



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

**XXVI General Assembly
XXVIème Assemblée Générale**

22 June - 2 July 2015
Prague, Czech Republic

**Council Meeting
Agenda Book**

Session I: Monday, 22 June, 13:30-18:00 / 1ère Session: Lundi, 22 juin, 13.30h-18h

Session II: Thursday, 25 June, 08:30-12:00 / 2ème Session: Jeudi, 25 juin, 8.30h-12h

Session III: Monday, 29 June, 15:00-18:00 / 3ème Session: Lundi, 29 juin 15h-18h

Council Meeting Venue:

**Conference Hall, 4th floor
Prague Congress Centre
5. května 65, 140 00 Prague 4**

Council Agenda / Ordre du jour du Conseil

**XXVI IUGG General Assembly, Prague, Czech Republic
XXVIème Assemblée Générale de l'UGGI, Prague, République tchèque**

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**Session I: Monday, 22 June, 13:30-18:00 /
1ère Session: Lundi, 22 juin, 13.30h-18h**

**1. Greetings; Presentation of the credentials; election of tellers /
Salutations; Présentation des lettres d'accréditation; élection des scrutateurs**

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**2. Approval of the Agenda /
Approbation de l'ordre du jour**

**3. Approval of the minutes of the Council Meeting in Melbourne (2011) /
Approbation du procès-verbal de la réunion du Conseil à Melbourne (2011)**

The Minutes of the Council Meeting in Melbourne were approved by the 2011 IUGG Council Delegates and published in Comptes Rendus of the XXV IUGG General Assembly 2011 (Part I: Proceedings of the General Assembly, pp. 40-54). The document is available at the IUGG website: http://www.iugg.org/assemblies/2011melbourne/2011%20GA%20Melbourne%20CR_PART%20I.pdf

4. Briefs Reports of the Officers / Brefs rapports des responsables

4.1. Quadrennial Report of the President (2011-2014) / Rapport quadriennal du Président (2011-2014)

The 2011-2015 quadrennial period has been very productive and path breaking in many ways for the entire IUGG community. Sincere efforts were made to engage younger generation of geodesists and geophysicists to be involved with IUGG activities. An IUGG Early Career Scientist Award was instituted, and the first awards would be made during the IUGG GA at Prague. An IUGG Gold Medal is instituted for an individual for outstanding contributions in geodesy and geophysics. This most prestigious IUGG recognition is for a scientist only once in every four year. An IUGG Fellowship has been instituted for individuals who have made exceptional contributions in international collaboration in geodesy or geophysics and attained eminence in the field of Earth and space sciences. The number is limited to 10 Elected Fellows every four years. Additionally, the past office bearers of IUGG and the Associations shall be given Conferred Fellowship for their outstanding services to IUGG and its Associations.

During this quadrennium, two ICSU General Assemblies took place: the XXX General Assembly from September 27 through September 30, 2011 at Rome, Italy and XXXI General Assembly from August 30 to September 3, 2014 at Auckland, New Zealand. IUGG took a very active part in both these assemblies.

One of the requirements was setting up of the IUGG Secretariat at a suitable location. Discussions were on with the GFZ German Research Center for Geosciences, Potsdam. During one of my visits to GFZ, a meeting was set up with Prof. Dr. H.C. Reinhard Hüttl, Scientific Executive Director and Chairman of the Executive Board of GFZ by Rainier Kind on 17th June, 2011. After some negotiations an agreement was reached and IUGG Secretariat was set up at the Helmholtz Center, Potsdam in 2013, and Franz G. Kuglitsch was appointed as the Executive Secretary of IUGG / Assistant Secretary General of IUGG. The office is being run to the satisfaction of all concerned.

Good progress has been made in developing a Strategic Plan for IUGG for the period 2016-2023, keeping in view the latest scientific developments and societal requirements.

The issue of Individual Membership of IUGG has drawn IUGG's attention since 2013. The opinion of the Association on this issue is divided. On advice of the IUGG Bureau, I sought the opinion of the Presidents and the Secretary Generals of the National Adhering bodies through a letter written on December 1, 2014. The response is being analyzed.

During the quadrennium Scientific Assemblies of all the 8 Associations were held. It was encouraging to see that several of these assemblies were held jointly by two or more associations.

IUGG Bureau meetings were held from 29th September through 2nd October 2012 at Lauterbad, Germany; 20th and 21st September 2013 at Prague, Czech Republic and on 11th and 12th June 2014 at Baku, Azerbaijan. These meetings were very productive and well organized, thanks to the efforts of IUGG Secretariat and the local hosts. The IUGG Executive Committee meeting followed the 2013 Bureau meeting at Prague.

International Council of Science (ICSU)

I completed my two terms as a Member of Committee on Scientific Planning & Review (CSPR) of ICSU by the end of 2011. IRDR and Future Earth were two very important topics where I could contribute significantly.

IUGG adheres to ICSU. During the quadrennium, two ICSU General Assemblies were held. In the XXX General Assembly held at Rome from September 27 through 30, 2011, IUGG was very visible. A

resolution on “Science on Disaster Risk” was presented and due to technical issues, it was referred to ICSU EB. It was heartening to see that nomination emerging from IUGG for the position of President-Elect of ICSU was successful and Gordon McBean became the President Elect of ICSU. Gordon McBean had earlier served on the IUGG Bureau as a member for two terms (1987-1991, and 1991-1995). Orhan Altan was elected as an Ordinary Member of ICSU EC representing Geo-Union cluster. At the same time Guoxiong Wu was elected as an Ordinary Member of ICSU EB in the category of National Members. Wu is the past president of IAMAS (2007- 20011).

The XXXI ICSU GA held at Auckland, New Zealand would be remembered for the in depth discussions on the “Future Earth” initiative. At the end of the GA, Gordon McBean took over as the President of ICSU. Orhan Altan was elected for the second term as an Ordinary Member of ICSU EB representing the Geo-Union cluster.

IUGG INITIATIVES

CCEC

In the year 2012, IUGG set up the Union Commission on Climatic and Environmental Change (CCEC). The aim is to promote the scientific understanding of climate and environmental change, boost research for reducing uncertainties in climate and environmental models, and encourage trans-disciplinary research on related topics. CCEC is expected to provide an all- Union perspective on the much-debated topic of climate and environmental change.

Chair: Tom Beer, Vice Chair: Jianping Li, Secretary-Treasurer: Keith Averson.

IUGG Gold Medal

IUGG Gold Medal, established in 2013, is the highest honor of the International Union of Geodesy and Geophysics to award Earth and Space scientists for their outstanding contributions to geodesy and geophysics and for unselfish international collaboration in research. The Medal is to be presented at the IUGG General Assembly by the President. There would be on such award every four years. The awardee is given the Medal, a Medal Certificate and an honorary Membership of IUGG.

Award Committee:

Chair: Dr. Robert (Bob) Engdahl

Members: Dr. Claudio Brunini; Dr. Laura Gallardo; Dr. Demetris Koutsoyiannis;
Dr. Joan Marti; Dr. Lawrence Mysak; Dr. Olga Solomina; Dr. Mamoru Yamamoto;
Dr. Alik Ismail-Zadeh.

The first IUGG Gold Medal would be awarded to **Prof. Sir Brian J. Hoskins**, United Kingdom at the IUGG General Assembly at Prague in June 2015.

IUGG Fellowship

Fellowship of IUGG is recognition of outstanding work carried out by individuals in the field of geodesy and geophysics, by the IUGG Bureau. Honorary members, selected for IUGG Fellowship, are bestowed with a certificate of IUGG Fellowship by the IUGG President at the opening ceremony of the IUGG General Assembly. The number of fellowships granted is limited to ten every four years.

Fellowship Committee:

Chair: Dr. Joyce E. Penner

Members: Dr. Hugo Delgado Granados; Dr. Jan Laštovicka; Dr. Harald Schuh;
Dr. Konrad Steffen; Dr. Kuniyoshi Takeuchi; Dr. Isabelle Ansorge.

Awardees:

1) **Prof. Xiaofei Chen**, China; 2) **Dr. Godin-Beckmann**, France; 3) **Prof. Jianping Li**, China; 4) **Prof. John Burrows**, Germany; 5) **Prof. Andrea Flossmann**, France; 6) **Prof. Gerald Jones**, Canada.

The IUGG Bureau has also announced the names of the “**Conferred Union Fellows**”, who have served IUGG and the Associations with distinctions. These are:

IUGG: **A. A. Ashour** (Egypt), **G. Balmino** (France), **O. B. Andersen** (Denmark), **J. Chen** (China), **Y. T. Chen** (China), **V. K. Gaur** (India), **S. Gregersen** (Denmark), **E. Groten** (Germany), **M. J. Hamlin** (UK), **D. D. Jackson** (USA), **J. A. Joselyn** (USA), **B. L. N. Kennett** (Australia), **M. Kono** (Japan), **G. McBean** (Canada), **H. Moritz** (Austria), **P. Pinet** (France), **U. Shamir** (Israel), **J. Somogyi** (Hungary), **A. F. Spilhaus** (USA), **K. Suyehiro** (Japan), **A. A. A. Tealeb** (Egypt), **J. F. Vilas** (Argentina), **S. Uyeda** (Japan), **P. J. Wyllie** (USA);

IACS: **I. Allison** (Australia), **G. Kaser** (Austria), **M. Lange** (Germany/Cyprus);

IAG: **G. Beutler** (Switzerland), **C. Boucher** (France), **M. Louis** (France), **I. Mueller** (USA), **F. Sansó** (Italy), **W. Torge** (Germany);

IAGA: **C. Barton** (Australia), **E. Friis-Christensen** (Denmark), **B. Hultqvist** (Sweden), **D. J. Kerridge** (UK), **H. W. Kroehl** (USA), **J. G. Roederer** (USA);

IAHS: **A. Askew** (Switzerland/Australia), **H. Colenbrander** (The Netherlands), **J. C. Rodda** (UK), **K. Takeuchi** (Japan), **G. Young** (Canada);

IAMAS: **H. C. Davies** (Switzerland), **R. A. Duce** (USA), **B. J. Hoskins** (UK), **M. Kuhn** (Austria), **R. List** (Canada), **M. C. MacCracken** (USA), **G. Wu** (China);

IAPSO: **F. E. Camfield** (USA), **S. Imawaki** (Japan), **P. Malanotte-Rizzoli** (USA/Italy), **R. D. Muench** (USA), **L. Mysak** (Canada), **J.-J. O'Brien** (USA), **L. V. Shannon** (South Africa);

IASPEI: **R. Adams** (UK), **E. R. Engdahl** (USA), **C. Froidevaux** (France), **A. V. Nikolaev** (Russia), **Z. Wu** (China); **Jean-Claude deBremaecker** (USA),

IAVCEI: **S. Aramaki** (Japan), **P. Gasparini** (Italy), **S. A. Fedotov** (Russia), **G. Heiken** (USA), **R. W. Johnson**, **S. R. McNutt** (USA), **S. Nakada** (Japan), **O. Navon** (Israel), **H.-U. Schmincke** (Germany), **S. J. Sparks** (UK).

The “**Conferred Fellows**” will be bestowed with a certificate of IUGG Fellowship and a pin at the closing ceremony of IUGG XXVI GA on July 1, 2015.

IUGG Early Career Scientist Award

This Award honors early career scientists for their outstanding research in Earth and space sciences and for their international research cooperation. IUGG Early Career Scientist Awards are presented by the IUGG President at the IUGG General Assembly following the announcement of the awards. The awardees are bestowed a certificate. IUGG covers travel expenses of the awardees to attend the General Assembly. The awardees will be invited to give a talk at the General Assembly.

Early Career Scientist Award Committee:

Chair: Jenny Baeseman;

Members: Salvatore Grimaldi; Thorne Lay; Satheesh Shenoi; John Turner; Laszlo Szarka.

Awardees:

1) **Dr. Ilona Riipinen**, Sweden; 2) **Dr. Johanna Salminen**, Finland; 3) **Dr. Ruiqiang Ding**, China; 4) **Dr. Gregory Foltz**, USA; 5) **Dr. Ben Kravitz**, USA; 6) **Dr. Ben Marzeion**, Austria; 7) **Dr. Futoshi Takahashi**, Japan; 8) **Dr. Andreas Fichtner**, Switzerland; 9) **Dr. Markus Hrachowitz**, The Netherlands; 10) **Dr. Matthias Huss**, Switzerland.

Strategic Plan for IUGG

A committee with **C. Rizos, F. Kuglitsch, M. Manda, A. Mackintosh, D. Giardini**, has been charged with the preparation of the IUGG Strategic Plan for 2016-2023. The Committee has been very active and has redefined the objectives, Mission and Vision statements, Core Principals & Aspirations and Strategic Goals. The document is under consultation and would be finalized in time for suitable implementation.

Preparation for the Prague General Assembly

Prof Vladimir Cermak is the Chair of the Local Organizing Committee of the XXVI IUGG GA to be held at Prague from 22nd June through 2nd July 2015. The preparation is underway. The scientific program committee chaired by Prof. **Eduard Petrovsky (Czech Republic)** is doing a commendable job of developing the IUGG GA program.

Union Lectures

Union Lectures are one of the most important activities of the IUGG General Assembly. We are lucky to have the concurrence of Noble Laureate Prof Y. T. Lee, the past president of ICSU to deliver an Union Lecture. The complete list of the lecturers is as follows:

1) **Prof. Yuan T. Lee**, Taipei; 2) **Prof. Dominic Mazumavi**, South Africa; 3) **Prof. Harald Schuh**, Germany; 4) **Prof. Jonathan Gregory**, U.K.; 5) **Prof. Janet Kozyra**, USA; 6) **Dr. Laura Gallardo Klenner**, Chile; 7) **Prof. Nicolas Gruber**, Switzerland; 8) **Prof. Raoul Madariaga**, France; 9) **Dr. Thomas Casadevall**, USA

Committees

With consultation of the Bureau and the Executive Committee of IUGG and drawing from the past experience of individual scientists globally with the IUGG affairs, the following committees have been constituted:

Nomination Committee:

Chair: Prof. Uri Shamir

Members: Prof. Alexie Gvishiani, Prof. Paola Rizzoli, Prof. Guoxiong Wu.

Nominations are solicited by the Nomination Committee, from all those eligible to nominate to the open Bureau and Finance Committee positions. Efforts are made to strike a balance of experience, disciplines, geographical distribution and gender balance in preparing the slate of candidates for the positions. The Statutes and By-Laws of the Union provide a possibility of further nominations.

Statutes and By-Law Committee:

Chair: Dr. David J. Kerridge

Members: Dr. Vijay Dimri, Dr. Jerome Dymont, Dr. Jeff Freymueller, Dr. JoAnn Joselyn, Dr. Michael Sideris.

The Statutes and By-Law Committee has been examining various issues that have arisen over the quadrennium with respect to existing Statutes and By- Laws. An effort is made to generate closeness and association with regional and national geo-societies to achieve common goals.

Resolution Committee:

Chair: Dr. Tom Beer

Members: Dr. Pierre Hubert, Dr. Laura Sanchez, Dr. Kusumita Arora, Prof. Domenico Giardini

The Resolution Committee will solicit proposals during the General Assembly, examine and evaluate them and prepare suggested resolutions appropriately for the consideration of the IUGG Council.

Site Evaluation Committee:

Chair: Prof. Satsuya Nakada

Members: Dr. Ian Allison, Dr. Alik Ismail-Zadeh, Dr. Peter Suhadolc, Dr. Kathy Whaler.

The Site Evaluation Committee was set up as a consequence of IUGG Council meeting at Sapporo, Japan in 2003 where it was required that the invitations to host the IUGG General Assemblies should be evaluated and the results be presented to the Council to facilitate its decision process. The members of this committee have rich experience of organizing large IUGG related conferences including past general assemblies. For the IUGG GA XXVII there are two bids, from Canada and India. After ascertaining that the two bids meet the desired criteria, and a visit to the venues, the Site Evaluation Committee will report to the IUGG Council.

Individual Membership

Currently 70 National Members of the International Union of Geodesy and Geophysics (IUGG) contribute to the development of the Union and promote an international cooperation in Earth and space sciences. IUGG would be happy to expand its membership involving as many countries as possible from Africa, Asia, and South America. This is a challenging problem, because many of the countries in the regions either have economical/financial difficulties or the fields of basic geophysics and geodesy are not well developed. However, there are active geophysicists and geodesists in non-member countries, who would like to contribute to activities of IUGG and its Associations.

In 2013 IAVCEI raised the topic of whether IUGG should introduce an individual membership allowing an individual scientist from any country (not only from Member country) to become an IUGG member, provided that individual members pay their membership dues and receive their membership benefits including the right to vote and the right to be elected to the office of the Union and its Associations.

This proposal was discussed by the IUGG Bureau, and the Bureau decided to seek the Association Presidents' opinion on the individual membership. The reports received from the Association Presidents showed a lack of consensus on the topic among the IUGG Associations.

Considering the importance of this issue and the different opinions of the Union Association, the IUGG Bureau decided to request the Union's Adhering Bodies and National Committees of the Member

Countries to express an opinion about the introduction of an IUGG individual membership. The questions raised are:

1. How would National and individual memberships complement each other and contribute constructively to IUGG activities?
2. What would be the benefits of IUGG to have individual members and the benefits of individual geoscientists to become members of IUGG?
3. How a geoscientist would become an individual member of the IUGG, and should individual membership be paid or free?

The response is sought by 1st February 2015.

The outcome shall form the basis for discussion and further course of action.

Acknowledgements and Thanks

The end of the IUGG GA on July 2, 2015 would bring to close my long association with the IUGG Bureau. I was first elected as a Bureau Member at the IUGG GA at Birmingham, UK in the year 1999. The positions held in IUGG Bureau by me include Member (two terms, 1999-2003, and 2003-2007), Vice President (2007-2011) and President (2011-2015). It has been a pleasure working for IUGG Bureau for a long period of 16 years.

During my term as the President of IUGG, several individuals provided support and advice making my task easier. Alik Ismail Zadeh, Secretary General of IUGG, needs to be thanked for constant advice and council. He has been all through very prompt and very knowledgeable about the IUGG affairs. He also carried the immense burden of day- to- day demands and operations of IUGG. Vice President Michael Sideris took care of his part of the responsibilities and provided support and advice. Treasurer Aksel Hansen has a long experience of managing finances of IUGG. He worked very well with the Finance Committee and has kept IUGG finances in an excellent shape. Members of the Bureau, namely, Isabelle Ansoerge, Pierre Hubert and Kenji Satake came with different back- grounds and provided valuable inputs to running the IUGG. We found in Franz G. Kuglitsch a very young and energetic Executive Secretary/Assistant Secretary General of IUGG, who has been very quick in learning and brought a lot of energy to the organization. I am most grateful to the Presidents and the Secretary Generals of the 8 Associations for their constructive participation in IUGG affairs and it's good performance. Special thanks are also due for the tremendous task done by the Local Organizing Committee under the Chairmanship of Vladimir Cermak and to the International Scientific Program Committee Chaired by Eduard Petrovsky for the XXVI IUGG GA.

Reinhard Hüttl and the Executive Board of GFZ are gratefully acknowledged for making it possible to establish an IUGG Secretariat at Potsdam staffed with a scientific position. This was a long felt need of IUGG that was fulfilled during the present quadrennium.

It is a pleasure to acknowledge the support and interest of ICSU President Y. T. Lee (2011-2014) on many IUGG related issues and his sensitivity, warmth and the time he invested on these issues.

I must acknowledge the support provided by the National Geophysical Research Institute, Hyderabad and National Disaster Management Authority, New Delhi for running the IUGG President's Office.

Harsh Gupta, IUGG President

4.2. Quadrennial Report of the Secretary General (2011-2014) / Rapport quadriennal du Secrétaire Général (2011-2014)

INTRODUCTION

The International Union for Geodesy and Geophysics (IUGG) is one of the largest international geoscience unions. The Union membership is comprised of the National Adhering Bodies (National Members), which establish National Committees for Geodesy and Geophysics in their countries. The Union is financially supported by National Members that benefit from the knowledge, data, services, and scientific talent that are concentrated within IUGG. Although the Union is not an individual membership organization like the American Geophysical Union (AGU), European Geosciences Union (EGU) or Asian Oceanic Geosciences Society (AOGS), *all Earth and space scientists from the Members Countries are members of the Union*. Actually, IUGG is a home for all geoscientists worldwide, those who share the Union's mission in advancing, promoting, and communicating knowledge of the Earth and its environment. As a member of the International Council for Science (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 is a union of eight International Associations, each dedicated to a specific scientific discipline, but with overlapping interests and complementary strengths: they are the International Associations of Cryospheric Science (IACS), Geodesy (IAG), Geomagnetism and Aeronomy (IAGA), Hydrological Sciences (IAHS), Meteorology and Atmospheric Sciences (IAMAS), Physical Sciences of the Oceans (IAPSO), Seismology and Physics of the Earth Interior (IASPEI), and Volcanology and Chemistry of the Earth Interior (IAVCEI). At present, there are five Union Commissions and one Union Working Group that are dedicated to particular interdisciplinary topics: Commission on Climatic and Environmental Change (CCEC), Commission on Mathematical Geophysics (CMG), Commission on Geophysical Risk and Sustainability (GRC), Commission on Study of the Earth's Deep Interior (SEDI), Commission on Data and Information (UCDI), and Working Group on History (WGH).

UNION ACTIVITIES

To meet changing scientific and organizational needs, the International Union of Geodesy and Geophysics started to reshape its structure and activities. Below I present the major activities related to modernization of the Union since 2008. The IUGG

- introduced two new categories of Union Membership: *Affiliate Membership* and *Honorary Membership*.
- established *two Union Commissions* on Climatic and Environmental Change and on Data and Information and the *Union Working Group* on History to supplement the existing Union Commissions on Geophysical Risk and Sustainability, on Mathematical Geophysics, and on Structure of the Earth's Deep Interior.
- set up four Union Committee to analyze membership structure of the Union (Membership Issues Committee), to develop *science education policy* (Capacity Building and Education Committee), to develop Union honor programs (Honor and Recognition Committee), and to analyze structure and activities of the Union, relationship between Union Associations and National Members, and to develop a *strategic plan* of the Union (Visioning Committee).
- developed the *Grants Program* to complement its existing program of funding scientific meetings. The Program aims to support projects of importance to the international geophysical and geodetic community, which will explore new scientific ideas and develop future international initiatives. The priority areas of the Program were (i) creation of new knowledge in Earth and space sciences; (ii) dissemination of knowledge, data and information on geophysics and geodesy; (iii) geoscience for sustainable development; (iv) geoscience and policy interface; and (v) geoscience education and outreach in developing countries. IUGG awarded 17 international multi-disciplinary (involving at least two Union Associations and/or Union Commissions) research and outreach projects.

- initiated a *new science education program* and signed agreement with the Abdus Salam International Centre for Theoretical Physics (ICTP) to enhance geophysical and geodetic education and science collaboration. Among other points, the agreement encourages collaboration in organization of advanced schools/workshops in geodesy and geophysics in ICTP or in economically less developed countries; in development of diploma courses related to Earth and space sciences; and in dissemination of information on educational and scientific meetings. Since 2012 IUGG awarded 24 educational events (advanced schools, workshops, seminars) at ICTP as well as in the economically-less developed countries.
- established *Honor and Recognition program* and introduced three major awards: (i) Early Career Scientist Award, (ii) Union Fellow award, and (iii) the Gold Medal to award Earth and space scientists for outstanding contributions to geodesy and geophysics and for unselfish international cooperation in research.
- enhanced its *publication policy*. In 2012 IUGG signed an agreement with the Cambridge University Press to develop a new series of special publications of the IUGG to publish peer-reviewed books on perspectives and reviews in multidisciplinary research.
- *strengthened its relationship* with United Nations, international, regional and national geoscience organizations.

Union activities during the past quadrennium are summarized below.

- **MEMBERSHIP.** The Kingdom of Saudi Arabia and Nicaragua became IUGG Regular Members (pending for Council's ratification of the votes by National Members). Due to mainly financial reasons Albania, Armenia, and Bosnia & Herzegovina moved to Associates. Monaco withdrew from IUGG as its Adhering Body is not involved anymore in the activities related to geosciences. Several scientific organizations became IUGG Affiliate Members (pending for Council's ratification of the votes by National Members): The Commission for the Geological Map of the World (CGMW), the Young Earth Scientists (YES) Network, the American Geosciences Institute, and the International Association for Mathematical Geosciences.
- **NEW COMMISSION.** IUGG established new 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.
- **NEW WORKING GROUP.** 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 in 2019.
- **SCIENTIFIC ASSEMBLIES.** Five Scientific Assemblies of IUGG Associations have been organized this summer around the world: (i) DACA-13, a joint assembly of IACS and IAMAS, *Davos, Switzerland*, 8-12 July; (ii) the IAVCEI Scientific Assembly, *Kagoshima, Japan*, 20-24 July; (iii) the joint scientific assembly of IAHS-IAPSO-IASPEI "Knowledge for the Future", *Gothenburg, Sweden*, 22-26 July; (iv) the IAGA Scientific Assembly, *Merida, Mexico*, 26-31 August; and (v) the IAG Scientific Assembly, *Potsdam, Germany*, 1-6 September. More than 4,000 scientists participated in the assemblies from more than 100 countries.
- **SCIENTIFIC MEETINGS.** Four IUGG Union Commissions held their major scientific meetings: CMG conferences on mathematical geophysics in Edinburgh, UK (2012), and in Merida, Mexico (2014); SEDI symposia in Leeds, UK (2012), and in Kanagawa, Japan (2014); GRC conferences in Orange, USA (2012), and in Madrid, Spain (2014); and CCEC workshop on Climatic and Environmental Changes in Beijing, China (2014).
- **PUBLICATIONS.** 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. The first volume of the Special Publication of the IUGG "*Extreme Natural Hazards, Disaster Risks and Societal Implications*" was published by the Cambridge University Press in 2014, and the second

volume “*Dynamics and Predictability of Global and Regional High-impact Weather and Climate Events*” is to be published in 2015.

- PROJECTS. IUGG was actively involved in the realization of three ICSU-sponsored projects: “Extreme Natural Hazards and Societal Implications – ENHANS”, “Better Internet Connectivity for Research and Education Institutions in Africa – eGYAfrica”, and “Uniting and networking the magnetic community in the northern Indian Ocean region – MAGNIO”.
- GRANTS. IUGG awarded 9 grants to support scientific and outreach projects of importance to the international geophysical and geodetic community, which will explore new scientific ideas and develop future international initiatives.
- SPONSORED SCIENTIFIC MEETINGS AND SCHOOLS. IUGG co-sponsored 43 scientific meetings (workshops, symposia, conferences) and 24 science education events worldwide in 2011-2015.
- COOPERATION. IUGG continued to strengthen cooperation with many International Scientific Unions including those related to Earth and space sciences (GeoUnions) and interdisciplinary bodies of the International Council for Science (ICSU) as well as with other international and intergovernmental organizations such as the United Nations Education, Science and Culture Organization (UNESCO) via the International Hydrological Program (IHP) and the Intergovernmental Oceanographic Commission (IOC), the World Meteorological Organization (WMO), the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), the Group on Earth Observations (GEO), the International Telecommunication Union (ITU), the International Civil Aviation Organization (ICAO), and with national and regional professional societies with international participation like the American Geophysical Union (AGU), the Asia-Oceanic Geosciences Society (AOGS), the European Geosciences Union (EGU), and some other international and intergovernmental organizations. Particularly, the IUGG
 - a) IUGG President and I took part in the General Assemblies of the International Council for Science (ICSU) held in Rome, Italy (2011) and in Auckland, New Zealand (2014), and in the meeting of ICSU Scientific Unions in Paris, France, in 2013.
 - b) IUGG participated in several meetings of the ICSU GeoUnions Steering Committee in Rome (2011), Istanbul (2012), Antalya (2013), Paris (2013), and Auckland (2014). I was elected a Vice Chair (2012-2014) and Chair (2014-2016) of the Steering Committee.
 - c) I participated in the General Assembly of the ICSU Scientific Committees on Space Research (COSPAR).
 - d) IUGG became a Participating Member of the Group on Earth Observations (GEO) in January 2014. I represented the Union at the GEO Plenaries X and XI.
 - e) I was invited to join the Scientific Program Committee for the 2015 Science and Technology Conference of the Preparatory Commissions for Comprehensive Nuclear Test-Ban Treaty Organization (CTBTO).
 - f) I attended the Preparatory Committee meeting for the Third U.N. World Conference on Disaster Risk Reduction to deliver a statement at the co-Chairs Forum.
 - g) IUGG took part in drafting the ICSU-ISSC synthesis paper “Disaster Risks Research and Assessment to Promote Risk Reduction and Management”, which states that the urgent need for significant improvements of existing assessment processes by scientific advice on disaster risks to support and catalyze disaster policy development and management across governments. Comprehensive periodic assessments of disaster risks at local to global levels should be undertaken by a high-level, trans-disciplinary body of experts appointed by national governments together with international and inter-governmental scientific organizations dealing with disaster risks.
 - h) I met with UNESCO Assistant Director General for Natural Sciences as well as with heads of several UNESCO sections (namely, the International Hydrological Program, the Intergovernmental Oceanographic Commission, Earth Sciences, and Disaster Risk Reduction) to

facilitate the cooperation between the Union, its Associations/Commissions and the UNESCO sections.

- i) IUGG representatives participated in several events of the World Meteorological Organization (WMO) including Executive Council meetings. Also IUGG became a Member of the Partnership Advisory Committee of the Global Framework on Climate Services (GFCS). Special thanks go to Arthur Askew, a Liaison Officer to WMO, for his voluntary service to IUGG and participation in many important WMO-related events during the last several years. Also IUGG/IAVCEI co-organized joint workshops on Ash Dispersal Forecast and Civil Aviation in 2012 and 2014.
- j) Together with the *International Mathematical Union* (IMU) and *International Union of Theoretical and Applied Mechanics* (IUTAM), IUGG organized a summer school in Merida, Mexico, and together with the *American Geophysical Union* (AGU) and IMU a Union session on Mathematics of Planet Earth in San Francisco, USA, in 2013.
- k) IUGG endorsed and supported the initiative of the International Geographical Union (IGU) related to “International Year for Global Understanding”. Also IUGG endorsed the “International Decade of Deltas”.

MEMBERSHIP OF THE UNION

As of 1 January 2015, IUGG has 70 Member Countries with distribution throughout the world as follows: Europe 31, Asia 18, North and South Americas 11, Africa 8, and Oceania 2. The current membership history is summarized in the table below.

MEMBERS	Dates of ADMISSION & TERMINATION	CATEGORY⁽¹⁾	UNITS⁽²⁾
ALBANIA	1997-2002, 2003	A	0
ALGERIA	1971-2006		
ARGENTINA	1927	3	3
ARMENIA	2000	A	0
AUSTRALIA	1919	5	7
AUSTRIA	1948	3	3
AZERBAIJAN	2010	1	1
BELGIUM	1919	4	5
BOLIVIA	1960-2000, 2006	A	0
BOSNIA & HERZEGOVINA	2003	A	0
BRAZIL	1922	3	3
BULGARIA	1930	1	1
BURUNDI	1987-1995		
CANADA	1919	6	10
CHILE	1924	2	2
CHINA	1977	6	10
CHINA – Acad. of Sciences in Taipei	1995	4	5
COLOMBIA	1938-1971, 2000	1	1
CONGO D.R. (**)	2004	A	0
COSTA RICA	2010	A	0
CROATIA	1992	1	1
CUBA	1960-1996		
CZECH REPUBLIC	1993	2	2
DENMARK	1923	4	5
DOMINICAN REP.	1957-1971		
EGYPT	1924	2	2
ESTONIA	1991	1	1
ETHIOPIA	1952-2000		
FINLAND	1927	3	3

FRANCE	1919	7	15
GEORGIA	2009	A	0
GERMANY	1951	8	20
GHANA	1957-1987, 2006	A	0
GREECE	1922-2003; 2008	3	3
<i>GUATEMALA</i>	<i>1957-2000</i>		
<i>GUINEA</i>	<i>1987-1995</i>		
<i>HAITI</i>	<i>1956-1971</i>		
HUNGARY	1930	2	2
ICELAND	1967	1	1
INDIA	1947	6	10
INDONESIA	1951	1	1
IRAN	1957	1	1
<i>IRAQ</i>	<i>1983-1996</i>		
IRELAND	1946	2	2
ISRAEL	1951	1	1
ITALY	1919	6	10
<i>IVORY COAST</i>	<i>1975-1996</i>		
JAPAN	1919	8	20
JORDAN	1979	1	1
<i>KENYA</i>	<i>1975-1997</i>		
KOREA	1960	2	2
<i>KOREA /DEM.REP</i>	<i>1967-2000</i>		
<i>LEBANON</i>	<i>1967-2003</i>		
<i>LIBYA</i>	<i>1979-1996</i>		
LUXEMBOURG	1971	1	1
MACEDONIA, F.Y.R.	1995-2001, 2010	1	1
<i>MADAGASCAR</i>	<i>1967-1995</i>		
<i>MALAYSIA</i>	<i>1967-2002</i>		
MAURITIUS	2003	A	0
MEXICO	1922	2	2
<i>MONACO</i>	<i>1967-2013</i>		
<i>MONGOLIA</i>	<i>1995-2001</i>		
MOROCCO	1924	A	0
MOZAMBIQUE	1983	1	1
<i>MYANMAR (BURMA)</i>	<i>1957-2003</i>		
<i>NEPAL</i>	<i>1975-1987</i>		
THE NETHERLANDS	1925	4	5
NEW ZEALAND	1927	1	1
NICARAGUA	2014	1	1
NIGERIA	1971	2	2
NORWAY	1923	4	5
PAKISTAN	1952	2	2
PERU	1925-1979, 2000	A	0
PHILIPPINES	1951	3	3
POLAND	1924	2	2
PORTUGAL	1919	2	2
ROMANIA	1930	1	1
RUSSIA (***)	1992	6	10
SAUDI ARABIA	1971-2001, 2012	2	2
<i>SENEGAL</i>	<i>1960-1995</i>		
<i>SERBIA & MONTENEGRO (*)</i>	<i>1996-2006</i>		
<i>SIERRA LEONE</i>	<i>1967-1983</i>		
SLOVAK REPUBLIC	1993	1	1
SLOVENIA	1994	1	1
SOUTH AFRICA	1924	3	3

SPAIN	1922	5	7
SUDAN	1955-2000		
SWEDEN	1923	4	5
SWITZERLAND	1923	5	7
SYRIA	1948-1995		
TANZANIA	1975-2000		
THAILAND	1923	2	2
TUNISIA	1927-2001		
TURKEY	1949	2	2
UK	1919	8	20
URUGUAY	1924-2000		
USA	1919	11	35
VENEZUELA	1975-2008		
VIETNAM	1931	1	1
ZIMBABWE	1967-2000		

- (1) According to IUGG Statute 12a, there are fourteen categories of membership in the Union, numbered 1 to 14, plus a special category, called A (Associate).
- (2) According to IUGG Statute 12b and IUGG By-Law 18 a, for categories 1 to 14, each member country pays annually the number of units of contribution assigned to the category in which it adheres. Associates (Category A) do not pay an annual contribution to the Union.
- (*) Adhesion in 1996 under the name of the Federal Republic of Yugoslavia, which was changed in 2003 to Serbia & Montenegro. In 2006, Serbia & Montenegro divided, and attempts to confirm membership of either country have been unsuccessful.
- (**) Adhesion in 1991 under the name Zaire, membership terminated in 1997.
- (***) Adhesion in 1954 under the name of the USSR

Affiliate Members of IUGG

- American Geoscience Institute (AGI) (since 2014)
- Commission for the Geological Map of the World (CGMW) (since 2014)
- International Association for Geoethics (IAGETH) (since 2014)
- Young Earth Scientist (YES) Network (since 2014)

ADMINISTRATION

The Bureau

The IUGG Bureau consists of the

President: Harsh Gupta (India)

Vice-President: Michael Sideris (Canada)

Secretary General: Alik Ismail-Zadeh (Germany/Russia)

Treasurer: Aksel W. Hansen (Denmark)

Members: Isabelle Ansorge (South Africa), Pierre Hubert (France), and Kenji Satake (Japan).

The Bureau met three times during the term: in Lauterbad, Germany (September 2012), in Prague (September 2013), and in Baku (June 2014). In addition, the Bureau held a teleconference meeting in November 2014.

Discussions at the Bureau meetings included the following:

- IUGG Membership. The number of Adhering Bodies and the extent of the arrears in dues has been a topic of concern at each meeting. Efforts to encourage dues payments have been discussed and actions taken with varying degrees of success.

- IUGG Financial Health. The state of the budget has been considered at each meeting accounting for comments from the Chair of the Finance Committee; the state has been found satisfactory. A draft budget for the 2016-2019 term was discussed at the Baku meeting.
- IUGG Associations, Association Scientific assemblies and Association's activity. A significant concern was the behavior of the IAVCEI officers who demanded changes in the IUGG membership. The Bureau agreed to conduct a survey related to individual membership of the Union and requested Union Association and National Members to respond on the questionnaire and to express their opinions on the individual membership and related topics. Based on the survey the IUGG President decided to call for an extra-ordinary meeting of the Executive Committee to resolve the tensions between the Union and one of the Union Associations.
- IUGG's relationship with ICSU, including the ICSU interdisciplinary bodies, Regional Offices, Grants Programme, new initiative on Future Earth as well as programs on data and information (WDS) and disaster risks (IRDR).
- IUGG relationship with GeoUnions, joint programs, statements, and projects.
- Review of IUGG Union Commissions including their Terms of Reference.
- Review of the Union Committees on Capacity Building and Education, Honors and Recognition, Membership Issues, and Visioning, including their Terms of Reference.
- IUGG cooperation with international, intergovernmental, regional and national geoscience organizations.
- International Lithosphere Program (ILP): review of the ILP activity and administration (jointly with IUGS).
- IUGG support of young scientists, in particular, nominations of persons to attend the Young Earth Scientist Conference in Beijing in 2009, Union Symposium "Early Career Scientists in Geophysics" in Melbourne in 2011.
- Educational program and policy
- Publication program
- The 2015 General Assembly, including the chairs and members of the Nominations Committee, Statutes and By-Laws Committee, the Resolutions Committee, and Site Comparison Committee.

The Executive Committee

The IUGG Executive Committee (EC) consists of the Bureau, the immediate past President of IUGG (Dr. T. Beer, Australia) and the Presidents of the Associations. Association Secretaries-General and the Chair of the IUGG Finance Committee are always invited to attend the meetings, with voice but without vote. The Executive Committee met twice

- in Melbourne, Australia, July 2011
- in Prague, Czech Republic, September 2013

The extra-ordinary meeting of the IUGG Executive Committee will be held in Vienna, Austria, on 18 April 2015 to consider several urgent topics related to IUGG membership, relationship between the Union Associations and National Members, Associations activities, and some other topics.

Decisions at the Executive Committee meetings included the following:

- Endorsed the applications for IUGG Membership (the Kingdom of Saudi Arabia, and Nicaragua).
- Recommended the IUGG Council to approve the request of Albania, Armenia and Bosnia & Herzegovina to become Associate Members and to invite the Scientific Centre of Monaco to re-consider its decision on withdrawal from IUGG.
- Endorsed the application for Affiliate Membership.
- Established the Union Commission on Climatic and Environmental Change.
- Established the Union Working Group on History.
- Approved the book proposal related to 100-years history of IUGG.
- Adopted the Terms of Reference for Union standing and ad-hoc Committees and approved the membership of the committees.
- Endorsed the decision of the IUGG Bureau to request the IUGG Capacity Building and Education Committee to develop a Science Education Policy of the Union.
- Set up an ad-hoc working group to develop an action plan for visioning and a strategic plan of IUGG for 2016-2023.

- Adopted new IUGG Honor and Recognition Program.
- Approved the Memorandum of Understanding between IUGG and the Local Organizing Committee for the XXVI IUGG General Assembly.
- Appointed Dr. Christophe Cudenneq (France) as the IUGG liaison to the International Hydrological Program of UNESCO, because Dr. P. Hubert (France) stepped down from the position of the IUGG liaison.
- Endorsed active participation of IUGG in the Future Earth Programme of ICSU.
- Endorsed IUGG cooperation with GeoUnions. Namely, endorsed the decision of the IUGG Bureau on the co-sponsorship of the International Year for Global Understanding, a program of IGU. Recommended development of cooperative scientific links between IUGG and IUGS on the IUGS initiative “Resourcing Future Generations” and on joint congresses.

IUGG Secretariat

The Statutes and By-laws provide that the daily affairs of the Union are managed by an elected Secretary General who attends to correspondence, circulates information, preserves the records, prepares reports of the Union’s activities, and arranges meetings of the General Assembly, the Council, the Executive Committee and the Bureau, including preparing and distributing the agendas and the minutes of all their meetings. Additional activities of the Secretariat:

- Produced the monthly IUGG E-Journal, the annual Yearbook, and the annual Report.
- Maintained, redesigned and expanded the IUGG webpage.
- Conducted ballots by correspondence concerning the Union admission.
- Issued the calls for support of meetings and inter-disciplinary projects, and facilitated the awards.
- Facilitated the work of the IUGG Commissions and Committees.
- Revised the Guidelines on IUGG Administration.
- Maintained close cooperation with the ICSU Secretariat and with GeoUnions Officers and promoted joint activities of IUGG with other international organizations.
- Supported the Scientific Programme Committee and the Local Organizing Committee in preparations for the 2011 General Assembly.

The office of the IUGG Secretariat moved in 2013 from Karlsruhe to Potsdam and is located now at the German Research Centre for Geosciences in Potsdam (GFZ-Potsdam). The Secretariat is managed by the IUGG Secretary General and the Assistant Secretary General / Executive Secretary. The German Research Foundation (DFG) supports the IUGG Secretariat and some business trips of the Secretary General. IUGG is very thankful for this generous support from GFZ-Potsdam and DFG.

IUGG Electronic Journal

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

IUGG Yearbook

The IUGG Yearbook is a reference document of IUGG members, administrative officers, and Association and Union Commission officers that is updated annually and distributed free of charge. Each issue endeavors to update the contact information for hundreds of persons who are actively participating in IUGG scientific activities. Information is compiled throughout the year until end December. The Yearbooks are published and posted at the IUGG website at the beginning of the year (<http://www.iugg.org/publications/yearbooks/>).

IUGG Annual Report

The IUGG Annual Report summarizes the activities of the Union, IUGG Associations and Union and Inter-Unions Commissions. The Annual Reports are published and posted at the IUGG website (http://www.iugg.org/publications/reports/annual_rep.php).

IUGG Website

The IUGG website (<http://www.iugg.org>), in English and French, is maintained by the IUGG Web-master Dr. Dmitry Krupsky and gets permanently updated.

IUGG on Facebook

To learn more about IUGG and to keep interested individuals updated on Union's activities and the IUGG General Assembly 2015, the IUGG Secretariat launched an IUGG Facebook page on 11 October 2013 (<https://www.facebook.com/InternationalUnionGeodesyGeophysics>). Currently, more than 2,500 people are following IUGG on Facebook. Thank you for your support!

IUGG Central Electronic Library (CEL)

The IUGG Secretariat together with the library at the Albert Einstein Science Park, Potsdam, Germany, initiated a project to develop a web-based IUGG Central Electronic Library (CEL) to (i) archive, (ii) present, and (iii) publish IUGG related documents at one single platform. IUGG-related documents include reports, yearbooks, newsletters, conference abstracts, oral/poster presentations etc. originating from the IUGG and its Union Associations, Union Commissions, Committees, Liaisons, Research Programs, and Science Education Events. Such an electronic library will increase the visibility of IUGG activities and will offer a new platform to present and publish scientific output.

IUGG Web-Conferencing Software

The Secretariat adopted a web-conferencing software for the IUGG, which supports real-time communication among IUGG Bureau and Executive Committee Members across geographically dispersed locations through: text-based instant messages, voice and video chat, online presentations, web conferences, and desktop sharing enables participants to increase communication, reduce travel expenses and conserve time, increase productivity, and accelerate the decision-making process. The first teleconference of the IUGG Bureau was successfully conducted in November 2014.

IUGG Exhibition Booth

To further increase the visibility of the IUGG and to promote the IUGG General Assembly 2015, the IUGG Secretariat together with C-IN, the professional conference organizer of the General Assembly, organized an exhibition booth at the EGU General Assembly 2014, Vienna, Austria, the AOGS Annual Meeting 2014, Sapporo, Japan, and the AGU Fall Meeting 2014, San Francisco, USA. The IUGG Brochure has been updated and re-designed. The new brochure can be downloaded from the IUGG website (<http://www.iugg.org/about/brochure.pdf>).

Travel of the Secretary General

Presence of IUGG officers at business and scientific meetings of IUGG, Union Associations, Union Commissions, National Committees, and sister geoscience organizations help to strengthen the links between IUGG bodies and other organizations. During the quadrennium, I attended the following meetings:

2011	2-6 April	General Assembly of the European Geosciences Union (EGU)	Vienna, Austria **
	13-15 April	Meeting of the Austrian National Committee for IUGG	Vienna, Austria **
	3-7 May	International Conference "Geoinformaiton for Disaster Management" (ISPRS-GI4DM 2011)	Antalya, Turkey **
	12-14 May	Scientific Panel, IGU initiative on International Year on Global Understanding	Jena, Germany **
	8-10 June	CTBTO Conference on Science and Technology	Vienna, Austria **

	23 June – 12 July	IUGG General Assembly	Melbourne, Australia
	19-22 September	General Assembly of the International Union of Radio Sciences (URSI)	Istanbul, Turkey **
	25 September - 1 October	General Assembly of the International Council for Sciences (ICSU)	Rome, Italy *
	20 October	Meeting of Scientific Executive Director and Spokesman of the Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences	Potsdam, Germany
	29 October – 5 November	International Conference “Integrated Research on Disaster Risk” (IRDR)	Beijing, China *
	16-19 November	World Science Conference	Budapest, Hungary
	27-30 November	European Science Foundation-COST High-Level Research Conference "Extreme Geohazards"	Sant Feliu de Guixols, Spain **
	3-9 December	Fall Meeting of the American Geophysical Union (AGU)	San Francisco, USA *
2012	20-25 February	International Workshop on Earthquake and Volcanic Hazards and Risks in Asia-Pacific Region(G-EVER)	Tsukuba, Japan **
	23-26 April	General Assembly of the European Geosciences Union	Vienna, Austria **
	27-29 April	Meeting of the ICSU GeoUnions	Istanbul, Turkey
	15-18 May	International conference "Moldavian Risk - From Global to Local Scale"	Bacau, Romania **
	11-12 June	Meeting of the Science Program Committee of the CTBTO Science & Technology Conference 2013	Vienna, Austria **
	9 July	Opening of the IUGG Secretariat at GFZ-Potsdam	Potsdam, Germany
	11 July	Meeting with the UNESCO Assistant Director General for Natural Sciences	Paris, France **
	15-21 July	Bilateral Presidential US-Russian Symposium on Geohazards in the North Pacific region	Moscow, Russia **
	12-17 August	General Assembly of the Asia-Oceania Geosciences Society (AOGS)	Singapore *
	19-22 August	General Assembly of the European Seismological Commission (ESC) of IASPEI	Moscow, Russia *
	1-8 December	AGU Fall Meeting	San Francisco, USA *
	9-12 December	IUGG GeoRisk Commission Conference	Orange, USA *
2013	21 January	Meeting with the President of the German Adhering Body	Hannover, Germany
	20 February	Meeting of the UNESCO Chief of Unit a.i., Cross-Cutting Thematic Unit on Disaster Risk Reduction	Paris, France **
	21-22 March	Meeting of the Science Program Committee for CTBTO Science and Technology Conference 2013	Vienna, Austria **
	7-12 April	EGU General Assembly	Vienna, Austria *
	27-30 April	ICSU Unions Meeting	Paris, France *
	13-19 May	AGU Joint Meeting of the Americas	Cancun, Mexico *
	30 May- 2 June	Meeting with the Local Organizing Committee of the 26 th IUGG General Assembly	Prague, Czech Republic

	16-19 June	CTBTO Science and Technology Conference 2013	Vienna, Austria **
	7-13 July	DACA-13: Scientific Assembly of IACS and IAMAS	Davos, Switzerland
	21-26 July	Joint Scientific Assembly of IAHS-IAPSO-IASPEI	Gothenburg, Sweden *
	2-4 September	U.N. OOSA Conference on Disaster Risk Management	Vienna, Austria
	19-24 September	IUGG Bureau, Executive Committee and Scientific Program Committee meetings	Prague, Czech Republic
	30 September - 5 October	International Conference "Geophysical observatories, multifunctional GIS and data mining"	Kaluga, Russia *
	12-15 November	Meeting of the IRDR Scientific Committee	Sanya, China
	17-19 November	Meeting of the ICSU GeoUnions	Antalya, Turkey
	7-14 December	AGU Fall Meeting	San Francisco, USA *
2014	8-11 January	50 th anniversary of the Indian Geophysical Union	Hyderabad, India
	13-16 January	GEO-X Plenary	Geneva, Switzerland
	27 April - 3 May	EGU General Assembly	Vienna, Austria *
	31 May - 6 June	IUGG CMG symposium	Merida, Mexico *
	8 - 14 June	IUGG Bureau Meeting	Baku, Azerbaijan
	14-16 July	PremCom1 meeting of the U.N. World Conference on Disaster Risk Reduction	Geneva, Switzerland
	2-10 August	COSPAR General Assembly	Moscow, Russia *
	23-28 August	General Assembly, ESC-IASPEI	Istanbul, Turkey *
	30 August – 4 September	General Assembly of ICSU	Auckland, New Zealand *
	20-22 October	Science Program Committee Meeting of the CTBTO	Vienna, Austria
	24-27 October	First CNC-IUGG Conference on Future Earth	Beijing, China **
	13-14 November	GEO-XI Plenary	Geneva, Switzerland
	17-21 November	IUGG GRC Conference	Madrid, Spain *
	14-19 December	AGU Fall Meeting	San Francisco, USA *
2015	24 February	Scientific Program Committee Meeting of the 26 th IUGG General Assembly	Prague, Czech Republic

* *Travel paid (in full or partially) by the German Research Foundation (DFG) via the special travel grant to the IUGG Secretary General.*

** *Travel paid (in full or partially) from other sources.*

Acknowledgments

It has been an honor and a privilege to serve IUGG in this office since July 2007. I have benefited enormously from the guidance and assistance of the members of the IUGG Executive Committee during the past eight years, especially President Tom Beer, President Harsh Gupta, and Treasurer Aksel Hansen. I am thankful to all Bureau Members for their cooperation and support. Also I am very grateful to the Association Presidents and Secretaries General for their contribution to our joint work for IUGG and Union Associations.

The office of the Secretary General has been hosted by the Karlsruhe Institute of Technology (2008-2012) and by the GFZ-Potsdam (since 2012). The position of the Assistant Secretary General (ASG) was financially supported by grants from the German Research Foundation (DFG) and by GFZ. The GFZ's generous offer permitted the hire of a full time ASG / Executive Secretary, who helped to manage the Union. It has been my pleasure to work with Ms. Simone Oswald (2008-2012) and with Dr. Franz Kuglitsch (since 2012), whose support of the duties of the Secretariat cannot be underestimated. I have appreciated Simone's and Franz's talent, punctuality, discipline, language skills, humor, and friendship. I have benefited from the extraordinary experience of working with excellent scientists to promote the mission and goals of IUGG and Earth and space sciences worldwide.

