

# **PART I**

## **PROCEEDINGS OF THE GENERAL ASSEMBLY**

## OFFICERS OF THE UNION, ASSOCIATIONS, AND COMMISSIONS FOR 2007-2011

### Bureau of the Union

<i>President:</i>	Tom Beer	AUSTRALIA
<i>Vice-President:</i>	Harsh Gupta	INDIA
<i>Secretary General:</i>	Alik Ismail-Zadeh	RUSSIA/GERMANY
<i>Treasurer:</i>	Aksel W. Hansen	DENMARK
<i>Members:</i>	Yun-tai Chen	CHINA
	David Jackson	USA
	Ali A.A. Tealeb	EGYPT

### Executive Committee of the Union

According to Article 10 of the Statutes of IUGG the Executive Committee consists of:

- the Bureau (see above),
- the Retiring President of the Union, Uri Shamir (ISRAEL)
- the Presidents of the International Associations:

<i>IACS:</i>	Georg Kaser (2007-2009)	AUSTRIA
	Ian Allison (2009-2011)	AUSTRALIA
<i>IAG:</i>	Michael Sideris	CANADA
<i>IAGA:</i>	Eigil Friis-Christensen	DENMARK
<i>IAHS:</i>	Arthur Askew (2007-2009)	SWITZERLAND/AUSTRALIA
	Gordon Young (2009-2011)	CANADA
<i>IAMAS:</i>	Guoxiong Wu	CHINA
<i>IAPSO:</i>	Lawrence Mysak	CANADA
<i>IASPEI:</i>	Zhongliang Wu	CHINA
<i>IAVCEI:</i>	Setsuya Nakada	JAPAN

### Finance Committee of the Union

<i>Chair:</i>	Juan Francisco Vilas	ARGENTINA
<i>Members:</i>	David Collins	UNITED KINGDOM
	Jan Krynski	POLAND
	Kiyoshi Suyehiro	JAPAN

### Secretaries General of the International Associations

<i>IAG:</i>	Hermann Drewes	GERMANY
<i>IAGA:</i>	Bengt Hultqvist (2007-2009)	SWEDEN
	Mioara Manda (2009-2011)	FRANCE
<i>IAHS:</i>	Pierre Hubert	FRANCE
<i>IAMAS:</i>	Hans Volkert	GERMANY
<i>IAPSO:</i>	Johan Rodhe	SWEDEN
<i>IASPEI:</i>	Peter Suhadolc	ITALY
<i>IAVCEI:</i>	Joan Martí	SPAIN

### Union Commissions

#### Union Commission on Data and Information (UCDI):

[www.iugg-ucdi.org](http://www.iugg-ucdi.org)

<i>Chair:</i>	Peter Fox	USA
<i>Vice-Chair:</i>	Charles Barton	AUSTRALIA
<i>Secretary:</i>	Adelina Geyer Traver	SPAIN

### **Union Commission on Geophysical Risk and Sustainability (GRC):**

www.iugg-georisk.org

<i>Chair:</i>	Kuniyoshi Takeuchi	JAPAN
<i>Vice-Chairs:</i>	Vladimir Kossobokov	RUSSIA
	Ramesh Singh	INDIA
<i>Secretary:</i>	Gerd Tetzlaff	GERMANY
<i>Treasurer:</i>	Paula Dunbar	USA

### **Union Commission on Mathematical Geophysics (CMG):**

<i>Chair:</i>	Daniel H. Rothman	USA
<i>Vice-Chairs:</i>	Einat Aharonov	ISRAEL
	Eli Tziperman	USA
<i>Secretary:</i>	Claudia Pasquero	USA

### **Union Commission on the Study of the Earth's Deep Interior (SEDI):**

www.sedigroup.org

<i>Chair:</i>	Gauthier Hulot	FRANCE
<i>Vice-Chair:</i>	Satoru Tanaka	JAPAN
<i>Secretary:</i>	Mike Bergman	USA

### **Inter-Unions Commission**

#### **Inter-Union Commission on the Lithosphere: The International Lithosphere program**

www.scl-ilp.org

#### **Officers Appointed for the Term 2008-2010**

<i>President:</i>	Sierd Cloetingh	NETHERLANDS
<i>Secretary General:</i>	Roland Oberhänsli	GERMANY
<i>Bureau Members:</i>	IUGG: Kevin Furlong	USA
	IUGG: Kalanchand C. Sain	INDIA
	IUGS: Yoshiyuki Tatsumi	JAPAN
	IUGS: Jean-Paul Cadet	FRANCE
	IUGS and IUGG: Alan Green	SWITZERLAND
<i>Chair of National Members:</i>	Victoria L. Pease	SWEDEN
<i>Executive Secretary:</i>	Alexander Rudloff	GERMANY

### **IUGG Liaison Officers with Intergovernmental Organizations**

<i>Cartographic Office of the United Nations:</i>	LuiZ Fortes	BRAZIL
<i>World Meteorological Organization (WMO):</i>	Arthur Askew	SWITZERLAND/AUSTRALIA
	John Turner	UNITED KINGDOM
<i>United Nations Educational, Scientific and Cultural Organization (UNESCO):</i>		
<i>International Hydrological Programme (IHP):</i>	Pierre Hubert	FRANCE
<i>International Oceanographic Commission (IOC):</i>	Eugene Morozov	RUSSIA
<i>International Civil Aviation Organization (ICAO):</i>	William I. Rose	USA
	Marianne Guffanti	USA
<i>Pan-American Institute of Geography and History (PAIGH):</i>		
	Hermann Drewes	GERMANY

### **IUGG Representatives on ICSU Committees and ICSU Regional Offices**

<i>Committee on Data for Science and Technology (CODATA):</i>		
	Charles Barton	AUSTRALIA
<i>Committee on Space Research (COSPAR):</i>		
	Eigil Friis-Christensen	DENMARK
<i>Scientific Committee on Antarctic Research (SCAR):</i>		
	Ian Allison	AUSTRALIA

XXV General Assembly of the International Union of Geodesy and Geophysics  
Officers of the Union, Associations, and Commissions for 2007-2011

<i>Scientific Committee on the Problems of the Environment (SCOPE):</i>	Norman E. Peters	USA
<i>Scientific Committee on Oceanic Research (SCOR):</i>	Michael MacCracken	USA
	Lawrence Mysak	CANADA
<i>Scientific Committee on Solar-Terrestrial Physics (SCOSTEP):</i>	Robert Vincent	AUSTRALIA
<i>Federation of Astronomical and Geophysical Data Analysis Services (FAGS):</i>	Ruth E. Neilan	USA
<i>World Climate Research Programme (WCRP):</i>	Guoxiong Wu	CHINA
<i>Regional Office for Africa (ROA):</i>	Richard Wonnacott	SOUTH AFRICA
<i>Regional Office for Asia &amp; the Pacific (ROAP):</i>	Sri Widiyantoro	INDONESIA
<i>Regional Office for Latin America and the Caribbean (ROLAC):</i>	Luiz Fortes	BRAZIL

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XXV General Assembly of the International Union of Geodesy and Geophysics  
Report of the Chair of the Local Organizing Committee

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**Sub-committees**

1. Scientific Program Sub-Committee
2. Exhibitions and Sponsorship
3. Scientific Fieldtrips and Workshops
4. Media and Community Liaison

**REPORT OF THE CHAIR OF THE LOCAL ORGANIZING COMMITTEE**  
**RAY CAS**

**Introduction**

Organising the XXVth IUGG General Assembly in the negative international economic climate lingering from the global financial crisis has been challenging and difficult. The Joint Australian and New Zealand Local Organising Committee (LOC) is therefore extremely pleased with the successful General Assembly held in Melbourne from 27<sup>th</sup> June to 8<sup>th</sup> July, 2011. I thank and congratulate all those involved in making the conference a success, including *arinex*, the professional conference organiser, for their outstanding on-site management of the conference. Key outcomes of the conference were:

- 3,441 delegates, including exhibitors, attended the conference.
- The venue for the conference, the Melbourne Convention and Exhibition Centre, was unanimously acclaimed as an outstanding venue.
- The scientific program ran very smoothly, with fewer program gaps.
- The Plenary Lecture Program was an outstanding success.
- The workshops and field trips that ran were successful.
- The exhibitions were well received, and their integration with the coffee break and poster display area was very successful.
- Sponsorship support exceeded the target, and
- Generally delegate feedback has been extremely positive.

**Specific Comments**

1. I want to thank all LOC members for their constant, constructive and unwavering commitment to ensuring the success of the conference. It has been a great pleasure to work with everyone.
2. Although there were some disagreements on specific issues, the collaboration between LOC, the IUGG, and the Association Secretaries General was positive, and constructive. The different perspectives certainly helped address many issues.
3. The LOC also feels that the length of the conference contributes to higher registration fees and cost of living expenses (hotel, meals) for delegates, and that both the duration and fees are a "put-off" for many scientists. IUGG is already considering the option for reducing the length of the GA even more. Thanks to Tom Beer for being the LOC's IUGG liaison officer, keeping the LOC up to date on IUGG news.
4. The conference would not have run so smoothly without the help of the volunteers, who were invaluable in doing many small things that *arinex* staff would not have been able to attend to. The volunteers were all research students, who in return for their help as volunteers for half of the conference, were given complimentary registration fees as delegates and were able to participate in the scientific program for the other half of the conference. Thanks go to Steve Siems and Patrick Hayman for their excellent management of this program.
5. Patrick Hayman and Peter Dyson devised a scheme for receiving applications for and allocating conference grants and a payments scheme, which ran very smoothly, and we thank them for their assistance.
6. The Melbourne Convention and Exhibition Centre is an outstanding conference venue and most things worked extremely well, including the wireless internet system. The weather worked in our favour and the setting for the MCEC in the Melbourne CBD works wonderfully well. We are fortunate in many ways that our bid for 2007 was unsuccessful, so that the new convention centre was available in 2011!
7. The on-site IT facilities worked extremely well. The Speaker Preparation Room facilities were excellent, and any problems that arose were very quickly attended to. Although the ePresenter

facility for uploading and displaying digital copies of posters attracted some interest, it was not as much of a focal point as we might have expected. This was probably due in part to the late decision and communication about this facility.

8. The exhibition and poster display area together with the coffee breaks worked very well. Thanks to Joanna Sloan of arinex for this. Thanks also to Stewart Franks (LOC) for his early work in organising the Sponsorship and Exhibition program and Drew Whait and Nick Cadey of arinex for their hard work in signing up both sponsors and exhibitors, leading to a very successful program and our targets being exceeded.
9. The Opening and Closing ceremonies were very successful and the LOC received many compliments about these. Thanks to Tom Beer (LOC and IUGG President) for co-ordinating these, assisted by Helen Fremlin of arinex and myself as LOC Chair.
10. The scientific program ran very smoothly in general, and having the discussion slots worked very well in many symposia. The Plenary Lecture series was an outstanding success, the scheduling being a very big factor in this. A big thank you to Peter Manins (LOC) and the rest of the Scientific Program Committee (SPC) for overall program management, Tom Beer (LOC) for convening the Plenary Lecture series, and Jacqui Murkins, Sarah Weatherby and Bree Richardson of arinex for a tremendous effort in constructing the scientific program schedule.
11. The media liaison program, although difficult to organise, worked very well in the end, and the exposure for the conference was excellent largely due to the proactive on-site activities of Simon Torok (LOC). There were many interviews covering all aspects of the science presented, and the public outreach event, Melbourne Conversations, was very successful. Thanks Simon for the getting this all together.
12. The Field trips and Workshops program eventually worked very well due to hard work of Adrian Pittari (LOC) and Helen Fremlin of arinex. It was unfortunate that many did not run because of lack of numbers, but those that did were very successful.
13. Organisation and preparation of agendas and minutes for LOC meetings was in general well handled by arinex, who acted as a secretariat for the LOC. Thanks to Erin Simmons, Rebecca Russell and Margaret Maling of arinex for their help with this.
14. On site management of the conference by arinex was excellent, and very professional. Thanks to Margaret Maling and Denisa Adamova for their overall management roles and to Jacqui Murkins, Sarah Weatherby and Dominika Howard of arinex for handling the program changes very well.
15. The conference scientific program book was excellent, visually very appealing, informative and very easy to use. Thanks especially to Erin Simmons and Jacqui Murkins of arinex for their excellent work on this.
16. The conference website generally worked well, and coped with the demand, although we did hear there were problems with re-entering one's registration page to make additions. Thanks to Erin Simmons of arinex for being very responsive to all requests. Some items remained on the website for longer than required, indicating the LOC should have had a member of the committee specifically dedicated to the role of website manager to monitor the functionality of the website, and working with arinex to keep it up to date.
17. Thanks especially to Gary Gibson for moving the Earth and organising a very topical earthquake in east Gippsland, Victoria, during the conference, as well as general Secretary duties in promoting the conference, assisted by Steve Chiswell in New Zealand.
18. I want to give a very big thank you to Peter Dyson, who as Treasurer, managed to keep the budget balanced, by working closely with me as Chair, and Rebecca Russell, Margaret Maling and Karine Bulger of arinex. Some difficult decisions were made at times, but in the end the conference did not suffer.
19. Having a professional conference organiser, arinex, working with the LOC from the beginning of the organisation process for 4 years, was essential to the successful running of the conference.



Arinex is congratulated and thanked for delivering an extremely well run conference. Their professionalism on-site was outstanding.

20. However, there are several aspects of the conference organisation that arinex should have handled better, in large part resulting from not understanding the complex nature of IUGG General Assemblies. Some issues included:

- **LOSS OF EVENT MANAGER:** The loss of the event manager, Rebecca Russell, because of motherhood, occurred at a very bad time during the organisation of the conference, and the transition to the new event manager, Margaret Maling, had many problems associated with it. Margaret took a long time to understand the conference, and probably did not grasp it until the actual conference.
- **ABSTRACT ENTRY SYSTEM:** The abstract entry system used by arinex, requiring different aspects of an abstract to be entered into different data windows in the on-line submission process, was outdated. Abstracts should be uploaded as a single, complete file in a specified format. That way each abstract can be downloaded and printed in entirety very simply from the abstract volume.
- **CONSTRUCTING THE SCIENTIFIC PROGRAM BOOK:** This is an enormously time consuming and complex process, that cannot be underestimated. Significant time needs to be allowed for DOUBLE checking the final draft before it is sent to the publisher for printing. We discovered some major errors, but because we had some extra time in our schedule we were able to rectify them in time.
- **CONSTRUCTING THE ABSTRACT VOLUME:** This may seem like a simple process, but it is also complex and requires adequate time for checking.
- **PRELIMINARY OR PREDICTIVE BUDGET PREPARATION:** Arinex made some errors in drawing up the initial predictive budget and estimating major cost items, but due to careful budget management, we were able to adjust the budget.
- **THE COST OF THE CONVENTION CENTRE AND ITS FACILITIES:** This was the biggest budget item and cost to the conference. The nature of the cost schedule negotiated by arinex was not clear, and unfortunately surprise extra costs kept arising. This has been explained as being due to the convention centre being built while the conference was being organised and so some initial cost estimates changed once the convention centre was operational. Other costs increased as the magnitude of the conference became clear. This was not satisfactory.

## **Summary**

Overall, the LOC is extremely pleased with how successful the conference was, justifying all the hard work involved. I thank everyone who contributed to making it so. We can be especially pleased, given that this was the most difficult global financial climate that I can remember for organising a major international conference. Achieving registered delegate numbers of about 3,400 was a significant achievement in the circumstances.

**REPORT OF THE CHAIR OF THE SCIENCE PROGRAM COMMITTEE**  
**PETER MANINS**

The Scientific Program of the XXV General Assembly of IUGG (IUGG2011) ran from 28 June through to 7 July 2011. It involved about 3400 scientists from 82 countries. Over the 10 days of the Assembly delegates participated in 198 Symposia and Workshops comprised of 2831 oral and 1927 poster presentations.

As well as the 128 Symposia sponsored by the individual Associations and the 64 Joint Symposia sponsored by two or more Associations, there were nine Union Plenary Lectures by eminent scientists, and several specialty workshops held outside the core time of the Assembly.

## **1. Foundation and Composition**

The Scientific Program Committee (SPC) began work in February 2009. It was composed of the Secretaries General (SsG) of the eight Associations, and the Secretary General (SG) of IUGG. Peter Manins, an Honorary Fellow of CSIRO Australia, Division of Marine and Atmospheric Research, was appointed as Chair of the Committee. The membership was:

- Alik Ismail-Zadeh, SG of the Union
- Manfred Lange, SG of the International Association of Cryospheric Sciences. Ian Allison, President of IACS, participated in all teleconferences on behalf of Manfred Lange.
- Hermann Drewes, SG of the International Association of Geodesy (IAG)
- Mioara Mandea, SG of the International Association of Geomagnetism and Aeronomy (IAGA)
- Pierre Hubert, SG of the International Association of Hydrological Sciences (IAHS)
- Hans Volkert, SG of the International Association of Meteorology and Atmospheric Sciences (IAMAS)
- Johan Rodhe, SG of the International Association for the Physical Sciences of the Oceans (IAPSO)
- Peter Suhadolc, SG of the International Association of Seismology and Physics of the Earth's Interior (IASPEI), and
- Joan Marti, SG of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI). Ray Cas, President of the IUGG2011 Local Organising Committee (LOC), participated in all teleconferences on behalf of Joan Marti.

## **2. Meetings**

The SPC initially corresponded by email, establishing an outline work plan and identifying one or two scientists in Australia and New Zealand matched to each Association, who could provide some help with local issues and scientific emphases that would assist the work of the Committee.

A first face-to-face meeting of the full SPC occurred on 12 October 2009 (21 months to Assembly start) in Melbourne, where initial science program ideas and expectations from each Association were discussed, the SsG endorsed a decision to limit the scientific program of the 2011 Assembly to 10 days, including each day of the central weekend, and a draft of the timetable for the Assembly scientific meetings was settled upon. This timetable was followed over the full planning phase and worked very well during the Assembly.

A second face-to-face meeting of the full SPC occurred over 2–3 May 2011 in Vienna (7 weeks to Assembly start). At this meeting, the SPC went through the scheduling of the draft scientific program,

combining some symposia, dropping and adding sessions, and setting the relative ordering of every symposium and workshop. The General Assembly's organising company, *arinex*, sent two staff to the Vienna meeting — Margaret Maling (IUGG2011 Manager) and Jacqueline Murkins (IUGG2011 Program Manager), their counterparts to the Local Organising Committee (LOC) and SPC Chair respectively. This meeting proved to be vital, showing that all symposia as agreed would actually fit together with only a few clashes and that there would be adequate rooms available for the scientific program and the Associations' and Union's business meetings in the venue.

Commencing 10 March 2010 (15 months to Assembly start) the SPC met for an hour by teleconference each month, a day or so before the regular meeting of the LOC in Melbourne. Also participating were Ray Cas (LOC Chair; representing IAVCEI) and Ian Allison (IACS president; representing IACS), Tom Beer (IUGG President) reporting on the Plenary Speakers, and *arinex* staff taking action notes and providing information on operational and program challenges. These meetings went very well and were very important in keeping all informed of issues and progress.

