctica, Harsh Gupta and his colleagues succeeded in establishing a permanent base station for scientific research in a record time of one Antarctic Summer. As Secretary to the Government of India, at the Department of Ocean Development, Dr. Gupta contributed to detailed Indian Ocean surveys for submitting India's claim for Legal Continental Shelf and to the foundation of the Indian Tsunami and Storm Surge Warning Center. Now as Member of the National Disaster Management Authority of the Government of India, he coordinates and administers the work in the areas falling under the zone of high earthquake vulnerability. His scientific achievements are broad. Harsh Gupta provided the first geophysical evidences of an enormously thick crust below the Himalaya and the Tibet Plateau region. He significantly contributed to understand the impact of artificial water reservoirs on triggered seismicity and to comprehend the genesis of earthquakes in stable continental regions. He worked on spectral magnitudes and showed its application in learning about the characteristics of seismic sources using broadband recordings (one of the latest applications has been in characterizing nuclear explosions).

Obituaries

Nicholas Ambraseys (born 1929), a prominent Greek and British seismologist, died peacefully at his home in Putney, UK, on 28 December 2012 at the age of 83. His research covered many problems associated with earthquakes and their effects on the ground, structures and populations. He served as Secretary General of the Greek National Committee for Geodesy and Geophysics from 2008 to 2012.

Mark F. Meier (born 1925), a prominent American glaciologist, passed away in Boulder, Colorado, USA, on 25 November 2012. He had been a resident of Boulder since 1985, where he was Professor of Geological Sciences and Director of the Institute of Arctic and Alpine Research (INSTAAR) from 1985 to 1994. Prof. Meier was a seminal leader of the modern geophysical study of glaciers, participating in glaciological studies during the International Geophysical Year (1957-58). Meier was very active within the International Association of Hydrological Sciences (IAHS), Vice-President of the International Commission on Snow and Ice (ICSI) in 1963-1967 and President of ICSI in 1967-1971, and was elected IAHS President (1979-1983).

Marcel Roche (born 1924), a prominent French hydrologist, passed away on 17 January 2012, aged 88. He was the Director of the ORSTOM (French scientific institute for overseas) Laboratory of hydrology. Also he had been the representative of France at the UNESCO International Hydrological Programme and the WMO Commission of Hydrology. He was a very active member of the International Association of Hydrological Sciences (IAHS), as Secretary and President of the French National Committee for IAHS (1972-1989) and as Secretary and Vice-President of the IAHS International Commission on Surface Water (1971-1983).

Klaus-Peter Schwarz (born on 1 February 1938 in Königsberg, Germany), a world-renown geodesist and President (1995-1999) of the International Association of Geodesy (IAG), passed away on Friday, 20 January 2012, in Calgary, Canada. His research and teaching was focused on geodesy and in particular on the use of inertial and satellite techniques for navigation and gravity field determination, with special emphasis on the combination of GPS and inertial navigation systems (INS). He made outstanding research contributions to the areas of airborne digital mapping and airborne gravimetry, including the simultaneous determination of position and gravity.

LIST OF ACRONYMS

AAAS	American Association for the Advancement of Science
AGU	American Geophysical Union
AOGS	Asia Oceania Geosciences Society
APECS	Association of Polar Early Career Scientists
CAST	China Association for Science and Technology
CCEC	Commission on Climatic and Environmental Changes
CCTF	Consultative Committee for Time and Frequency
CEA	China Earthquake Administration
CMG	Commission on Mathematical Geophysics
CNC-IUGG	Chinese National Committee for Geodesy and Geophysics
CODATA	Committee on Data for Science and Technology
COSPAR	Committee on Space Research
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DFG	German Research Foundation
EGU	European Geosciences Union
EMSEV	IAGA/IASPEI/IAVCEI Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes
GEO	Group on Earth Observation
GGOS	Global Geodetic Observing System
GOOS	Global Ocean Observing System
GRC	Commission on Geophysical Risk and Sustainability
IACS	International Association of Cryospheric Sciences
IAEA	International Atomic Energy Agency
IAG	International Association of Geodesy
IAGA	International Association of Geomagnetism and Agronomy
IAHS	International Association of Hydrological Sciences
IAMAS	International Association of Meteorology and Atmospheric Sciences
IAPSO	International Association for the Physical Sciences of the Ocean
IASPEI	International Association of Seismology and Physics of the Earth's Interior
IAU	International Astronomical Union
IAVCEI	International Association of Volcanology and Chemistry of the Earth's Interior
ICACGP	International Commission on Atmospheric Chemistry and Global Pollution
ICAE	International Commission on Atmospheric Electricity
ICAO	International Civil Aviation Organization
ICCL	International Commission on Climate
ICCP	International Commission on Clouds and Precipitation
ICDM	International Commission on Dynamical Meteorology
ICMA	International Commission on the Middle Atmosphere
ICPAE	International Commission on Planetary Atmospheres and their Evolution
ICPM	International Commission on Polar Meteorology
ICSU	International Council for Science
ICTP	Abdus Salam International Centre for Theoretical Physics
IGCP	International Geoscience Programme
IGOS-P	Integrated Global Observing Strategy Partnership
IGU	International Geographical Union
IHP	International Hydrological Programme
ILP	International Lithosphere Program
INQUA	International Union for Quaternary Research
INTERMAGNET	International Real-time Magnetic Observatory Network
IOC	UNESCO Intergovernmental Oceanographic Commission
IOC	International Ozone Commission
IRC	International Radiation Commission
IRDR	Integrated Research on Disaster Risk
ISC	International Seismological Centre
ISPRS	International Society for Photogrammetry and Remote Sensing
ISSC	International Social Sciences Council
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
IUSS	International Union of Soil Sciences
IUTAM	International Union of Theoretical and Applied Mechanics
JBGIS	Joint Board of Geospatial Information Societies
NKGG	German National Committee for Geodesy and Geophysics
OECD	Organisation for Economic Co-operation and Development

ÖNK	Austrian National Committee for IUGG
PAIGH	PanAmerican Institute of Geography and History
PHIVOLCS	The Philippines Institute of Volcanology and Seismology
ROA	ICSU Regional Office for Africa
ROAP	ICSU Regional Office for Asia & the Pacific
ROLAC	ICSU Regional Office for Latin America and the Caribbean
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Ocean Research
SCOSTEP	Scientific Committee on Solar-Terrestrial Physics
SEDI	Study of the Deep Interior of the Earth
UCDI	Union Commission on Data and Information
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations International Strategy on Disaster Reduction
UNOOSA	United Nations Office for Outer Space Affairs
UN-SPIDER	United Nations Platform for Space-based Information for Disaster Management and Emergency Response
URSI	International Union of Radio Science
WCRP	World Climate Research Programme
WDS	ICSU World Data System
WMO	World Meteorological Organization
WPMG	Western Pacific Geophysics Meeting
WSF	World Science Forum
VAACS	Volcanic Ash Advisory Centers
VASAG	Joint WMO-IUGG Volcanic Ash Scientific Advisory Group