Alik Ismail-Zadeh

4.3. Quadrennial Report of the Treasurer (2011-2014) / Rapport quadriennal du Trésorier (2011-2014)

Preliminary Report 2012 – 2015 and Final accounting 2008 – 2011

Introduction

This report will be presented for the Council at the upcoming XXVI IUGG General Assembly in Prague. It contains a financial part and some statistical information about the status of the members of IUGG. Accounting and budget spreadsheets are enclosed as 3 attachments:

- 1) The final accounting of the 2008 – 2011 quadrennium (year by year + accumulated) compared to the budget, (attachment 1).
- 2) A preliminary accounting for the present quadrennium 2012 – 2015 (year by year + accumulated), (attachment 2).
- 3) The 2012-2015 budget from Melbourne 2011, (attachment 3).

This procedure for reporting on the finances is a continuation of what was done at the General Assembly in Melbourne in 2011 and earlier.

With the General Assemblies normally taking place in the middle of the last year of a budget period it is not possible to give a full report on the finances of the quadrennium. Instead, it is accepted to present it at the next GA together with a preliminary accounting for the present quadrennium. Therefore in Prague the final accounting for the quadrennial report for 2008 – 2011 will be shown.

At the time of writing the preliminary report for 2012-2015 includes the year 2015 budget as a substitute for the accounting for the same year. But I also show a half-year accounting for 2015. In Prague in July it will be possible to present a better estimate of the accounting for 2015.

The budget for the period 2012 to 2015 is given in attachment no. 3. At the Bureau meeting in Prague, 2013, the Melbourne budget was slightly adjusted.

The final accounting for 2008 - 2011

As already stated at the GA in Melbourne the undesired accumulation of funds from the previous two 4-yr periods continued after 2007. This is clearly seen in the final accounting for the whole period 2008-2011. All in all, the balance at the end of the period was more than USD 300,000 higher than anticipated in the budget from Perugia in 2007. (see attachment 1). It was therefore decided in Melbourne to budget with a deficit for the present 4-yr period 2012-2015.

The preliminary accounting for the years 2012 - 2015

Income:

The first 3 years of the budget period 2012 – 2015 show lower income than given in the budget, due to less subscription paid the members and the fact that the interest has been zero.

After a short pause due to the international economical crisis in 2008-2010 the price of 1 unit is again going up. The price in 2015 is USD 1,905. Very close to the budget value.

Since 2004/2005, I have used a US Labor Department inflator index for September as the basis for calculation of the price of 1 unit for the following year. In 2009, the index went down leading to a lower price of 1 unit in 2010. But in 2011 and later the index has increased at a rate close to 2%/yr. Therefore, this inflation rate is used to construct the budget for the coming period too.

Only one country has withdrawn from IUGG in the present quadrennium. One or two more will maybe leave the union soon. Two new members have been admitted in the same period. A few paying members have moved to A-membership in contrast to one country that has decided to move to paying status from A-membership. Greece has paid a major part of its long term debt at the same time asking for a lowering of its category as of 2014.

Therefore, IUGG has now 70 members (January 1st, 2015), please see later for details.

In 2008 the Royal Society in London introduced a program to assist African countries in participating in the activities of unions like IUGG. This resulted in payments of dues for 3 former A-members of IUGG. However now after 7 years we must notice that none of these countries have been able to pay dues in the present period.

After a long time with a gradually decreasing number of units paid by the members we experienced a rather stable period around 2008-2011, but it appears that we now again may loose members. For instance in 2014 we have only received dues equivalent to 253 units, out of a total of 282 units.

Expenditures:

If we compare budget and accounting line by line we notice a reasonably good resemblance between the two set of numbers: e.g. travel expenses and line 14 symposia.

We have a small overspending in lines 12.1 and 12.2. In contrast we see a clear underspending in lines 18.3 and 18.4.

During the period, the ICSU program eGY-Africa terminated and a new one was initiated MAGNIO. IUGG is officially responsible for ICSU grants, but all money goes directly to the principal investigator.

Please, notice that some major spending items in 2015 are associated with the GA in Prague, but they have not yet been paid.

Balance:

Based on the above analysis it is expected that the total assets of IUGG as a union will be close to USD 5000.000 by the end of 2015. Which is close to one years turn over.

The US dollar has varied a lot during the last quadrennium, as usual one can say. This gives very variable buying power in different countries. It has been discussed if IUGG should change its basic currency to Euro, but no convincing arguments for a change have been put forward.

In general, one can say that the economical situation of IUGG is sound and that the net balance allows IUGG some flexibility.

However, it is very important that IUGG will be able to keep its present members in the union and at the same time attract new members. The problem of keeping the members in the union is serious and needs the full attention of the union and the member countries.

As Treasurer of IUGG, I want to thank every body I have been in contact with concerning IUGG business. In particular, I will send many thanks to Secretary General Alik Ismail-Zadeh and his assistant Franz Kuglitsch, with whom I have almost daily correspondence. Also thanks to the President Harsh Gupta and all other members of the Bureau, the Presidents and Secretary Generals/Treasurers of the Associations.

And also thanks to the Finance Committee. During the last few years my son has helped me in running the daily administration. Taking up a permanent job as geologist he had to stop earlier this year.

Aksel Walløe Hansen, Treasurer, IUGG

Appendix

- 1) Membership statistics

Attachments:

- 1) final accounting 2008 – 2011
- 2) preliminary accounting 2012 – 2015
- 3) budget 2012 – 2015 approved in Melbourne 2011, adjusted in Prague 2013

Membership statistics

In the following a summary of the relevant membership information is given.

First of all as of January 1st, 2015, IUGG has 70 member countries (1 up compared to 2011). IUGG has lost 1 member since early 2011, but we have welcomed 2 new members.

Monaco has left the union. New Members are Nicaragua and Saudi Arabia.

Recently, Greece has applied for a change to cat. 2. Costa Rica has moved to paying status in cat 1.

Morocco, DR Congo, Ghana, Armenia, Albania, Bosnia & Herzegovina have moved to A-membership.

The 70 members represent a total of 279 units. 10 members are A-members.

In early 2015 we have received full payments from 46 members representing a total of 244 units for 2014. The missing units are distributed over 14 members in various degrees of observer status.

Membership table 2014/2015

1) Payments for 2014 and member distribution 2015

Category	Units in Category	Number countries	Number of units	Paid 2014 numbers	(May 2015) units
A	0	10	0		
1	1	20	20	14	14
2	2	15	30	11	22
3	3	6	18	4	12
4	5	6	30	5	25
5	7	3	21	3	21
6	10	5	50	4	40
7	15	1	15	1	15
8	20	3	60	3	60
9	25				
10	30				
11	35	1	35	1	35
12	40				
13	45				
14	50				
Total		70	279	46	244 (number of units from paid-up members only)
USD (2015 values)			531.495		

The total amount of dues in arrears is USD 89,365. Over time, it is a substantial amount of money that is not paid by members in arrears with their dues and withdrawing without paying their debt.

Status of IUGG Members, May 1, 2015

Member Country	Category	Member Country	Category
10 adhering bodies in Bolivia Peru Mauritius Georgia Albania Armenia D.R. Congo Ghana Morocco Bosnia & Herzegovina	A	6 adhering bodies in Argentina Austria Brazil Finland Philippines South Africa	3 18 units observer, 2015 observer, 2011
1 adhering body in USA	11 35 units	15 adhering bodies in Chile Czech Republic Egypt Greece Hungary Ireland Korea, South Mexico Nigeria Pakistan Poland Portugal Saudi Arabia Thailand Turkey	2 30 units observer, 2014 wishes to move to Cat 2 observer, 2015 observer, 2015 new in 2013 observer, 2015
3 adhering bodies in Germany Great Britain Japan	8 60 units	20 adhering bodies in Azerbaijan Bulgaria Colombia Costa Rica Croatia Estonia Iceland Indonesia Iran Israel Jordan Luxembourg Macedonia Mozambique Nicaragua New Zealand Romania Slovak Republic Slovenia Vietnam	1 20 units observer, 2012 new in Cat 1 in 2015 observer, 2012 observer, 2015 observer, 2013 new in 2013, observer observer, 2015
1 adhering body in France	7 15 units		
5 adhering bodies in Canada China India Italy Russia	6 50 units observer, 2015		
3 adhering bodies in Australia Spain Switzerland	5 21 units		
6 adhering bodies in Academia Sinica Belgium Denmark Netherlands Norway Sweden	4 30 units observer, 2015		

IUGG Accounting and Budget, 2008 - 2011, Final

to be used at GA, Prague 2015

in US dollars	BUDGET				Budget 2008-2011	Accounting 2008-2011	ACCOUNTING			
	2008	2009	2010	2011			2008	2009	2010	2011
-										
RECEIPTS										
1. Membership Subscription	431.500	440.600	449.700	459.000	1.780.800	1.955.385	438.122	536.479	452.266	528.518
2. ICSU grant						39.526			39.526	
3. Assembly Surcharge				20.000	20.000	40.869	33.159			7.710
5. Sales of Publications	200	200	200	200	800	364	153	119	64	28
6. Miscellaneous										
a. Interest	12.500	12.500	12.500	12.500	50.000	21.915	16.483	5.563	-131	0
b. Gain on exchange						15.800		5.168	10.633	0
c. Other						1.782		115	0	1.667
d. Associations, surcharge						276.064	191.753			84.311
-	-	-	-	-	-	-	-	-	-	-
7. Total Receipts	444.200	453.300	462.400	491.700	1.851.600	2.351.706	679.669	547.444	502.357	622.235
8. Balance on 1/1	754.800	686.450	648.800	661.650	#####	747.055	747.055	784.511	883.918	854.089
-	-	-	-	-	-	-	-	-	-	-
EXPENDITURES										
11. Administration										
11.1 Personnel	20.000	20.000	20.000	20.000	80.000	71.474	29.120	13.779	14.831	13.744
11.2 Equipment	5.000	5.000	5.000	5.000	20.000	3.073	1.463	1.610	0	0
11.3 Supplies	5.000	5.000	5.000	5.000	20.000	9.123	2.904	4.412	0	1.807
11.4 Communications	8.000	8.000	8.000	8.000	32.000	19.693	78	0	5.799	13.816
11.5 Travel, Administration	50.000	60.000	35.000	70.000	215.000	219.177	50.556	60.683	21.306	86.632
11.6 Miscellaneous	1.000	1.000	1.000	5.000	8.000	60.292	3.282	22.502	12.994	21.515
11.6a Miscellaneous, ENHANS						23.025			18.590	4.435
11.6b Miscellaneous, associations						217.529	191.753			25.776
11.7 Travel, representation	5.000	5.000	5.000	10.000	25.000	21.413	8.570	4.449	4.798	3.595

in US dollars	BUDGET				Budget 2008-2011	Accounting 2008-2011	ACCOUNTING			
	2008	2009	2010	2011			2008	2009	2010	2011
12. New initiatives	50.000	50.000	25.000	25.000	150.000	90.344	10.000	5.418	64.926	10.000
13. General Assemblies										
13.1 Organization				10.000	10.000	10.135	0	0		10.135
13.2 Travelgrants				30.000	30.000	42.369		0		42.369
14. Symposia	20.000	20.000	20.000	5.000	65.000	68.109	19.500	21.001	19.607	8.000
15. Annual allocations						0				
15.1a Associations	238.600	211.000	215.600	220.200	885.400	990.830	223.075	238.761	298.384	230.610
15.1b WCRP, EMSEV	4.700	4.700	4.700	4.700	18.800	23.866	6.190	5.932	5.855	5.890
15.2 Intr. of IACS	20.000	20.000	20.000	20.000	80.000	22.980	22.980	0	0	0
16. Dues and Grants					0	0				
16.1 ICSU	17.000	17.000	17.000	17.000	68.000	89.406	21.899	25.372	20.157	21.978
17. Union					0	0				
17.1 GeoRisk, SEDI, CMG	30.000	24.000	28.000	24.000	106.000	55.874	14.000	10.000	19.874	12.000
17.2 Inter-Union Science (FAGS, ILP)	27.000	29.000	29.000	29.000	114.000	85.032	27.000	27.000	16.032	15.000
18. Countries in Need					0	0				
18.1 Travel grants	0	0	0	60.000	60.000	56.435		0	0	56.435
19. Miscellaneous					0	0				
19.1. Miscellaneous	0	0	0	0	0	0	0	0	0	0
19.2. Professional services	3.000	3.000	3.000	3.000	12.000	19.200	4.193	4.437	6.824	3.746
19.3. Fees	2.000	2.000	2.000	2.000	8.000	11.402	3.662	2.682	2.209	2.849
19.4. Loss on exchange	0	0	0	0	0	11.339	1.988	0	0	9.351
20. Contingencies	6.250	6.250	6.250	6.250	25.000	0	0	0	0	0
-	-	-	-	-	-	-	-	-	-	-
21. Total Expenditures	512.550	490.950	449.550	579.150	2.032.200	2.222.120	642.213	448.038	532.186	599.683
22. Balance on 31/12	686.450	648.800	661.650	574.200	#####	876.641	784.511	883.918	854.089	876.641
-	-	-	-	-	-	-	-	-	-	-

2012 - 2015 PRELIMINARY REPORT FINANCIAL REPORT, PRAGUE, 2015

US dollars	BUDGET				2012-2015	2012-2015	ACCOUNTING			BUDGET	1. half year	
	2012	2013	2014	2015			2012	2013	2014	2015	2015	
-												
RECEIPTS	No. Of units	275	275	275	275	paid units	271	270	253		89	
	Price of 1 unit	1.800	1.835	1.870	1.900		1815	1850	1875	1905		
1. Membership Subscription		495.000	504.600	514.200	522.500	2.036.300	1.888.024	429.172	499.163	437.189	522.500	293.266
2. Contracts with ICSU		30.000				30.000	65.707	25.707	0	40.000		0
3. Assembly Surcharge					20.000	20.000	20.000	0	0	0	20.000	0
4. Sales of Publications		200	200	200	200	800	1.268	0	0	1.068	200	0
5. Miscellaneous							0					0
a. Interest		12.500	12.500	12.500	12.500	50.000	12.500	0	0	0	12.500	0
b. Gain on exchange							10.347	8.361	1.985	0		0
c. Other							0	0	0	0		0
d. Cash in hand							1.000	0	0	1.000		1.000
-		-	-	-	-	-	-	-	-	-	-	-
6. Total Receipts		537.700	517.300	526.900	555.200	2.137.100	1.998.846	463.241	501.148	479.257	555.200	294.266
8. Balances on 1/1		766.600	708.700	638.500	588.100	#####	876.641	876.641	831.029	733.088	674.276	673.276
-		-	-	-	-	-	-	-	-	-	-	-
EXPENDITURES												
11. Administration												
11.1 Personnel		20.000	20.000	20.000	20.000	80.000	66.784	18.086	14.632	14.067	20.000	2.707
11.2 Equipment		5.000	5.000	5.000	5.000	20.000	7.996	0	2.908	88	5.000	0
11.3 Supplies		5.000	5.000	5.000	5.000	20.000	5.000	0	0	0	5.000	0
11.4 Communications		8.000	8.000	8.000	8.000	32.000	32.423	12.497	11.212	714	8.000	0
11.5 Travel, Administration only		50.000	65.000	50.000	70.000	235.000	255.452	43.757	93.994	47.701	70.000	13.889
11.6 Miscellaneous		1.000	1.000	1.000	5.000	8.000	8.691	242	2.434	1.015	5.000	300
11.6a Surcharge							58.384	58.384				0
11.7 Travel, representation		15.000	15.000	15.000	30.000	75.000	65.014	26	12.662	22.326	30.000	4.846

US dollars	BUDGET				2012-2015	2012-2015	ACCOUNTING			BUDGET	1. half year
	2012	2013	2014	2015			2012	2013	2014	2015	2015
-											
12. New Initiatives											
12.1 Education and outreach	30.000	30.000	30.000	30.000	120.000	102.043	20.000	30.043	22.000	30.000	20.000
12.2 Science	30.000	30.000	30.000	30.000	120.000	157.055	57.000	28.309	41.746	30.000	19.239
13. General Assemblies											
13.1 Organization				10.000	10.000	24.123	0	0	14.123	10.000	254
13.2 Travel				60.000	60.000	60.000	0	0	0	60.000	2.976
14. Symposia	30.000	30.000	30.000	0	90.000	85.239	29.960	23.338	31.941	0	0
15. Annual allocations											
15.1 Annual allocations	240.600	247.500	252.300	257.100	997.500	951.550	181.464	306.763	206.223	257.100	255.176
16. Dues and Grants											
16.1 ICSU	25.000	25.000	25.000	25.000	100.000	103.878	24.936	26.501	27.441	25.000	23.117
17. ICSU grants											
17.1 MAGNIO/eGY-Africa	30.000				30.000	62.130	7.879	14.138	40.113		
18. Union activities											
18.1 GRC, SEDI, CMG, UCIDI	18.000	18.000	18.000	18.000	72.000	70.000	24.000	12.000	16.000	18.000	0
18.2 Inter-Union Science (ILP)	15.000	15.000	15.000	15.000	60.000	60.928	15.000	15.000	15.928	15.000	0
18.3 Liaison Officers	30.000	30.000	30.000	30.000	120.000	48.056	13.289	0	4.766	30.000	0
18.4 International Scientific Programs	25.000	25.000	25.000	25.000	100.000	34.667	0	3.000	6.667	25.000	0
18.5 New commissions (CCEC)	5.000	5.000	5.000	5.000	20.000	20.000	0	0	15.000	5.000	0
19. Countries in need											
19.1 Travel Grants, General Assemblies	0	0	0	90.000	90.000	90.000	0	0	0	90.000	0
20. Fees											
20.1 Professional services	5.000	5.000	5.000	5.000	20.000	5.000	0	0	0	5.000	0
20.2 Bank fees	3.000	3.000	3.000	3.000	12.000	10.599	2.332	2.156	3.111	3.000	627
21. Contingencies	5.000	5.000	5.000	5.000	20.000	5.000				5.000	0
22. Loss on exchange									7.100		6.696
-	-	-	-	-	-	-	-	-	-	-	-
23. Total Expenditures	595.600	587.500	577.300	751.100	2.511.500	2.390.010	508.852	599.089	538.069	751.100	349.826
24. Balances on 31/12	708.700	638.500	588.100	392.200	392.200	#####	831.029	733.088	674.276	478.376	617.716
-	-	-	-	-	-	-	-	-	-	-	-

**IUGG Budget 2012 - 15, approved July 6, 2011, Melbourne,
Changed per October 2012**

Based on discussions at Bureau meetings in Cairo, 2010, and in Melbourne

Approved by Finance Committee and Executive Committee in Melbourne, 2011

All figures, except the value and number of units, are in thousands of US dollars

						Total
Year	2011	2012	2013	2014	2015	2012-2015
Estimated unit value	\$1.750	\$1.800	\$1.835	\$1.870	\$1.900	\$1.851
Estimated number of units	275	275	275	275	275	1100
INCOME						
1. MEMBERSHIP DUES	481,3	495,0	504,6	514,2	522,5	2036,3
2. ASSEMBLY SURCHARGE					20,0	20,0
3. SALES OF PUBLICATIONS, ETC		0,2	0,2	0,2	0,2	0,8
4. MISCELLANEOUS (interest)		12,5	12,5	12,5	12,5	50,0
5. ICSU GRANTS		30,0				30,0
6. TOTAL INCOME		537,7	517,3	526,9	555,2	2137,1
7. BALANCE 1/1		766,6	708,7	638,5	588,1	
EXPENDITURES						
11. ADMINISTRATION		104,0	119,0	104,0	143,0	470,0
11.1 Personnel		20,0	20,0	20,0	20,0	80,0
11.2 Equipment		5,0	5,0	5,0	5,0	20,0
11.3 Supplies		5,0	5,0	5,0	5,0	20,0
11.4 Communication		8,0	8,0	8,0	8,0	32,0
11.5 Travel, organizational		50,0	65,0	50,0	70,0	235,0
11.6 Miscellaneous		1,0	1,0	1,0	5,0	8,0
11.7 Travel, representative		15,0	15,0	15,0	30,0	75,0
12. NEW INITIATIVES		60,0	60,0	60,0	60,0	240,0
12.1 Education and outreach		30,0	30,0	30,0	30,0	120,0
12.2 Science		30,0	30,0	30,0	30,0	120,0
13. ASSEMBLIES		0,0	0,0	0,0	70,0	70,0
13.1 Organization		0,0	0,0	0,0	10,0	10,0
13.2 Travel Grants		0,0	0,0	0,0	60,0	60,0
14. SYMPOSIA		30,0	30,0	30,0	0,0	90,0
14.1 Symposia		30,0	30,0	30,0	0,0	90,0
15. ASSOCIATIONS		240,6	247,5	252,3	257,1	997,5
15.1 Allocations		240,6	247,5	252,3	257,1	997,5
16. DUES		25,0	25,0	25,0	25,0	100,0
16.1 ICSU		25,0	25,0	25,0	25,0	100,0
17. ICSU GRANTS		30,0				30,0

17.1 eGY-Africa	30,0				30,0
18. UNION ACTIVITIES	93,0	93,0	93,0	93,0	372,0
18.1 GRC, SEDI, CMG, UCDI	18,0	18,0	18,0	18,0	72,0
18.2 Inter-Union Science (ILP)	15,0	15,0	15,0	15,0	60,0
18.3 Liaison Officers	30,0	30,0	30,0	30,0	120,0
18.4 International Scientific Programs	25,0	25,0	25,0	25,0	100,0
18.5 New commissions	5,0	5,0	5,0	5,0	20,0
19. COUNTRIES IN NEED	0,0	0,0	0,0	90,0	90,0
19.1 Travel Grants, General Assemblies	0,0	0,0	0,0	90,0	90,0
20. FEES	8,0	8,0	8,0	8,0	32,0
20.1 Professional Services	5,0	5,0	5,0	5,0	20,0
20.2 Bank Fees	3,0	3,0	3,0	3,0	12,0
21. CONTINGENCIES	5,0	5,0	5,0	5,0	20,0
22. TOTAL EXPENDITURES	595,6	587,5	577,3	751,1	2511,5
23. BALANCE 12/31	708,7	638,5	588,1	392,2	

The shaded lines under EXPENDITURES represent subtotals for each line of expenditures

18.1 GRC	8	8	8	8
SEDI	4	4	4	4
CMG	4	4	4	4
UCDI	2	2	2	2
SUM	18	18	18	18
12.1 ICTP	20	20	20	20
grant programme	20		20	
12.2 grant programme	60		60	
History group	5			

4.4. Quadrennial Report of the Vice-President (2011-2014) / Rapport quadriennal du Vice-président (2011-2014)

Involvement in IUGG activities

As a member of IUGG's Bureau and Executive Committee (EC), I participated in all the Bureau and EC meetings held in Melbourne, Australia (2011), Lauterbad, Germany (2012), Prague, Czech Republic (2013) and Baku, Azerbaijan (2014).

At the request of the IUGG President, I represent IUGG at the 2013 Scientific Assembly of the IAG in Potsdam, Germany. In this Assembly, IAG celebrated its 150th Anniversary, and I delivered a welcome address on behalf of IUGG at the opening ceremony. The event was hosted, and expertly organized, by the GFZ (GeoForschungsZentrum Potsdam), which has also been hosting IUGG's Secretariat since 2012.

I also represented IUGG at the 68th Executive Committee Meeting of the International Union of Geological Sciences (IUGS), held in January 2015 in Vancouver, Canada. The IUGG-IUGS relationship was on the agenda of that meeting. After a very fruitful discussion, the IUGS President, Prof. Roland Oberhänsli, committed to strengthening the ties between the two Unions, by expanding future collaborative activities, including exploring the possibilities of holding joint sessions and conferences, and/or organizing a joint General Assembly. At the same meeting, Prof. Patrick Mc Keever, Chief of UNESCO's Earth Sciences and Geohazard Risk Reduction section, welcomed further collaboration between IUGG and UNESCO, including possible future involvement of IUGG in the International Geoscience Programme (IGCP).

I have organized and will be the convener of Union Symposium 11 (U11) at the 2015 XXVI IUGG General Assembly (GA) in Prague. U11 is the Early Career Scientists Symposium, which is specifically designed to attract, and highlight the contributions of, young scientists to geodesy and geophysics. Twelve invited presentations will be made, ten of which will be from the winners of the IUGG Early Career Scientist Award who will share their experiences, successes, expectations, suggestions and/or concerns on the future of geosciences.

In regards to IUGG committees, I prepared terms of reference for the new Outreach Committee, which will be chaired by the Vice-President. The committee's main task is to organize and manage IUGG's communication, promotion, public information and general outreach activities, including communication and possible collaboration with IUGG-related sectors of the industry. I was also an ex-officio member of the Status and Bylaws Committee, which worked on revising IUGG's constitution towards improving the decision making and voting procedures by the Council, the eligibility of individual scientists for election in various leadership positions, and membership issues.

In my position as Vice-President I also had to oversee the activities of IUGG's Commissions and the Working Group on History (WGH). A brief report on the work of the Commissions and the WGH follows.

Report on the activities of the IUGG Commissions

All Union Commissions were very active during the past four years. Although there have been some administrative and personnel changes, below I am briefly summarizing only their main scientific activities and achievements.

The newest Union Commission is the one on Climatic and Environmental Change (CCEC). It was established by the IUGG EC in 2012 to promote the scientific understanding of climatic and environmental change, and provide a focus for scientific expertise in climate and environment-related areas for all IUGG disciplines and Associations. During the past quadrennium, CCEC was very successful in achieving its main tasks. These were: to prepare an IUGG position statement for the new ICSU Program, Future Earth; to advance the Weather, Climate and Food Security (WeatCliFS) initiative; and to act as the IUGG liaison for the World Meteorological Organization (WMO) Global Framework for Climate Services. The Commission held its inaugural meeting and Future Earth

workshop in Beijing in April 2014. The workshop concentrated on research activities relevant to geophysicists, with presentations by the Presidents of the International Union of Food Science and Technology (IUFoST), the International Society of Photogrammetry and Remote Sensing (ISPRS), and the Executive Director of Future Earth. The workshop also identified scientific activities that could be used to foster linkages between the geodetic and geophysical communities, such as water resources (IAHS/IAG), sea level rise (IAPSO/IACS), climate extremes and food (IAMAS/IAVCEI), East Asia and the monsoon (IAMAS/IAHS), space weather and sustainability (IAGA / IAMAS), and urban risks. CCEC also co-organized and will be convening Union Symposium U1 at the IUGG GA in Prague on “Future Earth and Sustainability”.

The Union Commission on Mathematical Geophysics (CMG) continued to focus on the organization and co-organization of workshops and conferences on Mathematical Geophysics. In the last quadrennium, these were as follows: CMG biennial Meeting in Edinburgh, Scotland, June 18-21, 2012; two research workshops as a part of global program Mathematics of the Planet Earth on “Statistics and Triggering of Earthquakes”, August 30-September 1, 2013 in Banff, Canada, and on “Dynamics of Seismicity, Earthquake Clustering and Patterns in Fault Networks” in October 9-11, 2013 in North Carolina, USA; education and capacity-building workshop on “Mathematics of Climate Change, Related Hazards and Risks”, July 29-August 2, 2013 in Guanajuato, MEXICO; and CMG biennial Meeting in Merida, Mexico, June 2-6, 2014. CMG is working on organizing the next CMG biennial meeting in the summer of 2016 in Paris, France. NSF support will be sought to support the participation by early-career scientists in this meeting. The Union Symposium U3 on “Mathematics and Observations of Earth Systems” at the 2015 IUGG GA is co-organized will be convened by the CMG.

The Union Commission on Geophysical Risk and Sustainability (the GeoRisk Commission, GRC) is promoting scientific studies for the reduction of risk from natural hazards and is providing hazard data to public officials for reducing death toll and destruction. In 2013, GRC updated their Terms of Reference and in 2014 launched their new web site (<http://www.iugg-georisk.org/>). The GRC organized the 1st GRC Conference on “Extreme Natural Hazards and Their Impacts”, December 8-11, 2012 in Orange, California, USA, and the 2nd GRC Conference on “Improving Geophysical Risk Assessment, Forecasting, and Management”, 18-21 November, 2014 in Madrid, Spain. Both conferences were well attended and included panel discussions on topics like “Disaster Risks: Communication between Science and Society” and “The Risk of Extreme Geohazards: How prepared is a globally interdependent society?” The 3rd GRC Conference is planned for 2016. During the IUGG GA in Prague, the GRC will hold jointly with IAHS, IRDR, IAVCEI, IAPSO, IACS, IASPEI, IAG, IAGA, Union Symposium U2 on “Integrated Disaster Risk Science: Accounting for Extremes”.

The Union Commission on the Study of the Earth’s Deep Interior (SEDI) cuts across the traditional discipline-oriented bounds of the IUGG Associations, linking in particular with IAG, IAGA, IASPEI and IAVCEI in order to generate the most coherent and consistent picture of the workings of the Earth’s deep interior. SEDI’s main activity has been the organization of a dedicated symposium/workshop every even year. Two such meetings were organized in 2012 and 2014: The 13th SEDI Symposium in Leeds, UK, on July 1-6, 2012 and the 14th SEDI International Symposium in Kanagawa, Japan, on August 3-8, 2014. The SEDI 2012 Proceedings were published in a Special Issue of Physics of the Earth and Planetary Interiors (Volume 223, Special Issue, 2013). Contributions from the SEDI 2014 symposium are currently under review and will be published in a special issue of Progress in Earth and Planetary Science. The 15th SEDI workshop will be held in Nantes, France, in late July 2016. At the forthcoming IUGG GA in Prague, SEDI is co-organizing and will convene Union Symposium U5 on “New Discoveries in Deep Interiors of Earth and Planets”.

The Union Commission on Data and Information (UCDI) main objective is to enable IUGG’s Associations to deal with data and information issues at the Union level, and engage with similar bodies in other Unions and Societies by supporting and advancing data and metadata standards across the Union and by promoting open access to data and adoption of inter-operable data sets internationally. UCDI represented IUGG at meetings, committees, and task forces of ICSU’s Committee on Data for Science and Technology (CODATA) and World Data System (WGS), and the Research Data Alliance (RDA). In addition, UCDI continued liaisons with international organizations such as IUGS/CGI (Commission on Geoscience Information), IAU/WGAD (Working Group on

Astronomical Data), EGU/ESSI (Earth and Space Science Informatics), and AGU/ESSI (Earth and Space Science Informatics). At the 2015 IUGG GA, UCDI is co-organizing and convening the U4 Union Symposium on “Data Science and Analytics in Geodesy and Geophysics – Research and Education Progress and Opportunities.”

The Union Working Group on History (WGH) was established in 2012 with representatives from all IUGG Associations. Its primary tasks were to raise the historical consciousness of IUGG members and to preserve the IUGG scientific and institutional history. The WGH sponsored symposia at Association meetings. In particular, at the joint IAMAS-IACS Assembly in Davos, Switzerland from 8 – 12 July, 2013, it held a symposium entitled “A Century of international Cooperation in Geophysics: Examples from IACS and IAMAS”. The IAG Scientific Assembly in Potsdam, Germany from 1 to 6 September, 2013 featured a special History Session to commemorate the 150th anniversary of the IAG. At the IUGG GA in Prague, WGH is co-organizing and convening Union Symposium U9, titled “Revolutions in Earth Sciences: from Different Spheres to a Common Globe.” The WGH is also contributing to the Joint Symposium JA6 “Data on the Edge: Preservation and Utilization of Historical Data in the Geosciences.” It is also worth mentioning that, after an initiative by the IUGG Secretary General (SG), Dr. Alik Ismail-Zadeh, and with input from the WGH, former IUGG SG Dr. Jo Ann Joselyn has agreed to write the commemorative volume for the 2019 centenary of the IUGG. The WGH will identify co-authors to review scientific progress during the last 100 years for each of the Associations.

Involvement in IAG activities

In addition to the work mentioned above, I have also been contributing to IUGG activities indirectly during the past four years through my work for the International Association of Geodesy (IAG) as its Past President. Besides serving on the IAG EC and attending its meetings, I chaired three of its committees: the Nominations Committee which prepared the nominations and will oversee the election of new officers for the period 2015-2019, the Cassinis Committee, which reviewed the Status and Bylaws and proposed revisions to the IAG Council, and the Selection Committee for the Levallois Medal that is given in recognition of distinguished service to the Association and/or to the science of geodesy in general. In addition, I have been serving on the Coordinating Board of IAG’s Global Geodetic Observing System (GGOS) and chairing GGOS’s Theme 1: Unified Height Systems.

I was member of scientific and organization committees for several IAG and IAG-sponsored conferences, and I organized and convened several scientific sessions (including some at AGU and EGU annual meetings). I also was a co-author, and co-edited with past IAG President, Prof. Fernando Sanso, of the book “Geoid Determination - Theory and Methods” published in 2013 in Springer’s Lecture Notes in Earth System Sciences series, and contributed two articles on geoid determination to the Encyclopedia of Solid Earth Geophysics (2011) edited by IUGG’s President, Dr. Harsh Gupta. IAG was able to secure a geodetic session titled “Seeing Earth in the ‘Light’ of Gravity: New Views Through Satellite Geodesy” at the 2015 Annual Meeting of the prestigious American Association for the Advancement of Science (AAAS), held in San Jose, California, on Feb 12-16, 2015. I was invited to give a talk there titled “Building on the Geoid to Harmonize Height Systems Globally.” At the 2015 IUGG GA, besides the U11 Symposium mentioned earlier, I also co-organized and will co-convene the IAG Symposium G06 “Unified Height System”.

Acknowledgements

I would like to acknowledge the leadership and members of the IUGG Commissions and the WGH for their outstanding scientific work and for their prompt reporting. I am also grateful to have worked with all colleagues in the IUGG EC, Bureau and Secretariat, and would like to acknowledge their support and cooperation, and particularly their dedication and individual contributions to the Union. They have made my work easier, and a pleasure and an honour.

Michael Sideris, IUGG Vice President

4.4.1. Commission on Climate and Environmental Change (CCEC) / Commission sur le changements climatiques et environnementaux

INTRODUCTION

The Union Commission on Climatic and Environmental Change (CCEC) was established by the Executive Committee of IUGG in June 2012 in order to promote the advancement of scientific understanding of climatic and environmental change, to boost research in reducing uncertainties in climate and environmental models, to define criteria for collaborative trans-disciplinary research on climate and environmental change, to fulfil the objectives of IUGG and its associations, to provide an all-Union perspective on climatic and environmental change, and to make available the knowledge and insights developed through scientific research to the benefit of society and planet Earth, including consideration of the science of global change, related vulnerability and impacts, and potential responses.

CCEC provides a focus for IUGG scientific expertise in climate and environment related areas across the breadth of all IUGG disciplines and associations. CCEC enables the breadth of IUGG expertise to be brought to bear at the global level through collaborating with, and underpinning the work of ICSU and other international organizations. It also enables the geographic spread of IUGG expertise to be brought to bear at the local level through involvement with national bodies in the organization of meetings and other activities.

Objectives

- To build scientific capacity for responsibly addressing the broad, multi-disciplinary issues involved in climatic and environmental change;
- To provide useful information, understanding, and support to the public and governmental organizations;
- To interact and cooperate with outside activities that would benefit from the capabilities and resources of the IUGG Associations; and
- To strengthen links across the Scientific Associations within IUGG, to build new external links to organizations outside IUGG, to strengthen existing links to external organizations and to promote IUGG's contribution to global change research.

ADMINISTRATION

The following are current officers of the Commission:

Chair: Tom Beer (Australia)

Vice Chair: Jianping Li (China)

Secretary-Treasurer: Keith Alverson (USA)

Administrative activities during 2012 included approval of a logo and the development of a web site <http://ccec-iugg.org> that was launched on 14 January 2013. Information about CCEC is also available on the main IUGG web page at <http://www.iugg.org/about/commissions/ccec.php>

ACTIVITIES

Summarized, the work of CCEC during the past quadrennium was:

1. To prepare an IUGG position statement for the new ICSU Program, Future Earth.
2. To hold the Inaugural CCEC Meeting and Future Earth workshop in Beijing in April 2014.
3. To advance the Weather, Climate and Food Security (WeatCliFS) initiative.
4. To act as the IUGG liaison for the WMO Global Framework for Climate Services.
5. To organise a session (Session U1) at the IUGG General Assembly in Prague, and to hold a business meeting of CCEC at the General Assembly.

Future Earth

CCEC prepared a statement on possible IUGG involvement in Future Earth and supplied it to the IUGG Secretariat. The statement is available on the CCEC web site at:

<http://ccec-iugg.org/content/iugg-briefing-document-future-earth>

The statement makes the following points:

- IAMAS has issued a statement in relation to Future Earth.
- IAHS envisages that Panta Rhei could be a Future Earth activity.
- CCEC envisages that WeatCliFS could be a Future Earth activity.

The relationship between IUGG and Future Earth could be undertaken by CCEC being accorded the status of a Future Earth Committee, analogous to a National Committee.

In Appendix 1, the original text prepared by CCEC is given which was supplied to the IUGG Secretariat and which differs slightly from the final version of the IUGG.

First CCEC Meeting

The first workshop of CCEC brought together scientists from China, the United States, Japan, Denmark, Australia, France, Kenya, Luxembourg, and Turkey gathered at the Institute for Atmospheric Physics of the Chinese Academy of Sciences in Beijing from 11-12 April 2014 to discuss ways to strengthen multi-disciplinary research through internal IUGG linkages; and to examine ways to extend these links to interdisciplinary research by linking in to Future Earth (<http://www.futureearth.info/>) – a new interdisciplinary research program that is being established as a successor to the Earth System Science Partnership.

The first day of the workshop concentrated on research activities with which geophysicists can link with presentations by the Presidents of the International Union of Food Science and Technology (IUFoST), the International Society of Photogrammetry and Remote Sensing (ISPRS) and a Skype presentation by the Executive Director of Future Earth. These global perspectives were complemented by regional perspectives from the Chair of the Chinese Committee of IUGG, and from a member of the Future Earth Science Committee both of whom focused on Asian perspectives of Future Earth. The WMO and UNEP representatives to the meeting pointed out that existence of a recent international research programme, also sponsored by UNESCO, called PROVIA (Programme of Research on Climate Change Vulnerability, Impacts and Adaptation, see <http://www.unep.org/provia/>).

The second day of the workshop concentrated on scientific activities that could be used to foster internal linkages between and within the geodetic and geophysical communities. Though these are relatively straightforward and obvious in relation to meteorology and atmospheric sciences-through climate change; and in relation to the hydrological sciences through Panta Rhei it was noted that disparate fields such as geodesy can have links to hydrology through the ability of satellites such as GRACE accurately to map the gravity field, and hence the total radial mass at a given point on the earth's surface. Changes in the total liquid water content can thus be accurately deduced – though its partition into surface and ground water remains as a field of enquiry.

The participants identified six areas of possible linkages:

- Water Resources (IAHS/IAG)
- East Asia and the Monsoon (IAMAS/IAHS)
- Sea Level Rise (IAPSO/IACS)
- Space Weather and Sustainability (IAGA / IAMAS)
- Climate Extremes and Food (IAMAS/IAVCEI)
- Urban Risks

The workshop was sponsored by CCEC and hosted by the State Key Laboratory of Numerical Modelling for Atmospheric Sciences and Geophysical Fluid Dynamics (LASG), Institute of Atmospheric Physics (IAP); It was proposed and generously co-sponsored by China Association for Science and Technology(CAST), National Natural-Science Foundation of China (NSFC), Chinese

Academy of Sciences (CAS), International Union of Geodesy and Geophysics (IUGG), Chinese National Committee for IUGG (CNC-IUGG), International Association of Meteorology and Atmospheric Sciences (IAMAS), The International Commission on Climate (ICCL) and National Basic research Program of China (973 Program).

A report of the meeting was published in EOS as: Beer, T., Li, J-P., and Alverson, K (2014) Strengthening Multidisciplinary Research on Climate and Environmental Change, EOS, Transactions of the American Geophysical Union, 95, 307.



Participants of the First CCEC Meeting, Beijing, China, 11-12 April 2014.



During the First CCEC Meeting, Beijing, China, 11-12 April 2014.

Weather, Climate and Food Security (WeatCliFS)

CCEC was instrumental in persuading a consortium of international scientific unions to undertake an initiative on weather, climate and food security.

WeatCliFS intends to catalyse an integration of activity of many existing programs on hydrometeorology, on natural hazards and extreme events, on agriculture and food security and on disaster risk reduction to develop a research program through networking. To this end, specially targeted advanced research workshops and symposia were held in each of the geographic areas covered by the ICSU Regional Offices, to draw together experts working on relevant issues. Scientific meetings incorporating WeatCliFS in 2013 and 2014 were:

- AGU Meeting of the Americas, <http://moa.agu.org/2013/>, 14-17 May 2013, Cancun, Mexico

- First Africa Food Security Conference, <http://www.foodsec.aaknet.org/>, 20-21 August 2013, Nairobi, Kenya
- AOGS Annual Meeting, <http://www.asiaoceania.org/aogs2013/>, 24-28 June 2013, Brisbane, Australia
- General Assembly of IUNS, <http://www.icn2013.com/>, 20 September 2013, Granada, Spain
- General Assembly of IUFoST, 17-21 August 2014, Montreal, Canada
- General Assembly of ICSU, 1-3 September 2014, Auckland, New Zealand

At the WeatCliFS session (U52A) of the AGU Meeting of the Americas the quality of the speakers and of their papers was outstanding, and the session was attended by an audience that varied from 50 to 70 people. The paper on Ancient Mayan Agriculture, presented by Mark Pagani, was the highlight of the session.

The WeatCliFS session (IG12) of the AOGS Annual Meeting in Brisbane was convened by James Terry (National University of Singapore) and Tom Beer. Papers were given by Albert McGill, representing IUFoST, the International Union of Food Science and Technology; and Mark Howden of the CSIRO Climate Adaptation Flagship and Tom Beer (CCEC). A panel discussion was held following the three presentations. Audience participation was excellent (about 25 people attended).

At the IUNS 20th International Congress of Nutrition held in Granada, Spain, 15-20 September 2013 the WeatCliFS Session was linked to the IUNS Task Force on Urbanization, Climate Change and Nutrition Insecurity (IUNS Task Force T7-7.4). This Task Force was established specifically to make the connection between IUNS and the ICSU Program on Health and Well-Being in the Changing Urban Environment, see <http://www.icsu.org/what-we-do/interdisciplinary-bodies/health-and-wellbeing-in-the-changing-urban-environment>. The combined symposium under the title Urbanization, Climate Change and Nutrition Insecurity was chaired by Godwin D. Ndossi, Tanzania and Osman Galal, University of California, USA. The program consisted of five speakers in total with two speakers from the WeatCliFS initiative (McGill, Beer) and three speakers from the IUNS Task Force (Atinmo, Tacoli and Wahlqvist):

Presentations were also made by McGill and Beer at the IUFoST General Assembly in Montreal during August 2014, and this was followed by a poster exhibit and a presentation by CCEC Chair, Dr Tom Beer, to the ICSU General Assembly, as summarised in Appendix 2.



Speakers at the WeatCliFS Session at the AGU Meeting of the Americas on 17 May 2013 (From left to right: Alik Ismail-Zadeh, Jaime Fucugauchi, Brian Toon, Katya Kontar, Tom Beer, Mark Pagani)



Albert McGill – IUFOST addresses the IUNS symposium

WMO Global Framework for Climate Services (GFCS)

It is worth recalling the aims of the GFCS. The official wording states that it is:

“a UN-led initiative spearheaded by WMO to guide the development and application of science-based climate information and services in support of decision-making. The GFCS has four initial priority sectors: agriculture and food security, water, health and disaster risk reduction. The vision of the GFCS is to enable society to better manage the risks and opportunities arising from climate variability and change, especially for those who are most vulnerable to such risks. This will be done through development and incorporation of science-based climate information and prediction into planning, policy and practice. The greatest value of the GFCS will occur incrementally through the delivery of a multitude of climate services at national or local levels.”

Arthur Askew, IUGG liaison to WMO, has undertaken the role of GFCS liaison on behalf of CCEC. He attended the Meeting on the Implementation Coordination of the Global Framework for Climate Services (GFCS), Geneva, 28 September to 1 October 2014. All the papers and PowerPoint presentations presented at the meeting can be viewed at <http://gfcs.wmo.int/node/573>

He noted, amongst other points that:

“it is very difficult to identify exactly how the Union can contribute and what it would gain by doing so. The practical implementation of the Framework is focused on the 16 least developed countries mentioned above, the aim being to strengthen their ability to develop and use climate-related information/products. Many of our activities are relevant to these challenges but actually converting this relevance into action in a particular country is a major challenge for our Associations. “

IUGG submitted two projects onto the list of GFCS projects: the World Glacier Monitoring Service of IACS and Panta Rhei of IAHS.

Arthur Askew met with Roger Pulwarty, the Director of NOAA's National Integrated Drought Information System based in Boulder, Colorado, and agreed that that, while high quality science led the work on climate change and was widely recognized as doing so, the scientific community afforded far less attention to the science needed to support the development and provision of climate services. Research is essential for improving the climate services that are needed if communities and countries are to adapt to the changing climate and this research cannot be conducted without the close involvement of the communities it should serve. It needs to be geared to every-day problems faced by farmers, water resource and land-use managers, disaster risk reduction communities and national planners whose challenges differ widely from country to country. Such work attracts little funding in developed countries and no funds at all in the developing world and yet is constantly identified as critical to successful adaptation. The challenge is to bring this lack of support to the attention of those in a position to provide it, while at the same time energizing the scientific community to see such work as worthy of its attention.

The Assembly in Prague offers an excellent opportunity to open this question for debate within the IUGG community. CCEC has sponsored a one-day/half-day open workshop convened by Arthur Askew and Roger Pulwarty.

Arthur also attended the meeting of the GFCS Partner Advisory Committee that in Rome on 27 and 28 October. Further information on IUGG's link with the GFCS is contained in the report of the IUGG Liaison Officers to WMO.

Session U1 of the IUGG General Assembly in Prague

The Scientific Program Committee of the IUGG General Assembly accepted a CCEC proposal to organise a Union symposium (Symposium U1) to be held on 23 June 2015 titled Future Earth and Sustainability with the following invited speakers (in alphabetical order)

- Guy Brasseur, NCAR, Boulder, USA (Chair, WCRP JSC) - Climatic and Environmental Change
- Bruce M. Campbell (Director, CCAFS) International Center for Tropical Agriculture (CIAT), c/o University of Copenhagen, Copenhagen, Denmark - Climate Change and Food Security
- David Johnston (Chair, IRDR), GNS Science/Massey University, Wellington, New Zealand - Future Earth and Disasters
- Pavel Kabat (Director, IIASA), International Institute for Applied Systems Analysis (IIASA) Laxenburg, Austria - A Systems Approach to Future Earth
- Alberto Montanari (Director, Panta Rhei), University of Bologna, Bologna, Italy - Urbanisation and Water Resources
- Guoxiong Wu (ICSU Executive Board), LASG Institute of Atmospheric Physics, Beijing, China - Meteorology and Climate of Future Earth
- Tetsuzo Yasunari (IAMAS Executive Member), Institute for Humanity and Nature (RIHN), Kyoto, Japan - Monsoon Asia and Future Earth

Tom Beer, CCEC Chair

Appendix 1

IUGG and Future Earth

The following text was prepared by CCEC and supplied to the IUGG Secretariat. The final version of the IUGG statement differs slightly from the version given below.

Possible IUGG Contributions to Future Earth

Introduction

IUGG consists of eight international scientific associations and a number of scientific commissions. They were all requested to provide information as to their possible interaction with Future Earth. In some cases the associations point out that they can see areas of relevant science but that their plans are at an early stage. For example:

In the case of **IACS**, the International Association of Cryospheric Sciences, their ideas are still in very early stages of development. IACS is thinking of installing working groups on topics such as Glacier Mass Balance as well as Dust & Black Carbon on glaciers (and snow). These activities are in a very early stage of planning but may both have societal impacts as outcomes and could thus lead to potential contributions to Future Earth.

IAGA, The International Association of Geomagnetism and Aeronomy, has discussed how IAGA science is involved and noted that currents flowing and magnetic fields generated in the magnetosphere and ionosphere can disrupt satellite operations and communications on which modern technology-based life depends, and that the weakening of the magnetic field generated in the Earth's deep interior has increased the impact of this disruption locally (the 'South Atlantic Anomaly'), and threatens to do so globally. IAGA also notes that the question as to whether solar magnetic activity impacts the Earth's climate is not fully resolved.

The Future Earth activities of the International Association of Geodesy (**IAG**) are coordinated by its Global Geodetic Observing System (GGOS, www.ggos.org). GGOS Theme 2 is dedicated to new technologies for disaster monitoring and management, and GGOS Theme 3 is studying sea level change, variability and forecasting. The International Altimetry Service (IAS) is operating an Open Altimeter Database (openadb.dgfi.badw.de) providing global and regional sea level changes derived from various satellite altimetry missions. Several IAG Working Groups are dedicated to atmosphere (ionosphere and troposphere), hydrosphere and cryosphere studies using data from satellite gravity field missions and geometric surface scanning.

IUGG – Projects of Relevance to Future Earth

In the case of **IAMAS**, the International Association of Meteorology and Atmospheric Sciences these plans have advanced to a sufficient stage that IAMAS has passed a resolution

http://www.iamas.org/Pdfs/IAMAS-Resolution_FutureEarth-2013.pdf

IAHS, the International Association of Hydrological Sciences, and the IUGG Commission on Climate and Environmental Change (CCEC) are further advanced in activities that they consider would provide useful contributions to Future Earth. This document thus concentrates on these two activities.

Panta Rhei

The main IAHS contribution to Future Earth is Panta Rhei that is a decade-long research program that was launched in July 2013. Information about Panta Rhei can be found at their web site:

<http://www.iahs.info/pantarhei/>

that provides links to the call for proposals for research themes and working groups (due by 31 January 2014), the science plan, agenda-setting paper and the key science questions.

The Chair of Panta Rhei is Prof. Alberto Montanari of the University of Bologna, and the leadership is presently structured in terms of three Targets:

- Target 1 - Understanding:
- Target 2 - Estimation and prediction:
- Target 3 - Science in Practice:

whose rationale is presented in the science plan and the agenda-setting paper available at:

<http://www.iahs.info/pantarhei/?q=node/2>

The activities of Panta Rhei aim to address the following science questions:

1. What are the key gaps in our understanding of hydrologic change?
2. How do changes in hydrological systems interact with and feedback on natural and social systems driven by hydrological processes?
3. What are the boundaries of coupled hydrological and societal systems? What are the external drivers and internal system properties of change? How can boundary conditions be defined for the future?
4. How can we use improved knowledge of coupled hydrological-social systems to improve model predictions, including estimation of predictive uncertainty and assessment of predictability?
5. How can we advance our monitoring and data analysis capabilities to predict and manage hydrologic change?
6. How can we support societies to adapt to changing conditions by considering the uncertainties and feedbacks between natural and human-induced hydrologic changes?