By March 2011 (14 weeks to Assembly start) it became evident that due to the rapidly evolving progress for the Assembly, the teleconference format needed to be expanded. The agenda from then on included a section chaired by Ray Cas as Chair of the LOC, and had Peter Dyson, LOC Treasurer, and Gary Gibson, LOC Secretary, also participating. Items arising were either dealt with on the spot by this LOC sub-committee or were taken to the next full LOC meeting.

### 3. Defining the Symposia

At the first face-to-face meeting of the SPC it was agreed that the scientific program would include

- Nine Plenary Speakers, one each recommended by the Associations and the Union to the IUGG President who made the final invitations.
- 10–12 Union Symposia identified as being of wide interest to all. Oral presentations would be by invitation only; a call for poster presentations would be made. These Union Symposia would be supported by Symposia proposed by several Associations (Joint Symposia) and by Symposia specific to different Associations (Association Symposia).
- Joint Symposia put forward by two or more Associations. Topics would be identified by Secretaries General and leading scientists who might become Lead Convenors and supporting Convenors. These Symposia would include Invited Speakers and selected oral presentations from a Call for Abstracts. Poster presentations would also be called for.
- Association Symposia as for Joint Symposia but of more specialised interest to an individual Association.

Substantial effort was made over an extended period by all Secretaries General to limit the number of Symposia so that participants would not be faced with too many overlapping themes and too many sessions running in parallel.

A coding convention, evolved from previous IUGG General Assemblies, was adopted and proved to work well:

U	Union	IUGG
J	Joint	2 or more Associations
C	Cryospheric	IACS
G	Geodesy	IAG
A	Aeronomy and Geomagnetism	IAGA
H	Hydrology	IAHS
M	Meteorology	IAMAS
P	Oceanography	IAPSO
S	Seismology	IASPEI
V	Volcanology	IAVCEI

When followed by an assigned number, this Code was used to identify Symposia and Workshops, as for example V07 — IAVCEI Symposium number 07. Joint Symposia were identified as for example, JM01 — Joint Symposium number 01 led by IAMAS. JHW03 was Joint Symposium number 03 led by IAHS.

Secretaries General oversaw the development of the symposia that would be in the Scientific Program. A first deadline of 22 February 2010 was set. Senior scientists and all with strong interests put forward proposals and volunteered as Lead Convenors. Discussions between the Lead Convenors and others brought forward co-convenors and identified cross-Association linkages. A working version of the scientific program was put up on a closed Web page on 1 April 2010, and over the next two months this program was refined, consolidated and filled out so that on Friday 4 June 2010 (just over 12 months before Assembly start) a full program of symposia and workshops was proposed on the IUGG2011 Web site.

On Monday 16 August 2010 (10.5 months before Assembly start), the Call for Abstracts along with the proposed Scientific Program and draft timetable, was announced on the Web.

The process of refining the Scientific Program symposia and workshops continued up to and even during the Assembly in June/July 2011.

#### 4. Scientific Program Structure Defined

As defined in October 2009, the IUGG2011 Web site displayed the outline timetable for the Scientific Program both by Assembly day and by Association. This information was posted early 2010, before the Call for Abstracts was announced on 16 August 2010 and was held to throughout the planning process.

“The Scientific Program will run from Tuesday 28 June 2011 until Thursday 7 July 2011. Each day will consist of four 90 minute sessions and one poster session (excluding the first Tuesday and the second Thursday). The Tuesday afternoon session of the first week will be the opening ceremony, the Thursday afternoon session of the second week is the closing ceremony, and three morning sessions will have plenary presentations.” – from Second Circular.

**IUGG2011 Draft Scientific Program : by Times**

	Week 1					Week 2				
	28-Jun Tues	29-Jun Wed	30-Jun Thurs	1-Jul Fri	2-Jul Sat	3-Jul Sun	4-Jul Mon	5-Jul Tues	6-Jul Wed	7-Jul Thurs
0830-1000	Morning Session									
1000-1030	Morning Tea									
1030-1200	Morning Continued	Plenaries	Morning Continued	Plenaries	Continue	Plenaries	Morning Continued			
1200-1330	Lunch									
1330-1500	Afternoon Session									
1500-1630	Poster Session with Afternoon Tea									
1630-1800	Opening Ceremony	Afternoon Session Continued								Closing Ceremony
1800-1900	Welcome Reception			possible Reception			possible Reception			

Starting at 1030 on three days, Plenaries featured eminent Speakers presenting at a time likely to achieve a substantial audience. This worked very well.

Each oral session was divided into six 15 minute slots. Session structures were the responsibility of the Lead Convenors for the symposia. They decided on how these slots would be allocated among accepted speakers, discussions or poster previews.

An important requirement was that once published, presentations should not be moved, since delegates rely on the printed program for times to move between rooms to attend selected presentations. Unfortunately a firm-enough stand was not taken on the 15 minute intervals, and a few

symposium convenors determined to do their own thing, causing extra work for the organisers and inconvenience to some speakers and delegates.

The timetable by Association was established after that by Time, since it required a sense of priorities and conflicts and the likely oral presenter numbers. Even so, it was published on the IUGG2011 Web site by August 2010 (11 months to Assembly).

**IUGG2011 Draft Scientific Program : by Association**



Joint Symposia were held during the central few days to allow the maximum participation by delegates who had limited time. This appeared to work well.

## 5. Call for Abstracts and Delegate Registration

The Call for Abstracts was announced on 16 August 2010 on the IUGG2011 Web site. The LOC had determined in October 2009 that a A\$30 abstract submission fee would be charged, in an effort to reduce abstract submissions from people who had no real prospect of turning up; otherwise such applications would likely lead to no-shows at the Assembly and holes in the Program. This fee caused some controversy, as did the limit of two presenting author abstracts, and the exact application of the fee and limit evolved over time. Indeed, a letter dated 29 November 2010 from the National Academies of USA complained about the limit on presenting authors and that they be the “first author”.

By 26 January 2011 (5 months before Assembly start) subtle word changes were in place; the Second Circular sent out then noted the requirements as stated on the IUGG2011 Web site. These were:

“Authors are permitted to submit a limit of 2 presenting author abstracts for oral presentations, but may also submit abstracts for poster papers or be non-presenting co-authors on other oral presentations. However, all presenting authors are expected to register and pay the registration fee to have their paper(s) included in the scientific program.

This deposit will be deducted from your registration fees when you register for the General Assembly. If you do not register for the General Assembly, the fee will not be refunded. ABSTRACT(S) MUST BE SUBMITTED BY THE AUTHOR WHO WILL PRESENT THE PAPER. ”

“You will be required to pay a A\$30 author deposit by credit card, cheque or electronic funds transfer (EFT).”

This Abstract Submission fee was a major difficulty for a small number of potential delegates. The author limit was widely misinterpreted, but was designed to stop multiple presentations by speakers who were only loosely familiar with their subject material.

The wording about “submitting” author being the “presenting author” rather than the “first author” was a change that helped defuse some concerns, as was allowing Union Symposia presenters to submit an additional two abstracts for oral presentation and/or any number for poster presentation.

The meaning of “Registration” also evolved over time. At the time of the Second Circular (26 January 2011, 5 months before Assembly start), it was presented as follows:

“All presenting authors are expected to register by 11 April 2011, the Early Bird Registration deadline, to guarantee their inclusion in the program and to take advantage of the early-bird registration rate. Payment of the registration fee should also be made at this time. Payment of the registration fee after this date will attract the higher standard registration fee rate.”

Submitting authors were required to register and to at least commit to pay the Assembly fee applicable at the time of payment. Without this commitment being received by *arinex*, which was extended as late as possible, indeed until 16 May 2011 (five weeks before Assembly start), speakers who had been accepted and included in the draft Program, were removed from the final Program posted on the Web and sent to the Printer on 14 June 2011 (two weeks before Assembly start).

The large majority of submitting authors followed the requirements without difficulty.

Even though some accepted authors did not respond to requests to register, nor give a commitment to register and attend, by the 16 May 2011 deadline, they were advised that if they showed up at the Assembly they would be able to present a Poster or, by arrangement with the relevant Symposium Lead Convenor, even be included in a session and present an oral paper in one of the “Discussion” slots. “Discussion” slots appeared in several sessions due to removals or last-minute withdrawals. A substantial number of delegates, including some who had never responded to any contact after their initial abstract acceptance, arrived onsite and were reinstated or presented on behalf of their non-attending co-authors in these slots.

## 6. Roles of Lead Convenors and Co-Convenors

Lead Convenors and Co-Convenors mostly self-nominated in the process of developing the symposia and workshops for the IUGG2011 Assembly. For Joint Symposia and Union Symposia, it was important to have convenors from the other Associations.

Lead Convenors had very important roles in the management of the Scientific Program:

- Lead Convenors developed the symposia scopes, usually with input from SsG.
- Lead Convenors reviewed all submitted abstracts, accepting, rejecting or suggesting moving some abstracts to more relevant symposia. They decided whether some proposals for oral presentation should be made as posters and *vice versa*.
- Lead Convenors scheduled the oral presentations for each symposium, and consulted with the relevant SsG and the SPC about the possible length of their symposia. In some cases this led to poster presentations being offered, rather than orals.
- Lead Convenors approached people to act as Session chairs to run the Symposia during the Assembly.

Co-Convenors were also important to the success of the Scientific Program:

- Co-Convenors reviewed abstract submissions, providing comments and scores for the Lead Convenors to make the final decisions.
- Many Co-Convenors assisted Lead Convenors in the final acceptance process, along with structuring sessions.
- Many Co-Convenors also chaired Sessions during the General Assembly.

In some cases SsG sought out Convenors, and invited the combining of some proposals to better consolidate symposia that were closely similar.

Some Lead Convenors were not timely in finalising their acceptance of abstracts and this caused delays in developing the draft full program. Further, some Lead Convenors did not structure their sessions and it was left to *arinex* to do this. In the absence of other information, Lead Convenors were made Session Chairs.

At the Vienna SPC meeting in May 2011 the Secretaries General reviewed all symposia and workshops and agreed to extend the number of sessions in some cases, combine some symposia, and delete some that had not attracted adequate numbers of abstracts. In the small number of cases involved, Lead Convenors were approached to restructure their sessions.

## **7. Deadlines and their Adherence**

The first Newsletter for IUGG2011 was prepared in June 2010 but because of uncertainty about Plenary Speakers, it was not finalised and released until 29 October 2010.

The Second Circular for IUGG2011 was sent out 26 January 2011, noting the close of acceptance of abstracts on 1 February 2011.

On 1 February 2011, an announcement was made that the abstract submission close date had been extended to 7 February 2011. However the reality was that abstracts were accepted well after that date. Indeed, a fresh call for abstracts was made on 11 April for papers dealing with the latest Pacific Rim disasters.

The Third Circular was sent out on 29 March 2011. It reminded people that the Early Bird registration date of 11 April was fast approaching, and announced a call for abstracts for posters dealing with very recent Pacific Rim disasters. The Early Bird acceptance date was actually closed on 13 April 2011.

The final Circular was sent out 16 June 2011 (2 weeks before Assembly start), alerting recipients to the Final Program as printed, on the IUGG2011 Web site, giving information on how to use the Program, and the links for delegates arriving, speaker preparation information, and poster guidelines, which had been available for several weeks.

The deadline for authors to finalise their registration by paying the Assembly fee was 16 May 2011. Authors were then given a final deadline of 6 June 2011 to complete registration (or confirm their attendance) before their presentation position would be removed from the printed version of the Scientific Program and from the version released on the IUGG2011 Web site. In fact this was implemented on 14 June 2011.

Even though some accepted authors did not register, nor give a commitment to pay the fee by the 16 May 2011 deadline, they were advised that if they showed up at the Assembly they would be able to present a Poster or, by arrangement with the relevant Symposium Lead Convenor, be included in a session and present their accepted oral paper. A number of "Discussion" slots occurred in several sessions due to removals or last-minute withdrawals; this allowed the reinstatement of presentations or for Convenors to schedule Poster summaries. This undertaking was exercised by a substantial number of delegates, even including some who had never responded to any contact after their initial abstract acceptance.

## **8. The Final Program Handbook**

The Final Assembly Handbook was printed in 300 pages hardcopy and the Scientific Program pages were made available on the IUGG2011 Web site.

## **9. Role of Conference Organising Company, arinex**

The LOC contracted *arinex* to provide conference management services. For the Scientific Program activities, *arinex* assigned a Senior Program Coordinator to partner the SPC Chair. Up to October

2010 Bree Richardson had this role, with Jacqueline Murkins taking over to completion of the Assembly.

*arinex* arranged all SPC meetings, took Action Notes, and responded to requests and needs of the SsG. The management of the IUGG2011 Web site was also undertaken by *arinex*; they implemented a centralised Web site update process for the SsG and Symposia Convenors.

Bree Richardson worked very closely with the SPC to develop the Scientific Program symposia and workshop offerings for the Call for Abstracts, including responding to a large number of changes as the Web site for the Scientific Program was developed.

Jacqueline Murkins joined the project in time to handle the full range of tasks for a group of IAHS Symposia and Workshops that had an early submission deadline for full proceedings pre-print publication by 8 November 2010. This exercise gave her and *arinex* a taste of what was in store for the full Assembly.

As the Assembly approached, the magnitude of the tasks increased enormously. Dealing with delegate registrations and changes, the interminable changes from presenting authors, encouraging authors and convenors to respond to requests for action, developing the drafts of the detailed Scientific Program for the 10 days of the Assembly and including allocation of appropriate rooms and audio-visual requirements in the venue, and many other unseen tasks, kept Jacqueline and her team very busy.

*arinex* devised the drafts of all correspondence with authors and convenors, developed and managed the abstract review and assignment to themed sessions processes, managed all the details of assigning symposia sessions to a program grid and matching that with the rooms available in the venue, preparing the whole printed Assembly Handbook including devising and preparing the printed Scientific Program, produced a searchable USB stick version of the Scientific Program and all accepted Abstracts that included all co-authors.

During the Assembly Jacqueline and her team continually managed the Scientific Program onsite, including managing missing speakers, allocating new presentations to sessions, and managed replacement speakers and poster presenters.

## 10. Observations and Issues

The following are some points worth capturing — what should have been done, what could have been done better.

- It is important early in the Scientific Program development process to have in-depth discussions about key Scientific Program elements: such as what program structures might vary between symposia and between sessions, clarity on the needs of IAHS to have pre-Assembly preprints of proceedings, and what impact the requirements for publication of abstract proceedings might have on the way abstracts will be submitted.
- Extensions of deadlines have flow-on effects to key dates. For example, the second extension deadline for abstract submissions limited the co-convenors' review time to just 11 days, Lead Convenors were then limited to 7 days to complete all their acceptances before the Secretaries General met to finalise the program overview, with only one day remaining before the Early-Bird deadline date.
- Clarity on the requirements for abstract submissions and their repercussions: we required the submitting author to register and present at the Assembly, but it is important in scientific circles that the submitted author list be maintained and not require the first listed author to be the submitting author.
- The scientific program timetable of oral sessions, breaks, plenaries, dedicated Poster sessions and Poster Socials proved to be an excellent way to divide up each day.
- From comments received, the scientific program included too many orals of lesser quality. The SPC should be firm in restricting the number of sessions for many of the Symposia so



that Lead Convenors really do have to make hard decisions, perhaps focussing more on review papers. The size of the venue was such that it was too easy to offer Convenors of Symposia all the sessions initially requested and to even offer in a few cases, extra sessions.

- Accepting late registering presenters to fill “Discussion” slots and also offers to display posters, during the Assembly, seemed to be a popular and well received approach for dealing with latecomers.
- Session chairpersons in many cases failed to do their job well. Too few mentioned the Posters related to their session; in too few cases were Poster presenters offered an opportunity to introduce their Posters. There were some cases where timekeeping was very poorly managed.
- Electronic posters were offered as a complement to mandatory paper A0 posters.
- Although the two Poster Socials were listed in the Handbook, all too many delegates seemed to be unaware of these before the events. The venue notice screens should have featured these events and were in any case very poorly utilised throughout the Assembly.
- Scientific workshops held during the Assembly should be well incorporated into the Program.
- The offer of an oral presentation rather than a poster presentation is very important for some for participants to obtain funding from their host organisation.
- Program codes should be set for Plenary Speaker presentations and for Opening Ceremony Speaker presentations to aid in defining the timetable and uploading presentations.
- The Web site provided the ability for delegates to prepare a Letter of Invitation. A similar ability to generate a Certificate of Participation during the Assembly is also important for some and should be provided (passworded) as well.
- Poster boards were well located and well spaced in zigzag lines. However, at IUGG2011 the angle of 90deg between individual boards proved to be too tight — it should have been 120deg.
- The updating and the clarity of the Web site is an important requirement for any Assembly.
- The work involved in putting together the scientific program before the call for abstracts, the handling of abstracts, the structuring of sessions and speakers and room allocations, and the running of the Program onsite was so large that the Conference Organising company was essential.