WeatCLiFS (Weather, Climate and Food Security)

The Food Security recommendations of the Rio+20 Forum on Science, Technology and Innovation for Sustainable Development included a statement that it is necessary “To understand fully how to measure, assess and reduce the impacts of production on the natural environment including climate change, recognizing that different measures of impact (e.g. water, land, biodiversity, carbon and other greenhouse gases, etc) may trade-off against each other...”

To seek to operationalise such a recommendation within the geophysical community, the IUGG Union Commission for Climate and Environmental Change (CCEC), in conjunction with the International Union of Food Science and Technology (IUFoST) and the International Union of

Nutrition Sciences (IUNS) during 2013 ran a scoping activity concerning research activity in relation to weather, climate and food security.

From the broader point of view the topic addresses, *inter alia*, issues such as water, health, and agriculture and links environmental, social and economic dimensions of sustainable development in relation to the nexus between rainfall deficiency, drought, food production decline, food scarcity and famine as well as the nexus between extreme weather, disasters, food distribution and food logistics. IUNS has a particular interest in urbanisation and nutritional security and the role that climate change may play in this.

Within the IUGG community this activity brought together the specialists from IAMAS in climate and weather – especially severe weather – with the experts from cognate geophysical disciplines that produced events that would impact on food security. Thus the effects on food availability, food distribution and food logistics as a result of: volcanic eruptions were relevant to IAVCEI, earthquakes to IASPEI, floods to IAHS, landslides to IAG, avalanches to IACS, tsunamis and storm surges to IAPSO.

WeatCliFS intends to catalyse an integration of activity of many existing programs on hydrometeorology, on natural hazards and extreme events, on agriculture and food security, on disaster risk reduction to develop a research program through networking.

IUGG-Future Earth Networking

It is to be hoped that the Scientific Committee of Future Earth (FE-SC) sees some or all of these IUGG initiatives as falling within their remit and adopt them as part of the Future Earth science program (with IUGG as the implementing agency). If this occurs, then a possible means of maintaining liaison between IUGG and Future Earth would be through CCEC.

In fact, IUGG should seek to explore the possibility of CCEC becoming a Future Earth Committee, analogous to National Committees.

The feasibility of such an idea will depend on how the relevant organisations (IUGG and Future Earth) see the role and, of course, if such a possibility were to eventuate it would require the agreement of all parties. Considerations are that if IUGG wishes to encourage internal activity related to Future Earth then having a committee, analogous to a Future Earth National Committee, may be a better way to encourage liaison than designating a single liaison officer.

A possible disadvantage of such a procedure will be that of unclear or conflicting chains of command. The suggestion is predicated on the assumption that FE-SC is willing to adopt existing IUGG activities as FE activities and thus have a method for bringing IUGG activities into FE.

Appendix 2



Dr. Beer presents CCEC and WeatCliFS to the ICSU General Assembly, Auckland, New Zealand, 2 Sep 2014

The work of the International Union of Geodesy and Geophysics (IUGG) Commission on Climatic and Environmental Change (CCEC) was presented on 2 September 2014 to the General Assembly of the International Council for Science (ICSU) held in Auckland, New Zealand.

Dr. Tom Beer, CCEC Chair, highlighted that CCEC had taken the first steps in examining possible pluri-disciplinary research for the new Future Earth program by examining Weather, Climate and Food Security. This was done in a consortium with the IUGG, the International Union of Food Science and Technology (IUFoST), and with the International Union of Nutrition Sciences (IUNS).

Dr. Beer said that food security is more than just agriculture or food production and that there are nine areas of



The nine areas of food security. Image: Planet Under Pressure 2012
http://www.planetunderpressure2012.net/pdf/policy_foodsecurity.pdf

relevance to food security (please see accompanying graphic).

This was illustrated by one of the revelations that emerged from this pluri-disciplinary grouping of international scientific unions: the fact that the risks associated with geophysical hazards (tsunamis, floods, landslides, hurricanes, typhoons, earthquakes, volcanoes) impinge not just on food production and agriculture, but on food distribution. In this respect the quality and quantity of the food that is available after a disaster needs to be considered. In addition, any food that is provided by emergency relief agencies also needs to be sensitive to cultural sensitivities in relation to food.

The term pluri-disciplinary had previously been used at the General Assembly to describe projects that transcend inter-disciplinarity and multi-disciplinarity.

4.4.2. Commission on Data and Information (UCDI) / Commission pour les données et l'information

PREAMBLE

In 2008, the IUGG established the Union Commission on Data and Information (hereafter UCDI) to provide IUGGs 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. IUGG UCDI works closely with CODATA, other International Scientific Unions, and the International Council on Scientific and Technical Information (ICSTI).

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

ADMINISTRATION

Executive Committee and Membership

The UCDI executive is composed by:

<i>Chair:</i>	Peter Fox (pfox@cs.rpi.edu)	USA
<i>Vice-Chair:</i>	Charles Barton (charles.barton@anu.edu.au)	AUSTRALIA
<i>Secretary:</i>	Adelina Geyer Traver (ageyer@ictja.csic.es)	SPAIN
<i>Members:</i>	Tim Ahern (tim@iris.washington.edu)	USA
	Maria Assunção F. Silva Dias (mafdsdia@model.iag.usp.br)	BRAZIL
	Pierrick Givone (pierrick.givone@cemagref.fr)	FRANCE
	Ruth Neilan (ruth.e.neilan@jpl.nasa.gov)	USA
	Mark Parsons (parsonsm@nsidc.org)	USA
	Bernd Richter (richter@iers.org)	GERMANY
	Anatoly Soloviev (a.soloviev@gcras.ru)	RUSSIA
	Satheesh Shenoi (shenoi@incois.gov.in)	INDIA

Since autumn 2011, the UCDI has now the possibility to host members. In the UCDI webpage it is possible a form to become a members of the Union Commission (http://www.iugg-ucdi.org/UCDI/UCDI_member2011.html).

Business Meetings during 2011-2014

During this quadrennial the UCDI executive has tried to meet as regular as possible, principally, during different international conferences (partial attendance):

IUGG 2011, 28 June – 7 July 2011 (Melbourne, Australia)

1st ICSU World Data System Conference, September 3-6, 2011 (Kyoto University, Kyoto, Japan)

AGU Fall Meeting 2011, December 5-9, 2011 (San Francisco, USA)

EGU General Assembly 2012, 22-27 April, 2011 (Vienna, Austria)

EGU General Assembly 2013, 7-12 April 2013 (Vienna, Austria)

2nd RDA Plenary Assembly 2013, 16-18 March 2013 (Gothenburg, Sweden)

AGU Fall Meeting 2013, 9-12 December 2013 (San Francisco, USA)

3rd RDA Plenary Assembly 2014, 27-29 March 2014 (Dublin, Ireland)

EGU General Assembly 2014, April 2014 (Vienna, Austria)

ACTIVITIES

Scientific sessions in international conferences

* IUGG 2011 Session: Data Science/Informatics and Data Assimilation in Geophysical Models
Conveners: Peter Fox, Charles Barton

* EGU 2012 Session: Data Science/Informatics and Data Assimilation in Geosciences
Convener: Adelina Geyer / Co-Conveners: Peter Fox

* EGU 2013 Session: Data Science/Informatics and Data Assimilation in Geosciences
Convener: Adelina Geyer / Co-Conveners: Peter Fox

* IAVCEI Scientific Assembly 2013 special session: “Databases in Volcanology”
Convener: A. Geyer; B. Andrews / Co-Conveners: M. Bursik, A. Folch, G. Valentine, S. Sparks, C. Newhall, G. Jolly, B. Andrews, S. Loughlin, P. Papale

Other activities

UCDI has published its first newsletter (http://www.iugg-ucdi.org/UCDI/2011Newsletter_UCDI.pdf) with a summary of the topics discussed in the meetings, the result of the different sessions at the international conferences and the coming meeting and conferences.

UCDI Science Meetings

2012

eGYAfrica 2012: Better Internet Connectivity for Research and Education in Africa, 24-26 October 2012, Nairobi, Kenya . UCDI Convener: C. Barton, Co-Convener: P. Fox

2013

2013 Research Data Alliance Plenary Assembly, Mar 16-18, Gothenburg, Sweden.

Peter Fox presented the opening science keynote “Can it get any more important than this?” at the first RDA Plenary Assembly in the session: “Towards an Open Access Research Data without Barriers or Borders – RDA Mission” Chair: John Wood, Secretary General, The Association of Commonwealth Universities and RDA Council

Mark Parsons, Executive Director for the U.S. RDA program office, attended also the Plenary.

2013 Now and Future of Data Publishing, May 22, Oxford, UK

Peter Fox gave the first Keynote ‘The Now and Now for Data: Metaphors for Making Data Publically Available’ (based on work by Parsons and Fox) and represented IUGG science interests

2013 Research Data Alliance Plenary Assembly, Sep. 16-18, Washington, DC (USA).

Mark Parsons, Executive Director for the U.S. RDA program office, attended the Plenary and represented IUGG science and data interests.

AAAI Fall Symposium: Semantics and Big Data, Nov. 15-16, Arlington, VA (USA)

Peter Fox gave a Keynote talk: 'Geosemantics for weird data; mediation, integration, heterogeneity and vocabularies' and represented IUGG science and data interests.

ICSTI Workshop "Data and non-data integration", Oct. 16, 2013, Ottawa, Canada

Peter Fox gave a keynote talk: 'Progress in Open-World, Integrative, Web-based Collaborative Research Platforms' in this workshop organized by the International Council for Scientific and Technical Information, explicitly representing UCDI.

Climate and Weather of the Sun-Earth System II Closing Symposium, Nov. 18-22, Nagoya, Japan

Peter Fox presented an invited tutorial entitled: 'eScience and Informatics for International Science Programs.' CAWSES II (2009-2013) included all major science areas of IUGG. Fox also complete the term as co-chair of the eScience and Informatics task group. (www.cawses.org)

2014

Invited talk (Skype) at Japan Geoscience Union meeting (WDS/GEOSS). Thursday 1st May. Local parallel sessions (Future Earth Asia, Open Access Journal, Future of Earth/Planetary Sciences at Science Council of Japan) Title: Activities of the Union Commission for Data and Information of the International Union of Geodesy and Geophysics. Author: Peter Fox and Charles Barton.

2014 3rd Research Data Alliance Plenary Assembly, Mar 27-29, Dublin, Ireland.

Peter Fox attended in the capacity of RDA Technical Advisory Board member. Fox held discussions with Mokrane (WDS) and Hodson (CODATA) related to the IUGG Union session for 2015.

Mark Parsons, Executive Director for the U.S. RDA program office, attended the Plenary. Parsons is now Secretary General for RDA (worldwide).

2014 Society for Scholarly Publishing, May 29-30, Boston MA

Peter Fox gave an invited presentation and participated in a panel at the SSP meeting. Exploring the Research Data Ecosystem and representing IUGG science interests.

2014 4th Research Data Alliance Plenary Assembly, Sep 21-24, Amsterdam, The Netherlands.

World Data System Participation

2013

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

Peter Fox and Mark Parsons participated as external consultants/ community representatives in the WDS – Knowledge Network and Metadata Catalog working group (Chaired by Wim Hugo and Kim Finney). Activities began in early 2013 and run through late 2013.

2014

WDS Executive Director Mustapha Mokrane agreed to co-convene the UCDI union session for the 2015 IUGG General Assembly (U04).

CODATA Participation

2013

Mark Parsons and Alexei Gvishiani continued as IUGG co-delegates to CODATA and Anatoly Soloviev continues as vice-chair (Gvishiani is chair) of the CODATA Task Group on "Earth and Space Science Data Interoperability". Peter Fox and Mark Parsons began informal interactions with the CODATA Task Group on "Data Citation Standards and Practices" via its co-chairs (Brase,

Callaghan, Borgman).

2014

CODATA Executive Director Simon Hodson agreed to co-convene the UCDI union session for the 2015 IUGG General Assembly (U04). Simon has also initiated a Geo-Union Data and Information Commission discussion that would lead to a combined meeting in 2015. Several IUGG researchers attended SciDataCon (2-5 Nov. 2014 - <http://www.scidatacon2014.org>).

RDA Participation

2013

The Research Data Alliance (RDA) is aimed to build the social and technical bridges that enable open sharing of data. RDA enables data to be shared across barriers through focused Working Groups and Interest Groups, formed of experts from around the world – from academia, industry and government. RDA launched its search for a Secretary General in late 2013 requesting a suitably experienced leader, Mark Parsons was elected the first Secretary General of the Research Data Alliance (RDA).

2014

The Research Data Alliance (RDA; <http://rd-alliance.org>) is aimed to build the social and technical bridges that enable open sharing of data. RDA appointed its first Secretary General in late 2013: Mark Parsons (UCDI executive committee member and IUGG CODATA delegate). In this capacity Mark Parsons has agreed to co-convene the UCDI union session for the 2015 IUGG General Assembly (U04).

Liaison with Peer Organizations

2013

Continued interaction with international organizations such as IUGS/CGI (Commission on Geoscience Information), IAU/WGAD (Working Group on Astronomical Data), EGU/ESSI (Earth and Space Science Informatics), and AGU/ESSI (Earth and Space Science Informatics).

2014

In 2014, in addition to CODATA, WDS, and RDA, UCDI continued interaction with international organizations such as IUGS/CGI (Commission on Geoscience Information), IAU/WGAD (Working Group on Astronomical Data), EGU/ESSI (Earth and Space Science Informatics), AGU/ESSI (Earth and Space Science Informatics) and the Japanese Geophysical Union (JpGU).

Peter Fox, UCDI Chair
Adelina Geyer, UCDI Secretary General

4.4.3. Commission on Geophysical Risk and Sustainability (GRC) / Commission sur les risques géophysiques et le développement durable

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 between 2011-14 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 where five members indicated by * are the member newly joined to the Commission in 2011 nominated by the Secretary General of their base Associations and serving as the executive committee members. Note that Paula Dunbar remains as Treasurer despite having completed 2 terms in this role. This is because a new Treasurer could not be found, despite the best efforts of the Executive Committee. Ms Dunbar has kindly agreed to remain in the role until a new Treasurer can be found.

Note that * indicates the newly appointed members in 2011 by SG of their base Association.

Kuniyoshi Takeuchi	IAHS	Chair	kuni.t@pwri.go.jp
Vladimir Kossobokov	IASPEI	Vice-Chair	volodya@mitp.ru
John Labrecque*	IAG	Vice-Chair	jlalrecq@mac.com
Diana Greenslade	IAPSO	Secretary	d.greenslade@bom.gov.au
Paula Dunbar	IAPSO	Treasurer	Paula.Dunbar@noaa.gov
David Jackson	IASPEI	EC Member	djackson@ucla.edu
David Boteler*	IAGA	EC Member	David.Boteler@NRCan-RNCan.gc.ca
Joan Marti*	IAVCEI	EC Member	joan.marti@ictja.csic.es
Servando de la Cruz Reina*	IAVCEI	EC Member	sdelacrr@geofisica.unam.mx
Alan Thomson*	IAGA	EC Member	awpt@bgs.ac.uk
Gerd Tetzlaff	IAMAS	Member	tetzlaff@rz.uni-leipzig.de
Hermann Drewes	IAG	Member	drewes@dgfi.badw.de
A. Jayawardena	IAHS	Member	hrecjaw@hkucc.hku.hk
Yevgeniy Kontar	IAPSO	Member	ykontar@findlay.edu
Susan McLean	IAGA	Member	Susan.Mclean@noaa.gov
Kosuke Heki	IAG	Member	heki@mail.sci.hokudai.ac.jp
Steve McNutt	IAVCEI	Member	steve@giseis.alaska.edu
Martin Funk	IACS	Member	Funk@vaw.baug.ethz.ch
Tom Beer	IAMAS	Honorary Member	tom.beer@csiro.au
Alik Ismail-Zadeh	IASPEI	Honorary Member	Alik.Ismail-Zadeh@kit.edu
Ramesh Singh	IASPEI	Honorary Member	rsingh@chapman.edu
Harsh Gupta	IASPEI	Advisory Board Member	harshgupta@nic.in
Viacheslav Gusiakov	IAPSO	Advisory Board Member	gvk@sscc.ru
Uri Shamir	IAHS	Advisory Board Member	shamir@tx.technion.ac.il
Gordon McBean	ICSU	Advisory Board Member	gmcbear@uwo.ca

Terms of Reference

The Terms of Reference for the Georisk Commission were modified in order to remove some ambiguities and clarify some details relating to membership of the Commission. The modified Terms of Reference were approved by the IUGG Executive Committee in September, 2013.

Business meetings

A Business Meeting of the GRC was held on 30th June 2011 at the Melbourne Convention Centre, during the IUGG General Assembly in Melbourne, Australia. 16 members were present. Minutes of the meeting are available on the GRC website.

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. Minutes of this meeting can be found on the Commission's website at <http://www.iugg-georisk.org>

An informal Business meeting of the Commission was held in the occasion of the 2nd GeoRisk Conference in Madrid on 20 November 2014. Six GRC members (Alik Ismail-Zadeh, Ramesh Singh, Joan Marti, Viacheslav Gusiakov, Yevgeniy Kontar and Kuniyoshi Takeuchi) were present and discussed the commission matters including the plan of Union Session in IUGG GA at Prague.

ACTIVITIES

The IUGG GRC conferences

The First IUGG GRC Conference on "Extreme Natural Hazards and Their Impacts" was held from December 8-11, 2012 at Chapman University, Orange, California, USA. This included a special FORIN seminar, co sponsored by IUGG and the Integrated Research on Disaster Risk (IRDR) Programme of ICSU-ISSC-UNISDR. The conference was 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. 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), Kuniyoshi Takeuchi (Director, ICHARM) and Gezahegn Yirgu (Addis Ababa University, Ethiopia) and the discussion was moderated by Alik Ismail-Zadeh (Secretary General, IUGG).

The Second IUGG GRC Conference on "Improving Geophysical Risk Assessment, Forecasting, and Management" was held at Real Observatorio de Madrid, Instituto Geográfico Nacional (IGN), Madrid, Spain from 18-21 November 2014 hosted by Joan Marti, GRC member of IAVCEI. About 80 participants from over 15 nations participated. A total of 31 keynotes, 4 special speeches and 20 posters were presented and two special discussion panels "The Risk of Extreme geohazards: How prepared is a globally interdependent society?" and "Final discussions" were held. The six plenary sessions were: 1. Global risks assessment for natural hazards: methods and practices; 2. Modelling and assessment of geophysical hazards; 3. Vulnerability assessment methodologies; 4. Monitoring and early warning systems for geophysical hazards; 5. Decision making models and protocols; 6. Communication protocols and practices. The presentations and discussions were transdisciplinary and of an integrated nature with geo-scientists, engineers, geographers, sociologists, media experts etc. Reports included examples such as the Eyjafjallajökull eruption in Iceland, rare earthquakes in Spain, emergency responses in remote Canary Island in the Atlantic Ocean, citizen participation in Catalonia, Spain, a game "Kazan" development for disaster education. The guided tour of the Observatory, one of the oldest cosmic observatories in the world was a superb experience to the participants.

IUGG Statement

The GRC proposed the IUGG statement on Great East Japan Earthquake and Tsunami and this was adopted by the IUGG Bureau on 18 April 2011. The statement can be found at:

http://www.iugg.org/resolutions/IUGG_Statement_GreatEastJapan_Eq_Tsu.pdf

Website

A new website for the Commission was designed and all content from the previous website has been transferred to the new website. This was launched in May 2014 and can be found at: <http://www.iugg-georisk.org/>

FUTURE ACTIVITIES

During the 26th IUGG General Assembly, 22 June-2 July 2015, the GRC will hold jointly with IAHS, IRDR, IAVCEI, IAPSO, IACS, IASPEI, IAG, IAGA, a Union Symposium U02 “Integrated Disaster Risk Science: Accounting for Extremes” on 24 June.

During the IUGG GA in Prague, a GRC Business meeting is planned to be held.

The agenda will include:

- 1) The renewal and strengthening of the Commission.
- 2) Plans for the 3rd GeoRisk Conference in 2016. Initial discussions have been held with the Integrated Research on Disaster Risk (IRDR) programme in relation to a possible joint meeting.

Kuniyoshi Takeuchi, GRC Chair

4.4.4. Commission on Mathematical Geophysics (CMG) / Commission sur la géophysique mathématique

SUMMARY

During 2014 the commission held the 30th biennial CMG meeting during June 2-6, 2014 in Merida, Mexico. The commission is working on 31th CMG meeting in Paris. The administration has rotated. During 2013 the CMG had co-organized and convened an educational and capacity-building workshop on Mathematics of Climate Change within the global program Mathematics of Planet Earth 2013 and two research workshops on Statistical Seismology at prime international mathematical centers. The main activity organized by CMG in 2012 was the biennial Conference on Mathematical Geophysics that took place in Edinburgh, Scotland, UK during 18-21 June 2012 at the National Museum of Scotland.

ADMINISTRATION

The administration of CMG had rotated in the beginning of 2014, the new officers are: **Chair:** Yehuda Ben Zion (USA); **Vice-Chairs:** Einat Aharonov (Israel) and Claudia Pasquero (Italy); **Secretary:** Ilya Zaliapin (USA); **Past Chair:** Dan Rothman (USA)

Executive Committee meeting on June 21, 2012 at the University of Edinburgh, Informatics Forum, Edinburgh, UK. The meeting was attended by Yehuda Ben-Zion (President), Dan Rothman (Immediate Past President), Ilya Zaliapin (member) and the Union representatives: Matthias Holschneider (IAGA), Malcolm Sambridge (IASPEI), Gordon Swaters (IAPSO), Yulia Tchiguirinskaia (per request of Daniel Schertzer, IAHS). Agenda: 1) Selecting local organizers for CMG 2014 and CMG 2016 meetings; 2) General organization of CMG meetings; 3) Selecting IUGG representative for the IMU-IUGG-IUTAM-ICSU MPE13 Workshop.

Executive Committee meeting on June 4, 2014 in Merida, Mexico. The meeting was attended by Yehuda Ben-Zion (President), Ilya Zaliapin (Secretary), Gordon Swaters (IAPSO), and Alik Ismail-Zadeh (IUGG Secretary General). Agenda: 1) Selecting local organizing committee for CMG 2016, 2) CMG funds and sponsorship.

ACTIVITIES (most recent first)

CMG biennial Meeting in Merida, June 2-6, 2014

CMG organized and conducted the 30th CMG biennial meeting that took place during June 2-6, 2014 in Merida, Yucatan, Mexico. The scientific program included 7 special sessions, including a symposium dedicated to the memory of Prof. Keilis-Borok (the founder of the commission and President of IUGG during 1987-1991) who passed away in October of 2013. Each session featured talks by several invited speakers, as well as contributed talks and posters. There were 18 invited speakers from 9 countries.

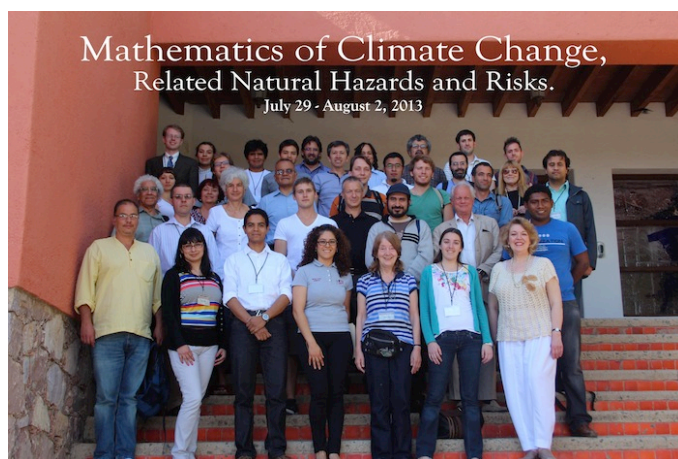


The total meeting participation was above 80 researchers, postdocs, and students. NSF supported the meeting participation by early-career scientists, providing travel funds for 12 student/postdoc participants. The social program included a day-long field trip to Chichen-Itza, as well as evening performance of local dancers and singers.

The meeting web site is: <http://eventos.iingen.unam.mx/IUGG2014/>

Education and capacity-building workshop on Mathematics of Climate Change, Jul 29-Aug 2, 2013

CMG had co-organized and co-conducted a Workshop on Mathematical Geophysics: “Mathematics of Climate Change, Related Hazards and Risks” during July 29-Aug 2nd at Centro de Investigación en Matemáticas (CIMAT), Guanajuato, MEXICO. The workshop was a part of the global program Mathematics of the Planet Earth 2013 (<http://mpe2013.org/>) and a satellite activity of the Mathematical Congress of Americas 2013 (<http://www.mca2013.org>).



The workshop featured 8 distinguished speakers who discussed the mathematical aspects of understanding and modeling the changing climate: Graciela Canziani (Universidad Nacional del Centro de la Provincia de Buenos Aires, Argentina), Michael Ghil (École Normale Supérieure, Paris, France), Oscar Velasco Fuentes (Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California, México), Eugenia Kalnay (University of Maryland), Carlos R. Mechoso (University of California Los Angeles), George Philander (Princeton),

Bala Rajaratnam (Stanford), and Eli Tsiperman (Harvard). The workshop was attended by 25 early career scientists from Latin Americas and the Caribbean, Europe, and Israel, who presented their research in a poster session and participated in round table discussions.

The scientific part of the workshop has been recorded and will be distributed to a wider audience.

Workshop web site: <http://www.mca2013.org/en/workshop-on-mathematics-of-climate-change.html>

Research workshop on Statistical Seismology, August 30-September 1, 2013

CMG has co-organized a workshop “Statistics and Triggering of Earthquakes” during August 30-September 1, 2013 as a part of global program Mathematics of the Planet Earth 2013 at the Banff International Research Station (BIRS), <http://www.birs.ca/>.

The confirmed invited speakers are I. Zaliapin, M. Naylor, J. Fineberg, P. Johnson, D. Zigone, A. Velasco, V. Durand, X. Meng, D. Eaton, N. van der Elst. The main goal of the workshop is to build and strengthen newly emerging links between active research groups in different scientific areas – statistics/probability, mathematics, physics, geodesy and seismology – toward achieving improved predictive understanding of seismicity patterns and structures and a physical theory for earthquake dynamics. The workshop will highlight the key role of the mathematical sciences in studying seismicity dynamics in relation to properties of faults and the crust as an essential component of this interdisciplinary research endeavor. The list of invitees reflects this diversity and includes senior and junior experts from different scientific areas. The ever-increasing threat to humanity from earthquakes in industrial and highly populated areas prompts for active cross-disciplinary earthquake research and justifies the necessity of this focused workshop.

The workshop organizers are Yehuda Ben-Zion (USC – IUGG representative), Joern Davidsen (U of Calgary), and Robert Schsherbakov (U of Western Ontario).

Workshop web site: <http://www.birs.ca/events/2013/2-day-workshops/13w2171>

Research workshop on Statistical Seismology, October 9-11, 2013

CMG has co-organized a workshop “Dynamics of Seismicity, Earthquake Clustering and Patterns in Fault Networks” during October 9-11, 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/>. The confirmed invited speakers are: Egill Hauksson (Caltech), Tomas Parsons (USGS), Antoinette Tordesillas (University of Melbourne), Bala Rajaratman (Stanford), Philip Stark (Berkeley), David Harte (Statistical Research Associates, New Zealand), Karin Dahmen (University of Illinois - Urbana-Champaign).

The main goal of the workshop is to build and strengthen newly emerging links between active research groups in different scientific areas – statistics/probability, mathematics, physics, geodesy, seismology and computer science – toward achieving a solid understanding of seismicity patterns and structures and a physical theory for earthquake dynamics. The workshop will highlight the key role of the mathematical sciences in studying seismicity dynamics in relation to properties of faults and the crust as an essential component of this interdisciplinary research endeavor.

The workshop organizers are Yehuda Ben-Zion (USC – IUGG representative), Joern Davidsen (U of Calgary), and Ilya Zaliapin (U of Nevada Reno – IUGG representative).

Workshop web site:

<http://www.samsi.info/workshop/2013-dynamics-seismicity-earthquake-clustering-and-patterns-fault-networks-october-9-11-2013>

CMG biennial Meeting in Edinburgh, Scotland, June 18-21, 2012

The main activity organized by CMG in 2012 was the biennial Conference on Mathematical Geophysics that took place in Edinburgh, Scotland, UK during 18-21 June 2012 at the National Museum of Scotland. The conference participants represented institutions from 23 countries. There were 170 registered delegates, 11 invited speakers, and 50 student participants. The conference featured 70 talks across 8 topical sessions (see below) and 110 posters in 2 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.

Meeting website: <http://www.cmgedinburgh2012.org.uk/>

FUTURE ACTIVITIES

CMG biennial meeting 2016 in Paris, France

CMG is working on organizing the next CMG biennial meeting during Summer of 2016 in Paris, France. NSF support will be sought to support the meeting participation by early-career scientists.

Yehuda Ben-Zion, CMG Chair

4.4.5. Committee on the Study of the Earth's Deep Interior (SEDI) / Comité sur l'étude des profondeurs terrestres

INTRODUCTION

SEDI (www.sedigroup.org) 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:

- 1) the investigation of the origin, evolution, structure, geochemical and mineralogical composition of the inner core, outer core, mantle and crust (on a planetary scale),
- 2) the investigation of core magnetohydrodynamics at all time scales, both from a theoretical point of view (e.g., 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),
- 3) 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),
- 4) 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),
- 5) 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](http://www.iuggg.org)). As such, it cuts across the traditional discipline-oriented bounds of the Associations of the IUGG [such as the International Association of Geodesy ([IAG](http://www.iag.org)), the International Association of Geomagnetism and Aeronomy ([IAGA](http://www.iaga.org)), the International Association of Seismology and Physics of the Earth's Interior ([IASPEI](http://www.iaspei.org)), and the International Association of Volcanology and Chemistry of the Earth's Interior ([IAVCEI](http://www.iavcei.org))] 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 Officers are traditionally elected during IUGG General Assemblies at a dedicated business meeting. Since the 2011 IUGG General Assembly in Melbourne, Australia, SEDI has been 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. Its membership rose from about xxx to xxx, as recorded on the email list used to broadcast information related to SEDI activities, upcoming meetings, funding opportunities, and academic openings.

ACTIVITIES

Meetings

SEDI's main activity is the organization of a dedicated workshop every even year and two such meetings were organized in 2012 and 2014. One important aspect of these meetings is that they should provide opportunities for students and young scientists from all over the world to attend and contribute to the ongoing debates.

The 13th SEDI Symposium was held at University of Leeds, Leeds, UK, on July 1-6 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>. Funding for the meeting came from IUGG; the US NSF; INSU/CNRS (France); Royal Astronomical Society; British Geophysical Association; The Mineralogical Society; Worldwide University Network. As is usually the case with SEDI meetings, the meeting was organized around 8 sessions, with each session having two lead review talks followed by ample time for discussion of posters and key scientific issues. These 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. About 180 participants attended, 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).

The 14th SEDI international symposium was held in Shonan Village Center, Kanagawa, Japan, on August 3-8 2014. It was very successfully organized by a Local Organizing Committee led by Hisayoshi Shimizu (Chair), Masataka Matsushima, Takashi Nakagawa (Program Chair), Masayuki Obayashi, Futoshi Takahashi, Nozomu Takeuchi and Satoru Tanaka. A website was set up and is still accessible at <http://www.geo.titech.ac.jp/sedi2014/>. With the support by Science Council of Japan, funding for the meeting came from IUGG; the US NSF; INSU/CNRS (France); Japan Geoscience Union (JpGU) and its journal “Progress in Earth and Planetary Science” (PEPS), Inoue Foundation for Science (Japan). As in 2012, the symposium was organized around eight sessions led by discussion leaders. These eight sessions were: S1: Mantle – Observations, S2: Mantle – Modeling & Dynamics, S3: The Core-Mantle Boundary, S4: Inner Core, S5: Outer Core – Observations, S6: Outer Core – Dynamics, S7: Experiments, and S8: Other Planets. About 150 participants attended, coming from fourteen different countries (Australia, Canada, China, Denmark, France, Germany, India, Japan, Netherland, Norway, Switzerland, Taiwan, UK and USA).

SEDI symposia traditionally include two major highlights: the Zatman Lecture, to be given by a prominent young scientist who has done outstanding work on core dynamics (in memory of Stephen Zatman, a prominent young scientist who studied core dynamics, and whose life was tragically cut short in 2002), and the Doornbos prize, to be presented to a young scientist for outstanding work on the Earth's deep interior (in honor of the Dutch seismologist, Durk Doornbos).

The 2012 and 2014 Zatman Lectures were respectively given by Nicolas Gillet (University of Grenoble) on “Stochastic core flow reconstruction over the observatory era” and Jon Mound (University of Leeds) on “Geomagnetic implications of inner core translation”.

In 2012 the Doornbos prize was awarded 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; 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.

In 2014 it was awarded to Nick Schmerr, for cross-disciplinary studies into the detailed natures of seismic discontinuities in the upper mantle, which give new views to mineralogical interpretation and their dynamical relationship with surface tectonic features of the Earth; Kenji Ohta, for outstanding experimental studies on phase transitions, thermal and electrical conductivities of materials in the lowermost mantle at high temperatures and pressures, which constrain strongly the interpretation of the dynamics of the core-mantle boundary region; Binod Sreenivasan, for fundamental contributions to our understanding of vortex dynamics and magnetic field stability in dynamo system and applications to the Earth's core.

In addition, between 2011 and 2014, SEDI co-sponsored various scientific sessions at IUGG, the American Geophysical Union. A Union Symposium was held at the 2011 IUGG General Assembly, entitled “Recent Progress in the Studies of the Earth's Deep Interior” and co-convened by Gauthier Hulot (IPGP, France), Michael Bergman (Simon's Rock College, USA), Greg Houseman (University of Leeds, UK) and Satoru Tanaka (JAMSTEC, Japan). At the forthcoming 2015 IUGG General

Assembly, a Union Symposium to be held, entitled “New Discoveries in Deep Interiors of Earth and Planets” is co-convened by Satoru Tanaka (SEDI), Dominique Jault (IAGA), Richard Gross (IAG), Thorn Lay (IASPEI), and John Gamble (IAVCEI).

Publications

Another important tradition of SEDI is that proceedings of the symposia be published in a peer-reviewed international journal. A SEDI 2012 Special Issue was already published in *Physics of the Earth and Planetary Interiors* (Volume 223, Special Issue, 2013), and contributions from the SEDI 2014 symposium are now under review. It will also be published in a special issue of *Progress in Earth and Planetary Science*.

FUTURE ACTIVITIES

The timing and location of the next SEDI Symposium are traditionally finalized during business meetings held at the previous SEDI edition. In 2014, after a presentation and discussion, it was agreed that the next (15th) SEDI workshop would be held in Nantes, late July 2016.

As the 2015 IUGG General Assembly also marks the end of the term of the current SEDI officers, a business meeting will be held to renew this board. We warmly encourage participants to take part to this important event.

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

INTRODUCTION

The IUGG Union Working Group on History (WGH) was established by decision of the IUGG Executive Committee in November 2012, following an organizational meeting at the IUGG General Assembly in Melbourne in 2011 and preparation of Terms of Reference.

The primary tasks for the WGH during 2013-2014 were to: (1) identify Representatives from each of the eight IUGG Associations and two Historian Advisors in accordance with the Terms of Reference, and (2) to begin working to fulfill the broad WGH missions of raising the historical consciousness of IUGG members and preserving IUGG scientific and institutional history as detailed below.

ADMINISTRATION

The following are the current officers and members of the Union Working Group on History:

Chair: Edward W. Cliver (USA)

Vice Chair: Hans Volkert

Association Representatives

IACS: Mark Carey (USA)

IAG: József Ádám (Hungary)

IAGA: Edward W. Cliver (USA)

IAHS: Maurits W. Ertzen (Netherlands)

IAMAS: Hans Volkert (Germany)

IAPSO: W. John Gould (UK)

IASPEI: Roger M.W. Musson (UK)

IAVCEI: Currently vacant, pending new appointment

Historian Advisors

Ron Doel (USA)

Gregory Good (USA)

A brief description of the WGH has been posted on the Union website (<http://www.iugg.org/about/history/>).

The WGH secured a budget of \$2500 per year from the IUGG for 2014 and 2015 that will be used to cover registration fees for speakers on history topics at the General Assembly in Prague, with preference given to historians (accustomed to smaller registration fees) and retirees.

ACTIVITIES

WGH-sponsored symposia at Association meeting in 2013:

(a) The joint IAMAS-IACS Assembly in Davos, Switzerland from 8 - 12 July, 2013 held a symposium entitled “*A Century of international Cooperation in Geophysics: Examples from IACS and IAMAS*”. Two solicited and five contributed presentations on such topics as the role of geophysics in scientific internationalism, Jacob Bjercknes, the World Weather Watch, and international cooperation in the geosciences were followed by a general discussion about the aims and intended modes of operation of the WGH. During the extended break between the sessions two posters were discussed and copies of IAMAS Publication Series Nos. 1 and 2 (Bolle, 2008; Bojkov, 2012) with historic content were distributed to interested participants.

References:

Bolle, H.-J., 2008: International Radiation Commissions 1896 to 2008: Research into atmospheric radiation from IMO to IAMAS. IAMAS Publication Series no. 1, iv + 141 pp.

Bojkov, R., 2012: International Ozone Commission: History and activities. IAMAS Publ. Series no. 2, iv +100 pp.

[Involved WGH Members: Ron Doel, Hans Volkert]

(b) The IAG Scientific Assembly in Potsdam, Germany from 1-6 September, 2013 featured a special History Session to commemorate the 150th anniversary of IAG's predecessor. Talks covered each of the key phases of IAG science during the last 150 years, followed by guided tours of the facilities at Telegrafenberg, videos from previous IAG Assemblies, and a barbeque.

[Involved WGH Member: József Ádám]

Preparations for the 26th IUGG General Assembly

On 19 February 2013, the WGH held its initial telecon. Topics discussed included: (a) Injection of historical content into scientific symposia at Prague; (b) Union Wide Symposium (U9) at Prague; (c) WGH Presence on the WWW; and (d) Association level history organizations.

A proposal for a Union Session was submitted and approved for the 26th IUGG General Assembly in Prague: (U10) "Revolutions in Earth Sciences: from different spheres to a common globe". Hans Volkert (IAMAS) is the lead convener and the other seven WGH members are Co-conveners.

At the initiative of Josep Batlló (IASPEI) and WGH member, Roger Musson, a Joint Symposium (JA6) entitled: "Data on the Edge: Utilization and Preservation of Historical Data in the Geosciences" was proposed and approved for Prague. Ed Cliver (IAGA) is the lead convener with co-conveners: József Ádám (IAG); Josep Batllo (IASPEI); Maurice Ertzen (IAHS); Bruce Raup (IACS), and Kris Harper (IAMAS).

The second half of 2014 was devoted to organization (via e-mail and phone) of the above-mentioned Union and Joint Symposia for Prague. In addition, each WGH member (with the exception of Dr. Ádám who organized the comprehensive historical symposium at the IAG Scientific Assembly in Potsdam in 2013), was charged to coordinate with conveners of symposia in their respective Associations to inject talks with historical content into the scientific sessions in Prague, with the following promising results:

IACS: Secured WGH co-sponsorship of IACS Symposium C17 (Challenges in Cryospheric Sciences: Past, Present and Future).

IAGA: Fostered talks with historical content in two IAGA Symposia (A17, Earth's Plasmasphere; A18, Space Weather).

IAHS: Fostered historical content talks in two IAHS Symposia: (HS01, Changes in Flood Risk and Perception; JH01, Extreme Hydrological Events).

IAPSO: Fostered historical content talks in five IAPSO Symposia (P03, Ocean Mixing; P04, Boundary Currents; P06, Southern Ocean; P08, Meridional Overturning Circulation and Deep Currents; P09, North Atlantic).

IASPEI: Contacted conveners of all IASPEI scientific symposia by e-mail and initiated, in collaboration with Josep Batlló, IAGA Joint Symposium JA6.

IAVCEI: Representative resigned from WGH before contacts initiated.

Publications

Following the initiative of IUGG SG Ismail-Zadeh, with input from the WGH, former IUGG SG Jo Ann Joselyn was selected to write the commemorative volume for the 2019 centenary of the IUGG. Dr. Joselyn has prepared an outline for the book and The WGH will identify co-authors to review scientific progress during the last 100 years for each of the Associations.

Edward Cliver, WGH Chair

4.5. Ratification of major decisions by the Bureau and Executive Committee

The Council will be asked to ratify the following major decisions of the IUGG Bureau and Executive Committee:

- Endorsed the applications for IUGG Membership (the Kingdom of Saudi Arabia, and Nicaragua).
- Recommended the IUGG Council to approve the request of Albania, Armenia and Bosnia & Herzegovina to become Associate Members and to invite the Scientific Centre of Monaco to re-consider its decision on withdrawal from IUGG.
- Endorsed the application for Affiliate Memberships.
- Established the Union Commission on Climatic and Environmental Change.
- Established the Union Working Group on History.
- Approved the book proposal related to 100-years history of IUGG.
- Adopted the Terms of Reference for Union standing and ad-hoc Committees and approved the membership of the committees.
- Endorsed the decision of the IUGG Bureau to request the IUGG Capacity Building and Education Committee to develop a Science Education Policy of the Union.
- Approved the science education program of IUGG and ICTP.
- Set up an ad-hoc working group to develop an action plan for visioning and a strategic plan of IUGG for 2016-2023.
- Adopted new IUGG Honor and Recognition Program.
- Approved the Memorandum of Understanding between IUGG and the Local Organizing Committee for the XXVI IUGG General Assembly.
- Appointed Dr. Christophe Cudennec (France) as the IUGG liaison to the International Hydrological Program of UNESCO, because Dr. P. Hubert (France) stepped down from the position of the IUGG liaison.
- Endorsed active participation of IUGG in the Future Earth Programme of ICSU.
- Endorsed IUGG cooperation with GeoUnions. Namely, endorsed the decision of the IUGG Bureau on the co-sponsorship of the International Year for Global Understanding, a program of IGU. Recommended development of cooperative scientific links between IUGG and IUGS on the IUGS initiative “Resourcing Future Generations” and on joint congresses.

5. Matters of Membership / Affaires d'adhésion (A. Ismail-Zadeh)

5.1. Admission: Saudi Arabia as Regular Member (cat. 2) / Adhésion: Arabie Saoudite comme membre régulier

A letter of request from Saudi Arabia to become Regular Member of IUGG, sent by Prof. Mohamed I. Al-Suwaiyel, President of the King Abdulaziz City for Science and Technology (KACST), was received and forwarded to the IUGG Executive Committee on 1 July 2012. The Adhering Organization is the KACST. The President of the National Committee is Prof. Tariq Alkhalifah, and the Secretary General is Dr. Khaled Aldamegh. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 22 August 2012. Professor Al-Suwaiyel, Prof. Tariq Alkhalifah, and Dr. Khalid Aldamegh were notified on 4 October 2012 that the voting was successful.

The Council is asked to ratify the provisional vote.

5.2. Admission: Nicaragua as Regular Member (cat. 1) / Adhésion: Nicaragua comme membre régulier

A letter of request from Nicaragua to become Regular Member of IUGG, sent by Ms. Heyddy Calderon, UNESCO-IHE Institute for Water Education, TU Delft, Delft, The Netherlands, was received and forwarded to the IUGG Executive Committee on 21 March 2014. The Adhering Organization is the National Water Authority of Nicaragua (ANA). The President of the National Committee is Ms. Heyddy Calderon, and the Secretary General is Ms. Yelba Flores. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 31 March 2014. Ms. Heyddy Calderon and Ms. Yelba Flores were notified on 6 May 2014 that the voting was successful.

On 3 March 2015, Dr. Heyddy Calderon informed us that the Nicaraguan Aquatic Resources Research Center (CIRA/UNAN-Managua) will replace the National Water Authority of Nicaragua (ANA) as the Adhering Organization. The IUGG Bureau approved this request.

The Council is asked to ratify the provisional vote.

5.3. Admission: Commission for the Geological Map of the World (CGMW) as Affiliate Member / Adhésion: Commission for the Geological Map of the World (CGMW) comme membre affilié

A letter of request from the Commission for the Geological Map of the World (CGMW) to become Affiliate Member of IUGG, sent by Mr. Philippe Rossi, President of CGMW, was received and forwarded to the IUGG Executive Committee on 17 October 2013. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 5 December 2013. Mr. Rossi was notified on 14 January 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

5.4. Admission: Young Earth Scientist (YES) Network as Affiliate Member / Adhésion: Young Earth Scientist (YES) Network comme membre affilié

A letter of request from the Young Earth Scientist (YES) Network to become Affiliate Member of IUGG, sent by Mr. Wang Meng, President of YES Network, was received and forwarded to the IUGG Executive Committee on 22 January 2014. A ballot for a vote by correspondence was sent to the

National Committees and Adhering Bodies on 3 February 2014. Mr. Meng was notified on 5 March 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

**5.5. Admission: International Association for Geoethics (IAGETH) as Affiliate Member /
Adhésion: International Association for Geoethics (IAGETH) comme membre affilié**

A letter of request from the International Association for Geoethics (IAGETH) to become Affiliate Member of IUGG, sent by Prof. Jesús Martínez-Frías, President of IAGETH, was received and forwarded to the IUGG Executive Committee on 22 July 2014. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 8 October 2014. Prof. Martínez-Frías Leahy was notified on 19 November 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

**5.6. Admission: American Geosciences Institute (AGI) as Affiliate Member /
Adhésion: American Geosciences Institute (AGI) comme membre affilié**

A letter of request from the American Geosciences Institute (AGI) to become Affiliate Member of IUGG, sent by Dr. Patrick Leahy, Executive Director of AGI, was received and forwarded to the IUGG Executive Committee on 18 September 2014. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 8 October 2014. Dr. Leahy was notified on 19 November 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

**5.7. Admission: International Association for Mathematical Geosciences (IAMG) as Affiliate Member /
Adhésion: International Association for Mathematical Geosciences (IAMG) comme membre affilié**

A letter of request from the International Association for Mathematical Geosciences (IAMG) to become Affiliate Member of IUGG, sent by Prof. Frits Agterberg, Secretary General of IAMG, was received and forwarded to the IUGG Executive Committee on 24 November 2014. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 3 March 2015. The deadline to return the ballots is on 3 April 2015.

**5.8. Admission: International Consortium on Landslides (ICL) as Affiliate Member /
Adhésion: International Consortium on Landslides (ICL) comme membre affilié**

A letter of request from the International Consortium on Landslides (ICL) to become Affiliate Member of IUGG, sent by Mr. Kyoji Sassa, Executive Director of ICL, was received and forwarded to the IUGG Executive Committee on 9 December 2014. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 3 March 2015. The deadline to return the ballots is on 3 April 2015.

**5.9. Transfer: Albania from Regular to Associate Member /
Transfert: Albanie de membre régulier à membre associé**

A letter of request from Albania expressing the wish to change from Regular to Associate membership, sent by Prof. Salvator Bushati, contact person of the Albanian Adhering Organization,

was received and forwarded to the IUGG Executive Committee on 17 November 2011. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 5 December 2013. Prof. Bushati was notified on 14 January 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

**5.10. Transfer: Republic of Armenia from Regular to Associate Member /
Transfert: Republique d'Armenie de membre régulier à membre associé**

A letter of request from the Republic of Armenia expressing the wish to change from Regular to Associate membership, sent by Dr. Hrachya Petrosyan, President of the National Committee, was received and forwarded to the IUGG Executive Committee on 29 August 2012. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 5 December 2013. Dr. Petrosyan was notified on 14 January 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

**5.11. Transfer: Bosnia & Herzegovina from Regular to Associate Member /
Transfert: Bosnie & Herzegovine de membre régulier à membre associé**

A letter of request from Bosnia & Herzegovina expressing the wish to change from Regular to Associate membership, sent by Prof. Admir Mulahusic, President of the National Committee, was received and forwarded to the IUGG Executive Committee on 30 September 2014. A ballot for a vote by correspondence was sent to the National Committees and Adhering Bodies on 6 October 2014. Prof. Mulahusic was notified on 19 November 2014 that the voting was successful.

The Council is asked to ratify the provisional vote.

**5.12. Lowering of Category: Greece from category 3 to category 2 / Changement de
catégorie d'adhésion: GRECE Depuis membre de catégorie 3 à membre de catégorie 2**

On 2 April 2015, the IUGG Secretariat received a request from Greece (the Academy of Athens) for lowering its membership category from Category 3 (at present) to Category 2 starting from 2014 due to the financial and economic conditions of the country. Please note that Greece paid all its dues in arrear for several years and is now ready to pay for 2014 waiting for your decision on lowering the membership's category. The IUGG Bureau examined this application. Considering that Greece has had severe financial problems for the last several years, the Bureau agreed to lower the membership category from 3 to 2. The request for lowering was sent on 10 April 2015 to National Members for voting. The results will be known on 15 May 2015.

The Council is asked to ratify the provisional vote.

5.13. Transfer: Costa Rica from Associate to Regular Member / Transfert Costa Rica

On 30 January 2015, the IUGG Secretariat received a request from Costa Rica (from the President of the National Committee) for upgrading the country's membership from Associate to Regular (Category 1). The IUGG Bureau approved with the request.

A vote of the Council on the change from Associate to Regular membership is not required.

6. Report of the Nominating Committee and Introduction of the Candidates / Rapport du comité des candidatures et l'introduction des candidats (U. Shamir)

The IUGG Nominating Committee selected the candidates named in the list for consideration in the election at the 26th IUGG General Assembly in Prague, Czech Republic:

President	Michael Sideris (Canada, IAG)
Vice-President	Kathy Whaler (United Kingdom, IAGA)
Secretary-General	Alik Ismail-Zadeh (Germany/Russia, IASPEI)
Treasurer	Aksel W. Hansen (Denmark, IAMAS)
Bureau Members (<i>Positions #1, #2, and #3</i>)	Isabelle Ansorge (South Africa, IAPSO) Pierre Hubert (France, IAHS) Jianping Li (China, IAMAS) Chris Rizos (Australia, IAG) Kenji Satake (Japan, IASPEI) Constantin Sava (Romania, IASPEI)
Finance Committee	
<i>Position #1:</i>	Corina Risso (Argentina, IAVCEI)
<i>Position #2:</i>	Virendra Tiwari (India, IAG)
<i>Positions #3 and #4:</i>	David Collins (United Kingdom, IACS/IAHS) Zoltan Hajnal (Canada, IASPEI) Jan Krynski (Poland, IAG)

The Curricula Vitae of the candidates are posted on the IUGG web site at http://iugg.org/elections/candidates2015_19.php.

According to the IUGG ByLaw 10b, re-nominations, from those previously nominated for the Bureau may be made over a period of 48 hours following the close of the first session of the Council meeting at the General Assembly (from 18:00, 22 June to 18:00 24 June 2015).

Such nominations must be submitted in written form to the Secretary General, supported by at least three members of the Council and accompanied by the same documentation as required with the original nominations (namely, a written acceptance of possible nomination, resumé outlining the position, research interests, and Union related activities of the candidates). The Council Delegates shall be informed of these additional nominations at least 24 hours before the elections. Please note that no one can be a candidate for more than one position in the election. Elections shall be by secret ballot.

According to the IUGG ByLaw 10c, the Council may add candidate(s) to the list of nominations for the Finance Committee during the General Assembly until three days prior to the elections. Candidates will be required to signify their acceptance of nomination and to provide a resumé outlining their suitability for serving on the Finance Committee.

If you have any question concerning the nomination procedure, please contact Uri Shamir, Chair of the IUGG Nominating Committee (shamir@technion.ac.il).

Please note that 3 of the 5 nominees for the Finance Committee currently serve on the FC. According to By-law 10 (c) two of the positions on the new Finance Committee should be filled by persons who are not currently on the Finance Committee.

**7. Proposed Changes of Statutes and By-Laws /
Propositions de modifications des statuts et du règlement intérieur
(D. Kerridge)**

**8. Report on the proposals to host the XXVII General Assembly in 2019 /
Rapport sur les propositions pour l'Assemblée Générale XXVII en 2019
(S. Nakada)**

By the deadline of 22 December 2014, two invitations were received to hold the 27th General Assembly of IUGG in 2019 in:

- Montréal, CANADA, from the Canadian National Committee for Geodesy and Geophysics supported by the Government of Canada;
- New Delhi, INDIA, from the Indian National Science Academy supported by the Government of India.

The bids were sent to the members of the IUGG Site Comparison Committee:

Chair: Setsuya Nakada (Japan),

Members: Ian Allison (Australia), Peter Suhadolc (Italy), Kathryn Whaler (UK), and Alik Ismail-Zadeh (Germany/Russia) as ex-officio.

The Committee was asked to evaluate both invitations against the criteria published (<http://www.iugg.org/assemblies/>). Based on the evaluation of the written invitations as well as visits to the proposed venues of the general assembly, a report will be prepared and presented at the Council meeting in Prague, Czech Republic, to assist the Council in its voting on the venue for the IUGG2019.

Session II: Thursday, 25 June, 8:30-12:00 / 2ème Session: Jeudi, 25 juin, 8:30h-12h

Greetings; Presentation of the credentials /
Salutations; Présentation des lettres d'accréditation

9. Strategic Plan for 2015-2023

“Towards a Strategic Plan for the IUGG”

The committee has been asked to prepare a draft of an IUGG Strategic Plan for 2016-2023. With this in mind the following first draft has been prepared.

C. Rizos, D. Giardini, F. Kuglitsch, A. Mackintosh, M. Mandea

7 May 2015

Objectives of the IUGG (according to the Statutes & ByLaws):

- a) to promote the study of all problems relating to the figure of the Earth, and the physics and chemistry of the Earth's interior, surface, fresh waters, cryosphere, oceans and atmosphere, along with relevant studies of other planets;
- b) to initiate, facilitate and co-ordinate research into, and investigation of those problems of geodesy and geophysics which require international co-operation or which are of international interest;
- c) to provide, on an international basis, for discussion and publication of the results of the researches indicated in Article 1.b);
- d) to promote co-ordination worldwide of scientific activities in the disciplines of interest to the Union;
- e) to assist with scientific advice the study of practical problems of a geodetic or geophysical character when such problems present an international aspect or when they require international co-operation of specialists or facilities;
- f) to promote and co-ordinate the scientific activities of several Permanent Services whose objectives are, on an international basis, to facilitate the standardization of measurements or to collect, analyze and publish geodetic or geophysical data, taking into account the results of planetary studies.

1. Mission Statement

“The mission of IUGG is to advance, strengthen and promote Earth and space sciences worldwide through international research cooperation and education and to communicate the knowledge to governments and policy-makers for the benefit of humanity.”

2. Vision Statement

“IUGG envision a future Earth that is environmentally sustainable and where societies are resilient against natural hazards”.

3. Core Principles (& Aspirations)

The IUGG aspires to:

- **ENCOURAGE RESEARCH ACTIVITIES FOR SOCIETAL BENEFITS**
 - To make discoveries in Earth and space sciences
 - To address impacts of Earth system processes on society, including those arising from climate change and natural hazards
 - To contribute to sustainable development, the responsible exploitation of resources, and the preservation of the environment
- **UNDERTAKE RESEARCH COMMUNICATION AND EDUCATION**
 - That communicates knowledge to expert users, and to the wider society
 - That defends freedom of thought and expression by individual scientists
 - That promotes universal principles of ethical research, such as excellence, inclusiveness, dissemination, participation, ethics, scientific principles, non-political, public good, and others
 - That encourages countries to guarantee worldwide participation in, and data contribution to, the Earth and space sciences
 - That supports capacity building in developing countries
- **INFLUENCE GOVERNMENT POLICY**
 - In order to play a leading role in advising policy-makers
 - To encourage the establishment of transnational agencies and services for those natural hazards not covered by the UN or other international non-government agencies and to promote the setting up an international panel for periodic, independent policy-relevant assessment of science on disaster risks and resilience
 - To champion an open data policy in the Earth and space sciences
 - To address the issue of supporting scientists from non-IUGG member countries
- **IMPROVE GLOBAL RESEARCH MANAGEMENT**
 - To strengthen global cooperation in Earth and space sciences
 - To strengthen the Union Associations so that they improve their effectiveness
 - To develop and promote standards for data, models and services
 - To deliver those products and services that support the Earth and space sciences that cannot be provided by other organisations and agencies
 - To draw attention to the societal benefits from advances in the Earth and space sciences

The IUGG promotes:

- Inter- and multi-disciplinary international research programmes (see Table 1)
- The collaboration with other multi-national or regional geodetic, geophysical or other geosciences organisations through its many partnerships and its Affiliate Membership programme (see Table 2)

The IUGG supports (Table 3):

- International Associations dedicated to the major disciplines of the Earth and sciences, its commissions, divisions and working groups, as well as inter-association activities
- Union Commissions and Working Groups dedicated to interdisciplinary research in Earth and space sciences
- International science meetings
- An interdisciplinary international grants programme
- A science education programme

The IUGG undertakes and supports the following Core Functions:

- international research cooperation
- representation of all geosciences
- flagship initiatives
- cross-cutting activities
- capacity building, outreach and education
- participation and involvement of all scientists and partner organisations

4. Strategic Goals

The Mission and Core Principles of the IUGG will be addressed by focusing on several Major Goals:

- To modernise the operations of the IUGG by developing strategies, and the promotion of implementation plans for:
 - improving the organisation and running of the affairs of the IUGG Associations; such as encouraging greater inter-association collaboration, modernising governance structures, reporting processes, sustainable funding, and others;
 - strengthening the membership; including addressing the issue of national membership vis-a-vis individual membership, membership fees and funding implications, election of office bearers, and others;
 - simplifying the reporting, decision-making and strategy development processes between Council Meetings; e.g. through greater use of technologies for holding virtual meetings, electronic voting, etc; and
 - strengthening the links between the IUGG Associations and member countries (the national correspondents of the Associations).
- To raise the visibility & effectiveness of the IUGG within the community and to policy-makers by:

- promoting the work of the IUGG & its associations to a wider community, as well as at high-level forums;
- developing a Communication Strategy that addresses the different IUGG (& Association) stakeholders; and
- developing strategies for improving product/service provision to science & society, and in the process emphasising the unique contributions of the IUGG Associations.
- To improve international collaborative research outcomes across the breadth of sciences represented by the IUGG associations by:
 - encouraging early-career scientists, particularly from developing countries, so as to grow the human resource capability across the geosciences and across nations;
 - promoting free exchange of information and data, encouraging countries and agencies to provide access to datasets, and initiating collaborative projects; and
 - fostering greater collaboration with sister organisations, private industry, national and space agencies, to ensure that technology can be applied to problems in the geosciences.

Table 1:

Research Projects initiated and/or supported by IUGG

Current	Past
<ul style="list-style-type: none"> • International Lithosphere Programme (ILP, a joint IUGS-IUGG activity) • Extreme Natural Hazards and Societal Implications (ENHANS) • Global Geodetic Observing System (GGOS, an IAG program) • International Geosphere-Biosphere Programme (IGBP) • World Climate Research Programme (WCRP) • Integrated Research on Disaster Risk (IRDR) • International Year of Global Understanding (IYGU) • International Year of Deltas (IYD) • Mathematics of Planet Earth (MPE) • World Data System (WDS) 	<ul style="list-style-type: none"> • International Year of Planet Earth (IYPE, 2007-2010) • Electronic Geophysical Year (eGY, 2007-2008) • International Polar Year (IPY, 2007-2008) • International Heliophysical Year (IHY, 2007-2008) • International Decade for Natural Disaster Reduction (IDNDR, 1990-1999) • Geodynamics Project (1972-1979) • Global Atmospheric Research Programme (1967-1980) • International Hydrological Decade (1965-1974) • Upper Mantle Project (1964-1970) • International Geophysical Year (IGY, 1957-1958)

Table 2:

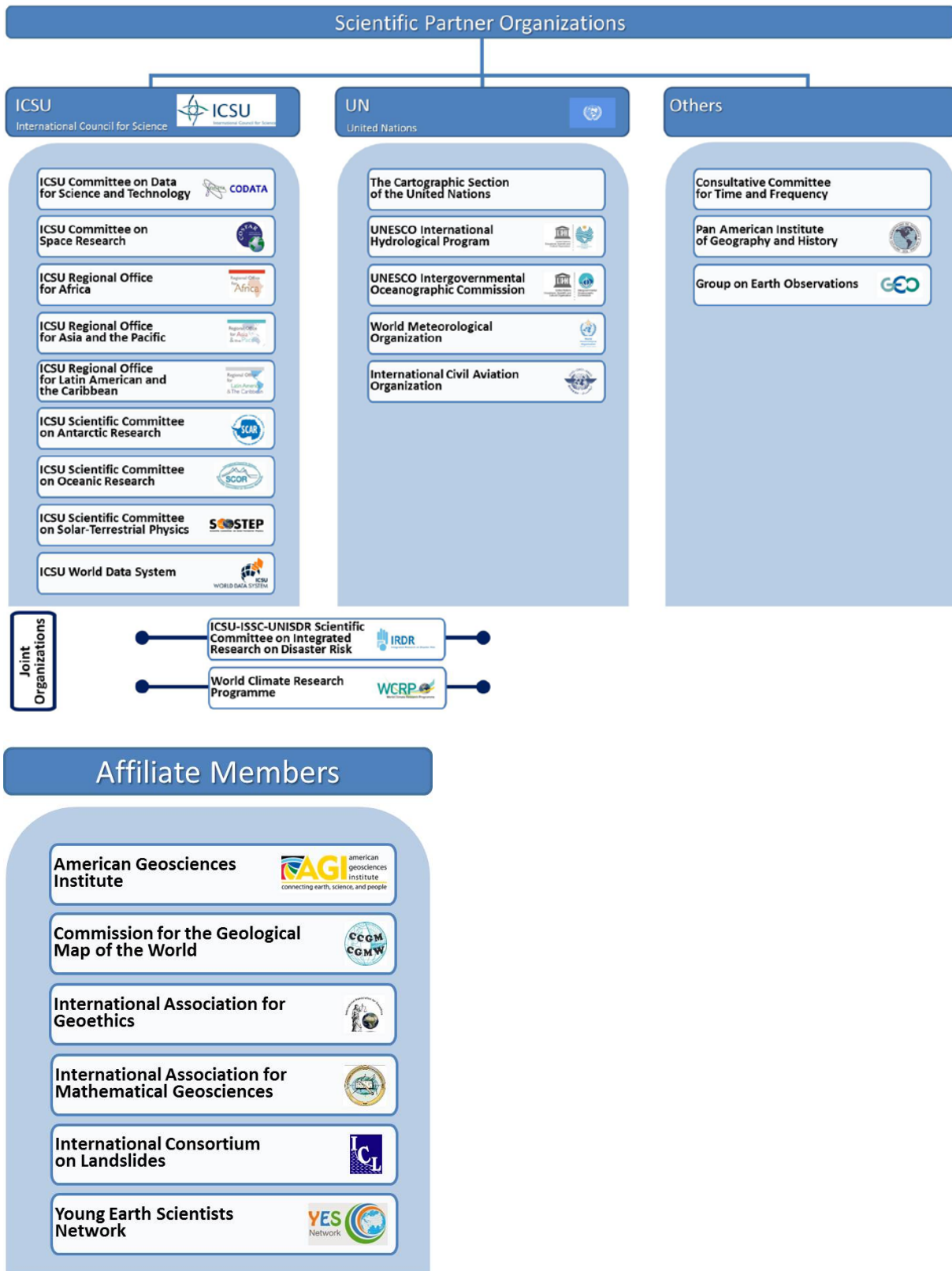
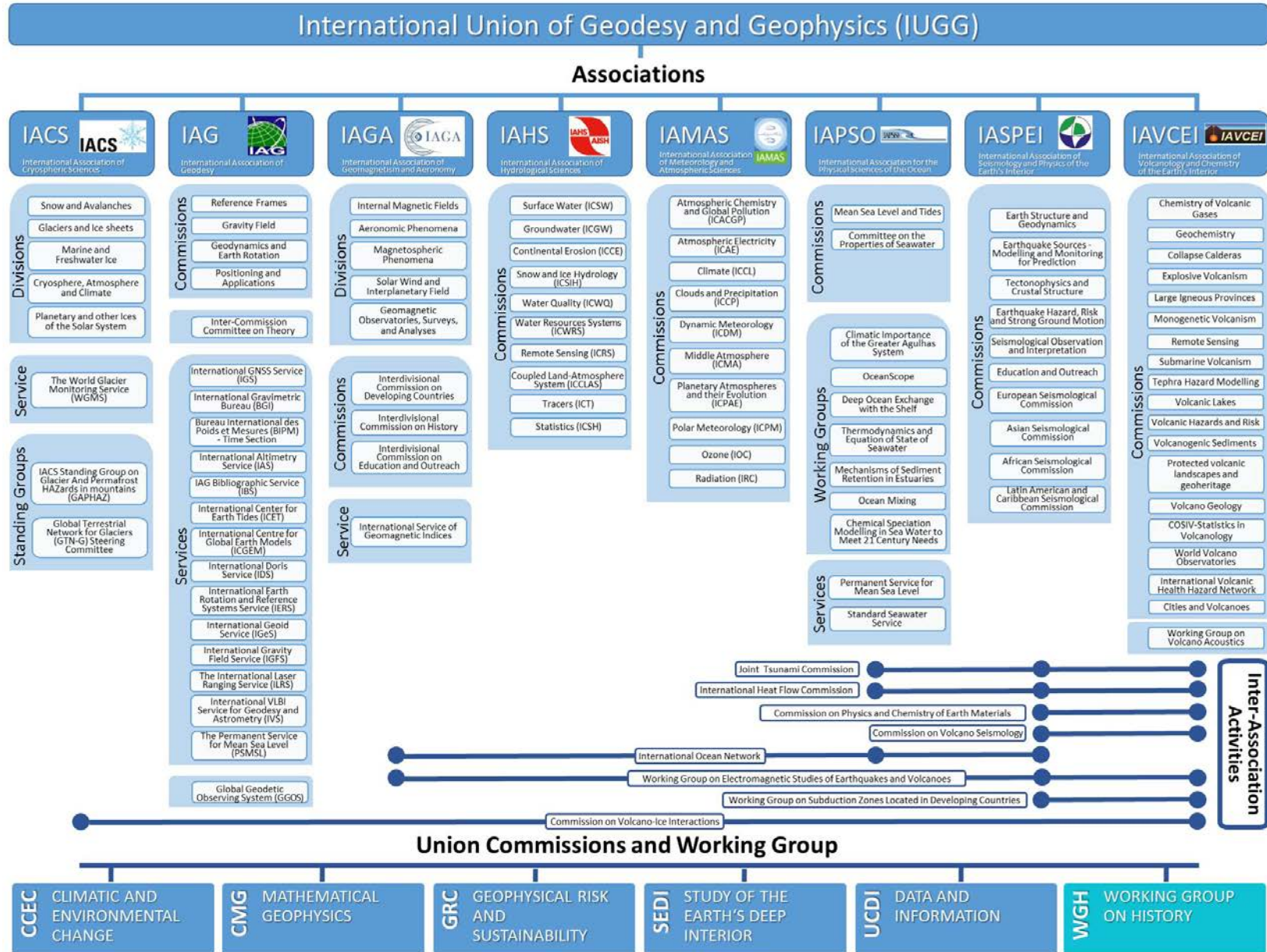


Table 3:



10. Reports by Association Presidents / Rapports des présidents des Associations

The reports contained in this section of the Agenda book are summaries of the annual reports prepared by each Association during the last quadrennium. Each year, their complete reports are included in the IUGG Annual Report that is posted on the IUGG web-site. Printed copies of the IUGG Annual Reports together with the IUGG Yearbooks are published each year and mailed to all Adhering Bodies and National Committees, ICSU, GeoUnions, relevant international and inter-governmental organizations, and to major libraries worldwide.

Each Union Association maintains a web-site; links to these sites are shown on the IUGG index page. The Association web sites are a valuable source of information not only about the Association itself, but also about their scientific disciplines.

During the quadrennium, the activities of the Associations were reported and discussed at the 2013 Executive Committee meetings with participation of the Association Secretaries General. These opportunities for the Association officers to compare challenges and solutions have proved to be quite valuable.

Each Association holds a Scientific Assembly approximately 2 years following the IUGG General Assembly. The Scientific Assemblies convened after the XXVth General Assembly, are listed below.

Association	Year	Location
IACS/IAMAS	2013	Davos, Switzerland
IAG	2013	Potsdam, Germany
IAGA	2013	Merida, Mexico
IAHS/IAPSO/IASPEI	2013	Gothenburg, Sweden
IAVCEI	2013	Kagoshima, Japan

In addition, the Associations organized the scientific programme for the 26th General Assembly and managed the distribution of travel assistance grants. The Scientific Programme Committee met in Prague (Czech Rep.) in 2013, in Vienna (Austria) in 2014, and in Prague in 2015, but carried out much of the work via the Internet.

10.1. International Association of Cryospheric Sciences (IACS) / Association Internationale des Sciences Cryosphériques (AISC)

INTRODUCTION

The International Association of Cryospheric Sciences (IACS) is the eighth and youngest Association of the International Union of Geodesy and Geophysics (IUGG). IACS is concerned with snow and ice science and provides expert advice on cryospheric issues to governmental and non-governmental organisations. Most snow and ice research within IUGG was previously covered within the International Commission on Snow and Ice (ICSI), a commission of the International Association of Hydrological Sciences (IAHS). The IUGG Council voted to establish IACS at the IUGG General Assembly in Perugia, Italy in 2007. This is hence the second Quadrennial report of IACS as an independent Association, the first having covered the period from 2007-2011.

The objectives of IACS are to:

- promote studies of cryospheric subsystems of the Earth solar systems,
- 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 standardisation 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. Members of the present Bureau were elected at the Plenary Administrative Session in Melbourne in 2011 and membership has remained stable during this second quadrennium. They have been President (Ian Allison, Australia – until July 2013 whence he became immediate Past-President), President-Elect (Charles Fierz – until July 2013 whence he became President), Secretary General (Andrew Mackintosh, New Zealand), three Vice-Presidents (Andres Rivera, Chile; Olga Solomina, Russia; Xiao, Cunde, China) and the heads of five disciplinary Divisions (Glaciers and Ice Sheets, Cecilie Rolstad-Denby, Norway; Snow and Avalanches, Ethan Greene, USA; Marine and Freshwater Ice, Hiroyuki Enomoto, Japan; Planetary and Other Ices of the Solar System, Ralf Greve, Japan; and Cryosphere, Atmosphere and Climate, Valérie Masson-Delmotte, France). The President, President Elect/Immediate Past President, and Secretary General make up the IACS Executive (EC). Most internal business of the Association and interaction with other scientific agencies is conducted by email. In addition, the EC conducts monthly teleconferences, which bureau members are invited to join. The Bureau meets in person once per year. Bureau meetings (BM) during this quadrennium were held in Melbourne, Australia (BM07), Sanya, China (BM08), Davos, Switzerland (BM09) and Tokyo Japan (BM10). Minutes of these meetings are available on the IACS website, www.cryosphericosciences.org. Plenary meetings with the IACS stakeholders, the cryospheric science community, were held in Melbourne, Australia in 2011 and Davos, Switzerland, in 2013.

The President and the Secretary General of IACS participated actively in the IUGG Executive Committee meetings in Melbourne, Australia in 2011, and in Prague, Czech Republic in 2013.

The current four-year term of most Bureau members finishes in July 2015, and a “nominating panel” of members independent of the Bureau (Kumiko Goto-Azuma, Japan; Martin Sharp, Canada; Danny Marks, USA) was established in October 2014 to identify suitable candidates for election to the Bureau. The nominating panel’s role is to ensure that candidates for the IACS Bureau provide a good coverage of world regions and cryospheric disciplines. The new slate of candidates will be circulated

to National Committees at least three months prior to its Plenary Administrative Session, to be held in Prague on Friday 26th June, 2015.

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. IACS Standing Groups include

IACS partnerships and collaborations

The IACS Bureau is proactive in keeping our partnerships alive, by keeping in regular email contact via specific liaisons, and by attending meetings and visiting the offices of our partners. There is not space to detail all of these activities, but below we list the partners that we have been active with during the last quadrennium;

- World Climate Research Programme Climate and Cryosphere Project (CliC; www.climate-cryosphere.org/).
- Association of Polar and Early Career Scientists (APECS; www.apecs.is/)
- International Permafrost Association (IPA; ipa.arcticportal.org/).
- Scientific Committee on Antarctic Research (SCAR; www.scar.org/).
- International Arctic Science Committee (IASC; www.iasc.info/).
- World Meteorological Organisation Global Cryosphere Watch (globalcryospherewatch.org/)
- International Glaciological Society (IGS; www.igsoc.org/)
- International Commission on Snow and Ice Hydrology (International Association of Hydrological Sciences, ICSIH)

Activities - Standing Groups

GAPHAZ, the Standing Group on Glacier And Permafrost HAZard in mountains organized a one-day “retreat” Workshop 14 September 2014 in Torino, Italy. GAPHAZ also launched a new website (<http://www.gaphaz.org>).

The Global Terrestrial Network of Glaciers (GTN-G) Standing Group and its daughter organisation the World Glacier Monitoring Service organised a number of glacier monitoring sessions at major conferences including the European Geosciences Union (EGU) in 2013 and 2014, and the American Geophysical Union (AGU) in 2014. WGMS has now also organised two summer schools (see below).

In June 2014, an advisory board consisting of C.R. Denby, L.M. Andreassen, A. Arendt, J.G. Cogley, A. Gardner and V. Ryabinin formally evaluated GTN-G. This included a site visit to the National Snow and Ice Data Center (NSIDC) in Boulder, USA. The report was very supportive of GTN-G activities but also made useful recommendations.

The IAVCEI/IACS Joint Commission on Volcano-Ice Interactions organised 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. In addition, this joint commission organised a large number of individual sessions at major conferences. Please see their website for more information (http://volcanoes.dickinson.edu/iaxcei_iasc_viic/events2012.html).

Activities - Working Groups

IACS working groups active in this quadrennium include;

- ‘Mass balance terminology and methods’ (2008-2012). This working group ended its successful term with publication of the ‘*Glossary of Glacier and Mass Balance Terms*’ (edited by Graham Cogley and WG members) published by IHP/UNESCO as IACS Contribution No. 2.
- ‘Flow law for polycrystalline ice’ (2010-2014). This WG ended its term in 2014, but its leaders are currently working on a paper to be submitted to an international peer reviewed journal in 2015.
- ‘MICROSNOW; From quantitative stratigraphy to microstructure-based modelling of snow’ (2012–2016). This WG has organised a number of workshops (see below), and is currently very active.

- ‘Randolph Glacier Inventory and infrastructure for glacier monitoring’ (2014-2018) and ‘Glacier thickness estimation’ (2014-2018). These two new working groups now have a presence on the IACS website (<http://www.cryosphericciences.org/workingGroups.html>) and will host their first symposia at IUGG Prague (Sessions C01 and C02; <http://www.iugg2015prague.com/iacs-symposia.htm>).

Conferences and Symposia

DACA-13, the Davos Atmosphere and Cryosphere Assembly 2013, “Air, Ice & Process Interactions”
IACS and IAMAS held their joint scientific assembly DACA-13 on 8-12 July 2013 in Davos, Switzerland. More than 950 participants from 52 countries and five continents were welcomed by Charles Fierz and Andrew Mackintosh (IACS President Elect and Sec.-Gen.), Athena Coustenis and Hans Volkert (IAMAS President and Sec.-Gen.), and Alik Ismail-Zadeh (IUGG Sec.-Gen.). Scientifically, the assembly covered numerous fields of atmospheric and cryospheric sciences, enriched by snow hydrology, oceanography, natural hazards, economy and risks, and the history of science. These made up an attractive programme consisting of 21 mostly joint Symposia featuring several sessions each. More than 350 posters were on display for the whole week while dedicated poster sessions facilitated deeper discussions with the presenters in attendance. Four distinguished scientists delivered well-attended end-of-day keynote lectures, also open to the Davos public: Thomas Stocker started with the topic “Climate change: Making the best use of scientific information”, Valérie Masson-Delmotte introduced us to “Water stable isotopes and climate in Greenland, from present-day atmospheric monitoring to glacial-interglacial ice core records”, Ronald B. Smith presented “Global aspects of orographic precipitation”, and Georg Kaser closed the scientific part of the assembly talking about “The cryosphere after AR5: more knowledge but also more uncertainty”.

The assembly was highly rated by the attendees. The quality of both talks and posters was generally regarded as excellent and the environment of Davos and its Congress Centre allowed for easy exchanges between colleagues. Indeed, many sessions brought together scientists that would not have otherwise met, and the question “When will the next DACA conference be held?” was often heard. It was a great pleasure to see many early career scientists (ECS) attending the conference. In addition, the Association of Polar Early Career Scientists (APECS) organized a successful workshop that for the first time considered the needs of early career cryospheric scientists in the Alpine area. Further social events included the Festa Cryospherica at the famous *Schatzalp Hotel*, and the Conference Dinner with over 500 diners in the plenary hall, entertained by a group of traditional musicians. During the latter Joyce Penner (IAMAS Vice President) and Andrew Mackintosh read out together a resolution of thanks to the hosts that had been passed by both associations. All guests warmly applauded the joint organizing team and the considerable group of student helpers.

Since 2009, the Swiss National Organizing Committee (SNOC) chaired by Heini Wernli had meticulously planned this event, strongly supported by the two local Davos institutes, the Physikalisch-Meteorologisches Observatorium Davos / World Radiation Center (PMOD/WRC with Local Organizing Committee chair Werner Schmutz) and the WSL Institute for Snow and Avalanche Research (SLF with Scientific Programme Committee chair Michael Lehning). Several generous sponsors helped in staging this event: the Swiss Academy of Sciences, MeteoSwiss, the Federal Office for the Environment, the Canton of Grisons as well as WMO (WCRP, WWRP) and IUGG by awarding travel grants in addition to those provided by IAMAS and IACS.

IACS also supported the following workshops, symposia and summer schools between 2011-2015:

IACS Working Group workshops:

- First International Snow Grain Size Workshop; Measurement and Applications was held in Grenoble, France from 2-5 April, 2013.
- Intercomparison of Snow Grain Size Measurements Workshop, 9-14 March 2014 in Davos, Switzerland.
- Microstructure in Snow Microwave Radiative Transfer (MICROSNOW), 6-8 August 2014, University of Reading, UK.

Conferences supported by IACS:

- International Partnerships in Ice Core Sciences (IPICS), held in Giens, France, from 1-5 October 2012.
- 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
- International Conference on Cryosphere: Changes, Impacts and Adaptation held between 10-12 November 2012 in Sanya, China.
- IAG/IACS symposium on "Reconciling observations and models of elastic and viscoelastic deformation due to ice mass change" that took place in Ilulissat, Greenland, 30 May-2 June 2013 (www.dtu.dk/subsites/iag.aspx).
- Symposium on "Physics, chemistry and mechanics of snow", in Yuzhno-Sakhalinsk, Russia, 23-28 September 2013
- International Symposium on Sea Ice in a Changing Environment, Hobart, Tasmania, Australia, 10-14 March 2014 (seaice.acecrc.org.au/igs2014/).
- Model-data workshop for the Late Pleistocene evolution of the Greenland and Antarctic ice sheets, 22-24 May 2014, Grenoble, France (<http://www.physics.mun.ca/MOCA/IceSheetModelandData2014.html>).
- International Workshop on Calving, 1-2 June 2014, Grenoble, France (<http://www-igge.obs.ujf-grenoble.fr/calving2014/theme.html>).
- *Special Session on Cryosphere Science*, XIX Geological Congress of Argentina, 2-6 June 2014, Cordoba, Argentina.

Summer schools supported by IACS

- World Glacier Monitoring Service (WGMS) on 'measurement and uncertainty assessment of glacier mass balance' in Tarfala, Sweden from 9-11 July 2012.
- WGMS summer school on 'Mass Balance Measurements and Analysis' in Zermatt, Switzerland, 2-7 September 2013.
- Second International Summer School in Glaciology University of Alaska, Fairbanks Glaciology Summer School, McCarthy, Alaska, USA from 10-20 June 2012.
- Third International Summer School in Glaciology University of Alaska, Fairbanks Glaciology Summer School, McCarthy, Alaska, USA, 6-16 August 2014.

FUTURE ACTIVITIES

IACS is looking ahead to the 26th IUGG General Assembly in Prague. IACS will lead Union Symposium U10 (Ian Allison, lead convener) at IUGG Prague. IACS is involved in a number of other union and joint symposia, as well as 17 IACS symposia. In addition to the scientific activities, the following important bureau activities will be carried out in Prague:

- IACS will hold its Plenary Administrative Session on Friday 26th June (6-8 pm), where the new Bureau will be confirmed. The current four-year term of most Bureau members finishes in July 2015
- We have established an IACS Early Career Scientist Prize, for the best cryospheric publication by an early career scientist in the calendar year (first year will be 2014). The Selection Committee will announce the winner late-March 2015 and the 2015 Prize will be formally presented during the IACS Plenary Administrative Session.
- The IACS dinner known as *Festa Cryospherica* will be held at Bastion Restaurant in Prague, immediately following the Plenary Administrative Session.
- IACS will hold its open Bureau meeting on Wednesday 24th June in the evening (6-8 pm).
- IACS will hold its annual Bureau meetings in Prague. The closed bureau meetings will be held on Monday 22nd June and Monday 29th June.
- IACS will hold its open Bureau meeting on Wednesday 24th June in the evening (6-8 pm).

- IACS are co-sponsoring an event by the Association of Polar Early Career Scientists (APECS) in the evening of Saturday 27th June.

Planning has commenced for a Joint IACS/International Glaciological Society (IGS)/World Climate Research Programme Climate and Cryosphere (CliC) Assembly in Wellington, New Zealand, February 2017.

Charles Fierz, IACS President
Andrew Mackintosh, IACS Secretary General

INTRODUCTION

The objective of the IAG is to study all geodetic problems related to Earth observation and global change. This includes the establishment of reference systems, determination of the Earth gravity field, monitoring Earth rotation, positioning of surface points, and studies of crustal deformation, mass transport and sea level changes. To accomplish the objectives, IAG is divided into four Commissions, fourteen Scientific Services, the Global Geodetic Observing System (GGOS), the Communication and Outreach Branch (COB), and the Inter-Commission Committee on Theory (ICCT). The administration is supervised by the Council and operated by the Bureau, the Executive Committee and the Office. The outreach is done by the COB. All these entities are in steady contact and inform about their activities through the IAG Newsletter and the bi-annual IAG Reports (Travaux de l'AIG).

ADMINISTRATION

IAG Council

The Council met twice during the IUGG General Assembly 2011 in Melbourne, Australia, and once at the IAG Scientific Assembly 2013 in Potsdam, Germany. The list of national correspondents forming the IAG Council was regularly updated in contact with the IUGG Secretary General. The Council was informed by e-mail about activities of the Bureau and the Executive Committee.

IAG Executive Committee (EC)

The Executive Committee is composed by the IAG President, immediate Past-President, Vice-President, Secretary General, the four Commission Presidents, the Chairperson of GGOS, the President of the COB, three representatives of the Services, and two members at large. Seven EC meetings were held during the legislative period from 2011 to 2014: Melbourne, Australia, July 2011, San Francisco, CA/USA, December 2011, Singapore, August 2012, Vienna, Austria, April 2013, Potsdam, Germany, September 2013, Vienna, Austria, April 2014, and San Francisco, CA/USA, December 2014. The meeting summaries were published by e-mail in the IAG Newsletter in IAG's Journal of Geodesy (Springer-Verlag) and are available online in the IAG Homepage (<http://www.iag-aig.org>) and in the IAG Office Homepage (<http://iag.dgfi.badw.de>).

Main agenda items at the EC meetings were the regular reports of the Commissions, Services, GGOS, ICCT, COB, the Editor in Chief of the Journal of Geodesy, and the Editor of the IAG Symposia Series (both at Springer). They were followed by the discussion on specific scientific issues, changes in the structures of GGOS and Services, and IAG publications. Other important topics were the IAG Scientific Assembly 2013, the preparation of the IAG Symposia during the IUGG General Assembly 2015, the discussion of the bi-annual IAG Reports (Travaux de l'AIG), sponsoring of symposia, and the links to other organizations, e.g. FIG, GEO, JBGIS, IHO, ISO, and UNOOSA (see below).

IAG Bureau

The IAG Bureau, consisting of the President, the Vice-President and the Secretary General, held monthly teleconferences and met regularly before each EC meeting. The President and Secretary General participated in the IUGG Executive Committee Meetings. The Bureau members represented IAG at various international scientific meetings and in several anniversaries, e.g., the 150th anniversary of the Swiss Geodetic Commission, Zürich, Switzerland, 10 June 2011, the 150th anniversary of the Arc Measurement in the Kingdom of Saxony, Dresden, Germany, 1 June 2012, the 150th anniversary of the Central European Arc Measurement, Vienna Austria, 14 September 2012, the 150th anniversary of the Austrian Geodetic Commission, Vienna, Austria, 7 November 2013.

ACTIVITIES

IAG Office

The IAG Office assists the Secretary General in the administrative organization of all IAG business, meetings and events. This includes the budget management, the record keeping of the individual IAG membership, and the preparation and documentation of all Council and Executive Committee meetings with detailed minutes for the EC members and meeting summaries published in the IAG Newsletters and the IAG Homepage. Important activities were the preparation and execution of the IAG Scientific Assembly 2013 together with the celebration of the 150th IAG anniversary and the IAG symposia of the IUGG General Assembly 2015, the edition of the Geodesist's Handbook 2012 as the organisational guide of IAG with the complete description of the IAG structure (reports, terms of reference, documents), and the Mid-Term Reports 2011–2013 (Travaux de l'AIG Vol. 38). The accounting of the Journal of Geodesy and the IAG Symposia series, both published by Springer, were supervised. Travel grants for young scientists to participate in IAG sponsored symposia were handled.

Communication and Outreach Branch (COB)

The task of the COB is the IAG public relation in particular by maintaining the IAG Homepage and publishing the monthly Newsletter online and in the Journal of Geodesy. It also keeps track of all IAG related events by the meetings calendar. The IAG newsletter is sent to all IAG Officers, individual members, the Presidents and Secretaries General of the IUGG Associations and liaison bodies. The COB prepared, printed and distributed a new IAG leaflet and a big IAG brochure and participated in the preparation of the Geodesist's Handbook 2012.

Commissions and Inter-Commission Committee

The four IAG Commissions (Reference Frames, Gravity Field, Earth Rotation and Geodynamics, Positioning and Applications) and the Inter-Commission Committee on Theory established their structure and scientific programme for the period 2011 – 2015 (published in the Geodesists' Handbook 2012) and coordinated their implementation. They reported regularly to the EC and prepared the mid-term reports 2011 – 2013 for publication in the IAG Reports (Travaux de l'AIG). Each Commission maintained its individual Homepage and held several symposia, workshops and other meetings (see below). All of them organized a symposium at the IAG Scientific Assembly 2013.

Services

There are fourteen IAG Services which may be split into three general fields: geometry (IERS, IDS, IGS, ILRS, and IVS), gravity (IGFS, ICGEM, IDEMS, IGeS, and BGI) and combination (IAS, BIPM, ICET, and PSMSL). All of them maintain their own Homepages and data servers and hold their administrative meetings (Directing Board or Governing Board, respectively). They published their structure and programme 2011 – 2015 in the Geodesists' Handbook 2012, and the progress reports 2011 – 2013 in the IAG Reports (Travaux de l'AIG). Most of the Services held international meetings (see below).

Global Geodetic Observing System (GGOS)

The GGOS is IAG's observing system to monitor the geodetic and the global geodynamic properties of the Earth as a system. A complete new structure was set up during a retreat in 2011 and implemented in 2012. It includes a 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 scientific work of GGOS is structured by Themes, Working Groups and Bureaus. The outreach is done by the GGOS Portal, Webpages (www.ggos.org), an exhibit booth, brochures and books. Several retreats were held in the following years for updating the structure.

Coordination with other organisations

IAG maintains close cooperation with several organizations outside IUGG. There were frequent meetings with the Advisory Board on the Law of the Sea (ABLOS, together with IHO), Group on Earth Observation (GEO, with IAG as a participating organization), International Standards

Organization (ISO, 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), and the United Nations Global Geospatial Information Management (UN-GGIM).

Meetings

Important meetings of IAG components and sponsored IAG meetings were in 2011 – 2014:

- 20th EVGA Meetg. & 12th VLBI Analysis Workshop, Bonn, Germany, March 29-31, 2011;
- 1st International Workshop “The Quality of Geodetic Observation and Monitoring Systems” (QuGOMS), Garching/Munich, Germany, 13-15 April 2011;
- Third Conference “Earth Observation for Global Changes (EOGC2011)”, Munich, Germany, 13-15 April 2011;
- 17th International Workshop on Laser Ranging and 23rd General Assembly of the International Laser Ranging Service (ILRS), Bad Kötzing, Germany, 15-20, May 2011;
- Sub-Commission 1.3a “EUREF” Symposium, Chisinau, Republic of Moldova, 25-28 May 2011;
- 2nd GIA Modeling Training School, Gävle, Sweden, 13-17 June 2011;
- Sub-Commission 1.3b “SIRGAS” General Meeting, Heredia, Costa Rica, 8-10 August 2011;
- International Workshop on GNSS Remote Sensing for Future Missions and Sciences, Shanghai, China, 7-9 August 2011;
- 3rd International Colloquium “Scientific and Fundamental Aspects of the Galileo Programme, Copenhagen, Denmark, 31 August – 2 September 2011;
- Internat. Symposium on Deformation Monitoring, Hong Kong, China, 2-4 November 2011.
- IGS Workshop on GNSS Biases, Bern, Switzerland, 18-19 January 2012;
- IVS VLBI2010 Workshop on Technical Specifications (TecSpec), Bad Kötzing/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 am Main, 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, IN, USA, 10-11 October 2012;
- International Symposium on Gravity, Geoid and Height Systems GGHS 2012, Venice, Italy, 10-12 October 2012;
- Sub-Commission 1.3b “SIRGAS” Meeting 2012, Concepción, Chile, 20-31 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;
- 21st European VLBI for Geodesy and Astrometry Workshop, Helsinki, Finland, 6-8 March 2013;
- 17th Int. Symposium on Earth Tides “Understand the Earth”, Warsaw, Poland, 15-19 April 2013;
- Internat. Symposium on “Mobile Mapping Technology”, Tainan, Taiwan, 30 April – 2 May 2013;
- Seventh IVS Technical Operations Workshop, Westford, Massachusetts, USA, 6-9 May 2013;
- IERS Workshop on Local Ties and Co-locations, Paris, France, 21-22 May 2013;
- IAG Sub-Commission 1.3a “EUREF” Symposium 2013, Budapest, Hungary, 29-31 May 2013;
- International Symposium on “Reconciling Observations and Models of Elastic and Viscoelastic Deformation due to Ice Mass Change”, Ilulissat, Greenland, 30 May – 2 June 2013;
- GNSS Precise Point Positioning: Reaching Full Potential, Ottawa, Canada, 12-14 June 2013;
- VIII Hotine-Marussi Symposium, Rome, Italy, 17-21 June 2013;
- Int. Conference on “Earth Observations and Societal Impacts”, Tainan, Taiwan, 23-25, June 2013;
- International Symposium on Planetary Sciences (IAPS2013), Shanghai, China, 1-4, July 2013;
- IAG Scientific Assembly, Potsdam, Germany, 1-6 September 2013;
- 2nd Joint Int. Symposium on Deformation Monitoring, Nottingham, UK, 9-11 September 2013;
- IAG Third Symposium on “Terrestrial Gravimetry: Static and Mobile Measurements (TGSM-2013)”, St Petersburg, Russian Federation, 17-20 September 2013;
- Scientific Developments from Highly Accurate Space-Time Reference Systems, Observatoire de Paris, Paris, France, 16-18 September 2013;
- ITU/BIPM Workshop on “The Future of the International Time Scale”, Geneva, Switzerland, 19-20 September 2013;
- 2nd International VLBI Technology Workshop, Seogwipo, South Korea, 10-12 October 2013;
- IAG Subcommission 1.3b “SIRGAS” Symposium, Panama City, Panama, 24-26 October 2013;
- 18th International Workshop on Laser Ranging, Fujiyoshida, Japan, 9-15 November 2013;
- European VLBI Network Technical and Operations Group (EVN TOG) Meeting, Bad Koetzing, Germany, 23-24 January 2014;
- International VLBI Service for Geodesy and Astrometry (IVS) General Meeting, Shanghai, China, 2-7 March 2014;
- European Reference System (EUREF) Symposium, Vilnius, Lithuania, June 04-06, 2014;
- International GNSS Service (IGS) Workshop "Celebrating 20 Years of Service", Pasadena, CA, USA, 23-27 June 2014;
- 3rd International Gravity Field Service (IGFS) General Assembly, Shanghai, China, 30 June - 6 July 2014;
- International Symposium on Geodesy for Earthquake and Natural Hazards (GENAH 2014), Matsushima, Miyagi, Japan, 22-27 July 2014;
- 18th WEGENER General Assembly: Measuring and Modelling our Dynamic Planet Leeds, UK, 1-4 September 2014;
- Journées 2014 "Systemes de reference spatio-temporels", Pulkovo Observatory, St. Petersburg, Russia, 22-24 September 2014;
- 12th European VLBI Network (EVN) Symposium, Cagliari, Italy, 7-10 October 2014;
- Reference Frames for Applications in Geosciences (REFAG2014), Luxembourg, Luxembourg, 13-17 October 2014;
- International DORIS Service (IDS) Workshop, Konstanz, Germany, 27-28 October 2014;
- International Laser Ranging Service (ILRS) Technical Workshop, 27-31 October 2014, Greenbelt, MD, USA;

- Third International VLBI Technology Workshop, Groningen/Dwingeloo, The Netherlands, 10-13 November 2014;
- PECORA 19 Fall Meeting (ASPRS, IAG, ISPRS) “Sustaining Land Imaging: Unmanned Aircraft Systems (UAS) to Satellites”, Denver, Colorado, USA, 17-20 November 2014;
- Sub-Commission 1.3b “SIRGAS” Symposium, La Paz, Bolivia, 24-26 November 2014;
- 11th International Symposium on Location-Based Services, Vienna, Austria, 26-28 November 2014.



Opening Session of the IAG Scientific Assembly on the occasion of the 150th Anniversary of IAG, Potsdam, Germany, 1-6 September 2013



IAG Presidents G. Beutler (2003-2007), W. Torge (1991-1995), I.I. Mueller (1987-1991), Ch. Rizos (2011-2015), M. Sideris (2007-2011) and Secretaries General H. Drewes (2007-...) and C. Boucher (1991-1995) at the IAG Scientific Assembly, Potsdam, Germany, 1-6 September 2013

The following IAG Schools were held 2011 – 2014:

- SIRGAS School “Geodetic Reference Systems”, Heredia, Costa Rica, 3-5 August 2011;
- GNSS School, Hong Kong, China, 14-15 May 2012;
- Internat. Summer School “Space Geodesy & Earth System”, Shanghai, China, 21-25 August 2012;

- SIRGAS School “Real Time GNSS Positioning”, Concepción, Chile, Oct., 24-26, 2012;
- EGU-IVS Training School for the Next Generation Geodetic and Astrometric VLBI, Helsinki, Finland, 2-5 March 2013.
- 11th School of the International Geoid Service: Heights and Height Datum, Loja, Ecuador, 7-10 October 2013.
- SIRGAS School “Reference Systems, Crustal Deformation and Ionosphere Monitoring”, Panama City, Panama, 21-23 October 2013.
- SIRGAS School “Vertical Reference Systems”, La Paz, Bolivia, 20-22 November 2014.

Publications

The Journal of Geodesy, the official IAG scientific periodical with an Editor in Chief approved by the IAG Executive Committee, was continuously published with monthly issues in Springer-Verlag. In the IAG Symposia proceedings Series, the following volumes were published in:

- 136: Geodesy for Planet Earth; Proceedings of the IAG Scientific Assembly 2009 (2012);
- 137: VII Hotine-Marussi Symposium on Mathematical Geodesy 2009 (2012);
- 138: Reference Frames for Applications in Geosciences; Symposium of Commission 1 (2013);
- 139: Earth on the Edge: Science for a sustainable Planet; Proceedings General Assembly 2011 (2014);
- 140: Quality of Geodetic Observation and Monitoring Systems Workshop 2011 (on-line 2014).

Reports of all IAG components were published in the Travaux de l’AIG Vol. 37 (2011) and 38 (2013).

Awards, anniversaries, obituaries

The following medals and prizes have been awarded:

- Levallois Medal to Ruth Neilan, USA (2011);
- Bomford Prize to Johannes Boehm, Austria (2011);
- Young Author Award to Elizabeth Petrie, UK (2011);
- Young Author Award to Thomas Artz (2013);
- Young Author Award to Manuela Seitz (2013).
- 53 Travel Awards to young scientists for participation in 15 IAG sponsored symposia.

The following anniversaries were celebrated with IAG participation:

- 150th anniversary of the Swiss Geodetic Commission, Zürich, Switzerland, 10 June 2011;
- 150th anniversary of the Arc Measurement in the Saxony, Dresden, Germany, 1 June 2012;
- 150th anniversary of the Central European Arc Measurement, Vienna Austria, 14 September 2012;
- 150th anniversary of the Austrian Geodetic Commission, Vienna, Austria, 7 November 2013;

Obituaries were written for former IAG officers and outstanding geodesists who passed away:

- 2011: A. Bjerhammar, Sweden; I. Fejes; Hungary; A. Finkelstein, Russia, S. Henriksen, USA;
- 2012: K.-P. Schwarz;
- 2014: C. C. Tscherning.

Chris Rizos, IAG President
Hermann Drewes, IAG Secretary General

INTRODUCTION

Outstanding frontiers of research in geomagnetism and aeronomy in the period 2011-2014 have included a wide range of new results, in diverse domains of Association activities. As we move out of a prolonged period of exceptionally low solar activity, space weather issues have been extensively considered, especially given mankind's increasing dependence on satellite technology; alongside this, radiation belt studies, and studies of the Earth's electromagnetic environment, are crucial. Other highlights include results from studies related to the understanding of solar processes, solar-terrestrial interactions - including those that influence climate, and coupling processes that link aeronomic and geomagnetic phenomena from the fringe of geospace through many steps to the Earth's core. The success of the "Decade of Geopotential Research" in securing continuous low-Earth orbit satellite mapping of the magnetic field, culminated with the launch of ESA's Swarm mission in November 2013. Other successes to highlight are the new remarkable contributions in modelling the temporal evolution of the magnetic field at the core-mantle boundary, the progress in understanding its origin and behaviour through numerical dynamo simulations, the greatly improved observation, modelling, and mapping of the field at and near the Earth's surface – used for geophysical exploration and direction-finding, palaeomagnetic contributions to solving geological and tectonic problems, the use of mineral magnetic properties to monitor environmental effects, the rapid expansion in the use of electromagnetic induction for both resource exploration and revealing the structure and composition of the crust and mantle, and the major advances in instrumentation, data acquisition, and sharing of information and services, often in real-time or near-real time. Underpinning much of this success has been the development and application of techniques pioneered in climate studies, such as data assimilation, empirical orthogonal functions, principal component analysis, and ensemble Kalman filtering, to geomagnetic research.

These examples of results in different research fields cover much, though not all, of the science of the Association. Important applications will hopefully result in the future in terms of improved risk assessments and forecasts of catastrophic events. Finally, the Swarm constellation satellite mission is well under way and will provide a community focus for research in the coming years.

ADMINISTRATION

New leadership of IAGA

During the IUGG meeting, the Conference of Delegates elected a new Executive Committee for the quadrennium 2011-2015. The new leaders for the Divisions and Commissions and their Working Groups were appointed by the Executive Committee and confirmed by the Conference of Delegates.

ACTIVITIES

Assemblies

2011: The XXVth IUGG General Assembly

The year 2011 was marked by the XXV IUGG General Assembly in Melbourne, Earth on the Edge: Science for a Sustainable Planet. The number of IAGA registrants (536) was smaller than at the previous IUGG meeting in Perugia (669). However, the IAGA presence was remarkable, as IAGA scientists were involved in organising 4 Union symposia, and led 5 Inter-Association symposia; the IAGA-only part of the meeting consisted of 16 symposia, sub-divided into several parts, spanning the full range of IAGA science interests.

2013: The XIIth IAGA Scientific Assembly

The IAGA 2013 Scientific Assembly took place August 26-30, 2013 in Mérida, Mexico, under the motto "Living on a magnetic planet". The meeting was attended by 459 participants from 43 countries, a smaller number than expected and probably caused by the economic restrictions in the USA and southern Europe. 871 papers (609 oral and 262 posters) were presented in 51 sessions organized by the five IAGA Divisions and the two Inter-divisional Commissions. In Merida, it was a pleasure to recognise the achievements of IAGA scientists at all stages of their careers at the Opening and Awards ceremony. The Assembly, full of exciting scientific results, was held in a framework of social interaction not only between the scientists, but also with the city's inhabitants and the great cultural atmosphere of the region. The IAGA Executive Committee members and the National Delegates warmly thanked the Local Organising Committee and particularly its Chair, Harald Böhnel, for the meeting organization.



2011 – IAGA dinner



2013 – Opening Ceremony

Topical meetings

Over the four-year period 2011-2014, IAGA sponsored 21 topical meetings covering large parts of the IAGA science. Many were inter-disciplinary, often involving co-sponsorship by other IUGG Associations. The meetings were well distributed geographically to make them available to a larger number of scientists. The IAGA financial contributions were directed mainly at helping young and needy scientists attend.

IAGA medals and awards

IAGA Shen Kuo Award for Interdisciplinary Achievements: In 2013, the first recipient of the Shen Kuo medal was Jean-Louis Le Mouél.

The IAGA Medal in Recognition of Valued Service to the IAGA Community: The recipients of this award were: in 2009 Bengt Hultqvist and in 2013 Evgeny Kharin and Michel Menvielle.