**LIST OF LECTURES AND SYMPOSIA HELD AT THE XXV GENERAL ASSEMBLY OF THE  
INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS**

**Union Lectures**

Union – IAMAS (Tucker Memorial Lecture)	Environmental Observations as a Basis for Environmental Intelligence (Greg Ayers, Australia)
Union – IAPSO	Present-day Sea Level Rise; How Unusual and Can We Explain It? (Anne Cazenave, France)
Union – IACS (Radok Memorial Lecture)	The Hidden History of Ice-Sheets: The Secret to Predicting Sea-level Rise (David Vaughan, United Kingdom)
Union – IUGG	Probing the Earth (Brian Kennett, Australia)
Union – IASPEI	Forecasting Earthquakes and Predicting Their Hazards (Thomas Jordan, USA)
Union – IAG	The Challenge in Earth Observation: From the Fast Response to Catastrophic Events to the Reliable Detection of Very Small Trends (Markus Rothacher, Switzerland)
Union – IAGA (Troitskaya-Cole Memorial Lecture)	Assessing Solar and Solar-Terrestrial Influences as a Component of Earth's Climate Change Picture (Daniel Baker, USA)
Union – IAHS	Hydrology and Change (Demetris Koutsoyiannis, Greece)
Union – IAVCEI	Volcanism and Global Sustainability (Stephen Self, USA)

**Union Symposia**

U01	Science & Nuclear Test Ban Monitoring
U02	Grand Challenges in Natural Hazards Research and Risk Analysis
U021	Grand Challenges in Natural Hazards Research and Risk Analysis: Earth on the Edge – Recent Pacific Rim Disasters
U03	Recent Progress in the Studies of the Earth's Deep Interior
U04	Progress and Perspectives in Studies of the Continental Lithosphere
U05	Data Science/Informatics and Data Assimilation in Geophysical Models
U06	Geoengineering: What are the Potentials for Climate Intervention, Carbon Scrubbing, and other Approaches to Moderate Climate Change and its Impacts?
U07	Mathematical Tools in Geophysical Modelling
U08	Global and Regional Sea Level Change
U09	Do We Really Know the Hydrological Cycle?
U10	Climate Change: a 360 Degree-View from IUGG Associations
U11	Earth and Space Science in Africa
U12	Geosciences and the Future of Planet Earth

**Inter-Association Symposia and Workshops**

JC01	Arctic System Modelling (IACS, IAMAS, IAPSO)
JC02/JC03	Snow – Atmosphere Interactions and Avalanches (IACS, IAMAS, IAHS(ICSIH))
JC04	Ice Shelves and Glacier Tongues – Ice on the Edge (IACS, IAPSO)
JG01	Space Geodesy-based Atmospheric Remote Sensing as a Synergistic Link between Geodesy and Meteorology (IAG, IAMAS)
JG02	Application of Geodetic Techniques in Cryospheric Studies (IAG, IACS)

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- JG03 History of Geosciences from Terrestrial to Spaceborne Observations (IAG, IAGA Inter-Divisional Commission on History, IASPEI)
- JG04 Structure and Deformation of Plate Interiors (IAG, IASPEI, IAVCEI)
- JG05 Integrated Earth Observing Systems (IAG, IACS, IAGA, IAHS, IAMAS, IAPSO, IASPEI, IAVCEI, IOC, GOOS, GCOS, GEO/GEOSS)
- JG06/JS06 Tectonic Geodesy and Earthquakes (IAG, IASPEI, IASPEI, IAG)
- JA01 Fluids in the crust and mantle: Geodynamic and seismological consequences – geophysical and geological constraints (IAGA, IAG)
- JA02 Climate and Weather of the Sun-Earth System – CAWSES –II early results (IAGA, ICMA, IAMAS)
- JA03 Long-term changes in the stratosphere, mesosphere, thermosphere and Ionosphere (IAGA, ICMA, IAMAS)
- JA04 Electromagnetic oscillations from space to Earth: Celebrating 150 years and recent developments in ultra-low frequency wave research (IAGA Div.3, IAGA Divisions I, II, V, Interdivisional Commission on History and IASPEI)
- JA05 Data rescue, digitisation and metadata requirements in geophysics (IAGA, IASPEI)
- JH01 GRACE, other remote sensing platforms and ground based methods for estimating multi-scale surface water budgets, groundwater system characterization and hydrological processes (IAHS (ICRS, ICSW, ICGW, ICWRS, PUB, GRACE), IAG, IAMAS)
- JH02 Hydro-climatology: Variability and change (IAHS (ICCLAS, ICSW, HYDROMET), IAMAS)
- JHW01 Integrated flood management (IAHS (ICSW, ICWRS), IAMAS, WMO, BOM Australia)
- JHW02 Interaction between fresh water and ecosystem in the coastal zone (IAHS (ICGW, ICWQ), IAPSO)
- JHW03 Impacts of changing climate, snow and ice on mountain hydrology (IAHS (ICSIH, ICLAS, ICRS, ICGW, ICSW, PUB), IAMAS, IACS)
- JHW04 Subglacial water: Properties, processes and role in ice-mass dynamics (IAHS (ICSIH), IACS)
- JM01 Geoengineering: Can it limit climate change and its impacts? (IAMAS (ICCL), IAVCEI)
- JM02 Data assimilation and ensemble forecasting for weather and climate (IAMAS (ICDM, ICMA), IAPSO, IAHS, IAGA, IACS)
- JM03 Earth system observations and integration (IAMAS (ICCL), IAPSO)
- JM04 Stratosphere-Troposphere-Ocean coupling in weather and climate (IAMAS (ICMA, ICDM, ICCL), IAPSO)
- JM05 Manifestation of anthropogenic forcing and natural variability in the Arctic and Antarctic climate systems (IAMAS (ICPM), IAPSO, IACS)
- JM06 High-impact weather and extreme climate events (IAMAS (ICCL, ICDM), IAHS)
- JM07 Atmospheres and ices on terrestrial planets (IAMAS (ICPAE), IACS)
- JM08 Predictability of the coupled climate system, climate system feedbacks and sensitivity to external forcing (IAMAS (ICCL, ICDM), IAPSO, IACS)
- JM09 External forcing from above on the middle atmosphere and lower ionosphere (IAMAS (ICMA), IAGA)
- JM10 Monsoons, Tropical Cyclones and Tropical Dynamics (IAMAS (ICCL, ICDM), IAPSO, IACS, IAHS, GEWEX, CLIVAR)
- JM11 From Ice-house to Green-house: Studies of Natural and Human-Induced Climate Change (IAMAS (ICCL), IAPSO, IACS)
- JM12/A06.4 Thunderstorms: from troposphere to mesosphere and beyond / Thunderstorms: Upwards and Downwards Coupling of the Atmospheric Layers and near-Earth Space (IAMAS (ICAE), IAGA (Division II))
- JM13 Precipitation measurements; instrumentation and statistics at all scales (IAMAS (ICCP), IAHS)
- JP01 The Southern Ocean in a changing world (IAPSO, IACS)
- JP02 Future state of the Arctic and potential impact (IAPSO, IACS, IAMAS)
- JP03 Global and regional sea-level change (IAPSO, IACS, IAG)
- JS01 Advances in Tsunami Science, Warning, and Mitigation (IASPEI, IAPSO and IAVCEI)
- JS02 Heat Flow, Tectonics, and Geothermal Energy (IASPEI)
- JS03 Scientific Results from Seafloor Networks (IASPEI, IAPSO and IAGA; ION)
- JS04/JV03 Physics and Chemistry of Earth Materials with Implications for Earth Structure and Processes (IASPEI, IAVCEI, IAGA, IAVCEI, IASPEI, SEDI)
- JS05/JV04 The Davies Mantle: Reconciling Geophysical and Geochemical Perspectives (IASPEI, IAVCEI, IAVCEI-SEDI, IASPEI, SEDI)
- JS07 Antarctic and Arctic Research (IASPEI, IACS, IAG, IAGA)

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JS08/JV12	Volcano Seismology (IAVCEI, IASPEI)
JS09	Electromagnetic Studies of Earthquakes, Active Faulting and Tsunamis (IASPEI, IAGA, IAVCEI)
JS10	Electromagnetic studies of active processes using space technology (IASPEI, IAGA, IAVCEI)
JS11/JV09	Imaging and monitoring active volcanoes and geothermal fields by Electro-Magnetic (EM) and other geophysical techniques (IASPEI, IAGA, IAVCEI)
JS12	Towards short-term earthquake prediction – Electromagnetic and other possible precursors and their generation mechanisms (IASPEI, IAGA, IAVCEI)
JV01	World Volcano Observatories (WOVO) and International Science (IAVCEI IAMAS)
JV02	Forecasting and Monitoring Volcanic Eruptions (IAVCEI, IASPEI, IAG, IAGA)
JV03/JS04	Physics and Chemistry of Earth Materials with Implications for Earth Structure and Processes (IASPEI, IAVCEI, IAGA, IAVCEI, IASPEI, SEDI)
JV04/JS05	The Davies Mantle: Reconciling Geophysical and Geochemical Perspectives (IASPEI, IAVCEI, IAVCEI-SEDI, IASPEI, SEDI)
JV05	Using Geodesy on Volcanoes to Understand Volcanic, Tectonic, and Hydrothermal Forces (IAVCEI, IAG)
JV07	Using Paleomagnetism to Understand Volcanic Processes (IAVCEI, IAGA)
JV08	Remote Sensing of Volcanic Hazards and the Risk to Global Aviation (IAVCEI, IAMAS)
JV09/JS11	Imaging and monitoring active volcanoes and geothermal fields by Electro-Magnetic (EM) and other geophysical techniques (IASPEI, IAGA, IAVCEI)
JV10/V19	Volcanic and Seismic Issues Related to Siting of Nuclear Facilities / Probabilistic Volcanic Hazard Mapping (IAVCEI, IASPEI)
JV11	Progress and Perspectives in Studies of the Continental Lithosphere (IAVCEI, IASPEI, ILP)
JV12/JS08	Volcano Seismology (IAVCEI, IASPEI)

### Association Symposia and Workshops

#### International Association of Cryospheric Sciences (IACS)

C01	Remote Sensing of the Cryosphere – linking and validating measurements from satellite, air, and ground
C02	Ice Cores and Climate
C03	Morphology of Snow and Ice on the Ground and in the Atmosphere (IACS, IAMAS)
C04	Glacier and Ice Cap Fluctuations

#### International Association of Geodesy (IAG)

G01	Reference Frames from Regional to Global Scales
G02	Monitoring and Modelling of Mass Distribution and Mass Displacements by Geodetic Methods
G03	Monitoring and Modelling Earth Rotation
G04	Multisensor Systems for Engineering Geodesy
G05	Geodetic Imaging Techniques
G06	Towards a Unified World Height System
G07	High Precision GNSS

#### International Association of Geomagnetism and Aeronomy (IAGA)

A011	Planetary Magnetic Fields and Geomagnetic Secular Variation (Div I and Div V)
A012	Planetary Magnetic Fields and Geomagnetic Secular Variation (Div I)
A013	Planetary Magnetic Fields and Geomagnetic Secular Variation (Div I)
A021	Electromagnetic Induction (Div I)
A022	Electromagnetic Induction (Div I)
A031	Paleomagnetism (Div I)
A032	Paleomagnetism (Div I)
A033	Paleomagnetism (Div I)
A034	Paleomagnetism (Div I)
A041	Rock Magnetism (Div I)
A042	Rock Magnetism (Div I and Div V)
A043	Rock Magnetism (Div I)
A044	Rock Magnetism (Div I)

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- A050 Electrodynamic and energetic of the middle atmosphere and lower thermosphere: the local and global picture (Div II)
- A061 Coupling in the atmosphere-ionosphere-magnetosphere system and its response to external forcing and forcing from below (Div II)
- A062 Coupling in the atmosphere-ionosphere-magnetosphere system and its response to external forcing and forcing from below (Div II and Div III)
- A063/A065 Coupling in the atmosphere-ionosphere-magnetosphere system and its response to external forcing and forcing from below (ICDC, Div II & Div III)
- A071 Radiation belt dynamics and remote sensing of the Earth's plasmasphere (Div II and Div III)
- A072 Radiation belt dynamics and remote sensing of the Earth's plasmasphere (Div II)
- A081 Space plasma processes (Div III)
- A082 Space plasma processes (Div III)
- A083 Space plasma processes (Div III)
- A091 Magnetosphere-ionosphere coupling (Div III and Div II)
- A092 Magnetosphere-ionosphere coupling (Div III and Div II)
- A093 Magnetosphere-ionosphere coupling (Div III and Div II)
- A101 The Sun and the Heliosphere: New Views (Div IV)
- A102 The Sun and the Heliosphere: New Views (Div IV)
- A111 The Sun and the Heliosphere: Physical Processes (Div IV)
- A112 The Sun and the Heliosphere: Physical Processes (Div IV)
- A113 The Sun and the Heliosphere: Physical Processes (Div IV)
- A121 Space Weather and Space Climate (Div IV)
- A122 Space Weather and Space Climate (Div IV and Div V)
- A131 Magnetic observations from ground to space – ingredients for new geomagnetic Research (Div V)
- A132 Magnetic observations from ground to space – ingredients for new geomagnetic Research (Div V)
- A141 Lithospheric field and related geological/tectonic implications (Div V)
- A142 Lithospheric field and related geological/tectonic implications (Div V)
- A143 Lithospheric field and related geological/tectonic implications (Div V)
- A144 Lithospheric field and related geological/tectonic implications (ICDC and Div V)
- A151 Reporter's Review (Div III)
- A152 Reporter's Review (Div IV)
- A153 Reporter's Review (Div V)
- A161 History sessions focused on IAGA subdisciplines (IAGA Inter-Divisional Commission on History)
- A162 History sessions focused on IAGA subdisciplines (IAGA Inter-Divisional Commission on History)

**International Association of Hydrological Sciences (IAHS)**

- H01 Conceptual and modelling studies of integrated groundwater, surface water, and ecological systems (ICGW, ICSW, ICWQ, ICWRS)
- H02 Cold regions hydrology in a changing climate (ICSIH, PUB)
- H03 Risk in Water Resources Management (ICWRS, ICSW, ICWQ)
- H04 Assessment of water quality under changing climate conditions (ICWQ, ICCE, ICWRS, UNESCO)
- HW01 Tracer applications in sediment research (ICCE, ICT, ICWQ, PUB)
- HW02 Understanding and quantifying physical and geochemical processes during artificial recharge of groundwater (ICGW, ICWQ)
- HW03 Regional groundwater modelling: Approaches, challenges, and future directions (ICGW, ICT)
- HW04 Snow and ice hydrology: Principles, processes and prediction (ICSIH, ICGW, ICSW)
- HW05 Revisiting experimental catchment studies in forest hydrology (ICSW, ICRS)
- HW06 Expert judgement versus statistical goodness-of-fit for hydrological model Evaluation (ICSW, ICWRS, STAHY)
- HW07 Hydro-geomorphology (ICSW, ICCE)
- HW08 Tracer hydrology as a tool for estimating flow parameters, groundwater dynamics, pollution transport and bioremediation processes in heterogeneous systems (ICT, ICGW)
- HW09 Revaluing system knowledge in water resources management (ICWRS, ICWQ)

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- HW10 Water quality and sediment prediction in ungauged basins (ICWQ, ICCE)  
HW11 Water supply and water quality in large metropolitan areas and megacities (ICWQ, ICWRS)  
HW12 Quality and quantity aspects of green and blue water: Impact on agriculture, environment, energy and industry (ICWQ, ICWRS)  
HW13 Recent development of statistical tools for hydrological application (STAHY, ICSW, ICWRS)  
HW14 Education in the hydrological sciences (EDU)

**International Association of Meteorology and Atmospheric Sciences (IAMAS)**

- M01 Solar UV radiation (IRC)  
M02 Chemistry-climate interactions (ICMA, ICACGP, ICCL, IOC, IRC)  
M03 Aerosol-Cloud-Precipitation-Radiation-Interactions (ICCP, ICCL, IRC))  
M04 Recent advances in middle atmosphere science (ICMA)  
M05 Comparative Atmospheres of the giant planets and their satellites (ICPAE)  
M06 Bioaerosols in the Earth system (ICCP)  
M07 Advances in atmospheric dynamics (ICDM)  
M08 The impact of solar variability on the Earth (ICMA, IRC, ICAE, ICCL, ICCP, IOC)  
M09 Three-dimensional radiative transfer in the atmosphere (IRC)  
M10 Tropospheric processes and processing: Pollution and biogeochemical cycling (ICACGP)  
M11 Ice in the Atmosphere: Formation, Measurement, Modeling and Impacts (ICCP)  
M12 Mesoscale and synoptic scale meteorology in the Arctic and Antarctic (ICPM)  
M13 Mineral dust: Its impact on the atmosphere and the ocean (ICCP)  
M14 Stratospheric processes and their role in climate focused on the Southern Hemisphere (IAMAS (ICMA), WCRP (SPARC), IGAC)

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

- PAS1 IAPSO The Prince Albert I Medal & Memorial Lecture  
P01 General topics of ocean physics and chemistry  
P02 Physical and biogeochemical processes in marginal enclosed and semienclosed seas  
P03 Ocean Mixing  
P04 Thermohaline Circulation (THC) and Deep Currents  
P05 New insights from Sustained Ocean Observing Systems  
P06 Eastern and Western Boundary Currents  
P07 Ocean acidification, including Coastal Coral Reef Oceanography

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

- S01/S03 Seismological Observation and Interpretation/ Sub-Saharan Africa Seismology  
S02 Triggered and Induced Seismicity  
S04 Non-instrumental seismology  
S05 Infrastructure for seismology (FDSN)  
S06 Recent Large/Destructive Earthquakes  
S07 Strong Ground Motions; their source, path, and site effects  
S08 Seismic Hazard and Risk – The Global Earthquake Model  
S09 Earthquake Early Warning Systems  
S10 Physics of the seismic process: from laboratory studies to field observations  
S11 Earthquake forecasting and testing  
S12 Episodic Tremor, Slip, and Large Earthquakes  
S13 Seismic Imaging of the Lithosphere and Mantle  
S14 Plate Boundary Processes  
S15 Anisotropy and attenuation: mechanisms, processes and observations  
S16 Earthquake Disaster Assessments: Seismology and Engineering  
S17/S18 Earthquakes and public health / Using NMSOP and other educational modules and tools for online and in-person training courses  
S19 Christchurch Earthquake

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

- V01/V04 Magma chambers and intrusions: their physical and chemical dynamics  
V02 Arc Magmatism: The Constructive and Destructive Dynamics of Convergent Margin Magmatism  
V03 Time-scales of Magmatic Processes and Volcanological Implications

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V05	Magmatic Volatiles and Gases
V06	The Rheology of Magmas
V07	Subaerial and Subaqueous Lava flows
V08	Volcanic Conduit and Vent Processes
V09	Eruption, Transport and Deposition of Pyroclasts in Plumes Using Field Studies, and Computational Modelling
V10	The Dynamics of Pyroclastic Density Currents: Field Studies of Their Deposits, Computational Modelling and Experiments
V11	Characteristics and Imaging of Pyroclasts
V12	Tectonic Controls on Volcanism
V13	Understanding Big Volcanic Systems
V14	Monogenetic Volcanism: Magma Sources, Ascent and Eruption
V15	Kimberlite Volcanology
V16	Subglacial and Subaqueous and Volcanism: processes, products and impacts
V17	Planetary Volcanism: what's different out there, what's new, and what are we learning?
V18	Surface processes in volcanic terrains: the erosion, transport and redeposition of volcanoclastic material and their associated hazards
V19/JV10	Probabilistic Volcanic Hazard Mapping / Volcanic and Seismic Issues Related to Siting of Nuclear Facilities (IAVCEI, IASPEI)
V20	Volcanic Systems and Mineral Deposits
VW01	VHub cyberinfrastructure for volcanology – modeling, data sharing, and collaboration
VW02	Ground-based and remote sensing of volcanic unrest
VW03	Workshop of the Volcanic Ash Fall Impacts Working Group

### **Pre-Assembly Workshops**

W01	The Greatest Natural Disasters of our Time
S-A-VJW01	GPlates Shortcourse
V-MJW01	Eyafjallajökull, volcanic clouds, and aviation – one year on

**XXV IUGG General Assembly Opening Ceremony**  
**MELBOURNE, AUSTRALIA, 28 JUNE 2011**

The Opening Ceremony of the XXV General Assembly of the International Union of Geodesy and Geophysics was held in the afternoon of Tuesday, 28 June 2011 at the Melbourne Convention Centre, Melbourne, starting at 16:00.

**PROGRAMME**

Welcoming Speech by Ray Cas, Chair of the Local Organising Committee of the XXV IUGG General Assembly

Address by Peter Hall, Vice-President of the Australian Academy of Science

Welcoming Address by Keith Hunter, Vice-President of the Royal Society of New Zealand

Address by Reiko Kuroda, Vice-President of the International Council for Science (ICSU)

Address by Peter Manins, Chair of the Scientific Program Committee of the XXV IUGG General Assembly

Report by Alik Ismail-Zadeh, Secretary General of IUGG

Welcome by Tom Beer, President of IUGG



**WELCOMING SPEECH BY RAY CAS,  
CHAIR OF THE LOCAL ORGANISING COMMITTEE OF THE XXV IUGG GENERAL ASSEMBLY**

Distinguished Guests and all Delegates,

You don't know how pleased I am to see you all here!!!

On behalf of the Joint Australian and New Zealand Organising Committee, welcome to Melbourne and the IUGG2011 General Assembly.