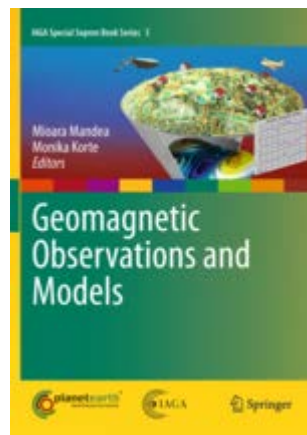
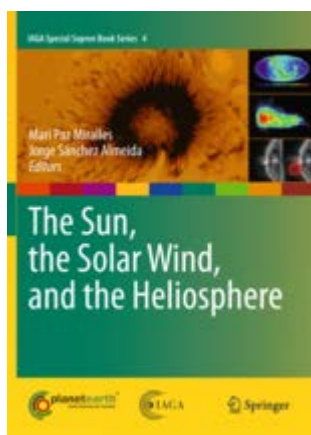
Honorary Member of IAGA: In 2013 the IAGA Conference of Delegates unanimously elected four honorary members: Charles Barton, Bengt Hultqvist, David J. Kerridge, Masaru Kono.

Recipients of the IAGA Young Scientist Award: Ten young scientists received the YSA, offered to young scientists who have made outstanding contributions at specialist meetings and workshops for which IAGA is a major sponsor, over the period 2011-2014:

http://www.iugg.org/IAGA/iaga_pages/honors/young_science_award.html

Publications

For the first time, IAGA has published a set of books, in cooperation with Springer Science and Business Media B.V. This 'IAGA Special Sopron Book Series' presents the state-of-the-art of the research of the 5 divisions of IAGA in their broadest sense: (I) Internal Magnetic Fields, (II) Aeronomc Phenomena, (III) Magnetospheric Phenomena, (IV) Solar Wind and Interplanetary Field, and (V) Geomagnetic Observatories, Surveys and Analyses. They were edited by former Secretary-General Bengt Hultqvist. The five book volumes are available.



IAGA News 48-51, containing information about IAGA activities and the Executive Committee decisions have been distributed annually, and can be found on the IAGA website (http://www.iugg.org/IAGA/iaga_pages/pubs_prods/public_relation.html).

Moreover, older IAGA Newsletters, originally published as hard copies, are all now scanned and available on the IAGA website. This is a nice realisation of the plan to put together all volumes and to have the complete IAGA memory, since 1963, on-line. Similarly, there is much valuable historical information, such as tables of geomagnetic indices and the International Geomagnetic Reference Field models, in the series of IAGA Bulletins; as copies of these are tracked down, they are also being made available via the website.

Kathryn Whaler, IAGA President
Mioara Mandea, IAGA Secretary General

10.4. International Association of Hydrological Sciences (IAHS) / Association Internationale des Sciences Hydrologiques (AISH)

INTRODUCTION

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 specialised 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 partners of the NGO and UN spheres.

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

- 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
- Working Group on Monitoring the XXIth Century (MOXXI) set up in 2013
- The decadal initiative PUB closed in 2013
- The decadal initiative Panta Rhei set up in 2013

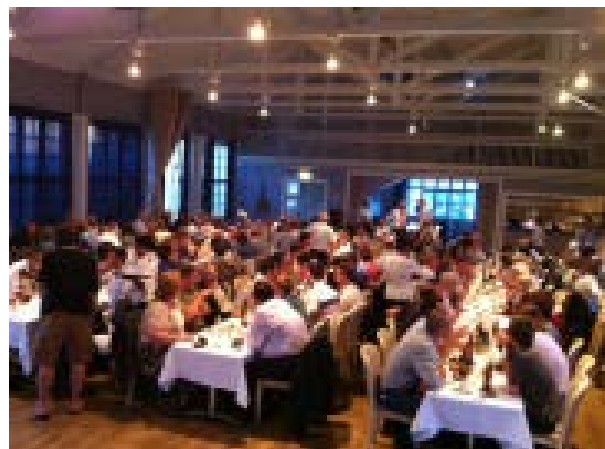
ACTIVITIES

The main IAHS events have been at the IUGG General assembly in Melbourne, 2011; and at the IAHS-IAPSO-IASPEI joint Scientific Assembly in Gothenburg, 2013. Over 2013-2015, intense preparation of the IUGG general assembly in Prague have been led.

The IAHS 90th Anniversary meeting has been held in Delft, The Netherlands in October 2012.

At this occasion the PUB – Prediction in Ungauged Basins decade has been wrapped up, followed by the publication of two major books (Blöschl et al., 2013 by Cambridge University Press and Pomeroy et al., 2013 by the Canadian Water Resources Association) and one milestone synthesis article (Hrachowitz et al., 2013 in Hydrological Sciences Journal).

A deep and inclusive process has been followed over 2012 to shape the 2013-2022 Scientific Decade, finally called “Panta Rhei – Everything flows”. Under the chairmanship of an officer designated by the Bureau, helped by a task force and by IAHS officers, the worldwide consultation and the synthesis were mainly based on an online blog and some key physical meetings during 2012 Conferences. The decade has been officially



During the IAHS 90th Anniversary meeting in Delft, Oct. 2012.

launched at the Gothenburg 2013 Scientific assembly and through an agenda setting community article published in Hydrological Sciences Journal (Montanari, 2013) and develops across major hydrological conferences and publications since then.

Many other conferences have been organized by the IAHS International commissions, and several other have received the IAHS patronage over the four years. A retrospective overview of these is available at the IAHS website.

The Hydrological Sciences Journal has increased the number of issues in an annual volume, up to 12, in the frame of a publishing agreement with Taylor and Francis. The editorial board is annually renewed.

IAHS Press has published 27 Red Books over the four years, 3 being in preparation for the Prague Assembly. This series is the oldest one in the discipline, dating back to 1924. A publishing agreement has been signed with Copernicus to relaunch this series as an open access proceeding journal – PIAHS from 2015. Four volumes of the “Benchmark Papers in Hydrology” Series have been published and one special publication. The whole catalogue, including online archives are available at the IAHS website.



At the “IAHS bookstall”.

The www.iahs.info website has been renewed in 2013. Three issues of the newsletter are disseminated every year, as well as individual alerts now thanks to the e-news tools associated to the website and the individual free membership database.

Relations are very strong with the UNESCO International Hydrological Programme and its secretariat, as well as with the WMO Commission of Hydrology and its secretariat. We have participated to intergovernmental meetings and bureau/Advisory groups of these, and co-convened scientific / capacity building events. We have also contributed to the UN-Water meetings and activities, including the regular World Water Development Reports, or the events of the 2013 – International Year of Water Cooperation.

The IAHS-UNESCO-WMO International Hydrology Prize has been jointly bestowed every year. Since 2014, the Prize is made of two different medals, namely the Dooge and the Volker medals. IAHS also bestows the annual Tison Award to young scientist (below 41) for papers published in any IAHS publication.

All information about IAHS activities are available on the WEB at www.iahs.info

Christophe Cudennec, IAHS Secretary General

10.5. International Association of Meteorology and Atmospheric Sciences (IAMAS) / Association Internationale de Météorologie et des Sciences de l'Atmosphère (AIMSA)

INTRODUCTION

IAMAS is the specialized association of the International Union of Geodesy and Geophysics (IUGG) which 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's ten International Commissions (IC), which are in alphabetical order the ICs on Atmospheric Chemistry and Global Pollution (ICACGP), on Atmospheric Electricity (ICAE), on Climate (ICCL), on Clouds and Precipitation (ICCP), on Dynamical Meteorology (ICDM), on the Middle Atmosphere (ICMA), the International Ozone Commission (IOC), the ICs on Planetary Atmospheres and their Evolution (ICPAE), on Polar Meteorology (ICPM), and the International Radiation Commission (IRC). All ICs, and IAMAS as a whole, take a leading part within the global communication and discussion of latest research results in a wide range of scientific meetings that are open to all scientists.

ADMINISTRATON

The current IAMAS Bureau was elected during the IUGG/IAMAS assembly in Melbourne in 2011.

The Officers of the Bureau for the period 2011-2015 are:

Dr. Athena COUSTENIS (France), President	Prof. Guoxiong WU (China), Past-President
Prof. Joyce PENNER (USA), Vice-President	Dr. Hans VOLKERT (Germany), Secretary-General
Prof. John TURNER (UK), Vice-President	Ms. Zheng (Jenny) LIN (China), Assistant Sec.- Gen.

The five Members-at-large of IAMAS are:

Prof. E. Hugo BERBERY (Argentina/USA)	Dr. Colin PRICE (Israel)
Dr. Vladimir KATSOV (Russia)	Prof. Tetsuzo YASUNARI (Japan)
Prof. Daren LU (China)	

During the IAMAS-IACS-assembly in Davos Switzerland, in 2013 (DACA-13), the IAMAS Executive Committee (EC) re-appointed Hugo Berbery as the financial auditor to monitor the IAMAS finances. Hugo will continue to serve in this position and report to the EC during IUGG/IAMAS 2015 in Prague.

The IAMAS Bureau continued working in an open and cooperative fashion as during the previous quadrennium. Besides communication by email, IAMAS Bureau members have regular telephone conferences. In this way, the Bureau members can quickly process commissions' requests, provide necessary support to science activities, and innovate policies, regulations and notices that can promote and coordinate international atmospheric and climate research. IAMAS's ten commissions also report to the Bureau annually. Through their involvement in international research, IAMAS/IUGG members are well represented in the atmospheric science community. Since 2012, information to the commissions and the national correspondents has been distributed by Info-E-mails (cf. www.IAMAS.org/NewsLetters).

Between the assemblies in odd years, the Bureau met face-to-face at the workplaces of its President in Paris, France, in 2012 and its Secretary-General in Oberpfaffenhofen near Munich, Germany, in 2014 (cf. snapshots in www.IAMAS.org/gallery).

ACTIVITIES

Hereafter a brief selection of the IAMAS activities is reported; the full compilation of commission reports will be posted on www.IAMAS.org/Reports.

IAMAS Joint Assembly DACA-13

IAMAS held its Joint Assembly with IACS from 8-12 July 2013 in Davos, Switzerland (Davos Atmosphere and Cryosphere Assembly or DACA-2013; see the still living website www.daca-13.org). The assembly attracted about 1000 participants - over 60% with IAMAS affiliation - from 52 countries on five different continents and covered numerous fields of atmospheric and cryospheric sciences, enriched by snow hydrology, oceanography, natural hazards, economy and risks, and the history of science. The broad programme consisted of 21 mostly joint symposia featuring several sessions each. More than 350 posters were on display for the whole week while dedicated poster sessions facilitated deeper discussions with the presenters in attendance. During the opening ceremony the First IAMAS early career scientist medal was bestowed upon James Screen (UK). More details are given in the September issue of the IUGG Electronic Journal (cf. www.iugg.org/publications/ejournals/IUGGej1309.pdf).



Audience witnessing the Opening Ceremony of DACA-13 in the Davos Congress Centre on 8 July 2013, with IUGG Sec.-Gen. Alik Ismail-Zadeh and IAMAS president Athena Coustenis (in the front row from left)

Highlights of the International Commissions within IAMAS activities are:

ICACGP (www.icacgp.org)

The highlight was the 13th quadrennial ICACGP symposium over 22-26 September 2014 in Natal, Brazil, attracting over 400 participants from 49 countries. Under the topical theme “Changing Chemistry in a Changing World”, the emphasis was put on current knowledge and understanding of the chemical, physical and biogeochemical processes, which determine atmospheric composition and behavior, their modification by anthropogenic activity and related feedbacks. More details about the programme and illustrative photos can be found under <http://igac-icacgp2014.org/>. In 2012 the commission cosponsored the IGAC Science Conference, held 17-21 September in Beijing, China; cf. details under www.igac2012.org.



Opening keynote of ICACGP-2014 in Natal, Brazil

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

The 15th quadrennial ICAE conference took place 15-20 June 2014 in Norman, Oklahoma, USA, attracting more than 200 participants. During the business meetings new commission officers and members were elected, who will start their service after IUGG-2015 in Prague. During the entire period regular and detailed ICAE newsletters appeared in May and November, which are available from <http://icae.jp/newsletters>.

ICCL (www.iccl-iamas.net)

The commission organized an expert assessment workshop on decadal climate variability, which took place in Beijing, China in April 2013. A detailed meeting summary entitled “Decadal climate Variability and cross-scale interactions: ICCL expert assessment workshop” was prepared and published.

in the Bull. Amer. Meteorol. Soc. (<http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-13-00201.1>).

ICCP (www.iccp-iamas.org)

The 16th quadrennial ICCP conference took place 30 July – 3 Aug. 2012 in Leipzig, Germany, attracting some 550 participants. More details about the programme and extended abstracts can be found under <http://iccp2012.tropos.de>; a special issue in *Atmospheric Research* contains a preface and 15 research articles (www.sciencedirect.com/science/journal/01698095/142). The 8th WMO international cloud modeling workshop (www.atmos.washington.edu/~andream/workshop2012) took place during the previous week. ICCP formed a working group on geo-engineering whose members formulated a Statement on Radiation Management Climate engineering (www.iccp-iamas.org/pdf/ICCP_RadiationManagement_Statement.pdf). ICCP's permanent Committee on Nucleation & Atmospheric Aerosols (CNAA) held its 19th international conference in Fort Collins, Colorado, USA during the period 24–28 July 2013 (<http://chem.atmos.colostate.edu/icnaa>).

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

The commission organized an international workshop “Dynamics and predictability of high impact weather and climate events” in Aug. 2012 in Kunming, China, which brought together 140 students and experts from China and abroad (<http://icdm2012.csp.escience.cn>). A book based on the invited presentations is to appear in the *IUGG special Publication Series* with *Cambridge University Press*. Commission members and the IAMAS Secretary General were much involved in organizing the first World Weather Open Science Conference convened by the World Meteorological Organization; in August 2014 it assembled 1000 participants from meteorological services, research laboratories, university institutes, and from end-users in Montreal, Canada (www.wwosc2014.com/welcome_e.shtml).



ICDM-2012 participants in Kunming, China

Montreal, Canada (www.wwosc2014.com/welcome_e.shtml).

ICMA (www.icma-iamas.org)

In the traditionally alternating sequence the commission sponsored a number of symposia at the IAGA assembly in 2013, taking place in Merida, Mexico. Recent workshops organized or co-sponsored by ICMA members include the 5th international HEPPA workshop in May 2014 in Baden-Baden, Germany (www.imk-asf.kit.edu/english/1486.php) and the 13th quadrennial solar-terrestrial physics symposium in October 2014 in Xi' An, China (<http://stp13.csp.escience.cn>).

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

The 13th Quadrennial Ozone Symposium took place at the end of August 2012 in Toronto, Canada, attracting more some 300 participants. The first copies of IAMAS Publication Series No. 2 were distributed; it was compiled by the former commission secretary Rumen Bojkov and entitled *International Ozone Commission: history and activities* (download from www.iamas.org/Pdfs/IAMAS-PubSer-No2.pdf). Recently commission members contributed to the WMO/UNEP 2014-Assessment on the state of the ozone layer (download from http://ozone.unep.org/en/scientific_assessment_2014.php).

ICPAE (<http://icpae.physics.ox.ac.uk/Welcome.html>)

The commission sponsored several special issues in the journal *Planetary and Space Sciences* and contributed to organizing and advertising various meetings worldwide. It organized the *Titan Through Time* workshop in April 2014 in Laurel, Maryland, USA, which attracted 65 international experts of Titan's atmosphere over seasonal, astronomical and geological timescales. ICPAE members celebrated

the tenth anniversary of Cassini-Huygens' arrival in the Saturn system in July 2014, and were deeply involved in responding to ESA's Cosmic Vision and NASA's Discovery-class calls for future mission concepts, including spacecraft to explore Venus, Saturn's interior and the ice giants Uranus and Neptune. ESA's first large-class (L1) mission, the Jupiter Icy Moons Explorer (JUICE) was formally adopted in November 2014 to enter the detailed design phase; it has ICPAE members on many of the science teams.

ICPM (www.icpm-iamas.aq)

The commission organized a workshop *Atmospheric Model Parameterizations in the Polar Regions* in July 2012 in Boulder, Colorado, USA. It also contributed to the Open Science Conference of ICSU's Scientific Committee on Antarctic Research (SCAR) held 23 August – 3 September 2014 in Auckland, New Zealand (www.scar2014.com).

IRC (www.irc-iamas.org)

The regular quadrennial International Radiation Symposium took place 6–10 Aug. 2012 in Berlin, Germany, attracting more than 500 participants. More details about the programme, abstracts and a gallery of photos can be found under www.irs2012.org. Detailed proceedings were published electronically in May 2013 (<http://scitation.aip.org/content/aip/proceeding/aipcp/1531>). Commission members also contributed to the formulation of the *Statement of Radiation Management for Climate Engineering* (www.irc-iamas.org/calendar/news.php?id=69)



IRS-2012 participants in Berlin, Germany

FUTURE ACTIVITIES

After the regular change in the Bureau's composition following IUGG-2015 in Prague, IAMAS aims to continue to promote - thanks to the voluntary work its members - promising ideas and concepts, collaborations, fruitful meetings and more, as it has undertaken since its inception in 1919 (cf. the detailed account by founding president Napier Shaw in Volume 49 the *Quarterly Journal of the Royal Meteorological Society*, published in 1923,

<http://onlinelibrary.wiley.com/doi/10.1002/qj.49704920507/pdf>). IAMAS has always been interested in extended fruitful exchanges with the other IUGG Associations and this has led to several very successful joint meetings. Always seeking to improve and enhance its impact in the relevant research fields, to assist in the distribution of knowledge and in forging solid cooperations around new projects, IAMAS will continue, within IUGG, to actively pursue its goals and through its Commissions to serve as well as possible its scientific community.

Athena Coustenis, IAMAS President
Hans Volkert, IAMAS Secretary-General

10.6. International Association for the Physical Sciences of the Ocean (IAPSO) / Association Internationale des Sciences Physiques de l'Océan (AISPO)

INTRODUCTION

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 1) biennial scientific assemblies; 2) working groups; 3) Commissions; 4) Services and 5) website information. Of special importance to IAPSO is to involve scientists and students from developing countries in the 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/>

ADMINISTRATION

The IAPSO office has been situated at Gothenburg University, Sweden since July 2007, and the day-to-day business has been managed by the Secretary General (SG) Johan Rodhe, Sweden. The Bureau of IAPSO comprises of the President, Eugene Morozov, Russia, the Past President, Lawrence Mysak, Canada, the SG, Johan Rodhe, and the Treasurer, Fred Camfield, USA. The SG has been responsible for the IAPSO website.

In 2013, there were three IAPSO business meetings and meeting of the EC during the Assembly in Gothenburg. The other IAPSO discussions were maintained by means of e-mail communication.

Members of IAPSO Executive Committee (EC) for 2011-2015

President: Dr. Eugene Morozov (Russia) Secretary General: Prof. Johan Rodhe (Sweden) Past President: Prof. Lawrence Mysak (Canada) Treasurer: Dr. Fred Camfield (USA) Vice President: Dr. Isabelle Ansorge (South Africa) Dr. Denise Smythe-Wright (UK) EC Members: M.Sc. Silvia Blanc (Argentina) Prof. Toshiyuki Hibiya (Japan) Dr. Chris Meinen (USA) M.App.Sc. Ken Ridgway (Australia) Dr. Satheesh Shenoi (India) Dr. Stefania Sparnocchia (Italy).

ACTIVITIES

Three of IUGG's constituent Associations, IAHS, IAPSO and IASPEI, met for a Joint Scientific Assembly in Gothenburg, Sweden, during the week 22 – 26 July 2013. The title of the Assembly, "Knowledge for the Future", was chosen in order to highlight the importance of improved knowledge in hydrology, oceanography and seismology in addressing the challenges posed by climate change and the risks of natural disaster events. The Assembly attracted 1087 participants from 66 different countries. More than 300 registered as IAPSO scientists.

The Assembly's opening day was marked by a joint plenary session with a lecture from each Association: James Mori (Japan), IASPEI, Kathryn Kelly (United States), IAPSO and Kuniyoshi Takeuchi (Japan), IAHS. The plenary lectures were followed by a formal Opening Ceremony and a reception hosted by the City of Gothenburg.

Each Association offered a broad programme of lectures and posters, with up to 11 parallel sessions at any one time. The lecture programme was organized into 48 Association symposia (11 IAPSO), together with 9 joint symposia focusing on areas such as land-ocean interactions, advanced applied statistics, and tsunamis. 2 of the joint symposia were organized by IAPSO and the rest were co-sponsored by IAPSO. This programme was complemented by two afternoon poster sessions.

Some highlights from the Association's programmes

IASPEI's Milne lecture on the history of British seismology was delivered by Roger Musson (United Kingdom). The IAPSO Prince Albert I Medal was presented to Arnold L. Gordon (United States), who then delivered the Albert I Memorial Lecture describing his research on the Indonesian Throughflow, the link between the Pacific and Indian Oceans. Deltas were a significant focus of the IAHS programme, including a plenary lecture by Efi Foufoula-Georgiou (United States). Several other prizes and medals were awarded during the week.

From the fall of 2013 the main activity has been to participate in the planning of IUGG2015 General Assembly in Prague This includes to organize a number of symposia: 13 IAPSO symposia, 5 IAPSO-lead Association-Joint symposia, 1 Union symposium. In addition IAPSO co-sponsors 6 Joint and 7 Union symposia.

Symposia Convened by IAPSO (only IAPSO Conveners and Co-conveners are noted)

- P01 General Topics on the Physical Science of the Oceans. Convener: I. Ansorge (South Africa), Co-conveners: I. Halo (South Africa/Mozambique), J. Durgadoo (Germany)
- P02 Physics and Biogeochemistry of Semi-Enclosed and Shelf Seas. Convener: K. Schroeder (Italy), Co-conveners: H. Burchard (Germany), L. Demina (Russia), K. Ridgway (Australia)
- P03 Ocean Mixing. Convener: T. Hibiya (Japan), Co-conveners: T. McDougall (Australia), L. Arneborg (Sweden)
- P04 Oceanic Boundary Current Systems. Convener: J. McClean (USA), Co-conveners: S. Pierini (Italy), W. Cai (Australia), S. Waterman (Canada)
- P05 Southern Hemispheric Forcing of the MOC and Carbon Cycle in Past, Present, and Future Climate Change. Convener: L. Beal (USA), Co-conveners: G. Marino (Australia), K. Kohfeld (Canada), M. Krug (South Africa), S. Dong (USA)
- P06 The Southern Ocean: where Ocean, Ice and Atmosphere Meet. Convener: K. Heywood (UK). Co-conveners: A. Wåhlin (Sweden), A. Thompson (USA), R. Tarakanov (Russia)
- P07 Chemical Trends and Impacts on Ecosystems. Convener: D. Smythe-Wright (UK), Co-conveners: E. Yakushev (Norway)
- P08 MOC and Deep Currents. Convener: C. Meinen (USA), Co-conveners: E. Morozov (Russia), E. Frajka-Williams (UK), S. Drijfhout (Netherlands)
- P09 The North Atlantic and Climate Change. Convener: S. Josey (UK), Co-conveners: S. Gulev (Russia), B. Hansen (Faroe Islands), S. Lozier (USA), P. Myers (Canada), F. Perez (Spain)
- P10 Sub-Mesoscale Eddies. Convener: M. Sokolovskiy (Russia), Co-conveners: X. Carton (France), K. Koshel (Russia), Y. Cotroneo (Italy)
- P11 Wind Waves, Including Extreme Waves. Convener: F. Qiao (China). Co-conveners: E. Pelinovsky (Russia), A. Babanin (Australia), C. Guan (China)
- P12 Indian Ocean Expedition I to Indian Ocean Expedition 2 - Five Decades of Indian Ocean Oceanography: Challenges in Physics and Biogeochemistry of Indian Ocean. Convener: S. Shenoi (India), Co-conveners: M. McPhaden (USA); Y. Masumoto (Japan); R. Hood (USA)
- P13 Internal waves dynamics in world oceans: from remote sensing, in situ monitoring to numerical modeling. Convener: X. Chen (China), Co-conveners: L. Qiang (China), R. Grimshaw (UK)
- U7 The Potential for Carbon- and Climate-Engineering to Offset Global Change. Convener: Tim Kruger, Oxford, U.K.
- JP1 Sea Level Change and Variability: Past, Present and Future. Convener: G. Mitchum, USA. Co-conveners: P. Woodworth, UK
- JP2 The Potential for Carbon- and Climate-Engineering to Offset Global Change. Convener: T. Kruger, U.K.

JP4 Satellite Oceanography and Climatology. Convener: A. Kostianoy, Russia, Co-conveners: S. Vignudelli, Italy, J. Benvenist, Italy

JP5 Tsunamis. Convener: V. Titov, USA, Co-conveners: S. Tinti, Italy

JP6 Acoustical Oceanography. Convener: Silvia Blanc, Argentina

Joint symposia Co-convened by IAPSO (only IAPSO Co-conveners are reported)

JC1 Sea Ice in the Arctic and Southern Oceans. Co-conveners: G. Bjork, Sweden, A. Marchenko, Norway

JM1 Earth Systems Dynamics, Predictability and Probabilistic Forecasting. Co-conveners: G. Swaters, Canada

JM2 Climate Variability and Earth Systems Modelling. Co-conveners: R. Marsh, U.K., S. Xie, USA, B. Qiu, USA

JM4 Data Assimilation in Geophysical Sciences. Co-conveners: K. Belyaev, Russia, L. Bertino, Norway, I. Fenty, USA

JS6 Array Techniques for Monitoring the State of the Earth. Co-conveners: Silvia Blanc, Argentina, S. Sheno, India

JV3 Geophysical Imaging and Monitoring of Volcanoes. Co-conveners: B. Levin, Yuzhno-Sakhalinsk, Russia

The planning for the Assembly in 2017 was started. This will be a joint assembly with the International Association of Geomagnetism and Aeronomy (IAGA) and International Association of Meteorology and Atmospheric Sciences (IAMAS). It will take place in Cape Town, South Africa.

Working groups

SCOR is an important partner of IAPSO, and IAPSO co-finances SCOR working groups of relevance to IAPSO. In 2011 the IAPSO President attend the annual meeting of the Scientific Committee on Oceanic research (SCOR) in Helsinki (Finland). In 2012 the IAPSO Vice-President D. Smythe-Wright and SG J. Rodhe visited the SCOR meeting in Halifax (Canada), In 2013 the IAPSO President E. Morozov visited the SCOR meeting in Wellington (New Zealand). In 2014 the IAPSO President E. Morozov and SG J. Rodhe visited the SCOR meeting in Bremen (Germany). The SCOR meetings review the progress of current SCOR working groups, evaluate proposed new WGs, and decide which of them will be funded. A number of international SCOR-related scientific programs were discussed. Details can be found at the SCOR website (www.scor-int.org). IAPSO decided to support financially WG “Chemical Speciation Modelling in Seawater to Meet 21st Century Needs (MARCHEMSPEC)”. The work of this joint SCOR/IAPSO WG will be an important part of the IAPSO activity.

Working groups are usually formed of not more than 10 scientists from different countries to deliberate on a narrowly focused topic and report their work in a peer-reviewed publication, book, manual, or database. Working groups are expected to complete their tasks in 4 years or less. Information about SCOR activity and WGs is at the IAPSO webpage.

The following SCOR working groups (WGs), which have received funding from IAPSO, have been active during this period and have published important books and/or special journal issues:

- SCOR/IAPSO WG 127 “The Thermodynamics and Equation of State of Seawater” (Chaired by T.J. McDougall) was reorganized into a special IACS-IAPSO Commission on Seawater.
- SCOR/IAPSO WG 133 “Ocean Scope” (Co-chaired by Tom Rossby and Kuh Kim)
- SCOR/WCRP/IAPSO WG 136 “The Climatic Implications of the Greater Agulhas System” continued their activity. (Co-chaired by L. Beal and A. Biastock)

IAPSO Commissions and Services

- Commission on Mean Sea Level and Tides (CMSLT), hosted by the Proudman Oceanographic Laboratory, UK. President: Simon Holgate. Website: <http://www.psmsl.org/>

- Joint Committee on the Properties of Seawater, JCS (with SCOR and IAPWS), Chair: Prof. Rich Pawlowicz, website: www.teos-10.org
- Tsunami Commission (Joint with IASPEI and IVACEI). Chair: Dr. Vasily V. Titov. Website: www.iaspei.org/commissions/JCT.html
- GeoRisk Commission (Joint with IAMAS, IAHS, IASPEI and IAVCEI). Website: www.iugg-georisk.org/
- Permanent Service for Mean Sea Level, hosted by Proudman Oceanographic Laboratory, UK. Contact: Dr. Lesley Richard. Website: www.pol.ac.uk/psmsl/
- IAPSO Standard Seawater Service, hosted by OSIL, Havant, Hampshire, UK. Director: Paul, Ridout; Website www.osil.co.uk

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 1 Medal

IAPSO and Monaco Royal Family established the Prince Albert I Medal for excellence in physical and/or chemical oceanography in honour Prince Albert I. The precursor of IAPSO was established in 1919 thanks to the vision and passion for the oceans of His Most Serene Highness Prince Albert I of Monaco. He became the first President.

The year before the biennial assemblies, IAPSO selects a winner of the Prince Albert I Medal.

Professor Arnold L. Gordon from Lamont-Doherty Earth Observatory, USA was selected in 2013 as the winner of the Prize for "his outstanding work on ocean dynamics". During the Assembly in Gothenburg he was awarded with the medal and presented a memorial lecture on the currents in the Indonesian straits (Indonesia throughflow).

Professor Toshio Yamagata from the Institute for Global Change Research, Tokyo (Japan) was the winner in 2014 in recognition of his fundamental contributions to our knowledge of the ocean physics. The medal will be awarded to him in Prague and he will present a memorial lecture.

Eugene LaFond Medal

This Medal, created in honour of Eugene LaFond who was a former SG of IAPSO, is awarded to a scientist from a developing world country for a paper presented at an IAPSO Assembly.

In 2011, the IAPSO EC decided to present the LaFond medal to Towhida Rashid from Bangladesh for her presentation about the sea level change in the Holocene.

In 2013, the medal was awarded to Issufo Halo, a student of the Cape Town University, originally from Mozambique.

Eugene Morozov, IAPSO President
Johan Rodhe, IAPSO Secretary General

10.7. International Association of Seismology and Physics of the Earth's Interior (IASPEI)/ Association Internationale de Sismologie et de physique de l'Intérieur de la Terre (AISPIT)

INTRODUCTION

IASPEI promotes the study of problems relating to earthquakes, the propagation of seismic waves, and the internal structure, properties, and processes of the Earth.

Comprehensive minutes of the past Quadriennium and other information are posted on the IASPEI website, <http://www.iaspei.org/>.

ACTIVITIES

IASPEI 2011 General Assembly at Melbourne (Australia)

Assembly. IASPEI participated to the conference with more than 400 (395 officially registered as IASPEI) delegates, of which 78 supported financially with grants. The scientific program included 18 IASPEI and 13 Inter-Association symposia with IASPEI participation.

Two resolutions passed at the General Assembly in Melbourne encourage the creation of two more regional Commissions of IASPEI: the African Seismological Commission and the Latin American Seismological Commission to foster more cooperation within these two regions and the organization of regular IASPEI regional meetings.

Statutes. After several years of preparation and discussion, revised IASPEI Statutes have been unanimously approved in Melbourne during the IUGG General Assembly. Changes mainly reflect the changes in practice related to shorter scientific assemblies, the possibilities offered by modern internet era tools, and clarifications of language to avoid ambiguity.

IASPEI 2013 Scientific Assembly at Gothenburg (Sweden)

The 37th IASPEI General Assembly was organized as a Joint Assembly of the three Associations IAHS, IAPSO and IASPEI in July 2013 in Gothenburg, Sweden. The 454 participants from 48 countries contributed to the success of the assembly by presenting 330 contributions and 200 posters within 36 symposia. 75 participants were supported with grants by IASPEI.

During the Opening Plenary, the first IASPEI medal was awarded to Robin Adams. In addition, two keynote lectures were presented by IASPEI President Domenico Giardini on GEM and by Roger Musson on the History of British Seismology. A third keynote lecture was given in the afternoon during the Joint Plenary by James Mori on drilling the plate boundary in the source region of the 2011 Tohoku-Oki earthquake.

On Friday, July 26, a round table discussion was held on "The role of scientists in the communication of risk: lessons from L'Aquila and international perspectives". Domenico Giardini presented an overview on the actual status of the L'Aquila case while Kenji Satake (Japan) and David Jackson (USA) explained how authoritative information to administrations and the public are organized in their countries in the case of an earthquake crisis. All three presentations were followed by a lively debate, for which the allocated time window in the assembly program proved to be too short.

The next IASPEI Scientific Assembly, after the General Assembly in connection with the IUGG 2015 one in Prague, Czech Republic, will be held in Kobe, Japan, in August 2017.

Asian Seismological Commission (ASC) meetings

ASC2012, Ulaanbaatar, Mongolia

The 9th General Assembly of ASC was held in Ulaanbaatar, Mongolia, from September 17 to 20, 2012, under the motto "International Scientific Cooperation for Prevention and Mitigation of Seismic

Disaster”. About 300 scientists (115 foreign) from 20 countries participated to the conference and made 87 oral and 50 poster presentations. The excellent premises were kindly provided by the Mongolian Government. In particular, the opening session was held in the Mongolian Parliament. The Young Scientist Training Course which took place in the days before the conference, was sponsored by the Young Scientist grant of Deputy Prime Minister of Mongolia and IASPEI. Eight foreign and eleven Mongolian participants took part to the course.

ASC2014, Makati City, The Philippines

The 10th General Assembly of ASC, with theme “Working together towards an earthquake-resilient Asia”, was held at the Dusit Hotel, Makati City, Philippines from 18-20 November 2014 with 156 participants from 21 different countries. The Assembly was organized by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) in cooperation with the Geological Society of the Philippines (GSP). The combined financial support from the Seismological Society of Japan (SSJ) and IASPEI enabled the conference to award full/partial support to 31 travel grantees from 11 countries. In addition to the formal opening ceremonies, a press briefing was also held on 18 November, with panelists Gary Gibson, Domenico Giardini, and Renato U. Solidum Jr. Eight invited talks were delivered in the plenary sessions and 133 papers were presented in the parallel sessions during the assembly. A 5-day Pre-Conference Training - “*Contributions of Seismology to Earthquake Risk Mitigation*” was held from 12-16 November and conducted by 2 invited trainers - Dr. Gary Gibson and Dr. Mark Quigley. Five special talks about monitoring, hazards and risk assessment and public awareness and preparedness in the Philippines were invited from PHIVOLCS. A total of 21 young scientists from various Asia and Oceania countries attended. The training was supported with funds from the Government of the Philippines. The ASC flag was officially turned over by Dr. Solidum to Brian Kennett of the Australian National University, representing Australia, the ASC 2016 host.

The next 2016 ASC conference will be in Australia.

European Seismological Commission (ESC) meetings

ESC2012, Moscow, Russia

The 33rd General Assembly of ESC was held in Moscow, Russia, from August 19 to 24, 2012, on the premises of the Russian Academy of Sciences. 548 people from 51 countries representing all five inhabited continents of our planet participated to the Assembly. The Assembly motto “*Seismology without Boundaries*” proved its value to the full.

In the framework of the ten 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 GA, the 9th International Young Seismologists Training Course “*Modern Methods of Seismological Data Processing and Interpretation*” was held in Obninsk. Ten lecturers presented a series of lectures 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.

ESC2014, Istanbul, Turkey

The 34th General Assembly of ESC was organized at the Istanbul Convention & Exhibition Centre (ICEC), in İstanbul, Turkey, from 24 to 29 August 2014, jointly with the 15th European Conference on Earthquake Engineering of the European Association of Earthquake Engineering (EAEE), in the framework of the Second European Conference on Earthquake Engineering and Seismology (2ECEES). About 1000 participants from 76 different countries presented 1550 contributions. There were also 13 Keynote Lectures and 40 Theme Lectures. There are two new ESC Titular Member countries: Azerbaijan Republic, represented by Gurban Yetirmishli; and Georgia, with Observer status, represented by Tamaz Chelidze. The week before the General Assembly (20-23 August 2014) the 2nd Young Seismology and Engineers Training Course on ‘Ambient noise measurements’ took place at the Istanbul Technical University at Maçka. There were eight lecturers at the course with 25 participants from more than 10 countries.

The next 2016 ESC conference will be in Trieste, Italy.

The Latin American and Caribbean Seismological Commission (LACSC) meetings

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

LACSC2014, Bogota, Colombia

LACSC held its first General Assembly in Bogota, Colombia, during July 23-25. More than 230 participants from 25 different countries presented 242 papers. Three simultaneous sessions had 149 oral presentations. 93 posters were displayed in the Exhibit Hall. The meeting fully accomplished the main LACSC goals: to establish in the Latin American community a framework for discussions, collaborations, and new acquaintances, besides motivating seismology students and young scientists. 65 students accounted for 27% of the papers. Very few no-shows were noticed in the oral sessions. Partial travel support from IUGG and IASPEI was given to 24 students and young scientists. The next LACSC Regional Assembly will be held in Costa Rica in 2016.

The African Seismological Commission (AfSC) meetings

The African Seismological Commission (AfSC) was launched on the 22 January 2014 during an Africa-Array workshop held at WITS University in Johannesburg, South Africa. The meeting was well attended and an attendance register was circulated in order to build a contact database of all interested parties. There were representatives from 21 African countries at the meeting: Algeria, Ethiopia, Madagascar, Ghana, Malawi, Zimbabwe, Zambia, Angola, Egypt, Senegal, Morocco, Libya, Nigeria, Cameroon, DR Congo, Tanzania, Mozambique, South Africa, Cape Verde Republic, Botswana and Rwanda. The meeting was opened by the IASPEI President, Domenico Giardini, and Secretary General/Treasurer, Peter Suhadolc. Due to the small number of IUGG members within Africa, the adopted statutes are valid temporarily and will be reassessed in 2018.

Other major initiatives with IASPEI Participation

Symposium on the Effects of Surface Geology on Seismic Motion

The 4th International IASPEI/IAEE Symposium on the Effects of Surface Geology on Seismic Motion (ESG4) was held at the University of California Santa Barbara from August 23 - 26, 2011, and organized by Ralph Archuleta. It included six plenary sessions.

IASPEI-IAG-IAGA Monitoring crustal deformation and the ionosphere by GPS in the Caribbean project

In the frame of the IUGG Grants Program, the project *Monitoring crustal deformation and the ionosphere by GPS in the Caribbean* was given a grant for the term 2012-2014. This project is further sponsored by IASPEI, IAG, and IAGA. The main objective of this initiative is to invite the Caribbean countries to participate actively in geodetic and geophysical projects going on in the Central and South American region, in order to enable the use the acquired data for practice and science in their countries, and to promote geosciences. This includes capacity building activities providing the basis for profound education and sustainable development as well as the establishment of international and interdisciplinary contacts to participate in research projects at regional and global scales. According to this, a capacity building called *School on Reference Systems, Crustal Deformation and Ionosphere Monitoring* was carried out in Panama City, from October 21 to 23, 2013. 145 participants from 28 countries attended the School. An extension of the Project duration was approved by IUGG.

Global Earthquake Model (GEM)

The GEM program, initiated by the OECD in 2009 and managed by the Secretariat located in Pavia (Italy), completed its first 5-year implementation phase in 2013, and is moving now to more engineering aspects of seismic hazard and risk in its second phase, initiated in 2014. The open-access OpenQuake software for hazard and risk assessment has been released and is available online to the

scientific community. Five GEM Global Components have been completed in 2013-2014 with the participation of IASPEI experts and producing new global standards of high interest for the whole IASPEI community:

- the *ISC-GEM Global Instrumental Earthquake Catalogue*, with more than 20,000 events covering 110 years of seismic history in a highly homogenous way (IASPEI organized the Scientific Advisory Board),
- the *Global Geodetic Strain Rate model*,
- the global database of active faults and seismic sources (*Faulted Earth*),
- the *Global Earthquake History* database and
- the compilation of *Global Ground-Motion Prediction Equations*.

GEM will complete a global hazard model by end 2015, including also the results of regional projects such as SHARE (Europe), EMME (Middle-East) and EMCA (Central Asia). Domenico Giardini, IASPEI President and GEM founding member, attended several Board meetings on behalf of IASPEI.

Other IASPEI-supported meetings

IASPEI has sponsored (on its own or via an IUGG grant) the following workshops/symposiums:

- *Session S4.6 of Seismotectonics and Seismic Hazards in Africa*, a session at the CAG23, 7 - 14 January, 2011, Johannesburg, South Africa, was sponsored by IASPEI. IASPEI support went to a student from the Ethiopia Geophysical Observatory.
- International Symposium on “*Advances in Earthquake Science-2011*” held at the Institute of Seismological Research, Raisan, Gandhinagar, India, on January 22-24, 2011, with 169 attendees of whom 15 supported by IASPEI/IUGG funds. Organized by the Institute of Seismological Research, Department of Science & Technology, Government of Gujarat.
- 12th International Workshop on *Modeling of Mantle Convection and Lithospheric Dynamics*, held in Groß Dölln (Germany) on August 20-25, 2011 with around 120 attendees. It was organized by GFZ under the auspices of the Commission on Earth structure and Geodynamics.
- International Symposium on *Geophysical Imaging with Localized Waves*, held at Sanya, Hainan Island, China on August 2011. It was organized by Ru-shan Wu under the auspices of the Task Group on Seismic Scattering and Heterogeneity, IASPEI Commission on Seismological Observation and Interpretation.
- International Course on “*Theory and Practice on the waveform inversion to compute the seismic moment tensor, Point- and complex-source modeling using program ISOLA*”. Held on September 2-10, 2011 in Costa Rica and organized by Ronnie Quintero (National University and Seismological and Volcanological Observatory of Costa Rica). 21 participants from Latin America attended the workshop, three of them sponsored with IASPEI funds.
- *The Magmatic Rifting and Active Volcanism Conference* was held in Addis Ababa, Ethiopia, 11-13 January 2012. More than 200 scientists from across the planet gathered to discuss their latest findings on the causes and impact of magmatic rifting and active volcanism in a variety of tectonic settings.
- ECGS 2012: *Earthquake source physics on various scales*. This workshop was organized by the European Center for Geodynamics and Seismology and held during three days, from 3 October 2012 until 5 October 2012, at the Alvisse Parc Hotel in Luxembourg City.
- *Latin American Seismology Symposium*. Held in Peru, it was the venue where the Latin American and Caribbean Seismological Commission (LACSC) was formed.
- The 13th International Workshop on *Modelling of Mantle and Lithosphere Dynamics*, held in Norway at Klækken Hotel in the vicinity of Oslo. 95 scientists attended the workshop, among which 32 graduate students and 17 postdoctoral researchers, from Europe, North America and Japan. Thirteen keynote speakers gave overviews and discussed latest developments in subduction

dynamics, plume dynamics, numerical techniques, surface and deep processes and dynamics of planetary interiors.

- IRIS Seismological Workshop *Managing Waveform Data and Related Metadata for Seismic Networks*, Kuwait, January 14-18, 2013. More information can be found at http://www.iris.edu/workshops/2013/kuwait_metadata/.
- The International Workshop *Training course in full waveform inversion for moment tensors and multiple source models* was held at Brasilia University in December, 2013, organized by the Seismological Observatory. 20 Latin American geoscientists from eight different countries attended the course.
- *Mega earthquakes and tsunamis in subduction-zones: forecasting approaches and implications for hazard assessment*, Rhodes, Greece, 6-8 October 2014.
- Special Symposium – *Four paradigms in predicting extremes: Legacy of Vladimir I. Keilis-Borok*, Merida, Yucatan, Mexico, 2-4 June 2014.

Scientific Programmes, Projects, Publications

The IDEA (International Digital Earthquake Archives) project of the Committee for Preservation of WWSSN and Historical Seismograms (also called simply *Seismoarchives: Seismogram Archives of Significant Earthquakes of the World*), under the guidance of Willie Lee, has achieved significant progress in this quadriennium. IRIS is archiving the scanned seismograms.

Several projects have been completed and are in progress, among the latter: *Project for the preservation, by scanning, of the old Batavia seismograms*, funded by the Earth Observatory of Singapore (EOS) in cooperation with the Meteorological, Climatological and Geophysical Agency of Indonesia (BMKG).

The IUGG-funded IASPEI-ISC Project Networking of world seismologists (*Improving Geophysical Science Link to the Society during Natural Extreme Events, Especially in Developing Countries*) was completed within this quadrennium. IASPEI and ISC have developed and are maintaining a worldwide registry of seismologists & geophysicists willing to serve as a point of contact in countries with and without affiliation to IUGG. This registry is available for scientific & research institutions, governmental bodies, charitable and relief organizations and media following natural extreme events such as earthquakes and tsunamis.

Publications

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

Some 2,000 hard copies of the first printed edition of the IASPEI New Manual of Seismological Observatory Practice (NMSOP 2002) are currently in use in more than 100 countries at seismological observatories, data and analysis centers, in teaching, research, and field applications, used as basic material in national and international seismology training courses, or by private enterprises and individual scientists.

In 2014, a rigorously updated and amended electronic second edition, NMSOP-2, was completed and put online, thanks to the efforts of Peter Borman. This version, as well as future ones, are professionally maintained, further developed and edited by the GFZ German Research Centre for Geosciences under a long-term commitment, the auspices of IASPEI and its Commission on Seismological Observation and Interpretation (CoSOI). All versions, including the slightly corrected 2009 electronic version of the first edition, are freely available and downloadable via <http://nmsop.gfz-potsdam.de>. This Website is mirrored by IASPEI (<http://www.iaspei.org/projects/NMSOP.html>) and the ISC (<http://www.isc.ac.uk/standards>).

With some 2000 pages of texts and figures, plus linked sources of information, NMSOP-2 is the largest seismology E-book available to date.

The following publications are available from the IASPEI Secretariat. IASPEI on approval distributes free copies of its publications to institutional libraries in less developed countries.

- *IASPEI: Cooperation for Better Understanding of the Earth* (26-page brochure).
- *International Handbook of Earthquake and Engineering Seismology (Part A and B)*, a two-volume comprehensive review, a state-of-the-art reference for seismologists, earthquake engineers, geologists, and geophysicists. For more information, consult <http://www.academicpress.com/quake>.

IASPEI Newsletter

The IASPEI Newsletter is distributed regularly as pdf file attachment to e-mails. The Newsletters are also available for downloading from the website. Apart from reports on IASPEI and its Commissions activities, it contains also special articles about anniversaries of several important seismologists of the past and obituaries for prominent scientists. 17 issues were distributed worldwide in the quadrennium 2011-2014.

IASPEI Website

IASPEI has its own website www.iaspei.org. In 2011 the domain moved from the USA to a new server at BGS, UK (maintained by the webmaster Alice Walker), whereas in late 2014 the website was moved from the BGS in Edinburgh to the ISC in Thatcham (UK). The new IASPEI webmaster is now Przemek Ozgo. A complete restyling the website is to be accomplished within 2015.

IASPEI Medal

IASPEI has decided to award no more frequently than biennially an IASPEI Medal for outstanding service in furthering the aims of IASPEI. The first IASPEI medal was awarded to Robin Adams during the IASPEI Scientific Assembly in Gothenburg, Sweden (2013).

Domenico Giardini, IASPEI President
Peter Suhadolc, IASPEI Secretary General

10.8. International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) / Association Internationale de Volcanologie et de Chimie de l'Intérieur de la Terre (AIVCIT)

ADMINISTRATION

Members

In 2011, the number of IAVCEI individual members was 714, 74 of them being Life Members, while in 2014 the number of IAVCEI individual members was 2174, 82 of them being Life Members, 1676 non-donor members, and 498 donor members.

Webpage

In the period 2011-2014, the IAVCEI web page has been updated several times, adapting it to the corresponding evolution of the associations and constantly updating its contents.

Newsletters

Thirteen issues of the newsletter "IAVCEI News" have been published through the website, during the 2011-2014 period, two in 2011, four in 2012, four in 2013 and three in 2014

IAVCEI Executive Committee activities

During the 2011-2014 period, the Executive Committee of IAVCEI has conducted the following activities:

- Election of new Executive Members for the period 2011-2015 resulting elected the following IAVCEI members:
 - President: Ray Cas (Australia)
 - Past-President: Setsuya Nakada (Japan)
 - Secretary General: Joan Martí (Spain)
 - Vice-President: Stephen Self (USA/UK)
 - Vice-President: Hugo Delgado (México)
 - Member: Patricia Mottes (Equador)
 - Member: Karoly Nemeth (New Zealand)
 - Member: Greg Valentine (USA)
 - Member: Hiroshi Shinohara (Japan)
 - Editor-in -Chief Bulletin of Volcanology: James White
- Revision and updating of the IAVCEI Statutes and by-Laws, which were approved by the IUGG Council during the IUGG GA held in Melbourne in June/July.
- Meetings of the past EC and the new EC during the IUGG GA held in Melbourne in June/July.
- Revision of IAVCEI Finances, funding support, and potential funding sources and strategies.
- Publication in the IAVCEI website of the new regulation to become member, in which the obligation of contributing with a membership has been removed
- The President (past and new) and the SG participated in the IUGG EC meetings held in Melbourne (Australia) in June/July where IUGG matters for the next period were discussed.
- A revision of the IAVCEI Commissions and Working Groups has been 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.
- The Editorial Board of Bulletin of Volcanology has been completely reorganised.

- Informal meetings of EC members who attended the different IAVCEI meetings organised during this period attended to discuss IAVCEI matters and future plans.
- Full revision of IAVCEI Finances, funding support, and potential funding sources and strategies.
- Official EC meeting during the IAVCEI Scientific Program for the Scientific Assembly that was held in Kagoshima (Japan) in June 2013.
- Preparation of the Scientific Program for the IAVCEI GA to be held In Prague 2015 during the IUGG GA.
- Nomination process (2014-2015) for new members of the EC for the period 2015-2019.
- Discussion on the current state of IAVCEI and its relationships with IUGG:
 - Adoption of the Principle of Freedom of Participation in Learned Societies
 - Submission of Proposal to Modernise IUGG and ICSU to IUGG and ICSU, focussing on adoption of self governance of the associations
 - Agreement to modernise and completely revise IAVCEI Statutes
 - Agreement of the need to reintroduce compulsory individual membership fees along the lines of the AGU membership fee structure, to ensure the dramatic decline in financial reserves between end 2013 and 2014 is arrested
 - Conducted plebiscite on the future affiliation be IAVCEI and IUGG should differences between the two organisations on the right to self-governance not be resolved. Remarkably 664 members voted in this voluntary plebiscite and even more remarkably 90% voted to leave IUGG if necessary if the differences were not resolved by the Prague IUGG GA.
- Call for nominations for Wager Medal and George Walker Award to be presented at IAVCEI 2015 GA.

Foreseen activities for 2015:

- Election of the new EC members for the period 2015-2019
- Publication of 4 IAVCEI newsletters
- Revision of Statutes and By Laws
- The senior members of the IAVCEI EC will draft new statutes for IAVCEI that accurately reflect the current governance practices of IAVCEI, which will be submitted to the members of IAVCEI at the IAVCEI Awards and Business meeting at the IAVCEI GA during the IUGG2015 GA in Prague in 2015.

IAVCEI awards

During the IAVCEI Scientific Assembly 2013 held in Kagoshima, Japan, on July 20-24, 2013, we celebrated the awarding ceremony.