For some members of the LOC, this has been a ten year journey, involving bidding for the conference twice, and then the final organization of the conference over the last 4 years.

The last 6 months has been particularly hard work, the most difficult part being to organize the eruption of Puyehue volcano in southern Chile and then navigating the ash cloud to Australia and New Zealand, for your entertainment! Ironically much of the ash that has caused aviation problems in Australia and New Zealand will end up back in South America after circumnavigating the globe.

There are many thanks, and I apologise to those I have missed

- The members of the LOC for their unfailing dedication
- Our wives and partners for putting up with our commitment
- The Secretaries General and Presidents of the IUGG and its eight member associations for their collaborative approach and co-operation
- The conference organizing company *arinex* for their incredible and sustained hard work
- The volunteers, all students, who will also participate in the conference, most as oral and poster presenters
- The sponsors, especially
  - the Victorian State Government, the major sponsor
  - the Silver Sponsor
    - Geoscience Australia
  - the Bronze Sponsors
    - CSIRO
    - Bureau of Meteorology
  - the minor sponsors
- The exhibitors who will display their activities during the middle part of the conference
- The Melbourne Convention and Exhibition Centre for the outstanding venue
- The city of Melbourne for being such a beautiful city for hosting this conference.

Please enjoy your time at the IUGG2011 conference!

**ADDRESS BY PETER HALL,  
VICE-PRESIDENT OF THE AUSTRALIAN ACADEMY OF SCIENCE**

The Australian Academy of Science is delighted that Melbourne is hosting the 2011 IUGG General Assembly, and that so many of you have come from near and far to take part in this meeting. The last time that Australia hosted an IUGG General Assembly was in Canberra in 1979. It is fitting that IUGG chose the southern hemisphere to hold this special event in 2011.

The Academy is pleased to have been the Australian adhering body to the International Council for Science, ICSU, since 1955. We greatly value the work that ICSU and the Unions have undertaken over many decades. The Academy and Australian researchers have had a long history of active involvement in IUGG and its associations. We have been particularly impressed by the work and dynamism of Dr Tom Beer as the President of the IUGG and we congratulate him on his presidency. I would also like to commend the local organisers, associations, and the scientific committee for putting together an outstanding and comprehensive program for this important event.

Australia has a proud tradition of excellence and innovation in science relating to the earth through studies of space, the oceans, the atmospheres and the solid earth. Australia plays a much larger international role in geophysics and geodesy than might be expected from the basis of mere population. We have the advantage of being a nation and a continent so that internal barriers are minimised. The configuration of a stable continent adjacent to active tectonic boundaries provides an excellent natural laboratory for many types of studies. As the largest landmass in a substantial slice of the Southern hemisphere Australia has taken a major role in the understanding of the Southern Ocean and Atmosphere, with strong links also to Antarctica where geophysical investigations help to understand the way in which this frozen continent responds to a changing environment.

Other Australian efforts range from observation and theoretical studies of the dynamic Sun to space weather, geomagnetism, meteorology, climate change, and tsunamis, all subjects of great interest to IUGG and indeed to humanity as a whole, especially in Asia and Oceania.

The Australian Academy of Science recognises the important contribution of the earth sciences and the need to both promote scientific excellence in Australia and to support Australia's contribution to international collaborative interdisciplinary science to address key global issues such as climate change.

**WELCOMING ADDRESS BY KEITH HUNTER,  
VICE-PRESIDENT OF THE ROYAL SOCIETY OF NEW ZEALAND**

**Ka** ta<sub>k</sub>i te Tītī, ka ta<sub>k</sub>i te Tōroa, ka ta<sub>k</sub>i hoki ko au, tihei mauri ora! (*Behold the breath of life*)

Tēnā koutou, tēnā koutou tēnā koutou katoa. (*Once, twice and thrice welcome*)

It is a very great pleasure for me to welcome you all here to the IUGG General Assembly in Melbourne on behalf of the Royal Society of New Zealand. I bring you all the greetings of the RSNZ President, Dr Garth Carnaby, the Council of the Society and its Academy of Fellows, of which I am the current chair.

I am reminded by an earlier speaker that the first ever IUGG General Assembly to take place in the southern hemisphere was held in Canberra in 1979. I attended that meeting as a young, newly-appointed academic, and so I find it particularly pleasing to return to the second IUGG General Assembly to be held in Australia in my present capacity. How the wheel of life turns!

Arguably, there has never been a more apt occasion for scientists to be gathering together to share knowledge and have discussions about the various earth sciences. A volcano in Chile has been conspiring to prevent many delegates for getting here. In my country, the city of Christchurch has been devastated by earthquakes since last year that never seem to end, and we have seen even more destruction and tragic loss of life in Japan and Haiti. And then there is the growing spectre of climate change, with its attendant flooding, heat waves and many other consequences. Looking at the scientific programme, these events will be central themes and like most of you, I am looking forward to participating.

My wife and I travel to Melbourne almost every year and now regard it as our second home. Therefore, let me recommend to you the many delights of this wonderful city. Delicious food from all around the world, wonderful museums and galleries, fascinating architecture. I hope that you will find time during your visit to enjoy the sights, sounds and tastes of Melbourne.

Nō reira tēnā koutou, tēna koutou, kia tatou katoa. (*And therefore, once, twice and thrice welcome again*)

**ADDRESS BY REIKO KURODA,  
VICE-PRESIDENT OF ICSU**

Vice-Presidents of the Australian Academy of Science and the Royal Society of New Zealand, President of IUGG, Prof. Tom Beer,  
Distinguished guests, Ladies and Gentlemen.

It is my great honour and pleasure to extend greetings on behalf of ICSU, the International Council for Science.

ICSU is a premier international scientific organization, non-governmental, established in 1931, and currently consists of 121 national scientific bodies, and 30 International Scientific Unions. ICSU is based on two earlier bodies: the International Association of Academies (IAA: 1899-1914) and the International Research Council (IRC: 1919-1931). It is a membership-based organization with 121 national members (representing 141 countries), and 30 International Scientific Unions, including IUGG.

ICSU has established 19 interdisciplinary bodies in key areas, with great success. Even though ICSU has limited finances it has unique worldwide access to intellectual resources.

ICSU's Mission is to "Strengthen International Science for the Benefit of Society". And to achieve this, ICSU mobilizes the scientific knowledge and resources of the international science community. The means to achieve this mission is to:

- Identify and address major issues of importance to science and society
- Facilitate interaction amongst scientists across all disciplines and from all countries
- Promote the participation of all scientists – regardless of race, citizenship, language, political stance, or gender – in the international scientific endeavor
- Provide independent, authoritative advice to stimulate constructive dialogue between the scientific community and governments, civil society, and the private sector.

We are currently finalizing the ICSU Strategic plan, 2012-2017.

Let me briefly introduce you our new initiative which is relevant to you, i.e., "*Earth System Research for Global Sustainability*".

To advance science and technology, change human behavior, and influence political will to avoid dangerous climate change, to meet needs for food, water, improved health and human security, and to eradicate extreme poverty and hunger and ensure ecosystem integrity, we will have to meet *a twofold challenge*:

- develop effective response strategies to ongoing global change
- deepen our knowledge of the functioning of the Earth system

and adopt *New ways of doing research*

- implement a more balanced mix of disciplinary, interdisciplinary, and transdisciplinary research
- actively involve stakeholders and decision-makers
- transition from research dominated by natural sciences to research
- involving the full range of sciences and humanities

IUGG consists of eight Union Associations and 69 member nations. It is noteworthy that related Unions get together to collaborate and become a big voice in the ICSU family.

IUGG promotes and coordinates physical, chemical and mathematical studies of the Earth and its space environment." Thus, IUGG and ICSU have similar missions and much in common.

The XXV General Assembly of IUGG is about to begin here in Australia, a country which produced many famous scientists, including Lawrence and William Bragg of X-ray crystallography, Howard

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Florey of penicillin, Barry Marshall of the *Helicobacter pylori* bacterium, and Elizabeth Blackburn of telomere and telomerase.

I wish a great success for the XXV General Assembly of IUGG, here in Melbourne.

Thank you for your kind attention.

**ADDRESS BY PETER MANINS,  
CHAIR OF THE SCIENTIFIC PROGRAM COMMITTEE OF THE XXV IUGG GENERAL  
ASSEMBLY**

It is my privilege and honour to be here to welcome you to my home city of Melbourne. You are one of about 3400 scientists from 82 countries taking part in the scientific program of the XXV Assembly of the International Union of Geodesy and Geophysics. Over the next 10 days you will participate in your selection from 198 Symposia and Workshops, over 2800 oral presentations and almost 2000 posters.

For most of you this is a welcome to the Southern Hemisphere where some things are different:

- such things as cyclones rotate clockwise,
- background carbon dioxide concentrations are lower,
- the ozone hole is a problem here,
- the sun is in the North, and the Southern Cross marks our Pole.

First of all I wish to thank the Chairman of the Local Organising Committee, Professor Ray Cas, for his strong leadership, and the entire Committee for their work in organising the logistics of this huge event.

The Scientific Program Committee, made up of the Union Secretary General and the Secretaries General of the eight member Associations of the Union, started work in January 2008. With me as Chair, they have met monthly by teleconference and in two face-to-face meetings over the period. I wish to record my admiration and thanks for their hard work in pulling together the large and complex scientific program. These people are:

- Alik Ismail-Zadeh, Secretary General of the Union,
- Manfred Lange, Secretary General of the International Association of Cryospheric Sciences,
- Hermann Drewes, Secretary General of the International Association of Geodesy,
- Mioara Manda, Secretary General of the International Association of Geomagnetism and Aeronomy,
- Pierre Hubert, Secretary General of the International Association of Hydrological Sciences,
- Hans Volkert, Secretary General of the International Association of Meteorology and Atmospheric Sciences,
- Johan Rodhe, Secretary General of the International Association for the Physical Sciences of the Oceans,
- Peter Suhadolc, Secretary General of the International Association of Seismology and Physics of the Earth's Interior, and
- Joan Marti, Secretary General of the International Association of Volcanology and Chemistry of the Earth's Interior.

I also wish to thank Bree Richardson and Jacqui Murkins of ARINEX, the Conference Organisers, for their friendly professionalism in coping with all our demands and needs and for making the science planning task run so successfully.

As well as the 128 Symposia sponsored by the individual Associations and the 64 Joint Symposia sponsored by two or more Associations, we have nine important Union Plenary Lectures by eminent scientists, including one by my friend Greg Ayers, head of the Bureau of Meteorology, Australia.

We have a series of particularly important symposia presentations dealing with recent Pacific Rim disasters where we really do feel 'Earth on the Edge'. We will cover the Japan Earthquakes, Tsunami and Nuclear disaster; the Christchurch Earthquakes; the Queensland Floods; and the Chile Earthquake and Tsunami; and possibly even the current Chilean volcanic eruptions.

There will also be a special Symposium on the 'Role of Geodesy and Geophysics in Delivering Economic, Social and Humanitarian Benefits', sponsored by Geoscience Australia.

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Special honours will also feature in Associations' meetings, including the award of the Prince Albert I Medal to my CSIRO colleague Trevor McDougall for his outstanding contributions to the enhancement and advancement of the physical sciences of the oceans.

I will now conclude by wishing you all a thoughtful and exciting science meeting, as well as hoping you have an opportunity to see something of this great city, and of Australia and New Zealand.

**ADDRESS BY ALIK ISMAIL-ZADEH,  
SECRETARY GENERAL OF IUGG**

Distinguished Guests, Dear Colleagues,  
Ladies and Gentlemen,

It is my pleasure to report to the XXVth IUGG General Assembly certain aspects of the administration of the Union.

As of 1 January 2011, IUGG has 69 Member Countries. This is four more than at the closing of the 24<sup>th</sup> General Assembly in Perugia, Italy, in 2007. Greece rejoined IUGG as a Regular Member. The Republic of Azerbaijan and the Former Yugoslav Republic of Macedonia became new Regular Members of the Union; Costa Rica and the Republic of Georgia joined IUGG as Associate Members; Bulgaria moved to a Regular Member; and India enhanced its membership category. Three Associate Members became regular members; thanks to the Royal Society of London (U.K. Adhering Body to IUGG) that paid membership dues of the Democratic Republic of Congo, Ghana, and Morocco for the last three years.

IUGG co-sponsored and took an active part in the four International Programs dedicated to the 50<sup>th</sup> Anniversary of the International Geophysical Year, namely: the International Polar Year, a joint initiative of the International Council for Science and the World Meteorological Organisation; the International Year of Planet Earth, a joint initiative of the International Union of Geological Sciences and UNESCO; and IUGG initiatives: Electronic Geophysical Year and the International Heliophysical Year.

During the past quadrennium, Scientific Assemblies of the Union Associations were held around the world emphasizing the importance of science to benefit society: volcanologists met in Reykjavik (Iceland); seismologists in Cape Town (South Africa); MOCA, a Joint Assembly of meteorologists, oceanographers and cryospheric scientists was held in Montreal (Canada), the association of geomagnetism and aeronomy held their assembly in Sopron (Hungary), geodesists met in Buenos Aires (Argentina), and hydrologists in Hyderabad (India).

The IUGG Union Commissions organized several conferences and symposia: two conferences on mathematical geophysics in Longyearbyen (Norway) and Pisa (Italy), two SEDI conferences in Kunming (China) and Berkeley (USA), and GeoRisk Commission symposia in Barcelona (Spain), Oslo (Norway), and Torino (Italy). GeoRisk Commission took active part in the organization and holding of the trans-disciplinary ENHANS project events in Iguassu (Brazil), San Francisco (USA), Pretoria (South Africa), Antalya (Turkey), and now in Melbourne.

Unfortunately several great natural disasters occurred for the last quadrennium. As a response to the 2010 Haiti earthquake disaster, IUGG adopted the special resolution on “Science on Natural Hazards and Environmental Disasters” and in March 2011 the special statement on the “Great East Japan Earthquake and Tsunami”. Another two statements on Volcanic Ash Clouds and on Volcanological and Meteorological Support for Volcanic Ash Monitoring, both related to the eruptions of the 2010 Icelandic volcano, were issued by IUGG and welcomed by the World Meteorological Organization and the International Civil Aviation Organization.

A new Union Commission for Data and Information was set up to provide a focused and sustainable organizational structure that supports and strengthens IUGG science through integrated scientific information activities. Four new Union Committees on (i) Capacity Building and Education, (ii) Honours and Recognition, (iii) Membership Issues, and (iv) Visioning were set up to increase IUGG visibility worldwide.

Seven multi- and inter-disciplinary international scientific projects were supported through the new IUGG Grants Programme. For the last quadrennial, a total of US\$65,000 in grants to support meetings was allocated to the organizers of 43 symposia, workshops, schools or meetings in 31 different countries, most of them in developing countries. IUGG Bureau and Executive Committee met in 2008



in Karlsruhe (Germany) and in 2009 in Melbourne (Australia); the Bureau met also in Cairo (Egypt) in 2010.

An important part of my duties during the past quadrennium has been service to the International Council for Science (ICSU), here represented by the ICSU Vice President, Professor Reiko Kuroda. IUGG issued the statement “Freedom to Conduct Science and Responsibilities of Scientists” highlighting the ICSU Principle of the Universality of Science, which is fundamental to scientific progress.

IUGG was successful in winning a total of EUR50,000 in competitive ICSU grants to promote research on natural hazards and disaster risks as well as geophysical research and geoinformation in Africa. IUGG nominated persons for numerous ICSU panels and scientific committees, and endorsed many initiatives of the Council. IUGG officers and representatives attended multiple ICSU meetings.

IUGG strengthened further its relationship with ICSU GeoUnions Consortium and ICSU Scientific Committees via cooperation in international programmes on natural hazards, data & information, and health & well-being. Since 2005 IUGG and the International Union of Geological Sciences (IUGS) assumed responsibility for the International Lithospheric Programme (ILP), formerly an ICSU Interdisciplinary Body. During the past 4 years, IUGG spent more than US\$120,000 to support inter-Union activities, including ILP, the World Climate Research Programme and the Federation of Astronomical and Geophysical Data Analysis Services (now transforming into the World Data System). We look forward to continuing positive collaborations with ICSU Members and within the active consortium of international Unions as well as to continuing a support of international scientific programs.

On behalf of IUGG, I thank the Local Organizing Committee and the Scientific Programme Committee of the XXV General Assembly for the excellent work done. Of particular importance, the Local Organizing Committee raised AU\$300,000 to support scientists who could not otherwise afford to travel to Melbourne. We understand the challenges of hosting a General Assembly, and we are grateful for their hard work.

During these past 4 years, the office of the IUGG Secretariat has been hosted by the Karlsruhe Institute of Technology in Germany and was financially supported by the grants from the German National Research Foundation (DFG). The grants permitted to hire the Assistant to the Secretary General and to help in travels of the Secretary General.

Finally, I thank the Members of the IUGG Executive and Finance Committees, Union Committees and Commissions and all IUGG Members for their dedication and active participation in the IUGG activities for the past 4 years. In particular, the IUGG President Tom Beer and Treasurer Aksel Hansen have served the Union with passion and dedication.

Best wishes to all for a successful General Assembly! Thank you.

**WELCOME BY TOM BEER,  
PRESIDENT OF IUGG**

I am pleased to welcome you all to Melbourne. It is ironic that all of you, the world's most distinguished geodesists and geophysicists, who are members of the international scientific union that devotes itself to research on the Earth, in order to be here have had to overcome volcanic ash clouds coming from South America, Earthquakes in New Zealand, Tornadoes in the United States, and devastating earthquakes and tsunamis in Japan.

All of you comprise the International Union of Geodesy and Geophysics, or IUGG as we call it. It has been in existence since 1919. Formally, countries – and only countries - are members of IUGG. This means that if your country is a member of IUGG, and you are a research scientist working on geodesy or geophysics then you are a part of IUGG. Of course, geophysics is taken in its broadest sense to mean solid earth geophysics and fluid earth geophysics, as well as studies of other planets and the space environment.

In Greek mythology there are nine spirits that inspire the creation of literature and the arts. They are known as the Muses. Each one has a name as well as a symbol that represents that particular muse. Nowadays we would say that each Muse has a logo. IUGG also has nine spirits that inspire the creation of knowledge about the physics and chemistry of the Earth. In addition to IUGG these scientific spirits are:

IACS      IAG      IAGA      IAHS      IAMAS      IAPSO      IASPEI      IAVCEI

Muses tame the wild spirits of humanity and each of these international scientific muses, or more correctly, international scientific associations, also has their own logo.

channel them into literature and the arts. As scientists we tame the wild spirits of humanity and channel them into science. I believe that we all do our work in the belief that the way to tame wild spirits is to know more about them.

But it is also important to share the knowledge.

To continue the parallels with the ancient Greeks, the IUGG General Assembly has been called the Olympic Games of Geodesy and Geophysics. The Olympic Games are held every four years. In our case, every four years the members meet at the General Assembly. This does not just consist of a scientific conference. The Union also holds business meetings of the IUGG Council, the Executive Committee and the IUGG Bureau. In addition, there are business meetings of the IUGG Associations, Union commissions and Association commissions, committees, and working groups.