IAVCEI Medal Awardees:

- Kraft Medal: Shigeo Aramaki (Japan)
- Thorarinsson Medal: Barry Voight (USA)
- Wager Medal: Antonio Costa (Italy) and Fidel Costa (Singapore)
- George Walker Award: Heather Wright (USA)

New IAVCEI Honoraty members:

- Prof. Servando de la Cruz-Reyna (Mexico)
- Prof. Sergei Fedotov (Russia)
- Prof. Grant Heiken (USA)
- Prof. Izumi Yokoyama (Japan)

MEETINGS, WORKSHOPS AND COURSES

During the 2011-2014 period, IAVCEI supported activities including a large number of workshops, conferences, meetings, and summer schools, all supported by at least one of the IAVCEI associations or directly by its EC. These are:

IAVCEI General Assembly, held during the XXV-IUGG General Assembly, Melbourne, Australia, 28 June – 7 July 2011

Workshop on Submarine and emergent volcanic arcs and associated volcano-sedimentary basins: facies models, petrology and volcano-tectonics, 2-7 May, 2011, Cabo de Gata, Spain <http://www.ija.csic.es/cabodegata>

The XVIII. Congress of INQUA (International Union for Quaternary Research) Bern (Switzerland), 21-27 July 2011

CONFERENCE ON REMOTE NATURAL HAZARDS AND ENVIRONMENTAL CHANGE, 28 - 29 July 2011, National University of Singapore, Singapore

VOLCANO OBSERVATORY BEST PRACTICES WORKSHOP: ERUPTION FORECASTING, Erice, Italy, 11-15 September, Sponsored by IAVCEI

11th Field Workshop on Volcanic Gases Kamchatka, Russia, September 2011. Organised by the Commission on Volcanic Gases

IAVCEI - IAS 4th International Maar Conference: a multidisciplinary congress on monogenetic volcanism 2012: Auckland, New Zealand, 20 – 24 February, 2012 Auckland, New Zealand <http://www.cvent.com/events/4th-international-maar-conference/event-summary-8da8b43ec50c46f3ad4276879992c4aa.aspx?i=90ac4a22-0aa2-4d9f-a5df-63c4c154bbb9>

1st International Congress on management and awareness in protected volcanic landscapes 21-25 May, 2012, Olot, Spain, http://www.volcandpark1.com/images/documents/abstracts_vp_2012.pdf

AGU Chapman Conference on Volcanism and the Atmosphere, 11– 15 June 2012, Selfoss, Iceland, <http://www.agu.org/meetings/chapman/2012/bcall/program/index.php>

4th International Workshop on Collapse Calderas (Vulsini, Italy), 23 – 29 September 2012, Vulsini, Italy, http://www.iavcei.org/documents/CCW2012_ABSTRACT_BOOK.pdf

EMSEV-2012 in Japan, 1-5 October 2012, Japan <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, 21– 27 October 2012, New Zealand, http://www.otago.ac.nz/geology/calendar/hopi_buttles_2012/index.html

Cities on Volcanoes 7, Colima 2012, 18-23 November 2012, Mexico, www.citiesonvolcanoes7.com

BASALT: Link between rift, tectonism and intracontinental volcanism – May 2013, Saxony, Germany, www.senckenberg.de/basalt2013, Sponsored by the IAVCEI Commission on Monogenetic Volcanism and Volcanogenic Sediments

International workshop Pan-American Advanced Studies Institute: Magma-Tectonic Interactions in the Americas, León, Nicaragua, 5-17 May 2013

8th Workshop on Volcanic Lakes, Japan 2013, Aso volcano, Kumamoto and Noboribetsu spa, Hokkaido Japan, 25th July to 31th July 2013, <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) Date: 20-24 July, 2013, Venue: Kagoshima Public Access Center, Kagoshima City, Japan, <http://www.iavcei2013.com>

2nd VOBP – Volcano Observatory Best Practices workshop “Communicating Hazards”, Erice, Sicily, 2 – 6 November, 2013

- 2nd workshop on Ash Dispersal Forecast and Civil Aviation, (with support and sponsoring from Univ. of Geneva, IAVCEI, IUGG, WMO, ICAO and U.K. Met. Office), WMO headquarters, 18-20 November 2013. <http://www.unige.ch/sciences/terre/mineral/CERG/Workshop2.html>
- 2nd International Conference on Active Volcanism & Continental Rifting with special focus on the Kivu rift zone (AVCOR2013), 12-14 November 2013, Hotel Serena, Gisenyi, Rwanda
- Course: Italian Association for Volcanology (AIV) 2013 International School in Volcanology: The Explosive Volcanism of Mafic-Alkaline Magmas
- 2nd International Post-graduate Course of Volcanology, Olot, Girona, Spain, 14-27 October 2013, http://www.gvb-csic.es/CURSO/CURSO_OLOT/Home.html
- XX Central Andes Volcanological Field Course, Universidad Nacional de Salta, Salta, Argentina, 11-21 November 2013, <http://www.unsa.edu.ar/~geonorte/cursos/curvol2013.htm>
- 1st International Workshop on Volcano Geology, 7-11 July 2014, Madeira, Portugal http://www.iavcei.org/IAVCEI_meetings/MADEIRA/Workshop_Volcano_Geology/Welcome.html
- Tephra 2014 - Maximizing the potential of tephra for multidisciplinary science, 3-7 August 2014, Portland State University, Portland, Oregon, USA, <http://www.geohazards.buffalo.edu/documents/Tephra2014.shtml>
- Cities on Volcanoes 8, 9-13 September 2014, Yogyakarta, Indonesia, www.citiesonvolcanoes8.com
- 12th Field Workshop on Volcanic Gases, 17-25 November 2014, Atacama, Chile, <http://iavcei2.campoalto.cl/>
- Georisk 2014: "IMPROVING GEOPHYSICAL RISK ASSESSMENT, FORECASTING, AND MANAGEMENT", 18-21 November 2014, Madrid, Spain, <http://www.georisk2014.com>
- 5th International Maar Conference (Mexico), 17-22 November 2014, Queretaro, Mexico <http://maar2014.geociencias.unam.mx/>
- 5th V Collapse Caldera Workshop "Caldera Volcanism and Society", 7-11 December 2014, Taupo, New Zealand
- 3rd Course: Italian Association for Volcanology (AIV) 2014 International School in Volcanology: The Explosive Volcanism of Mafic-Alkaline Magmas
- 3rd International Post-graduate Course of Volcanology, Olot, Girona, Spain, 13-26 October 2014, http://www.gvb-csic.es/CURSO/CURSO_OLOT/Home.html
- XX1 Central Andes Volcanological Field Course, Universidad Nacional de Salta, Salta, Argentina, 11-21 November 2014, <http://www.unsa.edu.ar/~geonorte/cursos/curvol2014.htm>
- Forthcoming meetings, workshops and courses in 2015:
- 4th INTERNATIONAL POST-GRADUATE COURSE IN VOLCANOLOGY (in Spanish), 12-25 October 2015, Olot, Spain, e-mail: ageytraver@gmail.com, website: <http://www.gvb-csic.es/CURSO/Home.html>
- IAVCEI General Assembly - 2015 (Prague, Czech Republic), June 22 - July 2, 2015, Prague Congress Centre, website: <http://www.iugg2015prague.com>
- 2nd VOLCANDPARK Conference, Lanzarote, Canary Islands, Spain, 16-20 November 2015, organised by the IAVCEI Commission on Volcano Geoheritage and Protected Volcanic Landscapes (VGPL), <http://www.volcandpark2.com>

Barcelona, January 31, 2015
Joan Martí, Secretary General IAVCEI

11. Report on scientific and educational programs / Rapport sur les programmes scientifiques et éducatifs (A. Ismail-Zadeh)

11.1. International Lithosphere Program (ILP) / Programme international de la lithosphère

INTRODUCTION

The International Lithosphere Program (ILP) seeks to elucidate the nature, dynamics, origin and evolution of the lithosphere through international, multidisciplinary geoscience research projects – Task Forces (TF) and Coordinating Committees (CC) that operate 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
- CC TOPO-EUROPE

II. Contemporary dynamics and deep processes

- TF 4: Continental Collisional Orogens: from Atomic Scales to Mountain Building
- TF 8: Lithosphere dynamics: interplays between models and data.
- TF 9: DISC - Deep Into the Subduction Channel
- CC TOPO-EUROPE
- CC MEDYNA - Mantle Dynamics and Plate Architecture Beneath North Africa

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
- TF 8: Lithosphere dynamics: interplays between models and data.
- CC TOPO-EUROPE
- CC MEDYNA - Mantle Dynamics and Plate Architecture Beneath North Africa

IV. Oceanic lithosphere

- TF 1: CALE - Circum Arctic Lithosphere Evolution
- TF 8: Lithosphere dynamics: interplays between models and data.

ADMINISTRATION

ILP has an international Bureau with members from several countries that meet regularly to monitor the progress and to select new projects in close consultation with the representatives of National Committees. The Bureau is chaired by the President with support from the Secretary General. The ILP Secretariat is located in the German Research Centre for Geosciences in Potsdam (GFZ-Potsdam) and is headed by the Executive Secretary A. Rudloff (Germany). The current ILP Bureau membership is presented below:

President:	S. Cloetingh	The Netherlands
Secretary General	M. Scheck-Wenderoth	Germany
Representative of IUGG	D. Jackson	USA
Representative of IUGG	K. C. Sain	India
Representative of IUGS	R. Oberhänsli	Germany
Joint Representative of IUGG and IUGS	A. Green	Switzerland
Chair Committee National Representatives:	V.L. Pease	Sweden

The Bureau is also supported by the associate members: J.-P. Burg, Switzerland, H. Thybo, Denmark, A. Morozov, Russia, F. Roure, France, M. Zoback, USA, and P. Mc Keever, UNESCO; by the lifetime members M. von Knorring, Sweden and H. Gupta, India as well as by Honorary President A. Green, Switzerland and ILP Fellow J.F.W. Negendank, Germany.

Business meetings of ILP, Vienna, Austria, 2011- 2014

The annual business meetings were held on the occasion of the EGU General Assembly every year since 2011 and attended by most of the PIs in ILP as well as by guests from IUGG and IUGS. At these meetings a short report has been given by the president and SG on new developments and on the financial situation in ILP. In addition all active Task Forces and Coordinating Committees reported on the activities of the past year and on current and planned activities. The guests informed the attendants about new developments in the mother unions. The Flinn-Hart-Award has been presented to Magdala Tessauro (Italy/Germany Netherlands) 2011 and to Manuele Faccenda (Italy/Australia) in 2012. The minutes were distributed among the Bureau Members and are available on request. The next business meeting at EGU 2015 in Vienna, Austria is scheduled for Monday, 13 April 2015, 18:00 - Room Y3 (Splinter meeting SPM2.4).

Bureau meeting of ILP, at AGU fall meeting 10th December 2013 San Francisco, USA

The annual bureau meeting was held on the occasion of the AGU General Assembly. The President and secretary general informed the attendants about current and planned activities of all active Task Forces and Coordinating Committees. After discussion of three new task force proposals, a new Task Force 11 on Lithosphere dynamics has been established and future activities have been planned. The minutes were distributed among the Bureau Members and are available on request.

Reports to Executive Committee (EC) meetings of IUGG and IUGS

The SGs have attended the IUGS EC meeting held during the 34th IGC congress in Brisbane, Australia, the IUGS EC Meeting Paris, France 19-22 February 2013, and the IUGG EC Meeting Prague, Czech Republic 21-23 September 2013. On all occasions, the SG and/or president have reported about ongoing activities in ILP. For the IUGS EC meeting in Goa, India 2013 the SG of ILP provided information on progress in ILP to the president of IUGS R. Oberhänsli.

ACTIVITIES

Full yearly activity reports of all Task Forces (TF) and Coordinating Committees (CC) and of ILP are available on request. ILP supported networking in the scientific community and helped to leverage numerous large projects at national and international levels.

Science Meetings organized under the auspices of ILP

Several sessions led by ILP Task Forces and Coordinating Committees and numerous presentations of ILP members contributed to the EGU - General Assemblies 2011, 2012, 2013, 2014, in Vienna, Austria and to the AGU Fall meetings 2011, 2012, 2013 and 2014 in San Francisco, USA as well as to several Goldschmidt conferences. Moreover, dedicated workshops have been organized by ILP Task Forces and Coordinating Committees with about 50-150 international participants with many young scientists. In addition, ILP members contributed at many other large international meetings (selection):

2014

- GSA annual meeting in Vancouver, Canada
- Meeting of the European Seismological Commission Istanbul, Turkey
- Annual meeting of the Seismological Society of America Anchorage, USA
- International Conference on Continental Dynamics, Xi'an, China.
- Geo-Frankfurt: International Annual Meeting of German Geological Societies, Germany
- ALAGO 2014, Armacao dos Buzios, Brazil,

- First EAGE Workshop on Basin & Petroleum Systems Modeling”, Dubai, UAE
- AAPG 2014 Annual Convention and Exhibition Houston, USA.

2013

- IAVCEI 2013, Japan
- Annual meeting of the Seismological Society of America, Salt Lake City, USA
- China Geological Society and American Geological Society Joint meeting: “Roof of the World” Chengdu, China
- International Eclogitic Conference, Courmayeur, Italy
- AAPG Hedberg
- EAGE-European Unconventional Resources Conference & Exhibition
- BBSPA Kiew Upstream & Investments Workshop, Ukraine
- GEO2012 Middle East Geoscience Conference and Exhibition
- World Shale Gas Asia, Singapore.
- ICDP Science Conference 2013, Potsdam, Germany

2012

- 34th IGC, Brisbane, Australia
- SESEH 2012 Sino-European Symposium on Environment and Health, Galway, Ireland
- Annual meeting Seismological Society of America, San Diego, CA, USA
- Kashiwazaki Symp. on Seismic Monitoring of Nuclear Power Plants, Kashiwazaki, Japan
- Geological Soc. America Annual Meeting, Charlotte, USA
- Workshop on Craton formation and destruction with special emphasis on BRICS Cratons, Johannesburg, South Africa
- 4th BBSPA Upstream & Investments Workshop, Kiew, Ukraine
- AAPG Hedberg Conference, Nice, France
- Bulgarian Energy Forum, Sofia, Bulgaria
- EAGE-European Unconventional Resources Conference & Exhibition, Vienna, Austria
- GEO2012, Middle East Geoscience Conference and Exhibition, Sanabis, Bahrain
- Geofluids Conference, Rueil-Malmaison, France
- Gordon Conference on Organic Geochemistry, Holderness, USA
- International Risk Governance Council Workshop, Zurich, Switzerland
- Reserve Estimation for Unconventional Resources, London, UK
- World Shale Gas Asia, Singapore

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FUTURE ACTIVITIES

- Establish new science plan and define new Task Forces/Coordinating Committees for 2015-2020
- Several sessions with TF and CC contributions at IUGG 2015 in Prague; EGU-GA Vienna, 2015
- Several workshops of individual task forces
- ILP Business meeting at EGU-GA in Vienna, 13 April 2015
- Prepare and conduct ILP 35th anniversary workshop, 21-23 Sept 2015 in Potsdam
- ILP Bureau Meeting at 35th anniversary workshop 2015 in Potsdam
- Launch and update new ILP website
- Advertising for new support by national science foundations and industry

ILP meeting 2015 on the occasion of ILP's 35th birthday

All PIs active in ILP as well as the Bureau Members are invited to attend the next ILP meeting to be held in Potsdam, September 21-23 in Potsdam, Germany. This will be the occasion of reporting on completed projects and of proposing new task forces/ coordinating committees. A bureau meeting will take place September 23 at the occasion of which the new President and Secretary General will be appointed and decisions will be taken which newly proposed projects will be supported in the phase 2015-2020.

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

11.2. Cooperation with the Abdus Salam International Centre for Theoretical Physics / Coopération avec le Abdus Salam Centre International de physique théorique

The International Union of Geodesy and Geophysics and the Abdus Salam International Centre for Theoretical Physics (ICTP) have taken steps to enhance geophysical and geodetic education and science collaboration.

Founded in 1964 by the late Nobel Laureate Abdus Salam, ICTP 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. The UNESCO- and IAEA-affiliated 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.

On 6 October 2011, ICTP Director Fernando Quevedo and IUGG Secretary General Alik Ismail-Zadeh 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 organization of advanced schools/workshops in geodesy and geophysics in ICTP or in economically less developed countries; in development of diploma courses related to Earth and space sciences; and in dissemination of information on educational and scientific meetings.

The IUGG co-sponsored annually (US\$ 20,000) selected educational events organized by ICTP. The IUGG Committee on Capacity Building and Education was in charge of selection of the education events. IUGG co-sponsorship is acknowledged by each of co-sponsored educational events. The following educational activities in 2012-2015 have been co-sponsored by IUGG:

2012

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

2013

- Workshop on Mathematical Models of Climate Variability, Environmental Change and Infectious Diseases, ICTP, Italy, 29 April - 10 May.
- Workshop on Water Resources in Developing Countries: Planning and Management in a Climate Change Scenario, ICTP, Italy, 6 - 17 May.
- Workshop on GNSS Data Application to Low Latitude Ionospheric Research, ICTP, Italy, 6 - 17 May.
- Advanced School on Synthetic Aperture Radar: A Global Solution for Monitoring Geological Disasters, ICTP, Italy, 2 - 6 September.
- Workshop on Fundamentals of Ocean Climate Modelling at Global and Regional Scales, Hyderabad, India, 30 June - 14 July.
- Workshop on Earthquake and Tsunami Risk Reduction: Bridging Education, Research and Communication for a Better Preparedness, Morocco, 7 - 18 October.

2014

- Workshop on the Theory and Use of Regional Climate Models, ICTP, Italy, 12-23 May.
- Workshop on Geophysical Monitoring and Modeling for Sustainable Energy and Geohazard Solutions, Arusha, United Republic of Tanzania, 22 June-5 July.
- African School on the Impact of the Sun on Ionosphere: Physics and Applications, Kigali, Rwanda, 1-12 July.
- Summer School on Attribution and Prediction of Extreme Events, ICTP, Italy, 21 July-1 August.
- School on Solar Variability and Its Impact on Climate, ICTP, Italy, 13-17 October.
- Advanced Workshop and School on Megathrust Earthquakes and Tsunamis, ICTP, Italy, 13-25 October.

2015

- Workshop on Ionospheric effects on SBAS and GBAS applications at Low Latitudes, ICTP, Italy, 2-13 March.
- School on Ocean Climate Modelling: Physical and Biogeochemical Dynamics of Semi-enclosed Seas, Ankara, Turkey, 7-15 September.
- Workshop on Earthquakes in the Zagros-Makran region: from Mechanics to Mitigation, Tehran, Iran, 21-31 May.
- Workshop on Water Resources in Developing Countries: Planning and Management in Face of Hydro-climatological Extremes and Variability, ICTP, Italy, 27 April – 8 May.
- Workshop on Modelling of Wildfires and their Environmental Impacts, ICTP, Italy, 22-26 June.
- Workshop on Uncertainty Quantification in Climate Modeling and Projection, , ICTP, Italy, 13-17 July.
- International School on Geothermal Exploration, ICTP, Italy, 7-12 December.

In addition, ICTP offered IUGG the venue and financial support to hold a Conference on Future Earth Science and Education, 2-6 November 2015.

Alik Ismail-Zadeh
IUGG Secretary General

12. Relations with ICSU / Relations avec le CIUS (A. Ismail-Zadeh)

12.1. Summary of Matters Arising / Résumé des affaires qui s'élèvent

IUGG has been a member of the International Council of Science (ICSU) since it was founded in 1919 under the name of the International Research Council. ICSU currently has 31 Scientific Union Members and 121 National Scientific Members covering 141 countries. In addition, ICSU has 23 International Scientific Associates and several Interdisciplinary Bodies. The Executive Board of ICSU has, in addition to the ICSU Officers (President, President-Elect, Past President, two Vice Presidents, Secretary General and Treasurer), four members elected by the National Members and four elected by the Unions, one from each of the four clusters of Unions (physical, bio, geo, and social clusters).

ADMINISTRATION

At the ICSU General Assembly in Rome, Italy, in 2011, Gordon McBean (former IUGG Bureau Members) was elected as ICSU's President-Elect and he became ICSU President at the closing ceremony of the General Assembly in Auckland, New Zealand in September 2014. At both last ICSU General Assemblies (in Rome, Italy, 2011, and in Auckland, New Zealand, 2014) the GeoUnions cluster named O. Altan (former President of ISPRS) as its sole candidate, and he was elected to the ICSU Executive Board both times. Note that U. Shamir (past President of IUGG) was an ICSU Executive Board Member for the last two terms (2005-2008, and 2008-2011). G. Wu, former IAMAS President, was a member of the ICSU Executive Board for the term of 2011-2014. The immediate Past President Tom Beer was selected as a member of the ICSU Committee on Scientific Planning and Review (CSPR), one of the important committees of ICSU, for the term of 2011-2014 and re-appointed for the term of 2014-2017.

ICSU has three Regional Offices: in Africa – ROA, in Asia and the Pacific – ROAP, and in Latin America and the Caribbean - ROLAC. IUGG appointed liaison officers to each ICSU Regional Offices, who took part in the regional activity of ICSU. The Regional Offices have the task of dealing with issue that have regional relevance and of engaging local scientists, in collaboration with the international scientific community. IUGG develops a productive relationship with each Regional Offices.

IUGG has been an active participant in ICSU, including the nomination of persons for numerous panels and working groups. Those panels for which IUGG was successfully included

- the Scientific Committee of the Program “Integrated Research on Disaster Risk” co-sponsored by ICSU, International Social Sciences Council, and UN International Strategy for Disaster Risk (hydrologist Dr. Kuniyoshi Takeuchi (Japan) as a Vice Chair and earthquake engineer Dr. Omar Cardona (Colombia) as a Member).
- the Scientific Committee of the ICSU World Data System (seismologist Dr. Jean-Bernard Minster (USA) as the Chair and geodesist Dr. Ruth Neilan (USA) as a Member).
- the Scientific Committee of the ICSU Health and Wellbeing in the Changing Urban Environment: a Systems Analysis Approach (hydrologist Dr. Luuk Rietveld (The Netherlands) as a Member).
- the Scientific Committee on Future Earth of the ICSU Regional Office for Africa (space scientist Ahmed Hady (Egypt) as a Member).

DISASTER RISK REDUCTION

In November 2013 IUGG was invited by the ICSU Executive Board to form a group of leading experts of ICSU and the International Social Sciences Council (ISSC) and to lead the process on a synthesis of knowledge on disaster risks to promote risk assessment. The ad-hoc group was formed in March 2014 and the first meeting of the group (co-sponsored by ICSU and IUGG) was held at the

ICSU Headquarters in Paris on 2 May 2014. The task of the group was to write a synthesis paper to assist in preparation to the United Nations Third World Conference on Disaster Risk Reduction (WCDRR, Sendai, Japan, 14-18 March 2015). The draft paper was discussed at the scientific conference held in Tokyo, Japan on 14-16 January 2015, and a summary for policymakers was distributed to the delegates of the WCDRR. The full paper can be downloaded from:

http://www.icsu.org/science-for-policy/disaster-risk/documents/DRRsynthesisPaper_2015.pdf

MEETINGS

President Dr. Harsh Gupta and Secretary General Dr. Alik Ismail-Zadeh attended the ICSU General Assemblies in Rome, Italy and in Auckland, New Zealand, and three meetings of the ICSU Scientific Unions, one held in Rome (2011), Paris (2013), and Auckland (2014). In July 2012 Secretary General Dr. Alik Ismail-Zadeh met the ICSU Executive Director Dr. Steven Wilson in the ICSU Secretariat in Paris. 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.

GEOUNIONS

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).

Meeting in Rome (September 2011). The Steering Committee of GeoUnions met in Rome (Italy) on 25 September 2011. Each Union reported on progress since the last business meeting in Paris (April 2010). IGU President R. Abler presented new initiative of the Union on International Year of Global Understanding (IYGU). This initiative aims to bridge the awareness gap between local acts and global effects, and it will do this through research, education and information. A. Ismail-Zadeh reported on the activities related to the ENHANS project (<http://www.enhans.org>), an IUGG initiative related to promotion of studies of natural hazards and disaster risk analysis, and to bridging natural and social sciences with engineering as well as science with society. Several Scientific Unions of ICSU and other multi-national and intergovernmental organizations supported the ENHANS project enthusiastically. ISPRS President O. Altan described a new ISPRS – UN-SPIDER initiative and the Society's involvement in the VALID project. The Value of Geo-Information for Disaster and Risk Management (VALID) project intends to study the economic, humanitarian, operational and organizational benefit, which can be realized by applying geoinformation to disaster management. ISPRS invited GUs to join the initiative. GUs discussed a possible cooperation in the global land cover mapping project presented by ISPRS Secretary General J. Chen. Also GUs discussed the procedure of nomination of candidates to the ICSU Executive Board, the role of Unions in ICSU interdisciplinary scientific committees, and involvements of GeoUnions in the ICSU Regional Scientific Programs. GUs analyzed the agenda topics of the Union Member Forum and the ICSU General Assembly and discussed their involvements in the U.N. Conference on Sustainable Development (Rio+20, <http://www.uncsd2012.org/rio20>).

Meeting in Istanbul (April 2012). The Steering Committee 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 (ISPRS President, and an ICSU Executive Board Member) with support from the Istanbul Technical University. The representatives of the GeoUnions updated each other on the activities for the time from the last meeting in Rome, September 2011, and discussed joint actions of the GeoUnions, namely the VALID project (<http://www.un-spider.org/VALID-stakeholder-assessment-I>) 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 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 Steering Committee of GeoUnions.

Meeting in Paris (April 2013). The Steering Committee of GeoUnions met in Paris, France, on 28 April to coordinate scientific activities of the Unions, to exchange ideas, and to promote scientific research of common interest. The meeting was organized by Alik Ismail-Zadeh, IUGG Secretary General and Vice Chair of the Joint Board, with a local support from Jean-Paul Cadet, Honorary President of the Commission for the Geological Map of the World. Representatives of eight Unions attended the meeting and welcomed several distinguished guests: Gordon McBean, President-Elect of the International Council for Science (ICSU); Steven Wilson, ICSU Executive Director; Howard Moore, ICSU Senior Advisor; and Jane Rovins, Executive Director of the Integrated Research on Disaster Risk (IRDR). The meeting was chaired by Ron Abler, IGU Past President and Chair of the Joint Board. The representatives of GeoUnions updated each other on the activities of the Unions since the last meeting in Istanbul, Turkey, April 2012, and discussed joint actions of the GeoUnions, namely, (i) the International Year for Global Understanding (<http://global-understanding.info/>) led by the International Geographical Union (IGU), (ii) the VALID project (<http://www.un-spider.org/VALID-stakeholder-assessment-I>) led by ISPRS and UN-SPIDER, (iii) the International Year of Deltas (<http://www.iyds-2013.org/>) co-sponsored by IUGG, IGU, ISPRS, IUGS as well as by the International Geosphere-Biosphere Program (IGBP) and the World Climate Research Program (WCRP), and (iv) new ISPRS project proposal on global land cover data and information. GeoUnions discussed the aspects of communication between ICSU and the Unions, the Unions’ role in ICSU committees and interdisciplinary bodies and in the ICSU Regional Scientific programs. Special emphasis was given to the role of GeoUnions in “Future Earth: Research for Global Sustainability” (<http://www.icsu.org/future-earth>), a new ICSU major program. They received a report from the IRDR Executive Director on the new research topics on the assessment of integrated research on disaster risk and FORIN (Forensic Investigation of Disasters), and discussed their involvements in the IUGG-IRDR initiative on negotiations about setting up an intergovernmental panel on disaster risk assessment. The participants discussed the future of scientific publications and how scientific advice can underpin decision-making.

In September 2013, the ICSU GeoUnions, JBGIS and UNOOSA/UN-SPIDER presented a new report which shows the economic, humanitarian and organizational benefits of applying geoinformation to disaster management. The report “The Value of Geo-Information for Disaster and Risk Management (VALID): Benefit Analysis and Stakeholder Assessment” was edited by O. Altan et al. The publication aims to raise awareness and to help setting priorities in research and development.

Meeting in Antalya (November 2013). Among important topics of the meeting agenda were joint GUs projects/initiatives related to Future Earth Scientific Program, scientific assessment of disaster risk, risk management, the International Year of Global Understanding (IYGU), and some others. Particularly, the Steering Committee considered the proposal of the International Union of Geological Sciences (IUGS) on Resourcing Future Generations and the ISPRS proposal on Global Land Cover Information for Future Earth, discussed the IUGG initiative on building actions toward setting up a high-level intergovernmental body to assess disaster risk (due to natural hazard events), and the ISPRS initiative on Application of Geoinformation to Enhance Disaster and Risk Management. Also GUs

considered and approved the working procedures of the Steering Committee and agreed to launch the GUs webpage. The website launched in December 2013 at <http://icsu-geounions.org/>.

Meeting in Auckland (August 2014). The Steering Committee of GeoUnions (GUs) met in Auckland, New Zealand on 30 August 2014 on the occasion of the ICSU General Assembly. Representatives of seven Unions participated in the meeting. Ron Abler (Past President of the International Geographical Union) chaired the Steering Committee. IUGG was represented by Harsh Gupta (President), Alik Ismail-Zadeh (Secretary General and Vice-Chair of the GUs Steering Committee), and Tom Beer (IUGG Past President). The representatives of GeoUnions discussed the important topics related to the Agendas of the Scientific Unions Meeting (held on 31 August) and the 31st ICSU General Assembly (held from 31 August to 3 September). IUGG and the International Union of Geological Sciences (IUGS) initiated a discussion on the program of Future Earth and highlighted the fact that a very important component related to the physical and chemical processes within solid Earth is missing from the proposed program of Future Earth. These processes are responsible for causing earthquakes, landslides, inundations, volcanoes, providing the material for soil development within which plants grow and all related phenomena affecting environment and society. Continuously improving the understanding of these processes is essential for a better life on Planet Earth and its sustainability. It was decided that GeoUnions should raise the topic of underrepresentation of solid Earth science in the program of Future Earth both at the Unions meeting and at the General Assembly. Harsh Gupta (IUGG President) and Roland Oberhaensli (IUGS President) discussed it during the ICSU meetings and sent a letter to the leadership of Future Earth on behalf of GUs. Alik Ismail-Zadeh provided information about the initiative proposed by IUGG, GUs, and the Integrated Research on Disaster Risk Scientific Program (IRDR) on disaster risk assessment and pointed to the relevant topic of the Agenda of the ICSU General Assembly. He presented this initiative to the General Assembly on 2 September. GUs nominated Orhan Altan (the International Society of Photogrammetry and Remote Sensing - ISPRS) for the position of an ICSU Executive Board Member, and he was elected to the Board on 3 September. The International Cartographic Association (ICA) applied to become a Union Member of ICSU, and the General Assembly approved this application. Congratulations to ICA, a new member of the Earth and space cluster of ICSU! Three draft applications for the 2015 ICSU Grants Programme have been presented and discussed at the meeting: (i) on supporting Future Earth with Global Geo-information (led by ISPRS), (ii) on future Earth and space science and education (led by IUGG), and (iii) on resourcing new generations (led by IUGS). Also the Steering Committee discussed cooperation within three forthcoming international years: International Year of Global Understanding (IYGU) led by the International Geographical Union (IGU); 2015 International Year of Soils (IYS) led by the International Union of Soil Sciences (IUSS); and the International Year of Light and Light-based Technologies (IYL 2015) co-sponsored by the International Union of Radio Sciences (URSI). Orhan Altan briefly presented a follow-up joint GUs Booklet Project related to disaster risk management (DRM) and geoinformation products and services. Alik Ismail-Zadeh assumed the position of Chair of the GUs Steering Committee. Ron Abler was thanked for chairing the Steering Committee for the last three years.

GRANTS

IUGG has appreciated the opportunity to propose or to support initiatives for ICSU grants. The following projects were awarded by ICSU:

- Project “Uniting and networking the magnetic community in the northern Indian Ocean region (MAGNIO)” led by IUGG.
- Project “Mathematics of Climate Change, Related Natural Hazards and Risks” led by the International Mathematical Union (IMU) and supported by IUGG.
- Project “G@GPS-Africa: Long-term Recharge of Large Groundwater Basins” led by the International Union for Quaternary Research (INQUA) and supported by IUGG.

FINANCE

In 2011, ICSU introduced a new dues structure, where IUGG is among 4 Scientific Unions to pay the highest membership dues to ICSU.

Alik Ismail-Zadeh
IUGG Secretary General

13. Reports from liaisons to ICSU Commissions and Committees / Rapports des officiers de liaison avec des commissions et comités du CIUS (A. Ismail-Zadeh)

13.1. Committee on Data for Science and Technology (CODATA) (Liaison A. Gvishiani)

Participation in CODATA conferences and General Assemblies

23rd International CODATA Conference and 28th General Assembly of CODATA, Taipei, 28 Oct - 2 Nov 2012

The 23rd International CODATA Conference “Open Data and Information for a Changing Planet” was held on 28-31 October 2012 in Taipei. The event was hosted at Academia Sinica. I was highly involved in organization of IUGG participation in this event. Unfortunately, due to another commitment occurred in the last minute I was not able to participate to the conference. Finally in result of agreement IUGG appointed temporary Delegate to 23rd International CODATA Conference Dr. Anatoly Soloviev.

The 28th General Assembly of CODATA followed the CODATA Conference and lasted for two days from the 1st to the 2nd November 2012. The following highlights of the General Assembly meeting should be pointed out:

- 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 created;
- The General Assembly decided on the creation 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 nine existent Task Groups to continue and the following three new Task Groups were approved additionally: TG on Linked Open Data for Global Disaster Risk Research, TG on Advancing Informatics for Microbiology and TG on Mining Space and Terrestrial Data for Improved Weather, Climate and Agricultural Predictions;
- The General Assembly decided to move the Data Science Journal to an Established Open Access Publisher. Publishing the DSJ through an established, full-time OA publisher is likely to greatly increase the visibility of the Journal and CODATA;
- The CODATA General Assembly accepted the invitation from India to hold its next CODATA Conference 2014 in New Delhi. It was agreed that the World Data System Conference and CODATA Conference will be merged.

Dr. A. Soloviev delivered two reports on IUGG relevant activities: oral presentation on “Russian-Ukrainian geomagnetic data center” at the Session “Earth and Environment” and poster presentation

on “Automated quality control of geophysical time series”. At the Closing Ceremony he was given Best Poster Award for his poster from CODATA President Huadong Guo. As a Secretary of the CODATA Task Group “Earth and Space Science Data Interoperability” A. Soloviev presented its activities, which are also consistent with IUGG interests.

The main conclusion that was made as a result of the Taipei conference is lack of young scientists in CODATA structure. Extensive preparation was carried out for the follow-up CODATA conference and proposal with candidacies for new CODATA executive committee were made. The candidacies for CODATA main positions were elected from the list of young scientists that are famous with their activities in IUGG.

SciDataCon, New Delhi, 2-5 November 2014

Data Sharing and Integration for Global Sustainability conference (SciDataCon 2014) was held in the Convention Centre of the Jawaharlal Nehru University on 2–5 November. Many young researchers from Ukraine, Russia, South Africa, China, Japan and India (from Jawaharlal Nehru University) took part in the conference activities. Unfortunately due to visa problems the past-acting president of CODATA, Prof. Guo Huadong from China, was not able to participate in the conference. The same way, over 20 Chinese data specialist had no opportunity to deliver their talks in India. This issue was highly discussed during the conference and the appropriate resolution was made during the 29th General Assembly of CODATA that was held in the Indian National Science Academy (INSA) 6–7 November, 2014. Prof. Geoffrey Boulton from UK was elected on the position of CODATA president. Prof. Niv AHITUV (Israel) and Prof. Takashi GOJOBORI (Japan) were elected on the positions of vice-presidents. New Executive Committee was elected. It consists mostly of the same members as in a previous term. However two new young scientists Alena Rybkina from Russia and Paul Laughton from South Africa were elected. I actively supported both candidates along with young candidate from Ukraine on behalf of IUGG.

The list of 2014-2016 elected CODATA Executive committee members is as follows:

1. Bonnie CARROLL (USA)
2. Paul Laughton (South Africa)
3. Der-Tsai LEE (China)
4. Alena Rybkina (Russia)
5. Mark THORLEY (UK)
6. Mary ZBOROWSKI (Canada)
7. Anil Kumar (India)
8. Li Jianhui (China)

New member states joint CODATA: The Netherlands, Kenya and RDA (Research Data Alliance). They made presentations about their view of future national and international CODATA activities. The main focus was made on the promotion of CODATA activities among data and research community and involving young scientists to CODATA working groups. Short reports on their data-related activities and requirements were prepared by CODATA Task Groups. As a result of voting procedure following task groups were reelected:

1. Advancing Informatics for Microbiology
2. Anthropometric Data and Engineering
3. Data at Risk
4. Data Citation Standards and Practices
5. Earth and Space Science Data Interoperability
6. Linked Open Data for Global Disaster Risk Research
7. Global Roads Data Development
8. Preservation of and Access to Scientific and Technical Data in/for/with Developing Countries (PASTD)

Two new CODATA Task Groups were elected:

1. Interoperable Data Publications
2. Science and the Management of Physical Objects in the Digital Era

Linking IUGG and CODATA

I provided necessary linkage to the fact that IUGG and CODATA became co-organizers of the important international conferences “Artificial Intelligence in the Earth’s Magnetic Field Study. INTERMAGNET Russian Segment” that was held on 26–28 January 2011 in Uglich, Yaroslavl region and partnership international conference "Geophysical observatories, multifunctional GIS and data mining" that was held 30th September – 3 October 2013 in Kaluga, Russia.

The conference in Uglich put together the leading scientists and specialists in geomagnetism and magnetic observations from Canada, France, Germany, Hungary, Russia, USA and Ukraine. At the conference was a meeting between the institutions of RAS, overseeing the work of the Russian observatories and institutions of INTERMAGNET. On the base of these institutions an installation of new INTERMAGNET observatories is planned, including the institutions of RAS and ROSHYDROMET. As a result of this meeting the following important steps to join efforts in creating and developing the INTERMAGNET Russian Segment have been taken:

1. An agreement for joint working on the project of the INTERMAGNET Russian Segment deployment was concluded;
2. A decision to establish a Working group within the National Geophysical Committee of Russian Federation for creation of the INTERMAGNET Russian Segment was taken;
3. An agreement to establish a national node for collection and processing of geomagnetic data for serving the INTERMAGNET Russian Segment, based on the Geophysical Center of RAS with the perspective of INTERMAGNET Seventh–GIN (Geomagnetic Information Node) status acquisition, was reached;
4. The deployment of an experimental training temporary INTERMAGNET observatory, based on the magnetic station “Moscow” of IZMIRAN in Troitsk, Moscow Region, was initiated;
5. Leading scientists of geomagnetism formulated the recommendations on the deployment of new INTERMAGNET observatories in Russia.

In Uglich I served as chair of program committee. IUGG was represented by secretary general of IAGA Mioara Mandea and vice-president of IUGG Commission of Geophysical Risk and Sustainability Vladimir Kossobokov.

IUGG and CODATA were co-organizers of the partnership international conference "Geophysical observatories, multifunctional GIS and data mining" that was held 30th September – 3 October 2013 in Kaluga, Russia. The conference brought together more than 120 participants from 11 countries of the world. The participation of leading scientists representing different branches of Earth sciences and specialists in development of system analysis methods proves the high importance of this event.

The conference summed up the results and outlined new ways of development of projects in the field of study of the Earth’s magnetic field and practical application of results of this study.

The sessions of the conference were followed by stage panel discussions. The list of the Kaluga sessions:

1. Geophysical observation systems and data mining.
2. High quality observations of the earth’s magnetic field.
3. Multifunctional intellectual methods for geophysical, ecological, socio-economic and biomedical research.

4. Advanced system analysis, data mining and artificial intelligence in processing time series from geomagnetic, geophysical, ecological, socioeconomic and biomedical observations.
5. Geology, geophysics and geoinformatics of the arctic region: multifunctional observatories and intelligent gis.

In Kaluga I served as chair of program committee. IUGG was represented by secretary general of IUGG Alik Ismail-Zadeh, vice-president of IUGG Commission of Geophysical Risk and Sustainability Vladimir Kossobokov and member of IUGG Union Commission on Data and Information Anatoly Soloviev.

Another linkage between IUGG and CODATA is publishing of the first edition of “The Atlas of the Earth's Magnetic Field”. The Atlas was published in Russian in 2012 and in English in 2013 (electronic version). The Atlas of the Earth's Magnetic Field represents a unified set of physical, geographic, thematic, and historical materials for a detailed study of the geomagnetic field from 1500 to 2010. The Atlas is intended for a wide range of scientists, teachers, students and experts in applied areas relating to the geosciences, including geologists and geophysicists studying geomagnetism. The Atlas is a unique cartographic product that contains comprehensive and scientifically grounded characteristics of geomagnetic phenomenon, and contains the results of historical and modern studies of the Earth's magnetic field.

International workshop “The Atlas of the Earth's Magnetic Field. Second Edition” is planned in May 2015. Results of this meeting will contribute to publishing of the second edition of the Atlas of the Earth's Magnetic Field that is scheduled in 2016-2017. Upcoming workshop will extend the content of the second edition of the Atlas and contribute to further realization of this project.

Alexei Gvishiani, IUGG liaison to CODATA

13.2. Committee on Space Research (COSPAR) (Liaison E. Donovan)

Report on the Council Meeting of the ICSU Committee on Space Research (COSPAR)

Note: The IUGG Liaison Officer to COSPAR, Prof. Eric Donovan (CANADA) was unable to conduct his duties. Therefore, I accepted the invitation from COSPAR and represented IUGG at their Council Meeting.

The COSPAR Council met on Saturday, 2 August, and on Sunday, 10 August 2014 to consider several topics of major importance for the scientific committee. The COSPAR President G. Bignami presented his Presidential report and the COSPAR Executive Director J.-L. Fellous presented the activity report for the period since the 2012 COSPAR Scientific Assembly, including information on the activities of the COSPAR Scientific Advisory Committee. The COSPAR Treasurer presented the financial report including the report of the Finance Committee, execution of the 2012 and 2013 budgets, the 2014 and 2015 COSPAR budget considerations, and 2015 national contributions.

As mandated by the revised By-laws adopted by the Council at its 2012 meeting, by the time of the Assembly voting for the COSPAR President have to take place by correspondence. Two candidates were placed in the ballot: current President G. Bignami (Italy) and L. Fisk (USA). Ballots were counted at the Council meeting. The results of the voting on the election of the COSPAR President was announced: L. Fisk was elected the new President of COSPAR. Dr. G. Bignami considered the result as a vote of no confidence in him and decided to step down immediately. According to the Statutes the COSPAR Vice President J. Wu (China) took over of the presidency until the end of the Council meeting, when L. Fisk will assume the office of the COSPAR President. The Council elected two Vice-Presidents, Bureau, and Finance Committee. A concern was expressed regarding the nomination and presentation of the candidates for the COSPAR vacant positions, particularly related to the gender issue and representation of the ICSU Scientific Unions. At the Council meeting, I proposed Mioara Mandaia (IAGA Secretary General) as a candidate for the COSPAR Nomination Committee. This proposal was supported by 3 Council Members and her name was placed in the slate of candidates. The vote was unsuccessful, and particularly because of the “last-minute” proposal. In future, an IUGG Liaison Officer should propose experts of IUGG for various vacant officer positions in COSPAR.

The COSPAR Executive Director reported on the Capacity Building Workshops including (i) 16th COSPAR workshop in Beijing, China, September 2012, (ii) 17th COSPAR workshop in Buenos Aires, Argentina, October 2012, (iii) 18th COSPAR workshop in Xuyi, China, September 2013, (iv) 19th COSPAR workshop in Bangkok, Thailand, November 2013, and (v) 20th COSPAR workshop in Bandung, Indonesia, January 2014. Also the Council was briefed on the 1st COSPAR Symposium which was held in Bangkok, Thailand, 11–15 November 2013, as well as on plans for future Symposia.

A representative of the Local Organizing Committee of the 41st COSPAR Scientific Assembly (COSPAR 2016), presented a report on the activities related to the preparations to the meeting. The final registration fees were approved, and the proposal for the 2016 Scientific Program Committee chair was discussed.

COSPAR received one bid from USA to hold the 42nd COSPAR Scientific Assembly in 2018 in Pasadena, California. Another bid was submitted to the Council members at the meeting from Malaysia. Both bids were presented to the Council. Without discussion and detailed consideration of each bids, the voting on the venue of the 42nd COSPAR Scientific Assembly was held. The results showed that the majority of votes went to Malaysia. At the next session of the Council, COSPAR Executive Director J.-L. Fellous and Vice President J. Wu informed the Council that the COSPAR Bureau considered the two bids in much detail and expressed significant concerns related to organization of the COSPAR assembly in 2018 in Malaysia. They presented the statistics related to Malaysian and US bids and the Bureau concerns to the Council. After intensive discussions, the Council decided to ask the Bureau to investigate the case within 1-2 months and to come with the report regarding the possibility of Malaysia to organize a COSPAR assembly in 2018.

At the second session of the Council, M. Panasyuk, Chair of the Local Organizing Committee (LOC) reported on the registration statistics and other salient aspects of the 2014 COSPAR Assembly. 2232 (including 121 students) people from 74 countries attended the Assembly. In total 2527 talks and 1344 posters were presented. Two public lectures were delivered by V. Fortov, President of the Russian Academy of Sciences (“Extreme State of Matter on the Earth and in the Space”) and V. Sadovnichii, Rector of the M.V. Lomonosov Moscow State University (“Space Education and Research: the Role of Universities”).

The Council was informed on the elected or appointed by the Bureau officers of the COSPAR Commissions/Panels. The reports of COSPAR Scientific Commissions and Technical Panels were distributed among the Council members. Particularly,

- Commission A (Space Studies of the Earth's Surface, Meteorology and Climate) proposed to host a dedicated session on Geodesy/Solid Earth Geophysics at the next Scientific Assembly in Istanbul, Turkey in 2016.
- Commission B (Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System) proposed to reorganize the sub-commission B2 (International Coordination of Space Techniques in Geodesy), joint with IUGG/IAG (with proposed chair T. Duxbury and Vice Chair B. Archinal)
- Technical Panel on Satellite Dynamics (PSD) proposed an event for the COSPAR 2016 Scientific Assembly with a tentative title “Earthquake revealed from space: observations, models and implications”. It was suggested to run the event together with IUGG/IAG.

The Council will be briefed on the current state of COSPAR publications, including creation of a spin-off journal to *Advances in Space Research* (ASR) entitled *Life Sciences and Space Research* (LSSR). Recommendations from the working group to review the Scientific Assembly structure and practices, established by the Bureau in 2013, were presented. Decisions adopted will be implemented for the 2018 Assembly.

The COSPAR Scientific Program was co-sponsored by many national, international and intergovernmental organizations including IUGG and its associations (IAGA and IAMAS).

A. Ismail-Zadeh
IUGG Secretary-General

13.3. ICSU World Data System (WDS) (Liaison R. Neilan)

The report was not submitted.

13.4. ICSU Regional Office for Africa (Liaisons I. Ansorge, A. A. A. Tealeb)

INTRODUCTION

Role of the Regional Office for Africa

The ICSU Regional Office for Africa (ICSU ROA), inaugurated on 1st of September 2005, endeavours to ensure that the voice of African scientists influence the international science agenda and that scientists from Africa are fully involved in international research programmes guided by regional priorities. ICSU ROA promotes the participation of African scientists, organisations and institutions in the programmes and activities of the ICSU family and its partners on the continent. ICSU works with strategic partners to plan and coordinate international research programmes that address major issues of relevance to both science and society. To this end, a number of Interdisciplinary Bodies have been created, addressing various themes, including: global environmental change; hazards and disasters; ecosystem change; oceans; polar research; space research; and solar-terrestrial physics.

Members in Africa

ICSU has 121 National Members representing 141 countries around the world. Of these, 29 are from the African region including Cameroon, Angola, Ethiopia

MEETINGS AND NEWS 2011-2014

Natural and Human-Induced Hazards & Disasters Consortium Project Proposals Consolidation Workshop

Five core scientists of the Hazards and Disasters Consortium (Genene Mulugeta, Ray Durrheim, Samuel Ayonghe, Abdourahamane Konare and Mitulo Silengo) and the Programme Specialist responsible for the Hazards and Disasters Science Plan of ICSU ROA (Richard Glover) participated in a 3-day project proposal consolidation workshop in Yamoussoukro, Ivory Coast from 2 to 4 December, 2014.

ICSU ROA to work with NASAC Feb 16, 2015

ICSU ROA has established a working relationship with the Network of African Academies (NASAC) in recent months, following a long and considered engagement. The two are planning to work together to initiate research projects to implement science plans of the Regional Office, which are in the areas of Global Environmental Change (including Climate and Adaptation), Health and Human Well-being, Hazards and Disasters, as well as Sustainable Energy. These projects, we hope, will get funding from a large proposal currently in process with a reputable research funder, with the involvement of the ICSU head office.

Launch of ICSU's International Programme Office on Urban Health and Well-being

The International Programme Office (IPO) for Health and Wellbeing in the Changing Urban Environment Programme, the latest addition to the ICSU family, was launched in Xiamen, China, on 8 December 2014. The Office is hosted by the Institute for Urban Environment (IUE) of the Chinese Academy of Science (CAS). The Urban Health & Wellbeing programme aims to better understand what makes a "healthy urban environment", and is co-sponsored by the United Nations University (UNU) and the Inter-Academy Medical Panel (IAMP).

SciDataCon2014 Conference

The International Conference on Data Sharing and Integration, held every two years, is an important showcase of open science around the world. The 2014 conference was held at the Convention Centre of the Jawaharlal Nehru University (JNU), New Delhi, India. The conference, with an overarching

theme Data Sharing and Integration for Global Sustainability, was organised in partnership between ICSU's Committee on Data for Science and Technology (CODATA), ICSU World Data System (WDS) and the Indian National Science Academy (INSA)

Swedish/Africa Consortium Building Workshop

A one day consortium building workshop, under the theme "Reducing the Risk of Natural and Human-induced Hazards and Disasters" for Africa's Sustainability was organised at Eklundshof, Uppsala on 31 October 2014, by the Sustainable University Network, at the Baltic University Programme, Uppsala University, and the ICSU Regional Office for Africa.

International Workshop on Open Data Knowledge Environment for Sciences and Sustainability in Developing Countries

An International Workshop on Open Data Knowledge Environment for Sciences and Sustainability in Developing Countries was organised by the CODATA Task Group on Preservation of and Access to Scientific and Technical Data in/for/with Developing Countries, 06 – 08 August 2014 at the United Nations Conference Centre in Nairobi.

SSEESS Research Links Programme 2015

The Swedish Secretariat for Environmental Earth Systems Sciences (SSEESS) offers project planning grants aiming to facilitate the formation of North-South research consortia within global environmental change (GEC) research.