This is the first time that the General Assembly has been held in Melbourne, the second time it has been held in Australia, and only the third time that it has been held outside of Europe and North America. I was a young scientist when I attended my first IUGG meeting in Canberra in 1979. It enthused me and inspired me to devote my life to science and to international collaboration.

The highlights of IUGG General Assemblies are the Union Lectures. I invited nine of the world's leading geo-scientists to present these. Three of these Lectures have become eponymous lectures as memorials to Association Presidents with strong Australian connections who died in this past quadrennium. These are the Tucker Memorial Lecture to be given by Dr Greg Ayers; the Radok Memorial Lecture to be given by David Vaughan; and the Troitskaya-Cole Memorial Lecture to be given by Dan Baker. Details of all of the Union Lectures can be found in the Program Book. I urge you to attend all of them.

Prof. Ray Cas, the Chair of the Local Organising Committee (LOC), has been helped in the preparations for the meeting by the LOC and by a firm of professional conference organisers, arinex. The scientific program committee for IUGG General Assemblies consists of the Secretaries-General of IUGG and the Union Associations, the Union President, and a local Chair – Dr Peter Manins in this case. They have all done an excellent job and deserve our appreciation and thanks.

XXV General Assembly of the International Union of Geodesy and Geophysics  
Opening Ceremony

To symbolise the movement of the IUGG General Assembly from Perugia to Melbourne, and to formally open the XXVth IUGG General Assembly I would like to invite the Delegate from Italy, Giuliano Panza to present the IUGG Flag to the Chair of the Melbourne Organising Committee, Professor Ray Cas.

**MINUTES OF THE COUNCIL MEETING**  
**XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 27 JUNE - 8 JULY 2011**

**MINUTES OF THE FIRST SESSION**  
**MONDAY, 27 JUNE, 2007 (14:00 – 18:00), ROOM 106, MELBOURNE CONVENTION CENTRE**

**PARTICIPANTS**

**NATIONAL DELEGATES**

Australia	Brian Kennett
Austria	Norbert Höggerl
Brazil	Marcelo Assumpção
Canada	Zoltan Hajnal
China	Jianping Li
Czech Republic	Vladimir Cermak
Denmark	Søren Gregersen
Estonia	Rein Rõõm
Finland	Elena Kozlovskaya
France	Jérôme Dymont
Hungary	József Ádám
India	Virendra Tiwari
Israel	Zev Levin
Italy	Giuliano Panza
Japan	Shiro Imawaki
Luxembourg	Tonie van Dam
F.Y.R. Macedonia	Cvetanka Popovska
New Zealand	David Rhoades
Nigeria	Dagogo Fubara
Norway	Ulf-Peter Hoppe
Poland	Jan Krynski
Portugal	João Agria Torres
Romania	Constantin Sava
Russia	Alexei D. Gvishiani
South Africa	Isabelle Ansoorge Raymond Roman (alternate)
Sweden	Berit Arheimer
Thailand	Nopphadon Chotsiri Chaiwat Promthong (alternate)
Turkey	Onur Lenk Soner Özdemir (alternate)
United Kingdom	David Collins
United States of America	Priscilla Grew
Vietnam	Ha Duyen Chau

**LISTENERS**

Costa Rica	Marino Protti
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**MEMBERS OF THE EXECUTIVE COMMITTEE**

President	Tom Beer
Vice-President	Harsh Gupta
Secretary General	Alik Ismail-Zadeh
Treasurer	Aksel Hansen
Bureau Member	Yun-tai Chen
Bureau Member	David Jackson
President IACS	Ian Allison

President IAG	Michael Sideris
President IAGA	Eigil Friis-Christensen
President IAHS	Gordon Young
President IAMAS	Guoxiong Wu
President IAVCEI	Setsuya Nakada

**MEMBERS OF THE FINANCE COMMITTEE**

Chair	Juan F. Vilas
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**GUESTS OF THE PRESIDENT ATTENDING THE  
FIRST SESSION OF THE COUNCIL**

IUGG Liaison to CODATA	Charles Barton
Candidate for IUGG Bureau Member	Jaime U. Fucugauchi
Chair of Statutes and By- Laws Committee	David Kerridge,
IAMAS Assistant Secretary General	Jenny Lin
IUGG Liaison to SCOR	Mike MacCracken
Chair of the IRDR Scientific Committee	Gordon McBean
Chair of the ICSU Regional Office for Asia and the Pacific	Bruce McKellar
IUGG Assistant Secretary General	Simone Oswald
IAPSO Secretary General	Johan Rodhe
IUGS Councillor IASPEI Secretary General	Colin Simpson Peter Suhadolc
Deputy Director, BISO, National Academies of Sciences	Ester Szein

**1. Greetings; Presentation of the credentials;  
election of tellers**

The First Session of the Council Meeting was called to order at 14:00 and began with a roll call of delegates. 28 delegates were present at the opening, all of them eligible to vote. The total number of countries eligible to vote was 57 (69 minus 7 in observer status minus 5 in associate status). The quorum (19) was reached. Other delegates arrived in the course of the session, bringing the total to 31 with all eligible to vote.

Tom Beer welcomed all participants in the Council Meeting and informed them that the latest number of Assembly registrants is over 3,000. He also introduced Simone Oswald, IUGG Assistant

Secretary General, and Jenny Lin, the IAMAS Assistant Secretary General, who will help in taking the minutes and be the contact points in case of any problems.

Three tellers for voting matters were announced, namely Jenny Lin, Johan Rodhe, and Raymond Roman. The Council Members accepted the proposal by the President.

## 2. Approval of the Agenda

The Agenda was approved.

## 3. Approval of the Minutes of the Council Meeting in Perugia (2007)

The Minutes of the 2007 Council Meeting were distributed to the participants of the 2007 General Assembly for their comments, published in the Comptes Rendus of the 24<sup>th</sup> General Assembly, and also posted on the IUGG web page. The Minutes were approved.

## 4. Brief Reports of the Officers

### President Tom Beer

Tom Beer summarized his activities since 2007 as detailed in his report in the Council Agenda Book. (Note: the quadrennial report of the President can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

He especially highlighted the item on IUGG membership and expressed his concern about the decreasing attendance of National Delegates at IUGG General Assemblies. After the General Assembly in Perugia, Italy, he therefore tried to contact several IUGG members to find out why the delegates are not coming. Possible reasons are:

- Restructuring of the Adhering Body or the retirement of a long-serving IUGG National Committee Chair who had not managed to find appropriate new persons.
- Visa problems;
- Financial difficulties

Concerning the restructuring and retirement issues in the Adhering Bodies and National Committees, Tom Beer encouraged the Council Members to give some thought to their respective National Committee about the following questions:

- Does the National Committee need to be reconstituted?
- Are the Committee Members still active?
- Is there a realistic succession plan to handle retirements and resignations?
- Is the National Committee providing sufficient feedback to the Adhering Body?

Furthermore, he pointed out that regional geophysical groupings such as the American

Geophysical Union (AGU), the European Geosciences Union (EGU), and the Asian Oceania Geosciences Society (AOGS) are all very strong, robust and vibrant, but they have no direct voice in the IUGG affairs. To improve this situation, a Membership Committee, chaired by Aksel Hansen, was established. This Committee recommended a possible new Membership category and various classes of Membership, which will be discussed under item 8.

### Vice-President Harsh Gupta

Harsh Gupta summarized his activities since 2007 as detailed in his report in the Council Agenda Book. (Note: the quadrennial report of the Vice-President can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

Additionally, he mentioned that, during his visit to the GeoForschungsZentrum (GFZ) in Potsdam, Germany, he had a chance of discussing the possibilities of establishing an IUGG Secretariat in GFZ-Potsdam. HG mentioned that the GFZ-Potsdam sent a response, which has been discussed by the IUGG Bureau, and IUGG will reply accordingly.

### Secretary General Alik Ismail-Zadeh

Alik Ismail-Zadeh summarized the activities of the Union since 2007 as detailed in his report in the Council Agenda Book. (Note: the quadrennial report of the Secretary General can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

He especially highlighted the item of IUGG membership. Greece rejoined IUGG as a Regular Member; the Republic of Azerbaijan and the Former Yugoslav Republic of Macedonia became new Regular Members; Costa Rica and Georgia joined IUGG as Associate Members; Bulgaria moved to regular membership; and India enhanced its membership category. Three Associate Members, i.e., DR Congo, Ghana and Morocco, also became Regular Members thanks to the Royal Society of London, UK, which offered to pay their membership dues for the last three years.

He mentioned that IUGG has been involved in various activities of the International Council for Science (ICSU), especially emphasizing the International Polar Year, new ICSU programs related to integrated research on disaster risk, and the world data system. IUGG was involved in research and outreach programs of several international bodies dealing with the Earth system science, e.g., programs of UNESCO, IOC, IHP, IYPE, IPY, etc.

Treasurer Aksel Hansen

Aksel Hansen summarized his report on the financial status of the Union as detailed in the Council Agenda Book. (Note: the quadrennial report of the Treasurer can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

IUGG currently has 69 members, i.e. 57 Regular Members, 7 Observers and 5 Associates. The Observers are: Greece and the Philippines in category 3, Egypt in category 2, Albania, Armenia, Ghana and Morocco in category 1.

Over the past years, IUGG has accumulated money. The new budget for 2012-2015 will increase expenditure of the Union on scientific programs and grants.

**5. Review of IUGG Union Commissions**

Harsh Gupta reported on the Union Commission activities. Detailed reports from the Union Commissions can be found in the Council Agenda Book (Note: the quadrennial reports of the Union Commissions can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

The four Union Commissions are:

- Commission on Data and Information (UCDI),
- Commission on Geophysical Risk and Sustainability (GRC),
- Commission on Mathematical Geophysics (CMG), and
- Commission on the Study of the Earth's Deep Interior (SEDI).

All four Commissions have been very active for the last four years.

**6. Matters of Membership**

Several new admissions and re-admissions of new members to IUGG require a two-thirds absolute majority vote of the Council for final approval (IUGG Statute 18). A vote by hand was conducted. Tom Beer invited Alik Ismail-Zadeh to lead through this vote. Johan Rodhe, Raymond Roman, and Jenny Lin volunteered to tally the votes.

Alik Ismail-Zadeh especially noted that Greece currently has severe financial and political problems due to which no National Delegate from Greece could travel to the Council Meeting and Greece is in arrears with its membership payments. However, he was informed by the Greek National Committee President Dr. Christos Zerefos that Greece will pay its dues in arrears as soon as possible.

The matters requiring votes were presented in detail in the Council Agenda Book. The results are as follows:

Re-Admission: Greece as Regular Member (cat. 3)  
For: 26; Against: 0; Abstain: 2

Admission: Azerbaijan as Regular Member (cat. 1)  
For: 28; Against: 0; Abstain: 0

Admission: F.Y.R. Macedonia as Regular Member (cat. 1)  
For: 28; Against: 0; Abstain: 0

Admission: Georgia as Associate Member  
For: 28; Against: 0; Abstain: 0

Admission: Costa Rica as Associate Member  
For: 28; Against: 0; Abstain: 0

**7. Report of the Nominating Committee**

Due to health problems, Masaru Kono, Chair of the Nominating Committee, was not able to attend the Council Meeting. On his behalf, Tom Beer read his report and introduced the nominees for the IUGG Bureau and IUGG Finance Committee.

As required by IUGG By-Laws 10b and 10c, one or two candidates have been nominated for each position. The positions and the nominated candidates were:

IUGG Bureau

President: Harsh Gupta (India)  
David Jackson (USA)  
Vice-President: Michael Sideris (Canada)  
Guoxiong Wu (China)  
Treasurer: Aksel Hansen (Denmark)  
Bureau Members (Positions #1, #2, #3):  
Isabelle Jane Ansorge (South Africa)  
Jaime Urrutia Fucugauchi (Mexico)  
Pierre Hubert (France)  
Kenji Satake (Japan)

IUGG Finance Committee

Position #1: Zoltan Hajnal (Canada)  
Position #2: David Rhoades (New Zealand)  
Position #3 and #4:  
David Collins (UK)  
Jan Krynski (Poland)  
Juan Vilas (Argentina)

In accordance with By-Law 10b, David Jackson's nomination was changed from the position of Vice-President, for which he had originally been nominated, to the position of President.

Regarding the nomination of the Treasurer, Tom Beer explained that this does not contradict By-Law 10a because Aksel Hansen is the sole candidate for this position and agreed to serve for another period if re-elected by the Council.

In terms of the Finance Committee, By-Law 10c is not clear enough on who can be nominated for this Committee. In order to clarify this By-Law, a change in the wording was proposed and will be discussed under item 8.

Brian Kennett (Australia) made aware of the fact that it seems possible to be Council Delegate and Finance Committee Member at the same time although both statuses have different rights in the Council.

The candidates for President and for Vice-President each gave a short presentation of their position statement.

Harsh Gupta would work to engage the younger generation of geoscientists into the activities of IUGG and Union Associations; interact with decision makers to share knowledge for a better future; cut down time in making decisions; set up a permanent secretariat for IUGG; interface with industry, particularly with the energy sector; contact foundations/trusts for IUGG projects.

David Jackson would make sure the integration of associations are really maintained. His plans if elected are: encourage young people to participate; open invitations to plan scientific programs; reduce the price of meetings; outreach to users of scientific information; special projects with user involvement; collaborate with sister unions on projects.

Michael Sideris would like to strengthen relations with UNESCO to increase IUGG's visibility. He hopes the Union will make more efforts to boost IUGG visibility to the general public. He would promote the involvement of the Union in developing countries.

Guoxiong Wu would like to use his knowledge in climate to enhance the Union's activities in climate sciences and to assist the President in coordinating activities concerning the preservation of the environment, adaptation of climate change and mitigation of natural hazards.

## 8. Proposed Changes of Statutes and By-Laws

Tom Beer invited David Kerridge, Chair of the Statutes and By-Laws Committee, to present the report given in the Council Agenda Book.

Eleven proposed changes to the Statutes and By-Laws were received by the Statutes and By-Laws Committee and were discussed in the Council. They are:

1. Affiliate membership of IUGG – to create a new category of membership to formalize linkages with other regional and international

organizations having an overlap with the scientific interest of IUGG;

2. Fellowship of IUGG – to create an IUGG award and a new category of membership to recognize the contributions that individuals have made to the benefit of IUGG;
3. Definition of a General Assembly – to define the term “General Assembly” to better reflect the present situation;
4. Changes to the Statutes and By-Laws – to clarify the process by which proposals to change the Statutes and By-Laws are brought forward for consideration and decision by the Council and to explicitly allow the IUGG Bureau to propose changes as well as Member Countries;
5. Applications to host an IUGG General Assembly – to allow Member Countries to submit proposals to host an IUGG General Assembly up to two Assemblies ahead for consideration by the Council;
6. Council Meeting at a General Assembly – to correct an inconsistency in By-Law 10b regarding the Council Meeting as a single meeting consisting of multiple sessions;
7. Election of the Finance Committee – to eliminate an ambiguity in By-Law 10c to clarify who can be elected to the Finance Committee;
8. Transfer from Observer status to Category A – to simplify and clarify Statute 14g;
9. Reviews of Associate Membership – to clarify the process by which Associate Membership is reviewed;
10. Applications for membership and transfer to Associate Membership – to improve the clarity of By-Law 14;
11. Changes to the IUGG By-Laws – to move Statute 25 to the By-Laws.

During discussions of the changes, Tom Beer mentioned that the Executive Committee of IUGG is not in favor of the proposal to change the procedure of submission proposals to host a general assembly, as an 8-year period in advance of a general assembly is too long, and the selection would be quite uncertain.

Constantin Sava, the Council Delegate of Romania, mentioned the importance of the definition of a General Assembly and supported the change to item 3. Jérôme Dymont, the Council Delegate from France, argued that affiliated organizations should be only non-profit. Tom Beer mentioned that the new Statute's clause does not distinguish between non-profit and profit affiliated organizations, because the acceptance of an organization as an Affiliated member by the IUGG Council should be based on scientific involvement of the organization in geodesy and/or geophysics.

A vote on the proposed changes of the Statutes and By-Laws will be taken in the third session of the Council Meeting.

#### **9. Report on the proposals to host the XXVI General Assembly in 2015**

IUGG received six bids to host the XXVI General Assembly in 2015. As Greece had withdrawn its bid due to financial problems, five bids remained to be decided on:

- Buenos Aires, Argentina
- Prague, Czech Republic
- Copenhagen, Denmark
- Hyderabad, India
- Honolulu, USA

Michel Béland, Chair of the Site Evaluation Committee, was not able to attend the General Assembly. Therefore, Kiyoshi Suyehiro, Member of the Site Evaluation Committee, agreed to act as the new Chair. He reported that the Site Evaluation Committee is comprised of the following members:

Chair: Kiyoshi Suyehiro  
Members: Peter Suhadolc  
Tom Beer (ex officio)  
Alik Ismail-Zadeh (ex officio)

The Site Evaluation Committee will meet on 30 June 2011 where each of the bidder countries will make a presentation of 20 minutes plus 10 minutes for discussion to the Site Evaluation Committee. All Council Members are encouraged to attend this meeting to have the possibility to hear all bids. The Site Evaluation Committee then will prepare a short list of two countries, which will finally present their bids at the third session of the Council Meeting. A vote on the host of the XXVI General Assembly will be taken directly after these presentations.

Zev Levin, the Council Delegate from Israel, proposed two finalists to present their bids at the Second Session of the Council meeting. This proposal was seconded by Shiro Imawaki, the Council Delegate from Japan. Tom Beer called for a vote from the Council on the motion. The motion was lost.

After all items of the Agenda for the First Session of the Council Meeting had been discussed, Dagogo Fubara, the Council Delegate from Nigeria, commented on the visibility of IUGG which could be improved by running more summer schools in developing countries because many young scientists from Africa have problems to travel to the General Assemblies. Alik Ismail-Zadeh thanked Dagogo Fubara for his comment

and shortly introduced the new IUGG initiative to liaise with ICTP in order to improve the geodetic and geophysical education in developing countries, including Africa. Dagogo Fubara also supported the decision of IUGG to award medals, etc.

Finally, Tom Beer invited Gordon McBean to explain ICSU's work on capacity building for young people in the developing countries. Gordon McBean recalled his involvement in the IUGG and his present responsibilities in IRDR, a major initiative of ICSU involving national academies. ICSU has been bringing funding sources to support programs in Africa, Asia, etc. He appreciated IUGG's and GeoUnion's nomination of him to ICSU as a candidate for the position of President-Elect.

The First Session of the Council Meeting closed at 18:00.