African scientists appointed into Executive Board of ICSU

Two of the three scientists from Africa nominated to the Executive Board of ICSU for 2015. - 2017 were voted in during the 31st General Assembly in Auckland, New Zealand. Prof Daya Reddy an A rated scientist in the new President-elect of ICSU. Prof Reddy, an eminent and respected scholar and scientist, is the President of the Academy of Science of South Africa (ASSAf), Co-Chair of the InterAcademy Council, Fellow of The World Academy of Sciences (TWAS), and holds the South African Research Chair in Computational Mechanics at the University of Cape Town. He obtained his BSc in Engineering from the University of Cape Town, and PhD from the University of Cambridge. He is a recipient of the Order of Mapungubwe (Bronze), awarded by the President of South Africa for distinguished contributions to science. The GA, which takes place every three years, was held from 31st August to 3rd September 2014. This shows the confidence that the global scientific community has in developing countries as key role players in ensuring that global science is strengthened to benefit society.

Future Earth Regional Workshop for Africa II

ICSU Regional Office for Africa, in collaboration with the University of Pretoria, successfully organised a 2nd Future Earth Regional Workshop for Africa, which was held at the University of Pretoria, in Pretoria, South Africa, from 23 to 24 June, 2014. The Workshop was attended by about 70 participants (from across Africa) who represented national governments, intergovernmental bodies, regional economic communities, UN agencies, academic and research institutions, science academies, ICSU national members and scientific unions.

Global Environmental Change Symposium

The Global Environmental Change Symposium was held at the University of Mauritius on the 8th of April 2014, in partnership with the African Institute of South Africa (AISA). Three books co-published between the three partners were launched. Some of the Scientists who have tirelessly dedicated their time and energy to produce these books attended the symposium, to share first-hand information on the content of the books they have worked on.

Isabelle Ansorge, IUGG Liaison for ISCU ROA

13.5. ICSU Regional Office for Asia and the Pacific (Liaisons S. Roy, S. Widiyantoro)

Introduction

The ICSU-regional Office for Asia and the Pacific (ROAP) promotes the development of science throughout Asia and the Pacific region and aims to ensure that the scientists from developing countries in the region become involved in those aspects of the ICSU's 2006-2011 and 2012-2017 Strategic Plans that are especially relevant for Asia and the Pacific. ROAP functions under the umbrella of ICSU, which envisions universal and equitable access to high quality scientific data and information and all countries have the scientific capacity to use these and to contribute to generating the new knowledge that is necessary to establish their own development pathways in a sustainable manner.

Business meetings of ICSU-ROAP

I have attended the following business meeting:

5th ICSU Regional Consultation for Asia and the Pacific titled "Future Earth in Asia and the Pacific" held during November 26-27, 2013 at Seoul, Korea. My role at the meeting was to highlight IUGG's contributions to the program on FUTURE EARTH and to generate potential areas for collaboration with scientists of the Asia-Pacific region.

At the meeting, I also served as Panelist during the **Panel Discussion: Implementing Future Earth in the Asia and the Pacific Region**. The panel constituted the following members:

- Tetsuzo Yasunari
Council Member, Science Council of Japan (SCJ); Director-General, RIHN; and Member Science Committee Future Earth
- Guoxiong Wu
Institute of Atmospheric Physics, Chinese Academy of Sciences; Member ICSU Executive Board
- C.T (Arthur) Chen
Vice Chair of IGBP Scientific Committee
- Sukanta Roy
IUGG Liaison Officer to ROAP and Principal Scientist, CSIR – National Geophysical Research Institute, India
- Dong-pil MIN
Ambassador for S&T Cooperation, Republic of Korea; Professor Emeritus, Seoul National University; Scientific Advisory Board to the UN Secretary General on sustainable development

Following up on the recommendations of the June 2012 UN Conference on Sustainable Development (Rio + 20), the ICSU has launched a 10-year international programme titled *Future Earth*. *Future Earth* aims to provide critical knowledge required for societies to face the challenges posed by global environmental change and to identify opportunities for a transition to global sustainability. While the scope of Future Earth is global, a number of issues require region-specific approaches to provide robust observations and forecasts of regional environmental change, assess potential impacts and vulnerabilities, and explore mitigation and adaptation pathways. In particular, the Asia-Pacific region presents unique challenges due to its varied and contrasting, countries, economies, religions, geographies, climates and stages of development. The region is home to 60% of the world's population and accounts for more than 40% of the global economy. There are the large land masses of China, India and Australia with their dense and sparse population areas. This is in contrast with the small and remote island states of the south Pacific. Stakeholders in the region have a fundamental role to play in the design, conduct and implementation of sustainability research. This could involve identifying the needs and priorities of researchers and practitioners at national and regional levels, stimulating cooperation and partnerships, and promoting institutional coherence. The 5th ICSU Regional Consultation focused on the implementation of Future Earth programme in the Asia and the Pacific Region. Therefore, the ICSU-ROAP's initiative to hold the 5th Regional Consultation on *Future Earth* in the context of the Asia and Pacific region was both appropriate and timely.

The objectives of the consultation were:

- (i) To further enhance understanding of Future Earth especially in relation to what is needed to promote on-the-ground interdisciplinary integrative research that can point the way towards the transformative pathways to global sustainability;
- (ii) To explore the cross-cutting capabilities needed to support Future Earth research in Asia and the Pacific and to explore means of funding and implementing a programme to enhance those capabilities;
- (iii) To discuss opportunities and challenges in building a Future Earth research community in Asia and the Pacific.

The core consultation started with a review titled **Future Earth – research for global sustainability** by Tetsuzo Yasunari, Member of the Science Committee for Future Earth. This was followed by a presentation on **The Implementation of Future Earth** by Anne-Sophie Stevance, Future Earth Interim Secretariat and Science Officer, ICSU and a presentation on **Future Earth in Asia and the Pacific region** by M. Nordin Hasan. These two overviews set the table for discussion on a wide range of topics related to the modes of implementation of Future Earth programmes by various countries and organizations in the region. These discussions were captured in two break-out groups -- **Transformation towards Sustainability** and **Future Earth in Asia and the Pacific: Cross-cutting Capabilities and Funding Strategy**. A major challenge, the need for appropriate steps for data management and dissemination, was brought out by Rorie Edmunds – Programme Officer, World Data System (WDS) – IPO. The discussions during the break-out sessions extended to the evening over dinner.

The second day started with summaries of break-out group discussions that took place during the first day. A number of issues on the methods to be employed for propagating Future Earth initiatives were raised by participants from different countries. A participant from Bhutan explained at great length the need for a Happiness Index as compared to the Human Development Index to measure the achievements of an economy / society. Other discussions dwelled on the growing stress on Planet Earth to feed and nurture the current population in the Asia-Pacific region, and the need for sustainability in all spheres of life that alone could extend the human existence on this planet.

The summaries of break-out groups were followed by a panel discussion focused on **Implementing Future Earth in the Asia and the Pacific Region**. The panelists included representatives from Future Earth Science Committee, ICSU, IGBP, IUGG and Ambassador for S&T Cooperation, Republic of Korea. Brief presentations were made by the panelists to highlight the contributions to the implementation of Future Earth programs by various organizations and the challenges to more efficient implementation of the programs. The IUGG, with its diverse associations, Union and Inter-Association Commissions and Working Groups cover a wide spectrum of themes central to Future Earth. This was effectively brought out by the IUGG Liaison to ICSU-ROAP, and appreciated by ICSU and other organizations. The presentation and discussions brought out the pathways for effective collaboration with IUGG associations to not only promote the research needs but also take advantage of the diverse expertise in several key areas available with the IUGG.

Overall, the Regional Consultation was marked by enthusiastic participation and discussions by the members of different committees and representatives from different organizations in the Asia-Pacific region. There was unanimity about the common challenges facing mankind although the methods of addressing them could be very diverse and specific to individual communities in the region. Two clear challenges emerged from the discussions: (i) engagement of research and stakeholder communities at global, regional and national levels and (ii) capacity building in the Asia-Pacific region.

The salient outcomes of the consultation were:

- (i) A better understanding of how *Future Earth* can be implemented in Asia and the Pacific region keeping in view the diverse geographies, climates, economies, stages of development, and measures of development;
- (ii) A framework to facilitate integrated research towards the goals of Future Earth through collaboration between different stakeholders;

- (iii) Growing recognition of the need for cross cutting capabilities to support Future Earth research in the region;
- (iv) An initial road map for the implementation and monitoring of progress of *Future Earth* in Asia and the Pacific.



5th ICSU Regional Consultation on Future Earth, 26-27 Nov 2013, Seoul



5th ICSU Regional Consultation on Future Earth, 26-27 Nov 2013, Seoul

Other business meetings of the ICSU-ROAP are mentioned briefly in the following.

In February 2012, at the International Conference on **Planet under Pressure** in London, **ICSU ROAP convened a symposium on green and emerging challenges in Asia and the Pacific**. It highlighted many initiatives in Asia that explored ways of promoting green growth and of the need to develop a human sustainable development index (HSDI) to augment the currently popular human development index (HDI).

Towards the end of the year 2012, ROAP hosted two meetings - **the ICSU Global-regional Integration Workshop on Natural Hazards and Disasters**, and the **Regional Workshop on Future Earth**. The hazards and disasters workshop aimed at harmonising the implementation of ICSU's global science plan for Integrated Research on Disaster Risk (IRDR) and regional science plans on hazards and disasters. It sought to develop a common implementation framework by identifying commonalities and highlighting differences of global and regional science plans, and by agreeing on key characteristics of future research activities. The Future Earth Regional Workshop for Asia and the Pacific was highly successful in introducing the scientific community to the new 10-year international initiative on Earth systems research for global sustainability. Participants felt that the region has the ability to lead the move towards global sustainability under the **Future Earth** programme. The scientific community in Asia and the Pacific is ready to make the change to support integrated research that would build the knowledge and solutions necessary for the transition to sustainability. Through Future Earth, the region can engage with developed and less developed countries in a new programme which seeks to ensure development that is socially inclusive and environmentally sound.

During the year 2013, the ICSU-ROAP programs were dominated by FUTURE EARTH and follow-up meetings related to ICSU's three strategic science areas – (i) Hazards and Disasters, (ii) Sustainable Energy, and (iii) Health & Wellbeing in the Changing Urban Environment. The major meetings involving ICSU-ROAP were:

- ICSU Integration Workshop on Sustainable Energy, 8-9 April 2013, Mexico City, Mexico
- 15th Meeting, ICSU Regional Committee for Asia and the Pacific, 25-26 April 2013, Kuala Lumpur, Malaysia
- Symposium on Urban Health and Wellbeing, 23 May 2013, Kuala Lumpur, Malaysia
- 5th ICSU Regional Consultation in Asia and the Pacific, 26-27 November 2013, Seoul, Republic of Korea

Contacts (ICSU and other officers)

- (i) Prof. M. Nordin Hasan, Director, ICSU Regional Office for Asia and the Pacific
- (ii) Prof. Hong Kum Lee – Chair, ICSU Regional Committee for Asia and the Pacific and Principal Research Scientist, KOPRI
- (iii) Prof. Tetsuzo Yasunari – Council Member, Science Council of Japan (SCJ); Director-General, RIHN; and Member Science Committee Future Earth
- (iv) Anne-Sophie Stevance – Future Earth Interim Secretariat and Science Officer, ICSU
- (v) Javed Iqbal, Member ICSU Regional Committee for Asia and the Pacific
- (vi) Guoxiong Wu, Institute of Atmospheric Physics, Chinese Academy of Sciences; Member ICSU Executive Board

Discussion topics

- A presentation titled “IUGG’s Forays in FUTURE EARTH” was made on behalf of the IUGG during the 5th ICSU Regional Consultation for Asia and the Pacific titled “Future Earth in Asia and the Pacific” organized by ICSU-ROAP in Nov 2013 at Seoul. The contributions in the area of geophysics towards FUTURE EARTH goals made (or envisaged) by the different associations, union commissions and inter-association commissions and working groups of the IUGG were brought out during the presentation. The specific actions such as *Panta Rhei* (IAHS) and *Weather, Climate and Food Security WeatCLiFs* (CCEC) were appreciated and led to extensive discussions. The Intra-IUGG network established by CCEC on:

- ✓ Severe weather and climate (IAMAS)
- ✓ Volcanic eruptions (IAVCEI)
- ✓ Earthquakes (IASPEI)
- ✓ Floods (IAHS)
- ✓ Avalanches (IACS)
- ✓ Tsunamis / storm surges (IAPSO)

and plans to integrate Hydrometeorology, Natural Hazards/Extreme Events, Agriculture and food security, Disaster Risk Reduction were shared with participants at the meeting. Specific areas of cooperation in which ICSU-ROAP could take advantage of the IUGG initiatives on FUTURE EARTH, such as Energy, Climate and Disaster Mitigation were discussed during the Panel Discussion.

- During the panel discussion, the IUGG Liaison made an appeal before ICSU to recognize the relevant ongoing activities of the other Unions (IGBP, UPS, INQUA, IUBS, IGU, others) as FUTURE EARTH activities, with IUGG as the implementing Agency. He also brought out the urgent need to revisit data sharing protocols: past data vs. new data.

Other activities

At the sidelines of the 5th ICSU Regional Consultation for Asia and the Pacific titled “Future Earth in Asia and the Pacific” held at Seoul, discussions were initiated with ICSU-ROAP and other members /participants with regard to follow-up action on the ICSU-ROAP Science Plans on “Sustainable Energy” and “Hazards and Disasters”. The Science Plans were prepared during 2009-2010 by qualified ICSU-ROAP Science Teams. Both themes are intimately related to the activities of the IUGG. The Science Plans are excellent documents that not only highlight priority research areas focused on the needs of the Asia-Pacific region but also provide practical, region-specific road maps for reference and follow-up by governments of individual countries in the region.

Sukanta Roy, IUGG Liaison to ICSU-ROAP

13.6. ICSU Regional Office for Latin America and the Caribbean (Liaison J. U. Fucugauchi)

The Regional Office for Latin America and the Caribbean (ICSU ROLAC) was transferred from Rio de Janeiro, Brazil to Mexico City in January 2011. The Office has been operating for four years, based at the central headquarters of the Mexican Academy of Sciences (AMS) in Mexico City. A work plan for the short, medium and long term was developed, following the ICSU's global program and into line with the region's needs. The program has been directed to explore and develop strategic partnerships, regional scientific collaboration, and exchange in the region. The medium-term plan is advancing well, which includes the implementation and development of the tasks and activities. The long-term program is also achieving results.

In 2014, a number of activities related to the programs of the International Union of Geodesy and Geophysics (IUGG) and within the framework of the Future Earth Program have been carried out. Below we provide a summary.

Risks and Disasters

The following activities were organized:

- International Seminar on Forensic Investigations on Disasters FORIN 2014, Mexico City on February 24-25, 2014, with high-level experts and participation of young scientists in the region.
- Second meeting Steering Committee on Disaster Risk Reduction of ICSU ROLAC in Costa Rica on November 21, 2014. Meetings on risks have been conducted in collaboration with the ICSU Headquarters, IRDR and the United Nations International Strategy for Disaster Reduction (UNISDR).
- Second Workshop on Disasters and Risk Analysis, held in Guanacaste, Costa Rica on November 2014. The Workshop organized by the Mexican Physics Society had participation of researchers from various Latin American countries. The Workshop was held after the meeting of the Federation of Physics Societies from Latin America and before the ICSU ROLAC Steering Committee meeting.

Other activities:

- Participation of a young researcher at the IRDR Conference 2014 in Beijing, China in June 2014
- Participation of the Scientific Steering Committee and one of its members in the preparatory meetings for the World Conference on Disaster Risk Reduction to be held in Sendai, Japan was facilitated.

Sustainable Energy

The following activities were organized:

- ICSU ROLAC Steering Committee meeting on Sustainable Energy in Panama City on April 2014. ICSU ROLAC and IANAS are studying a Memorandum of Understanding between the two organizations; IANAS is the Inter-American Network of Academies of Science.

Another major energy organization in the region is OLADE, with which a Memorandum of Understanding is being discussed; OLADE is the Latin American organization for energy, working to contribute to the integration, sustainable development and energy security with a membership of 27 Countries. OLADE staff participated in energy integration workshops organized on this area and the follow-up workshop held in Mexico, April 2013.

Future Earth

On Future Earth, ICSU ROLAC has carried out various activities starting with a meeting in Mexico on 2012 under “Future Earth Regional Workshop for Latin America and the Caribbean” in coordination with the ICSU Headquarters.

- Workshop on Society and Nature: “Dialogue Between Natural and Social Scientists on the Challenges of Sustainability“ in Brazil, Rio de Janeiro, September 30 to October 2, 2014. The workshop was organized by ICSU ROLAC in coordination with the International Social Science Council (ISSC), the science academies of Mexico and Brazil, UNESCO and the Advisory Council of Mexico. The workshop had a wide participation of scientists and policy makers responsible for science policy from the Brazilian government, UNESCO, the Mexican Academy of Sciences, Brazilian Academy of Sciences and the Scientific Advisory Council of Mexico.

Jaime Urrutia Fucugauchi, IUGG Liaison to ICSU ROLAC

13.7. Scientific Committee on Antarctic Research (SCAR) (Liaison I. Allison)

Background

The Scientific Committee on Antarctic Research (SCAR) is an Interdisciplinary Body of the International Council for Science (ICSU). SCAR was formed in March 1958 as an outcome of the International Geophysical Year 1957-58 and following a recommendation from the ICSU Special Committee for the International Geophysical Year (CSAGI). The vision of SCAR is to establish through scientific research and international cooperation a broad understanding of the nature of Antarctica, the role of Antarctica in the Earth System, and the effects of global change on Antarctica. It initiates, promotes and co-ordinates scientific research across a wide area of disciplines in Antarctica and the Southern Ocean. SCAR also provides international, independent scientific advice to the Antarctic Treaty system and other bodies. Like other ICSU Interdisciplinary Bodies, SCAR is self-sufficient and independent in terms of day-to-day operations and financing, and has its own Secretariat based in Cambridge, UK.

SCAR has three categories of membership: Full Members (currently 31 nations), ICSU scientific Union Members (9 unions) and Associate Members (8 nations). Union members are those ICSU scientific unions that have an interest in Antarctic research, and include IUGG.

Relevance of SCAR science to IUGG

SCAR organizes the planning and coordination of Antarctic and Southern Ocean regional research through three discipline-based Standing Scientific Groups on Physical Sciences, Geosciences and Life Sciences. The work undertaken within the SSG Physical Sciences is of relevance to the IUGG Associations IAMAS, IAPSO, IACS, IAHS and IAGA; and that undertaken within the SSG Geosciences is of relevance to the IUGG Associations IAG, IASPEI and IAVCEI. High priority topical research areas are addressed by SCAR through its "flagship" scientific Research Programmes, of which there are currently six. The current SRPs of most relevance to IUGG interests are Antarctic Climate Change in the 21st Century (<http://www.scar.org/srp/antclim21>), Solid Earth Response and influence on Cryosphere Evolution (<http://www.scar.org/srp/serce>) and Past Antarctic Ice Sheet Dynamics (<http://www.scar.org/srp/pais>). The Standing Scientific Groups also initiate Action and Expert Groups to address specific research topics within their discipline.

Interactions between SCAR, IUGG and other scientific organizations

IUGG is a Union Member of SCAR and has regularly attended the biennial SCAR Delegates Meetings with voting rights. The Executive Committee of IUGG has appointed Dr. Ian Allison (past-President of IACS) as the current IUGG representative to SCAR.

In July 2008, the IUGG International Association of Cryospheric Science (IACS) signed a Letter of Agreement with SCAR and the International Arctic Science Council (IASC, an ICSU Scientific Associate). This letter recognizing that the three organization, each "affiliated" with ICSU, share common interests and practices, organisation, agreed to combine their efforts in selected fields and activities so as to raise the level of impact of all three organisation, in making scientific advances and of advising policy makers, as well as to avoid duplication. This agreement was renewed for a further 5 years in April 2013 "taking into account the development of last five years and the lessons learned from the International Polar Year 2007-2008."

SCAR is a co-sponsor of the World Climate Research Programme (WCRP) Climate and Cryosphere (CliC) project. CliC aims to "...understand and represent the role of the cryosphere in Earth's climate system and to assess and quantify the impacts that climate variability and change have on components of the cryosphere and its overall stability, and the consequences of these impacts for the climate system..." and thus has close links to the goals and objectives of IACS (and IAMAS and IAPSO).

SCAR also co-sponsors, with SCOR (the Scientific Committee on Oceanic Research) and IUGG/IAPSO, the Southern Ocean Observing System (SOOS). This is an international initiative

(evolving from the International Polar Year 2007-2008) with the mission to coordinate and expand the efforts of all nations and programmes that gather data from the Southern Ocean, with the specific aim of developing a coherent and efficient observing system that will deliver the multi-disciplinary observations required to address key scientific and societal challenges. A SOOS International Project Office has been hosted by Australia (with additional funding by Antarctic New Zealand) and an Science and Implementation Strategy has been published.

SCAR business meetings and planning activities

SCAR Delegates Meetings are held every two years to conduct administrative business and to formulate SCAR scientific policy and strategy. The XXXII biennial SCAR Delegates' Meetings was held in Portland, Oregon, USA from 23-25 July 2012. Ian Allison (then President of IACS) attended the 2012 meeting as the formal IUGG Delegate and as an IACS observer. During this meeting, the SCAR Physical Sciences SSG agreed to rejuvenate an Expert Group on Ice Sheet Mass Balance (ISMSS), with co-sponsorship from International Arctic Science Committee and the Climate and Cryosphere (CliC) project of WCRP.

In 2013 and 2014 SCAR undertook the "Antarctic and Southern Ocean Science Horizon Scan". This widely consultative process, culminating in a meeting of the world's leading Antarctic scientists, policy makers, leaders, and visionaries in Queenstown New Zealand in April 2014, identified the most important scientific questions that should be addressed by research in and from the southern Polar Regions over the next two decades. The overarching themes and 80 priority scientific questions identified by this process were published as a comment in *Nature* and as a more detailed paper in *Antarctic Science*.

The XXXIII SCAR Delegates Meeting was held in Auckland, New Zealand, 1-3 September 2014, again with Allison attending as IUGG Delegate. At this meeting, SCAR commenced planning of a strategic plan for 2017-2022 (a further 5-years beyond the present plan for 2012-2017).

SCAR Scientific meetings

The fifth SCAR Open Science Conference on "Antarctic Science and Policy Advice in a Changing World" was held in Portland preceding the XXXII Delegates' Meeting. The sixth Open Science Conference was held in Auckland, prior to the XXXIII Delegates Meeting on the theme "Global Messages from Antarctica". Both Open Science Conferences covered a broad and multi-disciplinary range of scientific sessions and each attracted about 1000 participants.

The 12th International Symposium on Antarctic Earth Sciences will be held in Goa, India, 13-17 July 2015.

Ian Allison, IUGG Liaison to SCAR

13.8. Scientific Committee on Oceanic Research (SCOR) (Liaisons A. Coustenis, E. Morozov)

The IUGG Council appointed two Liaisons to represent the oceanographic and meteorological communities at SCOR. Here is the part of the report from Dr. A. Coustenis, President of IAMAS and a SCOR Liaison.

IAMAS is a parent of the International Commission on Atmospheric Chemistry and Global Pollution (iCACGP). iCACGP supports atmospheric chemistry research that contributes to solving the basic societal issues of water supply, food production and human/ecosystem health. This is done through an enhanced understanding of the fundamental mechanisms that control atmospheric composition and development of improved predictive capabilities. Among others, iCACGP co-sponsors SOLAS (Surface Ocean Lower Atmosphere Study) together with IGBP, and the Scientific Committee on Oceanic Research (SCOR).

Athena Coustenis, IAMAS President, participated at the Executive Committee meeting of The Scientific Committee on Oceanic Research (SCOR) in *Wellington, New Zealand, 25-28 November 2013*. Athena Coustenis presented IAMAS and gave a report at that meeting on the association's activities. She participated in all the decisions and evaluations that the SCOR/EC had to make.

Athena Coustenis reported on a group "SCOR/InterRidge WG 135 on Hydrothermal energy transfer and its impact on the ocean carbon cycles" whose final activity will be a special session at the 2014 European Geosciences Union meeting and a final meeting of the group (this meeting was postponed from 2013). The group is preparing two publications, tentatively entitled "Coupled cycling of Fe and Corg in submarine hydrothermal plumes: Potential for impact on the global deep-ocean carbon cycle" and "Hydrothermal energy transfer and the ocean carbon cycling: How to assess vent ecosystem productivity?" Funding was approved for the group's 2014 meeting.

She thus actively contributed and participated in the selection of new SCOR Working Groups. SCOR had received eleven proposals for new working groups to consider already at the SCOR General Meeting. Based on the 2013 budget approved at the meeting, it was determined that two new groups could be funded. A. Coustenis, in consultation with the IAMAS Bureau, presented and discussed the evaluation of the proposals and was assigned in particular a couple of proposals for reviewing. IAMAS paid attention, among other, to exchanges between the ocean and the atmosphere, climate issues and formation of aerosols.

A. Coustenis reviewed in particular a proposal for a "SCOR Working Group on Surface Waves in Ocean Circulation and Climate System" and gave a summary of comments from national SCOR committees. The capacity building planned was thought to be good, but the proposal had not changed much from the previous year. This is an important topic, but there was a lot of disagreement that non-breaking waves are not taken into account. Some reviewers thought the proposal was premature. Several other drawbacks were noted. The majority of the community seems to be supporting broader initiatives. The membership should be more balanced in terms of gender. The products are not clearly described. It was suggested that the most appropriate approach to this topic would be to hold a symposium in 2015 at the IUGG General Assembly in Prague, where there will be a session on waves, or on some other occasion that would make it possible to expose the group's ideas to a broader portion of the community.

The final ranking and selection of the proposals was very much in agreement with the IAMAS suggestions.

Furthermore, A. Coustenis is the liaison of SCOR with *SOLAS* and she introduced Cliff Law, who made the presentation. The primary objective of *SOLAS* is "to achieve quantitative understanding of the key biogeochemical-physical interactions and feedbacks between the ocean and atmosphere, and how this coupled system affects and is affected by climate and environmental change." It does this by

- Providing a forum for international interaction

- Developing new research questions and implementation strategies by responding to and coordinating community initiatives
- Building capacity/training - the next generation of SOLAS scientists
- Promoting facility, standards, and data sharing

SOLAS has involved about 2,500 scientists from 75 different countries. SCOR provides a little over half of the activity funding for SOLAS, as of 2013. SOLAS held its sixth summer school in 2013, in a new location, at Xiamen University in China. The school used the same format and style of the five previous successful schools that were held at Cargese, Corsica, France. 69 students from 24 countries participated in the 2013 Summer School. Support for the school was obtained from numerous Chinese and international sponsors, including SCOR. Some former summer school participants are on the SOLAS SSC.

Several SOLAS-related workshops were held in 2013:

- “Towards an integrative regional coupling in the Eastern Boundary Upwelling Systems”, 26-28 November 2012, Lima, Peru
- “Marine gels effects on clouds”, 11-13 December 2012, Kiel, Germany
- ‘HitT – Climate impact of seasalt-derived Cl atoms’, 17-19 December 2012, Kiel, Germany

SOLAS has begun planning for its 2015 Open Science Conference, which will be held on 7-11 September 2015.

SOLAS is furthermore involved in several joint activities:

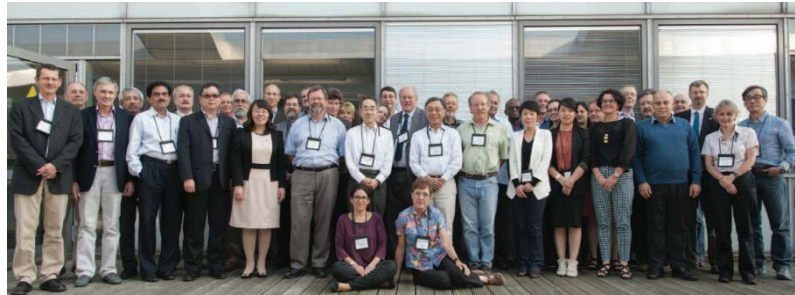
- SOLAS-IMBER Carbon (SIC) Group, in conjunction with IMBER and the International Ocean Carbon Coordination Group (IOCCP). This group has three subgroups, WG1 on Surface Ocean Systems, WG2 on Interior Ocean, and WG3 on Ocean Acidification. WG1’s main product in the past year has been SOCAT version 2, which was released in June 2013. This revised database includes about 10.1 million data points from 2,660 voyages. WG2 is continuing work on its global synthesis of repeat hydrography initiative. WG3’s major activity has been meetings on a global network for observation of ocean acidification.
- OceanFlux is a collaboration between the European Space Agency (ESA) and SOLAS, which is studying processes at the air-sea interface using satellite observations. Three projects were included: (1) Ocean-derived aerosols: production, evolution and impacts, (2) Air-sea flux of CO₂ and other long-lived radiatively active gases, and (3) Air-sea gas fluxes at eastern boundary upwelling and oxygen minimum zones. The projects were completed, but ESA is interested in continuing collaboration, though additional funding depends on its budget.
- SOLAS received EU COST funds for a project that developed global air-sea flux data sets of gases and aerosols. A book entitled Ocean-Atmosphere Interactions of Gases and Particles resulted from the activity. Law noted that three current SCOR working groups are of great interest to SOLAS: (1) WG 140 on Biogeochemical Exchange Processes at the Sea-Ice Interfaces (BEPSII), (2) WG 141 on Sea-Surface Microlayers, and (3) WG 142 on Quality Control Procedures for Oxygen and Other Biogeochemical Sensors on Floats and Gliders.

SOLAS has evolved significantly since the publication of the SOLAS Science Plan/Implementation Strategy in 2004. Since that time, SOLAS produced white papers, which formed the basis for the elements of the SOLAS Mid-Term Strategy (MTS). Significant progress has been made on several of the MTS elements in the past year. The work of the MTS element on “Sea-ice biogeochemistry and interactions with the atmosphere” is being carried out by SCOR WG 140 on Biogeochemical Exchange Processes at the Sea-Ice Interfaces (BEPSII). The MTS element on “Air-sea gas fluxes at Eastern Boundary upwelling systems” has been implemented through several meetings, national research cruises, moorings, and mesocosm experiments. The MTS element on “Atmospheric control of nutrient cycling and production in the surface ocean” has been implemented through a COST Action workshop, which has resulted in a paper being developed. The MTS element on “Ocean-derived aerosols: production, evolution and impacts” has advanced through several meetings, and upcoming research cruises will contribute new information. SCOR WG 141 on Sea-Surface Microlayers will also contribute to this part of the MTS. The next step in SOLAS evolution will be

development and approval of its plan for 10 additional years of the project. SCOR will be requested to continue as a sponsor and Future Earth as a new sponsor, in addition to WCRP and iCACGP.

SOLAS made requests for support of developing country scientists to participate in 3 different activities. This support was recommended by the SCOR Committee on Capacity Building and approved by meeting participants. Dr Urban mentioned that SCOR approved \$10,000 for SOLAS capacity building and that this should be added to the table of funding presented.

SCOR held its XXXII General Meeting in Germany, at the Center for Marine Environmental Studies (MARUM) at the *University of Bremen, 15-17 September 2014*. Representatives of national SCOR committees reviewed all SCOR activities, approved new working groups, and were briefed on activities of partner organizations. The meeting was preceded by a meeting of the SCOR Committee on Capacity Building and followed by a day of presentations about ocean science in Germany and a tour of the MARUM laboratories.



Participants of the SCOR General Meeting in Bremen, 15-17 Sep 2014

At this meeting it was announced that John Turner was going to replace Athena Coustenis as the ex-officio member from the International Association of Meteorology and Atmospheric Sciences (IAMAS). He is a research scientist at the British Antarctic Survey in Cambridge, UK where he leads a project investigating the climate of the Antarctic. Since 1986, Dr. Turner has investigated high-latitude precipitation, polar lows, teleconnections between the Antarctic and lower latitudes and weather forecasting in the Antarctic.



John Turner

A. Coustenis reported on “SCOR/InterRidge WG 135 on Hydrothermal energy transfer and its impact on the ocean carbon cycles” which held its final meeting in conjunction with the 2014 European Geosciences Union meeting. It convened a special session at the meeting and used the meeting there to complete work on an article that was submitted to the journal.

Science. The group had planned to produce two papers describing new models of the influence of hydrothermal systems on the global carbon cycle, but decided that not enough field data were available to construct the second model.

Action: Consider disbanding after final article completed

After review of the 8 new proposals that were received for new working groups, three were selected:

- WG 145 on Chemical Speciation Modelling in Seawater to Meet 21st Century Needs (MARCHEMSPEC)
- WG 146 on Radioactivity in the Ocean, 5 decades later (RiO5)
- WG 147: Towards comparability of global oceanic nutrient data (COMPONUT)

A discussion on SOLAS was initiated by Brevière and Coustenis. SOLAS is nearing the end of its first 10 years as a research project and is currently drafting a request for a 10-year extension to the project. SOLAS has held several workshops to gather input for its extension request, including a workshop for young scientists. The Executive Committee will report on its review of a draft of the extension request. SOLAS has requested sponsorship from the Future Earth initiative.

Action: Report out on SCOR Executive Committee response to draft extension request.

For additional information about SCOR activities, see the SCOR Web site: <http://www.scor-int.org>.

Athena Coustenis, IUGG Liaison for SCOR

13.9. Committee on Solar-Terrestrial Physics (SCOSTEP) (Liaison V. Kuznetsov)

As the IUGG representative to SCOSTEP, I attended all SCOSTEP Bureau Meetings in the period 2011-2014:

July 2, 2011, Melbourne, Australia
October 9-10, 2011 Greenbelt, USA
April 22, 2012, Vienna, Austria
May 6, 2013 Bern, Switzerland
November 18, 2013, Nagoya, Japan
March 20, 2014, Prague, Czech Republic
October 12, 2014 Xi'an, China

and took part in the discussions concerning the SCOSTEP current activity, realization of the CAWSES-II Program (Climate And Weather of the Sun-Earth System), and development of a new SCOSTEP research program for the period 2014-2018, i.e., VarSITI (Variability of the Sun and Its Terrestrial Impact). This program covers a wide range of topics that fall within the scope of interests of IAGA. Two sections of the program were developed with my participation, namely, SEE (Solar Evolution and Extrema) and ISEST (International Study of Earth-Affecting Solar transients) aimed at the study of the impact of solar transient and extreme phenomena on the Earth and geomagnetic field. These problems relate to the field of research of two IAGA Divisions - Division IV (Solar Wind and Interplanetary Field) and Division III (Magnetospheric Phenomena). The section of the Program entitled ROSMIC (Role of the Sun and the Middle atmosphere/thermosphere/ionosphere in Climate) is also closely related to IAGA, in particular, Division II (Aeronomic Phenomena). The section entitled SpeCIMEN (Specification and Prediction of the Coupled Inner-Magnetospheric Environment) will deal with the response of the inner magnetosphere to variations in the solar wind, which is a topic covered by the IAGA Division III (Magnetospheric Phenomena). Thus, the interests of IAGA as a whole and its particular Divisions (I, II, and III) are widely represented in the new SCOSTEP Program developed for the period 2014-2018.

I carried out some errands as a member of the SCOSTEP Bureau. In particular, I was Chairman of the Counting Board during the elections of the new President of SCOSTEP in 2011 and a Chairman of the Award Committee (2012-2014), which developed the Statute of three SCOSTEP awards (SCOSTEP Science Award, Young Scientist Award, SCOSTEP Service Award). These awards were first given in 2014 (http://www.yorku.ca/scostep/?page_id=1356). I took part in designing a new logotype for SCOSTEP, which was selected on a competitive basis and currently is an active SCOSTEP logo (see <http://www.yorku.ca/scostep/>). In 2014, I also analyzed the list of Science Discipline Representatives (SDR) from the SCOSTEP member countries. As a result, previously missing representatives of France, Greece, Slovakia, South Africa, Hungary, and Israel were added to the SDR list (http://www.yorku.ca/scostep/?page_id=465).

Besides being the IAGA representative to SCOSTEP, I was also working in the interests of IAGA as the Chairman of the Section on Geomagnetism and Aeronomy of the Russian National Geophysical Committee. In particular, annual reports on activities in the field of geomagnetism and aeronomy in Russia were submitted to IAGA. A number of scientific conferences were carried out with my participation as a member of the Program Committees and as Advisory board member:

- First Scientific Conference on "Databases, tools, and information support of polar geophysical studies". 24-26 May 2011, IZMIRAN, Moscow Troitsk, <http://agora.guru.ru/polar2011>
- International Workshop "Artificial Intelligence in the Earth's Magnetic Field Study. INTERMAGNET Russian Segment." 26-28 January 2011, Russian Federation, Yaroslavl region, Uglich, http://uglich2011.gcras.ru/index_e.html
- Second Scientific Conference on "Databases, tools, and information support of polar geophysical studies", 22-26 May 2012, IZMIRAN, Moscow Troitsk, <http://www.izmiran.ru/POLAR2012/>

- “Geophysical observatories, multifunctional GIS and data mining”, 30 September – 2 October, 2013, Kaluga, Russia, [http://www.kaluga2013.gcras.ru/doc/english version of circular.pdf](http://www.kaluga2013.gcras.ru/doc/english%20version%20of%20circular.pdf)
- International Science and Application Conference – Polar 2013 - “Polar Geophysics of Yamal: Observations, instruments, data bases and information systems related to the Oil and Gas industry”. Russia, Nadym, October 21-25, 2013, <http://www.izmiran.ru/POLAR2012/>
- International CAWSES-II Symposium, November 18-22,2013, Nagoya Japan, <http://www.stelab.nagoya-u.ac.jp/cawses2013/soc.html>
- International Science and Application Conference – Polar 2014 - “Polar Geophysics of Yamal: Observations, instruments, data bases and information systems related to the Oil and Gas industry”. Russia, Salekhard, April 13-17, 2014, <http://www.wdcb.ru/polar/index.html>
- SCOSTEP’s 13th Quadrennial Solar-Terrestrial Physics Symposium (STP13). October 12 – 18, 2014, Xi’An, Shanxi, China, <http://stp13.csp.escience.cn/dct/page/1>

As the Editor in Chief of the Russian Journal on Geomagnetism and Aeronomy (since December 2013), I have been working in 2014 on increasing the publishing activity and rating of the journal, which meets the interests of IAGA.

As a member of the Expert Group "C" (Space Weather) of the Working Group on Long-Term Sustainability of Outer Space Activities of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space of United Nations Organization, I wrote the Section of the report of the Expert Group, which emphasized the importance of IAGA investigations in performing the tasks of the Working Group. During 2012-2014, I participated in the work of the above-mentioned Expert Group representing the IAGA topical interests (the meetings were held twice a year – in February and June - in Vienna, Austria, UN Headquarters).

Vladimir Kuznetsov, IUGG Liaison to SCOSTEP

13.10. ICSU-ISSC-UNISDR Scientific Committee on Integrated Research on Disaster Risk (IRDR) (Liaison K. Takeuchi)

1. Basic information on the activities of IRDR

IRDR was established by ICSU co-sponsored by ISSC and UNISDR in 2008 with a science question “*Why, despite advances in the natural and social science of hazards and disasters, do losses continue to increase?*” Its IPO is in Beijing where the Executive Director was Jane Robins (US) till the end of 2013 and Rudiger Kline (Germany) took over the office since the mid-2014. Science Committee is the strategy and decision making body where Gordon McBean (Canada) served as the chair till the end of 2010, succeeded by Salvano Briceno (Venezuela) till the end of 2012 and from 2013 David Johnston (New Zealand) has been serving as the chair. The background discipline of McBean’s was meteorology, Briceno’s political science and Johnstone’s volcanology and psychology which symbolizes the integrated approach of IRDR.

IRDR’s main activities are Science Committee meetings (twice a year, one in China and One in Paris), Projects, National and Regional Committees, International Centers of Excellence (ICoEs) and IRDR Conferences. To follow are brief reports of them.

IRDR Projects:

The first project introduced was Forensic study of disasters (FORIN) which advocated the methodology of analyzing disasters by root cause analyses, meta analyses, longitudinal analyses and scenario analyses. There were quite a few FORIN workshops were held in the world and the concepts are fairly well accepted in many countries including China where they established national FORIN projects. The IUGG GeoRisk Commission also jointly worked with FORIN group as mentioned below.

The other three projects that eventually started are Disaster loss data (DATA), Risk identification and action (RIA) and Assessment of IRDR (AIRDR). Main Publications of IRDR on FORIN, DATA and AIRDR are:

- Forensic Investigations of Disasters: The FORIN Project (2011)
- IRDR Peril Classification and Hazard Glossary (2014)
- Guide to Assessing the Integrated Research on Disaster Risk (November 2014)

IRDR National and Regional Committees:

The number of National Committees is increasing. Starting from Japanese and Chinese, now there are in Australia, Canada, China, Colombia, France, Germany, Japan, New Zealand and USA. Other nations such as UK are under preparation. There is one Regional Committee was formed in Latin America and Caribbean region.

IRDR International Centers of Excellence (ICoEs).

It was originally ICoE-Taipei only which is working very active holding Advanced Institutes jointly with START program and hosting IRDR projects such as FORIN, DATA etc. Since 2013, other centers started established focusing on particular subjects. Currently, there are four other ICoEs, namely, ICoE of Vulnerability and Resilience Metrics (VaRM), University of South Carolina, USA, ICoE of Community Resilience (CR), Massey University, New Zealand, ICoE of Understanding Risk & Safety (UR&S) National University of Colombia, and ICoE of Risk Education and Learning (REaL), Periperi U, South Africa.

IRDR Conferences

Two major conferences IRDR Conferences were held in 2011 and 2014. They are the most important public fora to demonstrate an integrated approach over the globe.

On 31 October to 2 November 2011, the IRDR Conference 2011 “Disaster Risk: Integrating Science and Practice” was held in Beijing. Over 300 experts, political figures, and other stakeholders gathered from some 40 countries and regions.

On 7-9 June 2014, the 2nd IRDR Conference “Integrated Disaster Risk Science: A Tool for Sustainability” was held in Beijing. Over 300 participants from 54 countries were present and 6 plenaries and 20 parallel sessions were held. Keynotes included on Haiyan, GEJET and post-2015 framework for DRR.

2. Attendance of the business meetings of IRDR

As myself being a member of IRDR Science Committee, I attended all the Science Committees held twice a year in Paris and China except one in June 2013 due to an unavoidable domestic responsibility. I attended two IRDR Conferences in 2011 and 2014 described above and presented papers and chaired sessions.

3. Joint activities with IUGG

As myself being both the member of IRDR Science Committee and the chair of IUGG Commission on Geophysical Risk and Sustainability (GeoRisk), I had fully involved in the IRDR discussions, express the stand of IUGG and propose joint activities. Besides, our SG Alik Ismail-Zadeh and IRDR SG Jane Rovins and later Rudiger Klein had kept close communication each other. These resulted not quite enough but rather close collaboration between IUGG and IRDR.

One good example was the FORIN session jointly organized by IUGG GeoRisk Commission and IRDR FORIN project held at the 1st GeoRisk Conference on "Extreme Natural Hazards and Their Impacts" on December 8-11, 2012 at Chapman University, Orange, California, USA. This was a full one day session attended by about 30 geophysicists, geographers, anthropologists and social scientists and had an active dialogue on root causes of various catastrophic disasters triggered by natural hazards.

The other may be an attempt of improving science input to policy making on disaster risk reduction. ICSU initiated an Ad-Hoc Expert Group on disaster risk assessment and invited a number of IUGG and IRDR members and held a meeting in Paris on 2 May 2014. The Group is now jointly drafting a synthesis paper “Disaster Risks Research and Assessment to Promote Risk Reduction and Management” led by Alik Ismail-Zadeh.

4. Contacts with the officers and members of IRDR in order to promote IUGG activities

IUGG or geophysics oriented persons are quite a few in Science Committee. They would serve as contacts to promote IUGG activities. The current geophysics related SC members are:

- Irasema ALCÁNTARA-AYALA - Vice-Chair, Mexico, landslides
- Djillali BENOVAR, Algeria, Seismology, (term ends in June 2015)
- Omar DÁRIO CARDONA, Colombia, EQ engineer, (term ends in June 2015)
- S.H.M FAKHRUDDIN, WMO (form Bangladesh), Hydrology
- David JOHNSTON - Chair, New Zealand, Earth sciences, (term ends in June 2015)
- Kuniyoshi TAKEUCHI - Vice Chair, Japan, civil engineer, (term ends in June 2015)
- Sisi ZLATANOVA, Netherland, Geo-information
- Besides, the former members include:
- Gordon McBEAN - former SC chair, current ICRU Presidnet
- Steven SPARKS, U Bristol, UK, volcanologist
- Maria PATEK, Austria, avalanches
- Michel LANG, CEMAGREF, France, hydrology

5. Some interventions made into IRDR activities

In the 10th Science Committee held in Paris in November 2013, IUGG Secretary General Alik Ismail-Zadeh raised a question on the need of IRDR flagship project that combines all the IRDR efforts and

demonstrates their use to outer world under a single banner. Along this line Kuniyoshi Takeuchi proposed a task team to look into possibility of a project, based on a proposal presented by Tony Liu of ICoE-Taipei, to bring all the research outcomes of IRDR and other science initiatives to real cities and jointly implement science based DRR actions with practitioners. The task team was formed and presented a report "Draft Proposal IRDR Flagship: Disaster Risk and Loss Reduction – Integrating Research, Policy and Practice" at the 11th Science Committee in Paris in June 2014. The pilot project is under planning now centered in ICoE-Taipei close collaboration with IRDR-Japan.

6. Nomination opportunities of IUGG scientists for IRDR Science Committee

The nomination of Science Committee members is through SC members. Every time of membership renewal, I nominated quite a few IUGG related persons but not successful. By next June, five SC members including myself will be replaced. The nomination is very important but needs to note that balance in gender, geographical distribution and discipline is prerequisite.

7. Other activities as an IUGG Liaison Officer

As a member of IRDR-Japan, contributed for preparation of "Tokyo Conference on International Study for Disaster Risk Reduction and Resilience" organized by Science Council of Japan, IRDR, UNISDR and U Tokyo held on 14-16 January 2015. I got involved in the preparation process of Tokyo Statement which is the outcome of Tokyo Conference to be brought in to the 3rd WCDRR in Sendai. The idea of the ICSU Ad-Hoc Expert Group on disaster risk assessment was reflected in the Statement.

Kuniyoshi Takeuchi, IUGG Liaison to IRDR

Adoption of the Reports / Adoption des rapports

14. Reports from liaisons to inter-governmental and other organizations / Rapports des officiers de liaison avec des organisations intergouvernementales et autres organismes (A. Ismail-Zadeh)

14.1. Cartographic Office of the United Nations (Liaison L. P. S. Fortes)

During the report period 2011-2014, the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) was established by the UN Economic and Social Council (ECOSOC) resolution 2011/24, of July 27, 2011. UN-GGIM aims at playing a leading role in setting the agenda for the development of global geospatial information and to promote its use to address key global challenges. It provides a forum to liaise and coordinate among Member States, and between Member States and international organizations.

Since the establishment of UN-GGIM, the author of this report had the opportunity of participating with presentations and reports in many of its meetings, based on his role as President of the Permanent Committee for Geospatial Data Infrastructure of the Americas (PC-IDEA) during 2009-2013 and as the IUGG liaison to the United Nations Cartographic Office. The following sections describe those activities along with important accomplishments, related to IUGG, achieved in the context of UN-GGIM. Additional information can be found at <http://ggim.un.org>.

“First High Level Forum on United Nations Global Geospatial Information Management” and on the “First Session of the United Nations Committee of Experts on Global Geospatial Information Management”, Seoul, Republic of Korea, October 24-26, 2011

The “First High Level Forum on Global Geospatial Information Management (1st HLF UN-GGIM)” was co-organized by the Korean National Geographic Information Institute (NGII Korea) and the UN Department of Economic and Social Affairs (UN-DESA), supported by the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP), the Permanent Committee for Geospatial Data Infrastructure of the Americas (PC-IDEA) and the Committee on Development Information, Science and Technology (CODIST) for Africa. 350 participants from 90 countries, 22 United Nations representatives, and 37 representatives from international organizations and the private sector attended this meeting. Among the issues discussed during this Forum, the one related to the adoption of a global geodetic reference system by countries in the world was of special interest to IUGG.

At the same occasion, UNCE-GGIM convened its inaugural session on October 26, 2011. The inaugural meeting brought together experts from Member States and observers from international organizations to adopt the Terms of Reference of the Committee, review its Rules of Procedure, and discuss its contribution to Rio+20 Conference as well as an inventory of critical issues to be addressed by the Committee.

Rio+20 United Nations Conference on Sustainable Development, Rio de Janeiro, Brazil, June 20-22, 2012

The Rio+20 side event “Monitoring Sustainable Development – Why Location matters” was organized by the UN-GGIM secretariat and supported by the United Kingdom, Australia, and Brazil, taking place on June 20, 2012.

This event demonstrated the vital role accurate, maintained and reliable geospatial information is playing in helping to deliver sustainable development across the globe and in providing financial benefits to users. With presentations based on real-country experiences, it illustrated why Member States should develop and leverage accurate and maintained geospatial information in order to deliver successfully on the outcomes of Rio+20 and to monitor the implementation of such outcomes effectively. The main target audience was senior government officials with decision responsibility on monitoring systems for sustainable development. It must be emphasized that the Rio+20 final document refers to the importance of reliable geospatial information for Disaster risk reduction in

paragraph 187, and recognizes the importance of space-technology-based data, in situ monitoring and reliable geospatial information for sustainable development policymaking, programming and project operations, in paragraph 274 (“Technology” Section).

10th United Nations Regional Cartographic Conference for the Americas (UNRCC-A), New York, USA, August 19-23, 2013

The United Nations Regional Cartographic Conference for the Americas (UNRCC-A) provides a regional forum where government officials, planners, scientists and experts from the Americas and other regions meet to address their common needs, problems and experiences in the field of surveying and mapping, cartography, hydrography, remote sensing, land and geospatial information systems. The 10th Conference was held at the UN headquarters under the theme “UN-GGIM and the Americas, addressing global challenges through geospatial information”. It was attended by 94 participants, comprising 80 representatives from 29 states, 11 participants from international organizations and the private sector, and the representatives of three United Nations entities. As Past President of the 9th UNRCC-A, held in 2009, Dr. Fortes had the honor of opening the conference. He also presented a report on PC-IDEA activities for 2009-2013, corresponding to his mandate as President of this committee.

To accomplish its objectives, the Conference established three technical committees to discuss the following issues: UN-GGIM and the Americas: Strategic, Policy, Economic and Institutional Issues (Committee I); Spatially Enabling Government Through Geospatial Data Collection, Management and Dissemination (Committee II); and Best Practices and Applications Including Climate Change and Disaster Risk Management (Committee III). Dr. Fortes had the privilege of chairing Committee II. In total, eight resolutions were adopted in the plenary meeting held in the last day of the Conference. At the occasion, Dr. Fortes was awarded a “Certificate of Appreciation for Exemplary Leadership in Advancing Geospatial Information Management in the Americas”, awarded by the United Nations Statistics Division (UNSD).

Other UN-GGIM-related meetings held during 2011-2014

During this time period, UN-GGIM has been very active in organizing and supporting several meetings, in addition to those described in the previous sections of this report. Among them, the following can be mentioned:

- Hangzhou Forum on United Nations Global Geospatial Information Management, Hangzhou, China, 24 - 25 May 2012;
- Second Session of the United Nations Committee of Experts on Global Geospatial Information Management, New York, 13 - 15 August 2012;
- Second High Level Forum on Global Geospatial Information Management, Doha, Qatar, 4 - 6 February 2013;
- Third Session of the United Nations Committee of Experts on Global Geospatial Information Management, Cambridge, United Kingdom, 24 - 26 July 2013;
- Chengdu Forum on United Nations Global Geospatial Information Management, 15 - 17 October 2013, Chengdu, China;
- Fourth Session of United Nations Committee of Experts on Global Geospatial Information Management, 6 - 8 August 2014, New York.