**MINUTES OF THE SECOND SESSION**  
**SATURDAY, 2 JULY 2011 (10:00 – 13:00), ROOM 106, MELBOURNE CONVENTION CENTRE**

**PARTICIPANTS**

**NATIONAL DELEGATES**

Argentina	Corina Risso Silvia Blanc (alternate)
Australia	Brian Kennett
Austria	Norbert Höggerl
Azerbaijan	Gulam Babayev
Belgium	Johan De Keyser
Brazil	Marcelo Assumpção Ana P. C. Larocca (alternate)
Canada	Zoltan Hajnal
Chile	Rodrigo Maturana Nadal
China	Jianping Li
China – Taipei	Shaw Chen Liu
Colombia	Laura Sanchez
Croatia	Mirko Orlic
Czech Republic	Vladimir Cermak
Denmark	Søren Gregersen
<i>Egypt</i>	<i>Ahmed Hady</i>
Finland	Elena Kozlovskaya
France	Jérôme Dymont Michel Menvielle (alternate)
Germany	Rainer Kind
Hungary	József Ádám
Iceland	Kristin Vogfjörd
India	Virendra Tiwari
Ireland	John Gamble
Israel	Zev Levin
Italy	Giuliano Panza
Japan	Shiro Imawaki
Luxembourg	Tonie van Dam
F. Y. R. Macedonia	Cvetanka Popovska
Mexico	Harald Böhnelt
New Zealand	David Rhoades
Nigeria	Dagogo Fubara
Norway	Ulf-Peter Hoppe
Poland	Jan Krynski
Portugal	João Agria Torres
Romania	Constantin Sava
Russia	Alexei D. Gvishiani
South Africa	Isabelle Ansoorge Raymond Roman (alternate)
Spain	Alicia García García
Sweden	Berit Arheimer
Switzerland	Marc Parlange
Thailand	Nopphadon Chotsiri Chaiwat Promthong (alternate)
Turkey	Onur Lenk
United Kingdom	David Collins
United States of America	Priscilla Grew
Vietnam	Ha Duyen Chau

*Italics for Countries in Observer Status*

**LISTENERS**

Costa Rica Marino Protti

**MEMBERS OF THE EXECUTIVE COMMITTEE**

President	Tom Beer
Vice-President	Harsh Gupta
Secretary General	Alik Ismail-Zadeh
Treasurer	Aksel Hansen
Bureau Member	Yun-tai Chen
Bureau Member	David Jackson
Past President	Uri Shamir
President IACS	Ian Allison
President IAG	Michael Sideris
President IAHS	Gordon Young
President IAMAS	Guoxiong Wu
President IAPSO	Lawrence Mysak
President IASPEI	Zhongliang Wu
President IAVCEI	Setsuya Nakada

**MEMBERS OF THE FINANCE COMMITTEE**

Chair	Juan F. Vilas
Member	Kiyoshi Suyehiro

**GUESTS OF THE PRESIDENT ATTENDING THE SECOND SESSION OF THE COUNCIL MEETING**

IUGG Liaison to CODATA	Charles Barton
IAHS Secretary General	Pierre Hubert
Secretary General of the Russian National Committee for IUGG	Roman Krasnoperov
IAMAS Assistant Secretary General	Jenny Lin
IUGG Liaison to SCOR	Mike MacCracken
IGA Secretary General	Mioara Manda
IAVCEI Secretary General	Joan Martí
IUGG Assistant Secretary General	Simone Oswald
IAPSO Secretary General	Johan Rodhe
IUGS Councillor	Colin Simpson
IASPEI Secretary General	Peter Suhadolc
Deputy Director, BISO, National Academies of Sciences	Ester Sztajn
IAMAS Secretary General	Hans Volkert

The Second Session of the Council Meeting was called to order at 10:00 with a roll call of delegates. 40 delegates were present at the opening, 39 eligible to vote. The quorum (19) was reached. Other delegates arrived in the course of the session, bringing the total to 44 with 43 eligible to vote.

Kiyoshi Suyehiro, Chair of the Site Evaluation Committee, reported that the hearing's session was

given by five countries: Argentina, Czech Republic, Denmark, India, and the United States of America. The committee met after the hearing and individual scoring and voted for two finalists.

Tom Beer announced two finalists: Honolulu, Hawaii, USA, and Prague, Czech Republic.

#### **10. Reports by Association Presidents**

Council Delegates were asked to note the reports of the Associations available in the Council Agenda book. (Note: the quadrennial reports of the IUGG Associations can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

The IUGG Associations Presidents reported on the activities of the associations from 2007-2011 and on the revision of statutes and by-laws.

#### IACS

Ian Allison reported that IACS already elected a new Bureau. The new officers of the IACS Bureau for 2011-13 are:

President: Ian Allison (Australia)  
President-elect: Charles Fierz (Switzerland)  
Secretary General: Andrew Mackintosh  
(New Zealand)

IACS established several Working Groups and Standing Groups in the last four years. In addition, IACS has Joint Bodies, i.e. Working Groups or Standing Groups run jointly with other international organizations, e.g., SCAR and IASC.

Ian Allison highlighted two reference publications, namely *The International Classification for Seasonal Snow on the Ground* and *The Glossary of Glacier and Mass Balance Terms*, which are published by the UNESCO International Hydrological Programme (IHP).

Besides working together with SCAR, IASC and UNESCO IHP, IACS has also established liaisons to other international bodies, e.g., to the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC).

The first Joint Assembly of IACS, IAMAS and IAPSO (MOCA-09) was held in Montreal, Canada, in 2009. The next Joint Assembly of IACS and IAMAS (DACA-13) will be held in Davos, Switzerland, in 2013.

#### IAG

Michael Sideris reported that IAG also elected a new Bureau and Executive Committee. The new officers of the IAG Bureau for 2011-2015 are:

President: Chris Rizos (Australia)  
Vice-President: Harald Schuh (Austria)

Secretary General: Hermann Drewes (Germany)

Michael Sideris especially highlighted the Global Geodetic Observing System (GGOS), which became a major component of IAG in the last four years. Furthermore, a GGOS Inter-Agency Committee was established in order to support the sustainability of GGOS.

The IAG Scientific Assembly was held in Buenos Aires, Argentina, in 2009.

In the 2011 IUGG General Assembly, IAG has contributed 7 IAG led symposia, 6 joint symposia, 1 Union symposium, 1 Union lecture, and several joint symposia with other Associations. The next scientific assembly will be held in 2013, the year of 150<sup>th</sup> anniversary of IAG.

Nigerian delegate suggested IAG having a regional office in other continents, e.g. Africa. MS replied that IAG would like to have a regional office in Africa as long as there's a host country.

#### IAGA

Mioara Manda gave a report on the activities of IAGA.

She especially highlighted the IAGA Scientific Assembly held in Sopron, Hungary, in 2009, where five books on the outcome of this Assembly were published by Springer.

Mioara Manda also mentioned that the European Space Agency (ESA) will launch a new mission to attract and involve more young scientists in 2012.

#### IAHS

Gordon Young first pointed out that IAHS is having its 90<sup>th</sup> anniversary in 2012.

The IAHS Scientific Assembly was held jointly with the International Association of Hydrogeologists (IAH) in Hyderabad, India, in 2009.

Gordon Young brought special attention to the decade of the Working Group on the Prediction in Ungauged Basins (PUB) being the major and extremely successful initiative of IAHS. 1400 hydrologists from around the world are currently working in this initiative.

IAHS has a very strong publication output. From 2007-2010, the IAHS Press published among others the *Hydrological Sciences Journal*, 31 *Red Books*, 2 *Blue Books* and 8 volumes in the *Benchmark Series*. Six further *Red Books* are already printed for the current IUGG General Assembly, two of which are joint with other sister Associations. IAHS publications, which are older than 5 years are made freely available on the internet.

Gordon Young emphasized that IAHS strongly cooperates with other international organizations especially with UNESCO IHP, the World Meteorological Organization (WMO) and the International Atomic Energy Agency (IAEA).

The next Joint Assembly of IAHS, IAPSO and IASPEI will be held in Gothenburg, Sweden, in 2013.

#### IAMAS

Guoxiong Wu reported on the broad activities of IAMAS. Particularly, he mentioned that IAMAS has liaisons to the ICSU Scientific Committee on Oceanic Research (SCOR), the ICSU Scientific Committee on Antarctic Research (SCAR) and to the World Climate Research Programme (WCRP). The International Ozone Commission (IO3C) of IAMAS and IUGG signed a Letter of Agreement with WMO to establish an ad hoc expert team.

He also proposed the establishment of an IUGG Union Commission on Climate as climate change becomes more and more important scientific and political issues. ICSU established several panels and activities on climate, and IUGG is very active and important in the geosciences but has only a little voice in this issue through the International Commission on Climate of IAMAS. As climate is also a multi-disciplinary science, he has approached WCRP and the Presidents of IACS, IAHS, IAPSO and IAVCEI who showed their support. In order to get this commission working, a Task Force, chaired by Tom Beer, and with the mentioned Association Presidents as potential members, is proposed to be set up. IAG, IAGA and IASPEI were asked whether they support this proposal as well and gave positive feedback.

#### IAPSO

Lawrence Mysak reported that IAPSO also elected its new Bureau and Executive Committee. The members of the Bureau for 2011-2015 are:

President:	Eugene Morozov (Russia)
Past President:	Lawrence Mysak (Canada)
Secretary General:	Johan Rodhe (Sweden)
Treasurer:	Fred Camfield (USA)

Lawrence Mysak emphasized that IAPSO is closely working together and has also several joint Working Groups with SCOR.

He also highlighted the presentation of the Prince Albert 1 Medal, which was awarded to Dr. Trevor McDougall at the IUGG General Assembly in Melbourne. The next medal will be awarded at the Joint Assembly of IAPSO, IAHS and IASPEI in Gothenburg, Sweden, in 2013.

A new resolution to adopt the International Thermodynamic Equation Of Seawater (TEOS-10) was approved by the IAPSO Bureau and will be submitted to Uri Shamir, Chair of the IUGG Resolutions Committee.

#### IASPEI

Zhongliang Wu reported that the last IASPEI Scientific Assembly took place in Cape Town, South Africa, in 2009. This was the first time that a Scientific Assembly was held in an African country.

He especially highlighted the Asian Seismological Commission (ASC) and the European Seismological Commission (ESC) of IASPEI, which are very active.

IASPEI issued many scientific products such as technical standards and recommendations, seismological software, training courses, earth models and travel time tables.

Furthermore, IASPEI cooperated with many international organizations, e.g., in the *Global Earthquake Model (GEM)* project with the International Association of Earthquake Engineering and Seismology (IAEE), and in the *Networking of world seismologists* project with the *International Seismological Centre (ISC)*, in which IASPEI and ISC will develop and maintain a worldwide registry of seismologists and geophysicists (also in countries not adhering to IUGG) who are willing to act as contact points in their country with a special focus on developing countries. This registry will be available for scientific and research institutions, governmental bodies, charitable and relief organizations and media following natural extreme events. After several devastating earthquakes in the last four years, this networking project was established to improve international activity, which had not really been present.

Since 2007, IASPEI has collected, evaluated and implemented many successful resolutions.

Giuliano Panza, the Council Delegate from Italy, commented on the IUGG statement "Freedom to Conduct Science and Responsibilities of Scientists". He stressed the importance of having complete information about the situation after the 2009 L'Aquila earthquake and the manslaughter trial of several Italian seismologists and a government official. The legal system, if duly respected, can help scientists and science in general; so a caution is needed in supporting not fully proven statements.

#### IAVCEI

In his report, Setsuya Nakada highlighted that IAVCEI started its own grants program in 2009

with supporting project proposals with up EUR 20,000 each.

In addition, IAVCEI issued together with IUGG the Statement on Volcanic Ash Clouds and the Statement on Volcanological and Meteorological Support for Volcanic Ash Monitoring.

IAVCEI also issued several special publications, online textbooks and calendars.

The IAVCEI Scientific Assembly took place in Reykjavik, Iceland, in 2008.

Setsuya Nakada shortly explained the changes proposed to be made to the IAVCEI Statutes and By-Laws. The most important change is that only National Correspondents are allowed to vote on Association business. Additionally, IAVCEI removed the need to pay to become an IAVCEI member. The category of Donating Affiliate was introduced instead.

The new IAVCEI Bureau from 2011-2015, which was approved later during the IUGG General Assembly, consists of the following members:

President: Ray Cas (Australia)  
Vice Presidents: Hugo Delgado Granados (Mexico)  
Steve Self (UK)  
Secretary General: Joan Martí (Spain)

The Council Delegates were asked to approve the reports. The reports were approved unanimously.

### 11. Report on Inter-Union Activities

Alik Ismail-Zadeh summarized the reports on the activities of the International Lithosphere Program (ILP) and the GeoUnions Consortium. Detailed reports can be found in the Council Agenda Book. (Note: the quadrennial report of the International Lithosphere Program can be found in the Comptes Rendus of the 2011 IUGG General Assembly).

#### International Lithosphere Program (ILP)

ILP is a joint body of IUGG and the International Union of Geological Sciences (IUGS).

IUGG appointed two representatives to the ILP Bureau for the term 2007-2011, namely Kevin Furlong (USA) and Kalanchand Sain (India). Alan Green (Switzerland) is the joint IUGS/IUGG representative.

ILP holds annual meetings where the results and further tasks of its Task Forces and Regional Coordinating Committees are discussed. Furthermore, an ILP award is given to young excellent scientists active within the ILP Task Forces.

The Program is also a founding member of the International Year of Planet Earth (IYPE) and still

supports it. In the context of IYPE, ILP produced a first volume, entitled *New Frontiers in Integrated Solid Earth Sciences*, which was published by Springer in a series on the highlights of the IYPE.

Alik Ismail-Zadeh especially noted that more than 800 publications, about 20 special volumes, and 2 books were published on ILP themes.

The report on the ILP activities was approved unanimously by the Council Delegates.

#### The GeoUnions Consortium

Eight ICSU Scientific Unions that focus on geosciences form the GeoUnions Consortium:

the International Astronomical Union (IAU), the International Geographical Union (IGU), the International Union for Quaternary Research (INQUA), the International Society of Photogrammetry and Remote Sensing (ISPRS), the International Union of Geological Sciences (IUGS), the International Union of Soil Sciences (IUSS), the International Union of Radio Science (URSI), and IUGG.

The leaders of the Unions meet annually to coordinate their activities and to cooperate on trans-disciplinary topics. After its foundation in 2004, the Consortium is now a very strong forum. It is perceived by ICSU with great enthusiasm and viewed as a model for other Unions to follow.

A joint Science Program was developed with four topics, each led by a GeoUnion:

- Health and Well-Being (ISPRS),
- Natural Hazards and Disaster Risk (IUGG),
- Geosciences in Africa (IUGG), and
- Data and Information (IUGS).

The first three teams set up to prepare a scientific program on the topics progressed very well and received grants from ICSU. In this context, Alik Ismail-Zadeh highlighted the ICSU sponsored project on Extreme Natural Hazards and Societal Implications (ENHANS) led by IUGG and supported by many other Scientific Unions, Commissions and Committees of ICSU and the United Nations.

He finally mentioned the efforts to strengthen the collaboration between the ICSU GeoUnions and UNESCO.

### 12. Relations with ICSU

Alik Ismail-Zadeh summarized his report on the relations with the International Council for Science (ICSU). A detailed report can be found in the Council Agenda Book.

Several IUGG officers (still) have key roles within ICSU, e.g., Uri Shamir as representative of the

GeoUnions was re-elected in 2008 to the Executive Board of ICSU, Harsh Gupta was selected as a member of the ICSU Committee on Scientific Planning and Review (CSPR), Gordon McBean was nominated by IUGG for the position of the ICSU President-elect.

IUGG has been a very active participant in ICSU programs, IUGG people were selected to serve for several ICSU panels and working groups, e.g., in the Scientific Committee of the Integrated Research and Disaster Risk, the Scientific Committee of the ICSU World Data System, and the ICSU Strategic Coordinating Committee on Data and Information.

IUGG kept very good relations with the three ICSU Regional Offices, namely the Regional Office for Africa, the Regional Office for Asia and the Pacific and the Regional Office for Latin America and the Caribbean, and appointed liaisons to each of these three Offices. A fourth Regional Office for the Middle-East Region will soon be established by ICSU, and IUGG hopes to also establish very good links to this Office.

Starting from 2012, ICSU will introduce a new dues structure, in which IUGG, being the Union with the high membership income, continues to pay (together with three other ICSU Scientific Unions) the highest membership dues to ICSU. Since the appointment of the new Director of ICSU in 2008, IUGG improved significantly relationship with the ICSU Secretariat.

Uri Shamir, Past President of IUGG and the ICSU Ordinary Board Member representing the GeoUnions cluster in ICSU, mentioned the importance of cooperation between the GeoUnions and of cooperation of the Unions with regional offices of ICSU.

No comments or questions were raised by the Council.

### **13. Reports from Liaisons to ICSU Commissions and Committees**

In order to conserve time, Alik Ismail-Zadeh referred the Council to the reports in the Agenda Book and only briefly reviewed each of the organizations. He welcomed any comments and questions by the Council.

- Committee on Data for Science and Technology (CODATA),
- Committee on Space Research (COSPAR),
- Federation of Astronomical and Geophysical Data Analysis Services (FAGS)/ World Data System (WDS),
- ICSU Regional Office for Africa,

- ICSU Regional Office for Asia and the Pacific,
- ICSU Regional Office for Latin America and the Caribbean,
- Scientific Committee on Antarctic Research (SCAR),
- Scientific Committee on the Problems of the Environment (SCOPE),
- Scientific Committee on Oceanic Research (SCOR),
- Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)

Of special note was the discontinuation of the liaison to the ICSU Scientific Committee on the Problems of the Environment (SCOPE). As SCOPE was disconnected from ICSU, the Bureau decided to not appoint a liaison to the Committee for the term 2011-2015. New liaisons were recommended and voted on in the Third Session of the Council Meeting.

No comments or questions were raised by the Council. The reports of the liaisons were accepted unanimously.

### **14. Reports from Liaisons to intergovernmental and other organizations**

Alik Ismail-Zadeh continued to briefly review on these reports in the Council Agenda Book.

- Cartographic Office of the United Nations,
- International Civil Aviation Organization (ICAO),
- International Lithosphere Program (ILP),
- Pan-American Institute of Geography and History (PAIGH),
- UNESCO International Hydrological Programme (IHP),
- UNESCO Intergovernmental Oceanographic Commission (IOC),
- World Climate Research Programme (WCRP),
- World Meteorological Organization (WMO)

No comments or questions were raised by the Council. The reports of the liaisons were accepted unanimously.

### **15. Report of the IUGG Finance Committee**

Juan Vilas presented the report of the Finance Committee highlighting the problem of a systematic sub-application of the budget and the recommendation by the Finance Committee to calculate the budget for the next quadrennium with a deficit. A reserve for cases of emergency should be kept.

The report of the Finance Committee was accepted by the Council.

**16. Presentation of the 2012-2015 Budget**

Aksel Hansen discussed the proposed budget. As recommended by the Finance Committee, the surplus of the last quadrennia as well as a reserve were taken into account in the new budget. The reserve was set at 1<sup>1</sup>/<sub>2</sub> year's turnover.

Aksel Hansen noted that the budget proposed in the original Agenda book has been replaced by a new draft, appended to the Council Minutes. He highlighted the significant changes, then went through the budget line by line and answered questions as they were asked.

A final vote to adopt the 2012-2015 Budget took place in the Third Session of the Council Meeting.

The Second Session of the Council Meeting closed at 13:00.