In order to deal with this intense activity, the Committee of Experts has created four working groups and the Expert Group listed below. These groups focus on progressing the work items and following up on decisions adopted at the annual sessions:

- United Nations Expert Group on the Integration of Statistical and Geospatial Information;
- Working Group on Global Geodetic Reference Frame;
- Working Group on Development of a Statement of Shared Principles for the Management of Geospatial Information;
- Working Group on Global Map for Sustainable Development;
- Working Group on Trends in National Institutional Arrangements in Geospatial Information Management.

The Working Group on Global Geodetic Reference Frame is of special interest to IUGG, as it has been discussing and drafting a resolution on a “Global Geodetic Reference Frame for Sustainable Development” to be submitted to the next United Nations General Assembly, in February 2015, in New York. It should be noted that the International Association of Geodesy has been actively involved in this working group. More information can be found at http://ggim.un.org/UN_GGIM_wg1.html.

Luiz Paulo Souto Fortes, IUGG Liaison to the UN Cartographic Office

14.2. International Civil Aviation Organization (ICAO) (Liaisons W. I. Rose, M. Guffanti)

During the period 2011-2014, IUGG had significant involvement in the issue of volcanic-ash hazards to aviation, notably by participation in the International Volcanic Ash Task Force (IVATF). The IVATF was established by the International Civil Aviation Organization (ICAO) in response to severe disruptions to air travel during the eruption of Iceland's Eyjafjallajökull volcano in 2010. The IVATF brought industry representatives, civil aviation authorities, and scientists together from around the world to examine how best to define hazardous airspace and manage aviation risk globally. The IVATF held four meetings in Montreal, Canada, finishing its work in June 2012; its results and recommendations are documented at <http://www.icao.int/safety/meteorology/ivatf/Pages/default.aspx>. IUGG participation in the IVATF was through four liaisons: the IAVCEI representative to ICAO's International Airways Volcano Watch Operations Group (IAVWOPSG), a representative of the World Organization of Volcano Observatories (an IAVCEI Commission), and the co-chairs of the World Meteorological Organization-IUGG Volcanic Ash Scientific Advisory Group (VASAG).

From the start, the IVATF recognized the need for scientific guidance on best methods to detect and forecast ash clouds, and various tasks covering the science of ash hazards were assigned to a Science Subgroup that was managed by the IAVCEI representative to the IAVWOPSG. The main source of scientific guidance to the Science Subgroup was the VASAG, established in May 2010 by the WMO and IUGG in their support of on-going ICAO work on the topic. The IVATF also benefited from the work of many other scientists around the world who adjusted their research to focus more directly on ash-cloud characterization, detection, and forecasting.

Substantial recent scientific progress was tapped by the IVATF, notably in: airborne in-situ sampling of volcanic clouds; use of lidar (ground-based, airborne, space-based) to detect and characterize volcanic clouds; quantitative retrieval of ash-cloud microphysical properties from satellite data; development of inversion methods that use satellite data to improve dispersion model forecasts. A specific science-based recommendation of the IVATF was that ash concentration charts—such as were introduced in Europe in 2010—should not be used as an official ICAO advisory product at this time because *the charts do not delineate hazardous airspace with the level of confidence needed for operational decisions* (nor is there a global user requirement for those charts).

Unfinished science (and operational) tasks of the IVATF were handed off to the IAVWOPSG. IUGG was represented at the IAVWOPSG meetings held during 2011-2014 in Dakar (September 2011), Bangkok (March 2013), and Melbourne (February 2014). Reports of the meetings are available at <http://www.icao.int/safety/meteorology/iavwopsg/Pages/default.aspx/>. Going forward, IAVWOPSG tasks will be within the purview of ICAO's newly established (in 2014) MET Panel. IUGG involvement in the issue of ash hazards to aviation will continue in that context.

Marianne Guffanti, IUGG Liaison to the ICAO

14.3. Pan-American Institute of Geography and History (PAIGH) /
Institut panaméricain de géographie et de l'histoire (IPGH)
(Liaison H. Drewes)

The *Pan American Institute for Geography and History (PAIGH)* is a specialized organization of the *Organization of American States (OAS)* with 21 member states. The main objectives are

- 1) To encourage, coordinate, and publicise cartographical, geophysical, geographical and historical studies, as well as other related scientific studies of interest to the Americas;
- 2) To promote and carry out studies, work and training in the mentioned fields of activity;
- 3) To promote cooperation among organizations interested in these fields of activity in the Americas, and with related international organizations.

To fulfil these objectives it is structured in four *Commissions*:

- Cartography Commission - established in April 1941, currently presided by Uruguay;
- Geography Commission - established in August 1946, currently presided by USA;
- History Commission - established in August 1946, currently presided by Mexico;
- Geophysics Commission - established in June 1969, currently presided by Costa Rica.

The cooperation of the International Union of Geodesy and Geophysics (IUGG) with the PAIGH concentrates on the Cartography Commission and the Geophysics Commission.

In the *Cartography Commission* emphasis is placed on the “2013-2015 Joint Action Plan to Expedite the Development of the SDI of the Americas” which specifies three focal points:

- Geocentric Reference System for the Americas (SIRGAS, jointly with IAG, see below);
- Permanent Committee on Spatial Data Infrastructure (SDI) for the Americas (PC-IDEA, within the UN Regional Cartographic Conferences for the Americas, UNRCC/A);
- Regional initiative of spatial data producers in Latin America and the Caribbean (GeoSUR).

IUGG is involved in this action plan in particular by the activities within the *Geocentric Reference System for the Americas (Sistema de Referencia Geocéntrica para las Américas, SIRGAS)*, which is identical with Sub-commission 1.3b of the International Association of Geodesy (IAG). The objective is to define and to realise a unique reference frame of well-marked observation stations with three-dimensional, time-dependent coordinates for all the Americas which serves for ordnance survey, cadastre, geo-information, precise navigation, geodynamic studies etc. This means especially the weekly processing of all the satellite observation data (at present from more than 300 stations) including the modelling of the troposphere, ionosphere, and crustal deformation. The results are presented and discussed at the SIRGAS annual symposia, the following being held during the period 2011 – 2014:



Advertisement of the SIRGAS Symposium in a main street of La Paz, Bolivia, 2014

- Heredia, Costa Rica, 8 – 10 August, 2011 (144 attendees);
- Concepción, Chile, 29 – 31 October, 2012 (135 attendees);
- Panama City, Panama, 24 – 26 October, 2013 (184 attendees);
- La Paz, Bolivia, 24 – 26 November, 2014 (260 attendees).

In connection with these Symposia, there were Schools and Workshops held for advanced professional and scientific training, and capacity building:

- 2011: Geodetic Reference Systems (116 students);
- 2012: Networked Transport of RTCM via Internet Protocol (NTRIP, 50 students);
- 2013: Reference Systems, Crustal Deformation and Ionosphere Monitoring (145 students);
- 2014: Computational Workshop on Vertical Reference Systems (34 students).

The principal achievements of SIRGAS in 2011 – 2014 may be summarized as follows:

- Most of the countries of North, Central and South America have adopted SIRGAS as the basis of their national reference systems in compatibility with the International Terrestrial Reference Frame (ITRF) and are permanently increasing the number of stations.
- More and more analysis centres with high level scientific processing capability are established in Latin American countries (presently in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Uruguay, and Venezuela).
- The unification of height systems, which were nationally defined and based on local tide gauges with different sea levels in the past, is proceeding by exchanging existing levelling and gravity data, and by connecting the national levelling networks with GPS stations.
- Additional products are, e.g., regularly computed models of the ionosphere (total electron content) and troposphere (water vapour), real-time positioning using Networked Transport of RTCM via Internet Protocol (NTRIP), and post-seismic crustal deformation models.



Participants of the SIRGAS Symposium, La Paz, Bolivia, 2014



Impression of the SIRGAS School on Vertical Reference Systems, La Paz, Bolivia, 2014

IAG is supporting these activities through various cooperating institutions by

- giving scientific advice, in particular in dedicated meetings and by e-mail exchange;

- installing and operating GNSS observation stations in the Latin American countries;
- providing software packages for data processing, and train the operators;
- operating data archiving, data analysis, and output combination centres;
- offering training courses and individual assistance for capacity building, and
- giving lectures at SIRGAS and national schools and workshops.

The principal objectives of the Geophysics Commission concentrate on the following policy:

- Establish lively and rapid communication between the directive of the Geophysics Commission and the community of the area.
- Promote the lively exchange between institutions of PAIGH Member States in order to study and resolve problems in their interests.
- Continue with a great emphasis on the politics of formation of human resources and the obtainment of resources necessary for postgraduate level study.
- Contact agencies and centers of superior study for the obtainment of Masters- and Doctorate-level grants in the different disciplines of Geophysics and establish respective bilateral agreements.
- Propose that the Commission, by means of their Committees, assumes responsibility to update the directory of professionals that work in corresponding disciplines in Member States.
- Continue the publication of the Geophysics Journal and encourage its distribution in digital form.
- Examine the effectiveness of the Geophysics Journal through an analysis of publication standards, including its distribution, in order to explore possible formatting modifications and innovations to obtain a higher popularity and growth in scientific level.
- Incite the publication of the results of projects financed by the Commission in scientific journals.
- Promote the development of interdisciplinary multinational projects between the distinct Commissions of PAIGH.

The main projects 2011-2013 of international interest may be summarised by the following:

- Adaptation of Argentine experience to detect seismic spectra in the northern centre of Quito.
- Study of magnetic volcanism of the Caldera de Ilopango, El Salvador.
- Preliminary study on ethnophysiological differences and perspective maps of volcanic risk of the townships around the Santa Ana volcano, El Salvador.
- GPS-network in Mexico in support of the North American monsoon.
- Application of textural remote analysis techniques in inaccessible pyroclastic deposits of Mt. St. Helens, USA.
- Workshops and seminars on geomagnetism and climate change (hurricanes, tsunamis).

Hermann Drewes, IUGG Liaison to PAIGH

14.4. UNESCO International Hydrological Programme (IHP) (Liaison C. Cudennec)

I have been nominated IUGG liaison officer to UNESCO IHP on 20 November 2012, replacing Pierre Hubert, on his own suggestion. My IUGG liaison is very linked to the relationships I have with UNESCO IHP as the Secretary General of IAHS since July 2011. For the sake of information, I am here including some activities dating back to before November 2012.

The context within UNESCO has changed extensively.

- A severe financial crisis emerged in the winter 2011-2012 for geopolitical reasons, which is limiting the UNESCO's activities.
- The new Director of the water division at UNESCO, secretary of the IHP, B. Jimenez, took her duty in October 2012 after an interim period.

Further, 2013 is the UN International Year of Water Cooperation, UNESCO being the agency in charge of its implementation.

I have attended several UNESCO IHP meetings and have had several bilateral activities:

- Interaction with the interim and then the full Director of the water division concerning the 2012, 2013, 2014, 2015 IAHS-UNESCO-WMO International Hydrology Prize procedure.
- Preparation of the 2012 IAHS-UNESCO Kovacs colloquium (fully planned to be held at UNESCO headquarters, Paris, spring 2012, but canceled for financial reasons – See IAHS Newsletter 101) in cooperation with UNESCO partners S. Demuth and S. Khan, and J. Pomeroy (IAHS) on synergies between FRIEND, HELP and PUB programmes.
- UNESCO IHP Bureau meeting, Paris, France, 1 June 2012.
- UNESCO IHP Intergovernmental Council, Paris, France, 3-7 June 2012.
- MedFRIEND International conference on 'Sediment transport modeling in hydrological watersheds and rivers', Istanbul, Turkey, 14-17 November 2012 – Member of the scientific committee.
- Organisation of two IAHS bureau meetings on 22 and 26 October in the facilities of the UNESCO IHE (Institute for Water Education – UNESCO Category 1 center) in Delft, around the IAHS 90th Anniversary conference held at TU Delft, The Netherlands, 23-25 October 2012.
- Meeting at UNESCO with the new Director of the water division, B. Jimenez, S. Demuth and G. Young (IAHS President), Paris, France, 6 February 2013.
- Kick off meeting of the International Year of Water Cooperation, UNESCO, Paris, France, 11 February 2013.
- Unsuccessful fundraising to support hydrologists from developing countries to attend the IAHS-IAPSO-IASPEI scientific assembly held in Gothenburg, Sweden, July 2013.
- Interaction for the organization of the World FRIEND Conference held in Montpellier, France Fall 2014 (initially planned in Viet Nam).
- Co-organization of the 2014 IAHS-UNESCO Kovacs colloquium to be held at UNESCO headquarters, Paris, France, June 2014 in conjunction with the IHP Intergovernmental Council meeting – on Water Security and co-edition of the post published (2015) Red Book volume.
- IHP Intergovernmental Council meeting, Paris, France, June 2014.
- Co-convening of Freshwater sessions at the Future Climate conference in Paris, France, July 2015 (before the UNFCCC COP 21 Paris meeting in December 2015).
- Co-writing chapters for the World Water Development Reports.

I also have had many side and informal meetings with the Chair of the IHP, the Director of the water division and the officers of the UNESCO secretariat at other meetings:

- WMO, CHy Advisory working group meeting, Geneva, Switzerland, 11-17 December 2011;
- UN Water SPM meeting, Stockholm, Sweden, 24-25 August 2012;
- WMO, Commission for Hydrology CHy, Geneva, Switzerland, 7-10 November 2012;
- WMO, CHy Advisory working group meeting, Geneva, Switzerland, 26-28 February 2013;
- Global Runoff Data Center (WMO) steering committee, Koblenz, Germany, 9-12 June 2013;
- Capacity development expert meeting of the UN-Water Decade Programme on Capacity Development, United Nations University, Bonn, Germany, 24-25 June 2013;
- UN Water SPM meeting, 30-31 August 2013, Stockholm, Sweden.
- WMO, CHy Advisory group meeting, Prague, September 2015.

allowing continuous relationships.

Christophe Cudennec, Liaison to UNESCO International Hydrology Programme (IHP)

14.5. UNESCO Intergovernmental Oceanographic Commission (IOC) (Liaison S. Sparnocchia)

The Intergovernmental Oceanographic Commission of UNESCO (<http://ioc-unesco.org/>) promotes international cooperation and coordinates programs in marine research, services, observation systems, hazard mitigation and capacity development in order to learn more and better manage the nature and resources of the ocean and coastal areas. Through the application of this knowledge, the IOC aims to improve management practices and the decision-making process of its Member States, foster sustainable development and protect the marine environment. In addition, the IOC strives to further develop ocean governance, which necessitates strengthening the institutional capacity of Member States in marine scientific research and ocean management.

IOC organizes Executive Council meetings every year and Sessions of its Assembly every two years. In the reporting period the following sessions were completed:

- The 44th Session of the IOC Exec Council, 21 June 2011
- The 26th Session of the IOC Assembly, 22 June - 6 July 2011
- The 45th Session of the IOC Exec Council, 25 June 2012
- The 46th Session of the IOC Exec Council, 25 June 2013
- The 27th Session of the IOC Assembly, 26th June - 5th July 2013
- The 47th Session of the IOC Exec Council, 1st - 4th July 2014

The purpose of the Assembly is to review the work of the Commission, including the work of the Member States and the Secretariat, and formulate a common work plan for the coming two years. The Executive Council reviews issues and items from on-going work plans, and makes preparations for the Assemblies.

During its 27th Session the IOC Assembly adopted a Medium-Term Strategy for 2014–2021 (ref. http://www.ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=11799), urging Member States to take it into account in developing their national plans and programmes for ocean sciences, observations and services, as well as in planning their contribution to and participation in the programmes of the Commission, and to support it during the discussions on the UNESCO Medium Term Strategy for 2014-2021. Relevant national, regional and international organizations were also invited to build collaboration and cooperation in implementing this Strategy.

The IOC Medium-Term Strategy for 2014–2021 is based on four high-level objective, to be collectively achieved by Member States through international cooperation:

1. Healthy ocean ecosystems and sustained ecosystem services
2. Effective early warning systems and preparedness for tsunamis and other ocean-related hazards
3. Increased resiliency to climate change and variability and enhanced safety, efficiency and effectiveness of all ocean-based activities through scientifically-founded services, adaptation and mitigation strategies
4. Enhanced knowledge of emerging ocean science issues.

The strategy is organized in a conceptual framework of functions required to advance towards the IOC Vision “*Strong scientific understanding and systematic observations of the changing world ocean climate and ecosystems shall underpin sustainable development and global governance for a healthy ocean, and global, regional and national management of risks and opportunities from the ocean*” :

- A. Foster ocean research to strengthen knowledge of ocean and coastal processes and human impacts upon them [Ocean research]
- B. Maintain, strengthen and integrate global ocean observing, data and information systems [Observing system / data management]
- C. Develop early warning systems and preparedness to mitigate the risks of tsunamis and ocean-related hazards [Early warning and services]

- D. Support assessment and information to improve the science-policy interface [Assessment and Information for policy]
- E. Enhance ocean governance through a shared knowledge base and improved regional cooperation [Sustainable management and governance]
- F. Develop the institutional capacity in all of the functions above, as a cross-cutting function [Capacity Development]

These functions correspond broadly to existing and on-going IOC programmes, components of programmes and mechanisms of cooperation, such as the Global Ocean Observing System (GOOS), the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) and the International Oceanographic Data and Information Exchange (IODE), the Ocean Biogeographic Information System (OBIS), the Tsunami Intergovernmental Coordination Groups (ICGs), the World Climate Research Programme (WCRP) and the Ocean Sciences programme, the Integrated Coastal Area Management (ICAM), the Harmful Algal Blooms (HAB), and Capacity Development (CD).

Following the discussion of previous sessions of the IOC Exec Council and Assembly, the following resolutions and decisions were adopted by the Executive Council during its last session in July 2014:

- Formalization of IOC's involvement in a Second International Indian Ocean Expedition (IIOE-2), implemented for the period 2015–2020 in collaboration with the Scientific Committee on Oceanic Research (SCOR) and Indian Ocean Global Ocean Observing System (IOGOOS), to commemorate the 50th anniversary of the First International Indian Ocean Expedition, also establishing the Interim Planning Committee (Group of Experts) for a period of one year, to June 2015, responsible for the initial planning for the IIOE-2 (EC-XLVII.1).
- Revision of Terms of reference of the General Bathymetric Chart of the Oceans (GEBCO) Guiding Committee encouraging Member States to voluntarily contribute to the improvement of global bathymetric data sets and data products of the IHO-IOC GEBCO Project (EC-XLVII/Dec. 3.1.II).
- Recognition of the Australian Integrated Marine Observing System (IMOS) as a GOOS Regional Alliance (EC-XLVII/Dec. 3.1.III).
- Acceptance of reports, decisions and recommendations from recent sessions of the Intergovernmental Coordination Groups for: the Pacific Ocean Tsunami Warning and Mitigation System (ICG/PTWS-XXV), the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS-IX), the North-Eastern Atlantic, the Mediterranean and Connected Seas Tsunami Warning and Mitigation System (ICG/NEAMTWS-X), and the report of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-VII). In particular they acknowledge efforts for developing Early Warning Systems and Preparedness for Tsunamis and encourage Member States contributions (EC-XLVII/Dec.3.2.1).
- Renewal of the JCOMM in-situ Observations Programme Support Centre (JCOMMOPS) Hosting Agreement with a view to improve its sustainability and encouraging Member States to contribute to the work of JCOMMOPS via the IOC (EC-XLVII/Dec.3.2.2).

In the reported period, I participated, on behalf of IUGG, to the Fourth Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM-4) that was held in Yeosu, Republic of Korea from 23 to 31 May 2012. A summary of my report was published in the IUGG Electronic Journal, Volume 12 No. 9, 2-4. In my report, I pointed out some potential linkages between IUGG bodies and JCOMM which, in my opinion, were worthy of attention from the perspective of a possible future collaboration (presently not established on a formal basis). I suggested potential collaborations mainly with IAPSO and IAMAS, but envisaged also relations with IAHS and IACS, in particular relating to the IUGG GeoRisk Commission, the IAPSO-IASPEI-IAVCEI Tsunami Commission, the IAPSO Commission on Mean Sea Level and Tides and Permanent Service for Mean Sea Level, and the IAPSO/SCOR Working Group number 133: Oceanscope. The full report was sent by the IUGG Secretary General to the Boards of the bodies under IUGG, where it was received with great interest by several members, who suggested even further potential links with IAGA (for the geomagnetism observatory network), IAG (GGOS and IGS) and IASPEI. In particular, Diana Greenslade (GRC SG), being already involved in one of the JCOMM expert teams, offered to assist

with communication between the two groups, or act in some sort of liaison role. I haven't gone any further on this issue, as I am waiting for some feedback from the Union.

Stefania Sparnocchia, IUGG Liaison to IOC

14.6. World Climate Research Programme (WCRP) (Liaison T. Beer)

The World Climate Research Program (WCRP) is the major mechanism for the coordination and promotion of climate science and its applications. It is supported by UNESCO's IOC, ICSU and the WMO. The WCRP establishes and coordinates major internationally coordinated research activities. Current major programs are Climate and Cryosphere Program (CliC), the Climate Variability and Predictability Program (CLIVAR), Global Energy and Water Experiment (GEWEX) and the Stratospheric Processes and their Role in Climate Program (SPARC). WCRP research is the major source of the assessments carried out by the IPCC.

WMO, IOC and ICSU each appoint a representative to the Joint Scientific Committee (JSC). IUGG provides a small contribution (\$5,000 per annum) to foster the work of WCRP, which is appreciated but is not considered by WCRP to be formal sponsorship.

It was originally envisaged that WCRP would merge into the new ICSU Program, Future Earth. On 17 June 2013 it was announced that WCRP will remain an independent entity that is part of Future Earth but not administered by the Future Earth Secretariat.

At the start of the liaison period, Tony Busalacchi, was Chair of WCRP (technically Chair of the Joint Scientific Committee) and Ghassem Asrar, was the Director of WCRP. At present (2015), the Chair is Prof. Guy P. Brasseur, and David Carlson is the Director of WCRP.

Meetings

The main liaison activity was attendance at the WCRP Open Science Conference (OSC), Denver, Colorado, 24-28 October 2011, website <http://www.wcrp-climate.org/conference2011/>. Attendance at the OSC was over 1900 participants from 86 countries.

The key outcome of the meeting was to identify the grand challenges facing the climate research community and help establish future priorities for climate research, see the figure on the right and the description on the WCRP web site at <http://www.wcrp-climate.org/grand-challenges>.

As the OSC proceeded the concept of focusing research on the delivery of 'climate services' which would comprise 'actionable science' - forecasts that are sufficiently predictive, accepted and understandable to support decision-making, including capital investment decision-making.

Other activities

Contact with the previous WCRP President and Director took place during the OSC. Networking with the new Director took place during the ICSU General Assembly in Auckland. The new Chair, Guy Brasseur, has accepted an invitation to make a presentation to Session U1 (on Future Earth) at the IUGG General Assembly in Prague.

The new WCRP Vice-Chair is Dr Vladimir M. Kattsov of Russia, who is also a member of the 2011-2015 IAMAS Executive Committee.

IUGG was instrumental in nominating WCRP for the BBVA Foundation Frontiers of Knowledge Award, see <http://www.fbbva.es/TLFU/tlfu/ing/microsites/premios/fronteras/index.jsp>

Despite the considerable effort expended in preparing the nomination it was not successful, possibly because the award committee favours awards to individuals rather than to a collective entity.

Grand Challenges

- ⊙ Clouds, Circulation and Climate Sensitivity
- ⊙ Changes in Cryosphere
- ⊙ Climate Extremes
- ⊙ Regional Climate Information
- ⊙ Regional Sea-level Rise
- ⊙ Water Availability

Grand Challenges identified at WCRP Open Science Conference, 2011

IUGG at its 2012 Bureau meeting discussed whether IUGG should continue its annual contribution to WCRP. The point was that the IUGG funds are transferred to ICSU, and the members of the WCRP executive appear to be unaware that IUGG makes a contribution or has an official WCRP liaison person. The IUGG contribution is not acknowledged in any documents so that it is understandable that officers of WCRP are not aware of it.

As IUGG representative to WCRP, I attended the impressive WCRP Open Science Conference held in Denver in October 2011. This was the first and only Open Science Conference that WCRP has held.

Thus the main role for an IUGG representative to WCRP should be to attend meetings of the Scientific Steering Committee (SSC). These are held at least annually. I have previously recommended **that IUGG write to WCRP requesting observer status on the WCRP SSC. This has not occurred and therefore there is little value in having an IUGG liaison who is not a member of the Joint Scientific Committee in their own right.**

Tom Beer, IUGG Liaison to WCRP

14.7. World Meteorological Organization (WMO) (Liaisons A. Askew, A. Folch, H. Volkert)

General

Both IAMAS and IAHS have been closely involved in WMO programmes since the very founding of the Organization in 1950 and so past practice was to appoint one, or at most two, liaison officers to WMO. However, common interests of the meteorological and volcanological communities suddenly came to the fore in 2010 with the eruption of the Eyjafjallajökull volcano and so in July 2011 IUGG appointed three liaison officers to WMO for the period 2011 to 2015, namely Arthur Askew (AA) of IAHS, Arnau Folch (AF) of IAVCEI and Hans Volkert (HV) of IAMAS. The annual reports of the liaisons have been published in the IUGG Annual Reports, and the following is a summary of these reports.

WMO is governed by the World Meteorological Congress, which meets every four years, its Executive Council (EC) meeting on an annual basis to oversee the implementation of Congress' decisions. Living in Geneva, AA has in recent years been able to attend all meetings of Congress and EC and assist his two colleagues to optimise their participation or make statements on their behalf. All three liaison officers have had frequent and fruitful contact with their counterparts within the WMO Secretariat.

Meetings of Congress and EC

Two sessions of Congress, one normal and one extraordinary, were held during this period, plus four sessions of EC. Many things can be said about how the meetings were conducted and specific items treated, but these are of no direct interest to the Union. What is important is to report that IUGG participation was well received and each session offered the opportunity to announce IUGG's continued interest in working with WMO and the opportunity was taken to meet with key people to promote IUGG's involvement and interests.

AA has been designated to represent IUGG at the Seventeenth WMO Congress in May 2015 and will report separately on the outcome to both the President and Secretary-General of the Union so that any matters of importance can be discussed in Prague.

Meteorology

HV paid several visits to Geneva to attend various sessions of Congress and EC with a focus on the World Weather Research Programme within WMO's Commission for Atmospheric Sciences (CAS). He contributed to the CAS Management Group and helped to organize the World Weather Open Science Conference WWOSC in August 2014 in Montréal, Canada. Also of importance was his participation in the meeting on the "Closure of THORPEX".

In the opinion of HV, the traditional link between WMO and IAMAS could be revitalized. Meetings of WMO Congress and EC are not the occasion for this. It is better achieved through involvement in specific activities of CAS and meetings such as WWOSC.

Hydrology

IAHS continues to be involved in a number of activities of WMO, in particular those implemented under WMO's Commission for Hydrology. IAHS is always invited to attend meetings of the Commission's Advisory Working Group and is often quoted as a partner in presentations to WMO Congress and EC.

Volcanology

IAVCEI links with WMO focussed on the IUGG-WMO Volcanic Ash Scientific Advisory Group (VASAG) that was established under the auspices of WMO and IUGG to address requests for specific advice or assistance from the ICAO International Airways Volcano Watch Operations Group, amongst others. In this regard AF has attended or otherwise been involved in a series of meetings on volcanic monitoring and dispersion. Of particular importance, AF was involved in organizing the 2nd IUGG-

WMO meeting on Ash Dispersal Forecast and Civil Aviation, held in Geneva in November 2013 under the sponsorship of IUGG, IAVCEI, WMO and University of Geneva.

Involvement with VASAG has also led AF to visit Eurocontrol in Brussels and attend the DUST 2014 meeting in Italy and that on Cities on Volcanoes 8 in Indonesia the same year. In 2013, the Barcelona Dust Forecast Center was designated as a regional node of the WMO Sand and Dust Storm Warning Advisory and Assessment System and the report submitted to IUGG.

Cryospheric Science

WMO's polar activities are overseen by a Panel of the Executive Council. In this context WMO now has a link with IACS through the Global Cryosphere Watch and its engagement with the World Glaciology Monitoring Service: the longest-standing activity of IACS and arguably the longest-standing activity of any IUGG Association. This development thereby brings to four the number of IUGG Associations which are co-operating with WMO.

Climate Services

For some years the Global Framework for Climate Services (GFCS) had been the main “cheval de bataille” of both the Secretary General and the WMO President: David Grimes of Canada. The principal aim of the GFCS is to reduce the vulnerability of society to climate-related hazards through the better provision of climate services. Much effort has been put into formulating the necessary actions into a global programme co-ordinated through WMO and to invite other international organizations to join WMO in the planning and implementation of the programme.

GFCS was therefore a major item on the agenda of Congress and all sessions of EC during this period and AA attended a total of four meetings devoted explicitly to the subject. In his interventions, he expressed the Union's interest in GFCS and our willingness to help in any way that we could, stating that we would also see it as a practical interface with the climate information user community. As a result, we have been invited to all GFCS meetings and are listed as a member of the Partner Advisory Committee. Having said this, it is very difficult to identify exactly how the Union can contribute and what it would gain by doing so.

If IUGG is to play a constructive role in this new initiative then we must engage the interest of the geoscience community itself. To put it bluntly, if our fellow scientists cannot be persuaded to take an interest in this subject, then we should withdraw from the GFCS mechanism. The Assembly in Prague offers an excellent opportunity to open this question for debate within the IUGG community and a panel discussion is scheduled there for this purpose.

Preparatory work on the GFCS has raised the problem of the international exchange of data because past WMO resolutions on this thorny issue refer to meteorological and hydrological data but not to climate data. It is now likely that a third resolution will be proposed to the next WMO Congress to cover climate data.

Closing remarks

It is important to maintain active liaison with WMO because:

For IAMAS, it is the only intergovernmental partner in meteorology;

For IAHS, it is one of its major intergovernmental partners in the field of hydrology;

For IAVCEI, it has now become an important link through which to further collaboration between volcanologists and meteorologists in both research and operational activities;

For IACS, it could be a valuable link in support of the World Glaciology Monitoring Service.

The three liaison officers have worked very well together and have been very pleased to serve the Union in this capacity over the past four years. All would be happy to continue in this function for a further four years, if so requested.

Arthur Askew, IUGG Liaison to WMO for hydrology
Arnau Folch, IUGG Liaison to WMO for volcanology
Hans Volkert, IUGG Liaison to WMO for meteorology

14.8. Consultative Committee for Time and Frequency (CCTF) (Liaison C. Boucher)

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 of IUGG, as well as the International Astronomical Union (IAU) and the International Union for Radio-Sciences (URSI).

Meetings

The 19th meeting of CCTF was held at the Bureau International des Poids et Mesures (BIPM), Sèvres (France) on September 13 and 14 2012. Among the numerous activities discussed during this meeting, some are of more direct connection with IUGG:

- 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):
 - **IERS Conventions**, the BIPM Time section being part of the IERS Convention product center, together with the US Naval Observatory (USNO).
 - the **International Terrestrial Reference System (ITRS)** which is the terrestrial reference system recommended by IUGG for all its activities (IUGG resolution 2 Perugia 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).
- **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 and propose to establish a joint CIPM-IUT-R working group on UTC. Also the availability of UT1 estimations by IERS was recognized.

In addition, a **Workshop on International time scales** was organized jointly by ITU and BIPM in Geneva on September 2013, which I attended and presented IUGG views on this issue.

Major common topics of interest

UTC

The IUGG views about UTC were specified in a position paper I prepared on request by the IUGG General Secretary. This document was established with the support of several persons, and specifically endorsed by the IAG Executive committee. Its content is fully consistent with communications I did at the previously mentioned meetings.

It also was used by the IUGG General secretary to answer to the consultation letter sent by ITU on these topics.

ITRS

The **General Conference for Weights and Measures** (Conférence Générale des Poids et Mesures, **CGPM**) in 2011, considering the significant and increasing number of Global Navigation Satellite Systems (GNSS), that the proliferation of time and geodesy reference systems in use in these navigation systems creates ambiguities for users, rendering their interoperability more difficult; and considering that the adoption of a common reference system is beneficial for users, adopted a

resolution recommending that “the ITRS, as defined by the International Union of Geodesy and Geophysics (IUGG) and realized by the International Earth Rotation and Reference Systems Service (IERS), be adopted as the unique international reference system for terrestrial reference frames for all metrological applications».

The adoption of this resolution by the CGPM (Resolution 9, 24th CGPM, 2011, puts in evidence the necessity of using a standard terrestrial reference in metrology.

Claude Boucher, IUGG Liaison to the Consultative Committee for Time and Frequency

14.9. Group on Earth Observations (GEO)

Report of the IUGG Secretary General on membership in and cooperation with the Group on Earth Observations (GEO)

The intergovernmental Group on Earth Observations (GEO) coordinates international efforts to build a Global Earth Observation System of Systems (GEOSS). It links existing and planned Earth observation systems and supports the development of new ones in cases of perceived gaps in the supply of information on the environment. The aim is to construct a global public infrastructure for Earth observations that, like the Internet, consists of a flexible and distributed network of content providers.

GEO was launched in response to calls for action by the 2002 World Summit on Sustainable Development and by the G8 (Group of Eight) leading industrialized countries. These high-level meetings recognized that international collaboration is essential for exploiting the growing potential of Earth observations to support decision making in an increasingly complex and environmentally stressed world. GEO is a voluntary partnership of governments and international organizations. It provides a framework for developing new projects and coordinating strategies and investments among partners. As of 2014, GEO's Members include 90 Governments, the European Commission, and 77 intergovernmental, international, and regional Participating Organizations with a mandate in Earth observation or related issues.

Although IAG and its Global Geodetic Observing System (GGOS) have been international Participating organizations of GEO since its inception, the IUGG Bureau decided with endorsement of the Executive Committee to apply for a membership in GEO. Several reasons have been mentioned in favor of an adhesion of IUGG to GEO:

1. As an international scientific organization, IUGG can
 - provide scientific expertise to GEO and its numerous groups, in particular its science and technology committee;
 - represent the community of geoscientists as one user community of the GEOSS;
 - contribute to GEOSS by running scientific services, such as seismological, oceanographic, geomagnetic networks or the multiple geodetic services coordinated by the GGOS organization of the International Association of Geodesy (IAG)
2. To fill a gap in the present list of international organizations members of GEO. Considering the broad covers of geosciences (cryospheric sciences, geodesy, geomagnetism and aeronomy, hydrology, atmospheric sciences and meteorology, oceanography, seismology, and volcanology), only organizations with operational character, such as WMO or IOC, are presently representing these fields in GEO. Geology is represented by IUGS or remote sensing by ISPRS, who are members of GEO.
3. To provide a significant contribution to several GEO structures. Considering the variety of existing structures within GEO, several would be candidates to benefit from IUGG contribution, such as:
 - several Societal Benefit Areas, which are the pillars of the societal visibility of GEO: Climate, Disasters, Water, and Weather.
 - several communities of practice: Atmospheric chemistry, Cryosphere, Coastal zones, Water cycle, and Geohazards.

Considering the reason and the decision of the Bureau, in 2013 IUGG applied for a GEO membership.

At the GEO-X Plenary and the Geneva Ministerial held from 12 to 17 January 2014 in Geneva, Switzerland, IUGG was unanimously recognized as a new Participating Organization of GEO. At the Geneva Ministerial on 17 January, GEO received unanimous endorsement to unleash the power of open data for a second decade (2015-2025). There was agreement to continue building on the

organization's first 10 years of pioneering environmental advances, which are designed to improve the quality of life of people everywhere. Fueled by open data, GEO's efforts are now evident in most regions of the world.

The XI Plenary of the Group on Earth Observations (GEO) was held on 13-14 November in Geneva, Switzerland. As a Participating Organization of GEO, IUGG was invited to attend the meeting. In my capacity of the IUGG Secretary General I represented the Union and addressed the Plenary (http://www.earthobservations.org/documents/geo_xi/geoxi_iugg_statement.pdf). The following topics were considered at the meeting: (i) GEO Strategic and Implementation Plans for 2016-2025; (ii) GEO engagement strategy; (iii) data management principles and mechanisms to ensure legal interoperability of shared data; (iv) monitoring and evaluation of implementation of the Global Earth Observing System of Systems (GEOSS); and (v) AfriGEOSS implementation plan. The Plenary approved the budget for 2015 and the membership of the implementation board, updated the rules of procedure, and considered the GEO Executive Committee and the financial reports. The XII GEO Plenary and the Ministerial Summit will be held in Mexico City, Mexico, 9-13 November 2015.

To clarify the role of IUGG in GEO involvement, the IUGG Bureau decided to establish an ad-hoc group to discuss the issues of cooperation with GEO and to report on the findings before the General Assembly in Prague in 2015. This report should include proposals with specific focus on: (i) implementation of the IUGG liaison to GEO; (ii) information on GEO activities in order to stimulate the participation of IUGG community; and (iii) identify some key projects existing in (or to propose to) GEO for major interest with regards to IUGG. The IUGG Bureau appointed Dr. Claude Boucher (IAG) and Dr. Mioara Manda (IAGA) to co-chair the group.

A. Ismail-Zadeh

Adoption of the Reports / Adoption des rapports

15. Report of the IUGG Finance Committee / Rapport du Comité des finances de l'UGGI (D. Collins)

The Finance Committee elected for the period 2011 (end of the GA)-2015 (end of the GA) held several meetings during that period, in Melbourne at the end of the General Assembly in 2011, in sessions in Prague in 2013 in parallel with meetings of the Bureau and Executive, and has three sessions during the Prague General Assembly in 2015. All four members attended all the meetings, and were joined by the Treasurer on each occasion. The Chair of the Committee took up invitations to attend meetings of the Bureau in Lauterbad, Germany, in 2012, and in Prague in 2013, but not in Baku in 2014.

In the Melbourne FC meeting, the Budget for the 2012-2015 quadrennium (the four calendar years 2012-2015) was reviewed after it had been approved by Council, useful for reaffirming principles and introducing the two new members of the FC to the structure of the balance sheet. The underlying principle of prudent financial management suggests setting budgets which maintain annual balances of roughly the funds necessary to support the Union's outgoings for one calendar year (USD 500k +/- 5%). By the end of 2011, however, the balance had increased to almost \$900k, and expenditure was to be increased through a series of grant initiatives for science and education, and outreach (line 12 of the balance sheet), with annual deficits being budgeted to return the balance to the desirable level.

At the FC meeting in Prague, the actual accounts for the quadrennium 2007-2011 were presented. From the current quadrennium, the actual balance sheet for 2012 was examined, showing only a limited reduction in end-of-year balance to an actual \$831k. The FC receives the actual annual accounts from the Treasurer, for comparison with budgeted figures, the latest to 31/12/2014 showing the balance standing at \$674k. FC understands that given the timing of meetings audited annual accounts are not always available.

The financial health of the Union ultimately depends on income from the member states. At Melbourne and in the Prague sessions, FC reviewed membership categories of the member states. In fact, review of membership categories occupied by individual countries has been one of the major items of discussion by the FC. FC has not only considered individual cases but also looked at the wider issue of factors affecting country membership, financial or otherwise. FC is concerned that whilst UNESCO has 195 member states, IUGG has 70, of which only 50 are fully active Council members with subscriptions paid up to date. In ideological debate, FC celebrates IUGG as a truly international organization, welcoming scientists from all around the world, and with peripatetic General Assemblies allowing 'local' participation in international science meetings by scientists distant from the fixed European and North American centres preferred by other geophysical unions. Desirable roving GAs however do not allow IUGG to accumulate resources from successful meetings.

But then many scientists are not able fully to participate in Union and Association affairs, as so many countries are not financially contributing members. The principles behind the allocation of countries to categories of memberships with differing levels of units payable are intended to reflect both the ability of a member state to pay and the benefits accrued by the country. These two are assessed using standardized scores of gross national product of a member state and the lower 3 of the numbers of participants from the state attending the last four General Assemblies. These scores are then weighted on a 50-50 basis.

Allocation of countries to categories is based on a regression line between the equally weighted scores and the number of units payable (excluding two major member states). This method dates from 2001 but appears to the FC to remain useful, but consideration will need to be given to several aspects:

Whether the 50-50 split GNP-Participation remains current

Whether removal of the large steps between higher categories (50% increase for example between category 6 and 7) may encourage upward movement of member states, whilst also encouraging descent

Possible introduction of an entry level of 0.5 unit, but the barrier to joining may also be also the need for an adhering body across the subject areas. (Such a 0.5 unit would be for entry only)

Whether simple arithmetic increase might replace categorical membership – this would be a major task.

FC noted that member states can only change category upwards between GAs. It was agreed that local agreements might be necessary where countries moving up between higher categories have small stepped increases in each of the four years between GAs, finally attaining the higher category by the year of the next GA.

It is apparent that there are ‘value for money arguments’ from certain member states on the horizon should individual membership of Associations be approved by Council. FC considers that only economic necessity should be acceptable for trading down categories.

It was agreed that the process for coaxing member states upwards would be that the Chair of the FC would write letters when appropriate to the adhering bodies, for the President to send judiciously.

Having spent considerable effort with membership categories, FC noted that this activity is not specifically set out as one of its activities and agreed therefore to recommend to Council that By-law 19 be amended to include this activity explicitly.

Although FC is entitled to see accounts of the Associations, these are not routinely submitted. FC has not thought it necessary actively to seek such accounts.

The draft budget for 2016-2019 was to be discussed at the Prague meeting, before the Treasurer takes recommendations to Council.

Expenditure can no longer carry on at the rate experienced in 2012-2015, as the underlying balance will have reduced to around \$500k.

FC agreed the policy that the budget balance sheet for 2016-2019 should concentrate on the main lines without too much reliance on sub-lines. Within the main lines flexibility is then possible operationally, rather than sticking to pre-determined distribution by sub-lines. In any case auditing of sub-lines is often not practicable. The budget for 2016-2019 to be presented to Council will be shown in this format by the Treasurer.

The minutes of the FC have been a problem. Where they are stored and to whom they are directed has not been clear. It was agreed in the Prague 2013 meeting that the FC minutes are presented to the Bureau for action. For web site archiving it is suggested that specific details relating to suggested movements of categories for individual member states are removed, and reported generically.

FC considers that a protocol, or manual of procedures, for the FC schedule of activities would help guide future FCs.

FC hopes it has offered the Treasurer sufficient support as well as critically discussing budgeted finance and actual out-turns. The Treasurer is the fount of all knowledge in this area; a Treasurer in training or assistant treasurer would seem to be an essential development to maintain the knowledge base as well as to provide actual support. Thanks go to the Treasurer and all members of the FC for making the meetings lively with stimulating discussions.

David N Collins, Chair

16. Presentation of the 2016-2019 Budget / Présentation du budget 2016-2019 (A. Hansen)

IUGG DRAFT Budget 2016 - 19

Discussed at Bureau Meeting in Baku, 2014

All figures, except the value and number of units, are in thousands of US dollars

Year						Total
	2015	2016	2017	2018	2019	2016-2019
Estimated unit value	\$1.900	\$1.940	\$1.980	\$2.020	\$2.050	\$1.998 app. +2% pr yr
Estimated number of units	275	275	275	275	275	1100 not all members are paying
INCOME						
1. MEMBERSHIP DUES	522,5	533,5	544,5	555,5	563,8	2197,3
2. ASSEMBLY SURCHARGE					20,0	20,0
3. SALES OF PUBLICATIONS, ETC		0,2	0,2	0,2	0,2	0,8
4. MISCELLANEOUS (interest)		0,0	0,0	0,0	0,0	0,0
5. ICSU GRANTS						0,0
6. TOTAL INCOME		533,7	544,7	555,7	584,0	2218,1
7. BALANCE 1/1		500,0	500,5	496,4	507,9	
EXPENDITURES						
11. ADMINISTRATION		96,0	111,0	96,0	135,0	438,0
11.1 Personnel		15,0	15,0	15,0	15,0	60,0
11.2 Equipment		5,0	5,0	5,0	5,0	20,0
11.3 Supplies		5,0	5,0	5,0	5,0	20,0
11.4 Communication		5,0	5,0	5,0	5,0	20,0
11.5 Travel, organizational		65,0	80,0	65,0	100,0	310,0
11.6 Miscellaneous		1,0	1,0	1,0	5,0	8,0
12. NEW INITIATIVES		40,0	40,0	40,0	40,0	160,0 CUP-agreement = ??
12.1 Education and outreach		20,0	20,0	20,0	20,0	80,0 ICTP-agreement = 4*10
12.2 Science		20,0	20,0	20,0	20,0	80,0 large grants = 2*30
13. ASSEMBLIES		0,0	0,0	0,0	50,0	50,0
13.1 Organization		0,0	0,0	0,0	10,0	10,0
13.2 Travel Grants		0,0	0,0	0,0	40,0	40,0
14. SYMPOSIA		20,0	20,0	20,0	0,0	60,0
14.1 Symposia		20,0	20,0	20,0	0,0	60,0
15. ASSOCIATIONS		261,3	266,8	272,3	277,8	1078,0
15.1 Allocations		261,3	266,8	272,3	277,8	1078,0
16. DUES		30,0	30,0	30,0	30,0	120,0
16.1 ICSU		30,0	30,0	30,0	30,0	120,0
17. ICSU GRANTS		0,0				0,0
17.1 ??						0,0
18. UNION ACTIVITIES		73,0	73,0	73,0	73,0	292,0
18.1 GRC, SEDI, CMG, UCDC, CCEC		23,0	23,0	23,0	23,0	92,0 see below for details
18.2 Inter-Union Science (ILP)		15,0	15,0	15,0	15,0	60,0
18.3 Liaison Officers		15,0	15,0	15,0	15,0	60,0
18.4 International Scientific Programs		15,0	15,0	15,0	15,0	60,0
18.5 New commissions		5,0	5,0	5,0	5,0	20,0
19. COUNTRIES IN NEED		0,0	0,0	0,0	60,0	60,0
19.1 Travel Grants, General Assemblies		0,0	0,0	0,0	60,0	60,0
20. FEES		8,0	8,0	8,0	8,0	32,0
20.1 Professional Services		5,0	5,0	5,0	5,0	20,0
20.2 Bank Fees		3,0	3,0	3,0	3,0	12,0
21. CONTINGENCIES		5,0	0,0	5,0	0,0	10,0
22. TOTAL EXPENDITURES		533,25	548,8	544,3	673,8	2300,0
23. BALANCE 12/31		500,5	496,4	507,9	418,1	

The shaded lines under EXPENDITURES represent subtotals for each line of expenditures

18.1 GRC	8	8	8	8
SEDI	4	4	4	4
CMG	4	4	4	4
UCDC	2	2	2	2
CCEC	5	5	5	5
SUM	23	23	23	23

Session III: Monday, 29 June, 15:00-18:00 / 3ème Session: Lundi, 29 juin, 15h-18h

Note: Any country wishing to present their national reports during the period while votes are being counted should notify the Secretary-General by the end of the first session of the Council meeting (22 June 2015).

Greetings; Presentation of the credentials /
Salutations; Présentation des lettres d'accréditation

17. Adoption of the 2016-2019 Budget / Adoption du budget 2016-2019

18. Election of IUGG Officers / Elections des responsables de l'UGGI

18.1. President / Président

18.2. Vice-President / Vice-président

18.3. Secretary General / Secrétaire Général

18.4. Treasurer / Trésorier

18.5. Bureau Members / Membres du Bureau

18.6. Finance Committee / Comité des finances

19. Presentations of the preliminary proposal to host a World Geosciences Congress in 2023/2024 in Germany (J. Müller, German Delegate of the Council)

World Geoscience Congress – an initiative to host a joint IUGG/IUGS Congress in Germany in the time frame 2023/24

Jürgen Müller, President IUGG German National Committee

Hans-J. Kämpel, President of the Federal Institute for Geosciences and Natural Resources (BGR),
adhering body to IUGG

Breakthroughs in scientific understanding as well as innovative technologies for gathering and organizing large amounts of information have expanded the frontiers of knowledge in the earth sciences at an accelerating pace. Notably, international and interdisciplinary collaborations in the study of the earth received major boosts from two of the largest global geoscience organizations: IUGG, the International Union of Geodesy and Geophysics, and IUGS, the International Union of Geological Sciences.

Priority objectives of IUGG are the promotion and coordination of physical, chemical and mathematical studies of the Earth and its environment. Particular goals of IUGS are to encourage interdisciplinary studies of geoscientific problems of worldwide significance as well as to support and provide scientific sponsorship for the International Geological Congresses (IGC). Overall aims of both organizations are to support and facilitate cross-disciplinary collaboration in the earth sciences.

German geoscientists have agreed to bid for hosting a major international geoscientific congress in Berlin. Key overarching objectives are to encourage technological innovation in geosciences, secure a sustainable development with limited resources, improve mitigation of threats from geohazards, enhance cooperation within the earth science communities, lobby for education in geosciences, and to raise the visibility of geosciences within a broad public. Considering various aspects, the German IUGG and IUGS committees discussed independently options to host a joint IUGG/IUGS Congress in Germany. It is believed that the envisioned combination of an IGC and an IUGG General Assembly can provide the full spectrum of topics from the Geological Sciences, Geophysics, and Geodesy. Such World Geoscience Congress could even more foster interdisciplinary approaches to address complex geoscientific challenges and enable timely exchange between the different communities in the geosciences.

Accordingly, a national organizing committee (NOC) was created to prepare for a bid to host the 37th IGC in the city of Berlin in either 2023 or 2024, as one element of a World Geoscience Congress. The application will be submitted – and decided upon – during the 35th IGC in Cape Town, South Africa in 2016. On that occasion, we will also promote our idea to host the 37th IGC jointly with the IUGG General Assembly that will take place in 2023. (The 36th IGC will be held in New Delhi, India, in 2020.)

If our bid in 2016 will have been successful, the NOC intends to submit a bid to host the 28th IUGG General Assembly jointly with the 37th IGC in Berlin. The bid will be submitted to IUGG for decision by the delegates during the 27th IUGG General Assembly in 2019. In case that both applications are successful, Germany will be ready to organise a World Geoscience Congress (37th IGC jointly with 28th IUGG General Assembly) in the time frame 2023/24.

**20. Presentations of the proposals to host the XXVII General Assembly. Selection of the venue of the XXVII General Assembly (2019) /
Présentations des propositions pour accueillir la XXVIIème Assemblée Générale.
Sélection du lieu de la XXVIIème Assemblée Générale (2019)**

**21. Vote on the proposed changes of Statutes and By-Laws /
Vote sur les modifications proposées des statuts et du règlement intérieur**

**22. Renewal of the IUGG liaison officers for 2015-2019 /
Renouvellement des officiers de liaison pour 2015-2019**

**23. Presentation and adoption of the Resolutions / Présentation et adoption des
résolutions
(T. Beer)**

Closing remarks / Remarques finales
End of Council / Fin du Conseil