**MINUTES OF THE THIRD SESSION**  
**WEDNESDAY, 6 JULY 2011 (15:00 – 18:00), ROOM 203, MELBOURNE CONVENTION CENTRE**

**PARTICIPANTS**

**NATIONAL DELEGATES**

Argentina	Corina Risso
Australia	Ian Jackson
Austria	Norbert Höggerl
Belgium	Johan De Keyser
Brazil	Ana P. C. Larocca
Canada	Zoltan Hajnal
Chile	Rodrigo Maturana Nadal
China	Jianping Li
Colombia	Laura Sanchez
Croatia	Mirko Orlic
Czech Republic	Vladimir Cermak
Denmark	Søren Gregersen
<i>Egypt</i>	<i>Ahmed Hady</i>
Estonia	Rein Rõõm
Finland	Elena Kozlovskaya
France	Jérôme Dymont Michel Menvielle (alternate)
Germany	Rainer Kind
Hungary	József Ádám
Iceland	Kristin Vogfjörð
India	Virendra Tiwari
Ireland	John Gamble
Italy	Giuliano Panza
Japan	Shiro Imawaki
Korea	Duk-Jin Kim
Luxembourg	Tonie van Dam
F.Y.R. Macedonia	Cvetanka Popovska
Mexico	Harald Böhnel
New Zealand	David Rhoades
Norway	Ulf-Peter Hoppe
Pakistan	Noor Elahi
Poland	Jan Krynski
Portugal	João Agria Torres
Romania	Constantin Sava
Russia	Alexei D. Gvishiani
Slovak Republic	Jozef Brestenský
South Africa	Isabelle Ansoorge Raymond Roman (alternate)
Spain	Alicia García García
Sweden	Berit Arheimer
Thailand	Nopphadon Chotsiri Chaiwat Promthong (alternate)
Turkey	Onur Lenk
United Kingdom	David Collins
USA	Priscilla Grew
Vietnam	Ha Duyen Chau

*Italics for Countries in Observer Status*

**LISTENERS**

Costa Rica	Marino Protti
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**MEMBERS OF THE EXECUTIVE COMMITTEE**

President	Tom Beer
Vice-President	Harsh Gupta
Secretary General	Alik Ismail-Zadeh
Treasurer	Aksel Hansen
Member	Yun-tai Chen
Member	David Jackson
Asst. Secretary General	Simone Oswald
Past President	Uri Shamir
President IAG	Michael Sideris
President IAGA	Eigil Friis-Christensen
President IAHS	Gordon Young
President IAMAS	Guoxiong Wu
President IAPSO	Lawrence Mysak
President IAVCEI	Setsuya Nakada

**MEMBERS OF THE FINANCE COMMITTEE**

Chair	Juan Francisco Vilas
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**GUESTS OF THE PRESIDENT ATTENDING THE  
THIRD SESSION OF THE COUNCIL**

IAHS Secretary General - elect	Christophe Cudennec
IAG Secretary General	Hermann Drewes
Presenter IUGG 2015 bid for the U.S.	Jeff Freymueller
Presenter IUGG 2015 bid for the Czech Republic	Petr Holota
IAHS Secretary General	Pierre Hubert
Chair of Statutes and By-Laws Committee	David Kerridge
Secretary General of the Russian National Committee	Roman Krasnoperov
IACS Secretary General	Manfred Lange
IAMAS Assistant Secretary General	Jenny Lin
IUGG Liaison to SCOR	Mike MacCracken
IAGA Secretary General	Mioara Manda
IAG Vice-President	Harald Schuh
IASPEI Secretary General	Peter Suhadolc
Presenter IUGG 2015 bid for the Czech Republic	Pavel Susak
Presenter IUGG 2015 bid for the Czech Republic	Daniel Svarc
Deputy Director, BISO, National Academies of Sciences	Ester Sztajn
IAMAS Secretary General	Hans Volkert
Presenter IUGG 2015 bid for the U.S.	Brenda Weaver

The Third Session of the Council Meeting was called to order at 15:00 with a roll call of delegates. 43 delegates were present at the opening, 42 eligible to vote. The quorum (19) was reached.

Delegates from Azerbaijan, China-Taipei, Israel, Nigeria, and Switzerland had deposited their votes with the IUGG President for matters to be taken up at the Third Session. One Delegate was not able to vote. Therefore, 46 votes were cast.

Manfred Lange, Jenny Lin, Peter Suhadolc and Raymond Roman were appointed as tellers.

Tom Beer also reminded the Council Delegates about the Closing Ceremony taking place on 7 July from 16:30-18:00 followed by a farewell reception.

Tom Beer invited the National Committees having given note to the Secretary General that they wish to present their National Reports to hold their presentations during the time the votes were being cast. Alexei Gvishiani (Russia), Onur Lenk (Turkey), Constantin Sava (Romania) and Virendra Tiwari (India) shortly presented their respective National Reports. Following a request from the Hungarian Council Delegate, Tom Beer also recommended the Council Delegates to check their pigeonholes for an announcement of the Hungarian National Report.

#### 17. Adoption of the 2012-2015 Budget

The Council was asked to vote on the 2012-2015 Budget presented in the Second Session of the Council Meeting. Votes on financial matters are weighted by category. The results are given below.

For: 150      Against: 0      Abstain: 4

The 2012-2015 Budget was adopted.

#### 18. Election of IUGG Officers

The Council was asked to elect the IUGG Officers for the term 2012-2015. All candidates were announced in the First Session of the Council Meeting. No further comments or questions were asked by the Council. This vote requires a simple majority of all ballots cast. For the position of President, Harsh Gupta was elected. For the position of Vice-President, Michael Sideris was elected. The three Bureau Members elected are Isabelle Ansoerge, Pierre Hubert and Kenji Satake. David Collins, Zoltan Hajnal, Jan Krynski and David Rhoades are the elected Finance Committee members for the term 2011-2015. The actual vote tallies are given below:

Candidate	For	Against	Abstain
Harsh Gupta for President	27	0	0
David Jackson for President	19	0	0
Michael Sideris * for Vice-President	31	0	0
Guoxiong Wu *	14	0	0

\* 1 ballot for the vote of the Vice-President was invalid.

for Vice-President			
Aksel Hansen for Treasurer	46	0	0
Isabelle Ansoerge for Bureau Member	38	0	0
Jaime Fucugauchi for Bureau Member	29	0	0
Pierre Hubert for Bureau Member	31	0	0
Kenji Satake for Bureau Member	34	0	0
Zoltan Hajnal for Finance Committee	45	0	1
David Rhoades for Finance Committee	46	0	0
David Collins for Finance Committee	32	0	0
Jan Krynski for Finance Committee	29	0	0
Juan Vilas for Finance Committee	28	0	0

#### 19. Presentations of the proposals to host the XXVI General Assembly. Selection of the venue of the XXVI General Assembly.

Out of five bids to hold the XXVI IUGG General Assembly, the two finalists chosen by the IUGG Site Evaluation Committee at their meeting on 30 June were Honolulu, USA, and Prague, Czech Republic. Tom Beer invited the presenters of the respective bids to give a short presentation of five minutes to the Council.

Following this, the Council was asked to vote on these two venues. The results were as follows:

2015 GA venue	Votes
Honolulu, USA	20
Prague, Czech Republic	26

The XXVI IUGG General Assembly will take place in Prague, Czech Republic.

#### 20. Vote on proposed changes of Statutes and By-Laws

Before the vote on each proposed change to the IUGG Statutes and By-Laws, David Kerridge answered last questions that arose. Except for the proposal on the applications to host an IUGG General Assembly, all proposed changes were accepted by the Council. The changes to the Statutes and By-Laws come into effect directly after the close of the General Assembly. The results of each vote are given below.

Proposal	For	Against	Abstain	Invalid ballots
1. Affiliate membership	36	5	3	2
2. Fellowship	44	1	1	0



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of IUGG				
3. Definition of a General Assembly	45	0	0	1
4. Changes to Statutes and By-Laws	46	0	0	0
5. Applications to host an IUGG General Assembly	22	21	2	1
6. Council Meeting at a General Assembly	45	0	0	1
7. Election of the Finance Committee	45	0	0	1
8. Transfer from Observer status to Category A	44	2	0	0
9. Reviews of Associate Membership	43	0	1	2
10. Applications for membership and transfer to Associate Membership	43	1	1	1
11. Changes to the IUGG By-Laws	46	0	0	0

**21. Renewal of the IUGG liaison officers for 2011-2015**

Alik Ismail-Zadeh presented the following table of proposed liaison appointments to the Council. As noted in item 13, the liaison to SCOPE will be discontinued. Tom Beer then asked the Council to approve the appointments and there was no dissent.

Organization	Liaisons 2011-2015
U.N. Cartographic Office	Luiz Paulo Souto Fortes (BRAZIL)
UNESCO IHP	Pierre Hubert (FRANCE)
UNESCO IOC	Stefania Sparnocchia (ITALY)
WMO	Arthur Askew (SWITZERLAND) Arnau Folch (SPAIN) Hans Volkert (GERMANY)

ICAO	William Rose (USA) Marianne Guffanti (USA)
PAIGH	Hermann Drewes (GERMANY)
CCTF	Claude Boucher (FRANCE)
CODATA	Alexei Gvishiani (RUSSIA) Mark Parsons (USA)
COSPAR	Eric Donovan (CANADA)
IRDR	Kuniyoshi Takeuchi (JAPAN)
ICSU Regional Office for Africa	Isabelle Ansorge (SOUTH AFRICA) Ali Tealeb (EGYPT)
ICSU Regional Office for Asia and the Pacific	Sukanta Roy (INDIA) Sri Widiyantoro (INDONESIA)
ICSU Regional Office for Latin America and the Caribbean	Jaime U. Fucugauchi (MEXICO)
SCAR	Ian Allison (AUSTRALIA)
SCOR	Athena Coustenis (FRANCE) Eugene Morozov (RUSSIA)
SCOSTEP	Vladimir Kuznetsov (RUSSIA)
WCRP	Tom Beer (AUSTRALIA)
WDS	Ruth Neilan (USA)

**22. Presentation and adoption of the Resolutions**

Uri Shamir, Chair of the Resolutions Committee, began his report by introducing the members of the Resolutions Committee: Jozsef Adam, Pierre Hubert, and Georg Kaser. Associations had been asked to submit their Resolutions to the Resolutions Committee. Each Resolution was then examined by the Resolutions Committee and carefully considered by the IUGG Executive Committee before being brought to the Council. Four Resolutions plus one traditional Resolution of Thanks of IUGG to all organizers of the 2011 General Assembly were put on screen, read and commented by Uri Shamir. He welcomed questions and comments by the Council. All Resolutions were reviewed in British English. Pierre Hubert translated all Resolutions into French (Français du Midi).

[The final versions of the Resolutions that were adopted will be presented in the Comptes Rendus as a separate section.]

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Resolution 1: Standardised schemes for the terminology for glacier mass balance measurements and for classification of snow on the ground, submitted by IACS.

Resolution 2: Gravity and magnetic field satellite missions, submitted by IAG and IAGA and endorsed by the Union Commission on the Study of the Earth's Deep Interior (SEDI).

Resolution 3: Second Realization of the International Celestial Reference Frame, submitted by IAG.

Resolution 4: Adoption of the International Thermodynamic Equation Of Seawater – 2010 (TEOS-10), submitted by IAPSO.

Resolution 5: Thanks.

Following brief discussion, Tom Beer asked the Council to vote on the Resolutions. The Resolutions passed with one abstention.

Uri Shamir also noted that several Resolutions and Statements were adopted by the IUGG Executive Committee during the inter-General Assemblies period, which are:

- Special Resolution "Science on Natural Hazards and Environmental Disasters", 29 January 2010
- Statement "Volcanic Ash Clouds", 20 April 2010
- Statement "Volcanological and Meteorological Support for Volcanic Ash Monitoring", 28 May 2010
- Statement "Freedom to Conduct Science and Responsibilities of Scientists", 28 June 2010
- Statement "The Great East Japan Earthquake and Tsunami", 18 April 2011

There was no dissent by the Council.

### **Closing remarks**

Tom Beer thanked all Council Members, Committees and organizers of the General Assembly for their help and assistance to make the Assembly such a success. He invited all Members to make their comments for the improvement of future General Assemblies known to IUGG.

Tom Beer reminded the Council about the Closing Ceremony where the video of IUGG will be shown again.

Tom Beer declared that the Council of Delegates to the XXV General Assembly was adjourned at 18:00.

XXV General Assembly of the International Union of Geodesy and Geophysics  
Officers of IUGG and the Union Associations for 2011-2015

## IUGG Budget 2012 - 15, approved 6 July 2011, Melbourne

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

Year	2011	2012	2013	2014	2015	Total
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
<b>INCOME</b>						
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
<b>6. TOTAL INCOME</b>		537,7	517,3	526,9	555,2	<b>2137,1</b>
7. BALANCE 1/1		<b>766,6</b>	708,7	638,5	588,1	
<b>EXPENDITURES</b>						
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
<b>22. TOTAL EXPENDITURES</b>		595,6	587,5	577,3	751,1	<b>2511,5</b>
23. BALANCE 12/31		708,7	638,5	588,1	<b>392,2</b>	

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

## OFFICERS OF IUGG AND THE UNION ASSOCIATIONS FOR 2011-2015

### BUREAU OF THE UNION

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

### EXECUTIVE COMMITTEE OF THE UNION

According to Article 10 of the Statutes of IUGG the Executive Committee consists of:

- the Bureau (see above),
- the Retiring President of the Union, Tom Beer (Australia)
- the Presidents of the International Associations:

<i>IACS:</i>	Ian Allison	AUSTRALIA
<i>IAG:</i>	Chris Rizos	AUSTRALIA
<i>IAGA:</i>	Kathryn Whaler	UNITED KINGDOM
<i>IAHS:</i>	Gordon Young	CANADA
<i>IAMAS:</i>	Athena Coustenis	FRANCE
<i>IAPSO:</i>	Eugene Morozov	RUSSIA
<i>IASPEI:</i>	Domenico Giardini	SWITZERLAND
<i>IAVCEI:</i>	Ray Cas	AUSTRALIA

### FINANCE COMMITTEE OF THE UNION

<i>Chair:</i>	David Collins	UNITED KINGDOM
<i>Members:</i>	Zoltan Hajnal	CANADA
	Jan Krynski	POLAND
	David Rhoades	NEW ZEALAND

### SECRETARIES GENERAL OF THE INTERNATIONAL ASSOCIATIONS

<i>IACS:</i>	Andrew Mackintosh	NEW ZEALAND
<i>IAG:</i>	Hermann Drewes	GERMANY
<i>IAGA:</i>	Mioara Manda	FRANCE
<i>IAHS:</i>	Christophe Cudennec	FRANCE
<i>IAMAS:</i>	Hans Volkert	GERMANY
<i>IAPSO:</i>	Johan Rodhe	SWEDEN
<i>IASPEI:</i>	Peter Suhadolc	ITALY
<i>IAVCEI:</i>	Joan Martí	SPAIN

**RESOLUTIONS ADOPTED AT THE XXV GENERAL ASSEMBLY  
BY THE UNION - 6 JULY 2011  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 28 JUNE - 8 JULY 2011**

**Resolution 1: Standardised schemes for the terminology for glacier mass balance measurements and for classification of snow on the ground**

The International Union of Geodesy and Geophysics,

*Considering*

- the fundamental importance of common terminology and classification schemes for the exchange of scientific knowledge between nations and across disciplines,

*Noting*

- that a recognized glossary of glacier mass balance terminology and a standardized classification for snow on the ground had not been updated since the 1970s and 1990s respectively, and
- that our scientific understanding and measurement capabilities and techniques have evolved and expanded since then,

*Recognizing*

- the work done by IACS Working Groups to update, publish and freely disseminate new standardized schemes:
- *The International Classification for Seasonal Snow on the Ground*. IHP-VII Technical Documents in Hydrology No. 83, IACS Contribution No. 1, UNESCO-IHP, Paris. 2009. 80 p.  
(<http://unesdoc.unesco.org/images/0018/001864/186462e.pdf>),
- *Glossary of Glacier Mass Balance and Related Terms*. IHP-VII Technical Documents in Hydrology No. 86, IACS Contribution No. 2, UNESCO-IHP, Paris. 2011. 114 p.  
(<http://unesdoc.unesco.org/images/0019/001925/192525E.pdf>),

*Urges*

- snow and ice scientists, practitioners, and scientists from related disciplines to adopt these new schemes as standards.

**Resolution 2: Gravity and magnetic field satellite missions**

The International Union of Geodesy and Geophysics,

*Considering*

- the interest of the IUGG scientific community in knowing with the highest accuracy and resolution the Earth gravity and magnetic fields and their time evolutions as one of the fundamental components of the Earth system, also to understanding the climate evolution of the Earth,

*Acknowledging*

- the large experience acquired within the IUGG in the last 10 years in analysing data from dedicated satellite missions like GRACE, GOCE, CHAMP and Oersted, for the purpose of estimating the gravity and magnetic fields and their time variations,

*Noting*

- the need for a long-term monitoring of the potential fields for Earth System science beyond the current and decided missions lifetime,

*Urges*

- international and national institutions, agencies and governmental bodies in charge of supporting Earth science research to make all efforts in implementing

new gravity and magnetic field satellite missions that would respond to the  
aforementioned need for continued observation.

### **Resolution 3: Second Realization of the International Celestial Reference Frame**

The International Union of Geodesy and Geophysics,

#### *Considering*

- that the International Union of Geodesy and Geophysics adopted at the 23<sup>rd</sup> General Assembly in Sapporo 2003 Resolution 4 on the first realization of the International Celestial Reference Frame,
- that the International Astronomical Union (IAU) adopted Resolution B3 at its XXVII General Assembly (2009) ([www.iau.org/static/resolutions/IAU2009\\_English.pdf](http://www.iau.org/static/resolutions/IAU2009_English.pdf)) that resolves to consider the Second Realization of the International Celestial Reference Frame (ICRF2) as the fundamental realization of the International Celestial Reference System (ICRS)<sup>1</sup>,
- that the celestial reference system and the nutation-precession model have a large influence on geodetic and geodynamic observations, analyses and interpretations,
- that the ICRF2 was constructed by the International Earth Rotation and Reference Systems Service (IERS) and the International VLBI Service for Geodesy and Astrometry (IVS),

#### *Urges*

- that the ICRF2 shall be used as a standard for all future applications in geodesy and astrometry,
- that the organizations responsible for geodetic VLBI observing programs take appropriate measures to continue existing and develop improved VLBI observing and analysis programs to both maintain and improve ICRF2,
- that highest consistency between the ICRF, the International Terrestrial Reference Frame (ITRF), and the Earth Orientation Parameters (EOP) as observed and realized by the IAG and its components such as the IERS should be a primary goal in all future realizations of the ICRS.

### **Resolution 4: Adoption of the International Thermodynamic Equation Of Seawater – 2010 (TEOS-10)**

The International Union of Geodesy and Geophysics,

#### *Considering*

- that since the International Thermodynamic Equation Of Seawater – 2010 (TEOS-10) has been adopted by the Intergovernmental Oceanographic Commission (IOC) at its 25<sup>th</sup> Assembly in June 2009 as the official description for the properties of seawater, of ice and of humid air,

#### *Urges*

- all marine scientists to use TEOS-10<sup>2</sup> in place of EOS-80 in their research and publications.

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<sup>1</sup> *The Second Realization of the International Celestial Reference Frame by Very Long Baseline Interferometry*, presented on behalf of the IERS / IVS Working Group, Alan Fey and David Gordon (eds.). (IERS Technical Note; 35) Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, 2009. See [www.iers.org/MainDisp.csl?pid=46-25772](http://www.iers.org/MainDisp.csl?pid=46-25772) or <http://iers.obspm.fr/icrs-pc/>.

<sup>2</sup> The software to implement this change is available at the web site [www.TEOS-10.org](http://www.TEOS-10.org). The formal description of TEOS-10 is the “TEOS-10 Manual”; IOC, SCOR and IAPSO, 2010: *The international thermodynamic equation of seawater – 2010: Calculation and use of thermodynamic properties*. Intergovernmental Oceanographic Commission, Manuals and Guides No. 56, UNESCO (English), 196 pp. The following two introductory articles are also available from the TEOS-10 web site [www.TEOS-10.org](http://www.TEOS-10.org):

- “Getting started with TEOS-10 and the Gibbs Seawater (GSW) Oceanographic Toolbox”, and
- “What every oceanographer needs to know about TEOS-10:- The TEOS-10 Primer”.

**Resolution 5:           Thanks**

The International Union of Geodesy and Geophysics

Gratefully records its appreciation for the organization, arrangements, and hospitality at the XXV General Assembly. On behalf of all participants, the Council expresses its warm thanks to the Australian Academy of Science and the Royal Society of New Zealand, the Local Organizing Committee, the Scientific Program Committee, and all others for their efforts to make the XXV General Assembly a scientific success in the beautiful city of Melbourne.

**Resolutions and Statements adopted by the IUGG Executive Committee during the inter-General Assemblies period:**

- Special Resolution "Science on Natural Hazards and Environmental Disasters", 29 January 2010
- Statement "Volcanic Ash Clouds", 20 April 2010
- Statement "Volcanological and Meteorological Support for Volcanic Ash Monitoring", 28 May 2010
- Statement "Freedom to Conduct Science and Responsibilities of Scientists", 28 June 2010
- Statement "The Great East Japan Earthquake and Tsunami", 18 April 2011

These can all be found at: <http://www.iugg.org/about/special.php>

**RESOLUTIONS ADOPTÉES A LA XXV ASSEMBLÉE GÉNÉRALE  
PAR L'UNION – 6 JUILLET 2011  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIE, 27 JUIN - 7 JUILLET 2011**

**Résolution 1: Projets de terminologie normalisée pour la mesure du bilan de masse des glaciers et de typologie des neiges terrestres**

L'Union Géodésique et Géophysique Internationale

*Considérant*

- l'importance fondamentale d'une terminologie partagée et d'une typologie commune pour l'échange des connaissances scientifiques entre pays et entre disciplines,

*Notant*

- qu'un glossaire reconnu de la terminologie du bilan de masse des glaciers et qu'une typologie normalisée des neiges terrestres n'avaient pas été mis à jour depuis respectivement les années soixante-dix et quatre-vingt-dix, et
- que notre compréhension scientifique et nos capacités de mesure ont évolué et progressé depuis,

*Reconnaissant*

- les travaux réalisés par les groupes de travail de l'AISC pour mettre à jour, publier et distribuer gratuitement les projets de normalisation
- *The International Classification for Seasonal Snow on the Ground*. IHP-VII Technical Documents in Hydrology No. 83, IACS Contribution No. 1, UNESCO-IHP, Paris. 2009. 80 p. (<http://unesdoc.unesco.org/images/0018/001864/186462e.pdf>),
- *Glossary of Glacier Mass Balance and Related Terms*. IHP-VII Technical Documents in Hydrology No. 86, IACS Contribution No. 2, UNESCO-IHP, Paris. 2011. 114 p. (<http://unesdoc.unesco.org/images/0019/001925/192525E.pdf>),

*Recommande*

- aux scientifiques du domaine des neiges et glaces, et aux scientifiques des disciplines connexes d'adopter ces projets en tant que normes.

**Résolution 2: Missions satellitaires gravimétriques et magnétiques**

L'Union Géodésique et Géophysique Internationale

*Considérant*

- l'intérêt de la communauté scientifique de l'UGGI à connaître avec la meilleure précision et selon la résolution la plus fine les champs magnétiques et gravitaires terrestres ainsi que leur évolution au cours du temps comme l'une des composantes fondamentales du système terrestre, y compris pour comprendre l'évolution climatique de la Terre,

*Reconnaissant*

- la grande expérience acquise au sein de l'UGGI au cours des dix dernières années dans l'analyse des données de missions dédiées tels que GRACE, GOCE, CHAMP et Oersted, afin d'estimer les champs gravitaires et magnétiques et leur variation au cours du temps,

*Notant*

- le besoin pour la science du système terrestre d'un suivi à long terme des champs de potentiels au delà des missions en cours ou programmées,

*Recommande*

- aux institutions nationales et internationales, aux agences et organismes gouvernementaux chargés de financer la recherche en sciences de la Terre, de consacrer



tous leurs efforts à la mise en place de nouvelles missions satellitaires dédiées aux champs magnétiques et gravitaires susceptibles de répondre aux besoins d'observation continue mentionnés ci-dessus.

### **Résolution 3: Seconde version du système de référence céleste international**

L'Union Géodésique et Géophysique Internationale

#### *Considérant*

- la résolution 4 sur la première version du système de référence céleste international adoptée par l'Union géodésique et géophysique internationale lors de sa 23e Assemblée générale à Sapporo en 2003
- que l'Union Astronomique internationale (UAI) a adopté la résolution B3 lors de sa XXVIIe Assemblée générale en 2009 ([www.iau.org/static/resolutions/IAU2009\\_French.pdf](http://www.iau.org/static/resolutions/IAU2009_French.pdf)) qui décide d'adopter la seconde version du système de référence céleste international (ICRF2) comme version fondamentale du Système de référence céleste international (ICRS)<sup>3</sup>,
- que le système de référence céleste et le modèle de précession-nutation ont une grande influence sur les observations, analyses et interprétations géodésiques et géodynamiques,
- que ICRF2 a été réalisé par le Service international de rotation de la Terre et des systèmes de référence (IERS) et le Service international VLBI pour la géodésie et l'astronomie (IVS),

#### *Recommande*

- que ICRF2 soit à l'avenir utilisé en routine pour toutes les applications en géodésie et en astronomie,
- que les organisations en charge des programmes d'observation géodésiques VLBI prennent les mesures appropriées afin de poursuivre et de développer les programmes d'observation et d'analyse VLBI pour la maintenance et l'amélioration de ICRF2,
- que la meilleure cohérence entre ICRF, le Système de référence terrestre international (ITRF), et les Paramètres d'orientation terrestres (EOP), tels qu'observés et réalisés par l'AIG et ses composantes tels que IERS, soit un objectif primordial de toutes les futures versions de ICRS

### **Résolution 4: Adoption de l'équation thermodynamique internationale de l'eau de mer – 2010 (TEOS-10)**

L'Union Géodésique et Géophysique Internationale

#### *Considérant*

- que la Commission océanographique internationale (COI) a adopté lors de sa 25e Assemblée en juin 2009 l'équation thermodynamique internationale de l'eau de mer – 2010 (TEOS-10) comme description officielle des propriétés de l'eau de mer, de la glace et de l'air,

#### *Recommande*

- que tous les scientifiques marins utilisent TEOS-10<sup>4</sup> en lieu et place de EOS-80 pour leurs recherches et publications.

<sup>3</sup> La seconde version du Système de référence céleste international par Interférométrie à très longue base, présentée au nom du groupe de travail IERS / IVS, Alan Fey and David Gordon (eds.). (IERS Technical Note ; 35) Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, 2009. Voir [www.iers.org/MainDisp.cs?pid=46-25772](http://www.iers.org/MainDisp.cs?pid=46-25772) ou [hpiers.obspm.fr/iers-pc/](http://hpiers.obspm.fr/iers-pc/).

<sup>4</sup> Le logiciel pour l'implémentation de cette modification est disponible sur le site [www.TEOS-10.org](http://www.TEOS-10.org). La description détaillée de TEOS-10 fait l'objet de "TEOS-10 Manual"; IOC, SCOR and IAPSO, 2010: *The international thermodynamic equation of seawater – 2010: Calculation and use of*

## **Résolution 5: Remerciements**

L'Union Géodésique et Géophysique Internationale

Exprime avec gratitude sa reconnaissance pour l'organisation, les dispositions prises et l'hospitalité de la XXVe Assemblée générale. Au nom de tous les participants, le Conseil remercie chaleureusement l'Académie des sciences australienne, la Société royale de Nouvelle-Zélande, le Comité local d'organisation, le Comité scientifique et tous ceux dont les efforts ont fait de la XXVe Assemblée générale un succès scientifique dans la belle ville de Melbourne.

## **Résolution et déclarations adoptées par le Comité Exécutif de l'UGGI pendant l'intersession :**

- Résolution exceptionnelle "Science on Natural Hazards and Environmental Disasters", 29 January 2010
- Déclaration "Volcanic Ash Clouds", 20 April 2010
- Déclaration "Volcanological and Meteorological Support for Volcanic Ash Monitoring", 28 May 2010
- Déclaration "Freedom to Conduct Science and Responsibilities of Scientists", 28 June 2010
- Déclaration "The Great East Japan Earthquake and Tsunami", 18 April 2011

que l'on peut trouver à : <http://www.iugg.org/about/special.php>

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*thermodynamic properties*. Intergovernmental Oceanographic Commission, Manuals and Guides No. 56, UNESCO (English), 196 pp. Les deux articles introductifs suivants sont également disponibles sur le site Web de TEOS-10 [www.TEOS-10.org](http://www.TEOS-10.org) :

- "Getting started with TEOS-10 and the Gibbs Seawater (GSW) Oceanographic Toolbox", et
- "What every oceanographer needs to know about TEOS-10- The TEOS-10 Primer".

**RESOLUTIONS ADOPTED AT THE XXV GENERAL ASSEMBLY  
BY THE IUGG ASSOCIATIONS  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIE, 27 JUNE - 8 JULY 2011**

**IAG RESOLUTION 1: Gravity field satellite missions**

The International Association of Geodesy,

*considering,*

the interest of the scientific community in knowing with the highest accuracy and resolution the Earth gravity field and its time evolution as one of the fundamental components of the Earth system, also to understanding the climate evolution of the Earth;

*acknowledging,*

the large experience acquired within the IAG in the last 10 years in analyzing data from dedicated satellite missions like CHAMP, GRACE and GOCE for the purpose of estimating the gravity field and its time variation;

*noting,*

the need for a long-term monitoring of the gravity field for Earth System science beyond the mission lifetime of GRACE and GOCE;

*urges,*

international and national institutions, agencies and governmental bodies in charge of supporting Earth science research to make all efforts in implementing new gravity field satellite missions that would respond to the aforementioned need for continued observation.

**IAG RESOLUTION 2: Second Realization of the International Celestial Reference Frame**

The International Association of Geodesy,

*considering,*

1. that the International Union of Geodesy and Geophysics adopted at the 23<sup>rd</sup> General Assembly in Sapporo 2003 Resolution 4 on the first realization of the International Celestial Reference Frame;
2. that the International Astronomical Union (IAU) adopted Resolution B3 at its XXVII General Assembly (2009) ([www.iau.org/static/resolutions/IAU2009\\_English.pdf](http://www.iau.org/static/resolutions/IAU2009_English.pdf)) that resolves to consider the “Second Realization of the International Celestial Reference Frame (ICRF2)” as the fundamental realization of the International Celestial Reference System (ICRS) (see note 1);
3. that the celestial reference system and the nutation-precession model have a large influence on geodetic and geodynamic observations, analyses and interpretations;
4. that the ICRF2 was constructed by the International Earth Rotation and Reference Systems Service (IERS) and the International VLBI Service for Geodesy and Astrometry (IVS);

*recommends*

1. that the ICRF2 should be used as a standard for all future applications in geodesy and astrometry,
2. that the organizations responsible for geodetic VLBI observing programs take appropriate measures to continue existing and develop improved VLBI observing and analysis programs to both maintain and improve ICRF2,
3. that highest consistency between the ICRF, the International Terrestrial Reference Frame (ITRF), and the Earth Orientation Parameters (EOP) as observed and realized by the IAG and its components such as the IERS should be a primary goal in all future realizations of the ICRS.

*Note 1:* The Second Realization of the International Celestial Reference Frame by Very Long Baseline Interferometry, Presented on behalf of the IERS / IVS Working Group, Alan Fey and David Gordon (eds.). (IERS Technical Note ; 35) Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, 2009. See <[www.iers.org/MainDisp.csl?pid=46-25772](http://www.iers.org/MainDisp.csl?pid=46-25772)> or <[hpiers.obspm.fr/icrs-pc/](http://hpiers.obspm.fr/icrs-pc/)>.

### **IAGA RESOLUTION 1:**

*(Division I)*

**IAGA,**

**considering**

the value of continuity in magnetic satellite missions to increase our knowledge of Earth dynamics;

**noting**

that no successor to ESA's Swarm mission yet exists;

**urges**

the development of missions by national and international agencies to fill this void for the period 2016 onwards.

### **IAGA RESOLUTION 2:**

*(Division I)*

**IAGA,**

**considering**

the significance of experimental data necessary for understanding the magnetic field and magnetic properties of Earth and Earth-related materials;

**noting**

the increasing demands on technical performance of up-to-date experimental facilities, and associated cost increases;

**acknowledges**

the scientific value of open and free access to sophisticated experimental facilities offered by certain research institutions.

### **IAGA RESOLUTION 3:**

*(Division V)*

**IAGA,**

**noting**

the importance of the Dst index for various applications including geomagnetic field modeling, space-weather and -climate studies and detection of local anomalous variations,

**recognizing**

that the absolute accuracy of the data from the contributing observatories, Kakioka, Honolulu, San Juan, Hermanus and Alibag, is essential,

**recommends**

that all agencies operating these geomagnetic observatories continue to support both absolute and variation measurements to maintain the required level of accuracy.

**IAGA RESOLUTION 4:**

*(Division V)*

**IAGA,**

**considering**

the importance of homogenous magnetic anomaly data coverage for global geological studies,

**urges**

the owners of airborne and marine magnetic anomaly data sets, in particular from equatorial areas and the southern hemisphere, to release them into the public domain as soon as possible.

**Note: Resolution No. 5 (1993):** *De-classifying magnetic survey data (Division V)*

The IAGA, **noting** that many magnetic surveys that have been carried out by both military and civilian authorities, **urges** that all institutions holding classified magnetic data consider de-classifying those data that may contribute to international geoscientific research.

**IASPEI RESOLUTION 1: Latin American Seismological Commission**

Noting the increasing seismological research activities in Latin America, the high level of earthquake risk in the region, and the success of the regional IASPEI Commissions (ESC and ASC) in developing seismological programs and cooperation,

IASPEI

encourages the formation of a Latin American Seismological Commission to foster more cooperation within the region and the organization of regular IASPEI regional meetings.

**IASPEI RESOLUTION 2: African Seismological Commission**

Noting the increasing seismological research activities in Africa, the variable level of earthquake risk in the region, and the success of the regional IASPEI Commissions (ESC and ASC) in developing seismological programs and cooperation,

IASPEI

encourages the formation of an African Seismological Commission to foster more cooperation within the region and the organization of regular IASPEI regional meetings.

**IASPEI RESOLUTION 3: IASPEI MEDAL**

Noting the established practice of several other IUGG associations of recognising outstanding contributions

IASPEI

resolves to award no more frequently than biennially an IASPEI Medal for outstanding service in furthering the aims of IASPEI.

**IASPEI RESOLUTION 4: Earthquake Forecasting**

Recognising the challenges associated with earthquake forecasting, and noting the findings of the International Commission for Earthquake Forecasting for Civil Protection (ICEF) convened by the Italian Department of Civil Protection following the 2009 l'Aquila earthquake, and the potential of its recommendations for improving earthquake forecasting both in Italy and elsewhere,

IASPEI

Endorses the findings and recommendations of the final ICEF report.

**IASPEI RESOLUTION 5: SeismoArchives Project**

Noting that steady progress has been made by the IASPEI SeismoArchives project and other efforts, in scanning and making the scanned seismogram files accessible online,

IASPEI urges that

- (i) appropriate sources of funding be found to complete a library of seismograms for significant earthquakes recorded at a set of key observatories prior to the digital era (~1980), and
- (ii) the SeismoArchives project help to facilitate the selection and preparation of records (along with related seismological information) to be scanned, including identification of those at risk of destruction, and provide guidance to assure that the resulting electronic libraries contain all relevant metadata and instructions for their use.

**IASPEI RESOLUTION 6: Appreciation**

RECOGNISING the enormous effort required to organise the General Assembly,

IASPEI

THANKS and CONGRATULATES the IUGG Local Organizing Committee and its Chair Professor Ray CAS for a most memorable meeting in Melbourne.

**RESOLUTIONS ADOPTÉES A LA XXV ASSEMBLÉE GÉNÉRALE  
PAR LES ASSOCIATIONS DE L'UGGI  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIE, 27 JUIN - 7 JUILLET 2011**

**RESOLUTION AIGA 1:**

*(Division I)*

**AIGA,**

**considérant**

l'importance de la continuité entre les missions satellitaires magnétiques pour l'amélioration de notre compréhension de la dynamique terrestre;

**notant**

qu'aucune mission n'est actuellement définie pour succéder à la mission Swarm de l'ESA;

**exhorte**

les agences nationales et internationales à développer de nouvelles missions pour combler cette lacune à partir de 2016.

**RESOLUTION AIGA 2:**

*(Division I)*

**AIGA,**

**considérant**

la valeur intrinsèque des données expérimentales nécessaires à la compréhension du champ magnétique et des propriétés magnétiques de la Terre et de ses matériaux compositionnels ;

**notant**

les exigences croissantes en ce qui concerne les performances techniques d'installations expérimentales de pointe, et l'augmentation des coûts associés ;

**reconnaît**

la valeur scientifique de l'accès ouvert et gratuit à des installations expérimentales sophistiquées, offert par certains instituts de recherche.

**RESOLUTION AIGA 3:**

*(Division V)*

**AIGA,**

**notant**

l'importance de l'indice Dst pour de multiples applications et en particulier la modélisation du champ géomagnétique, les études de météorologie et de climatologie spatiale, et la détection de variations locales anormales,

**reconnaisant**

que la précision absolue des données des observatoires de Kakioka, Honolulu, San Juan, Hermanus et Alibag, qui contribuent au calcul de l'indice Dst, est essentielle,

**recommande**

que toutes les agences en charge de ces observatoires magnétiques poursuivent leur soutien aux mesures absolues et aux mesures des variations pour maintenir le niveau de précision requis pour le calcul de l'indice.

**RESOLUTION AIGA 4:**

*(Division V)*

**AIGA,**

**considérant**

l'importance, pour les études géologiques globales, de la couverture spatiale homogène des données d'anomalies magnétiques,

**exhorte**

les détenteurs d'ensembles de données d'anomalies magnétiques aéroportées ou marines, en particulier pour les zones équatoriales et pour l'hémisphère sud, à rendre dès que possible ces données disponibles dans le domaine public.



## **XXV IUGG GENERAL ASSEMBLY CLOSING CEREMONY**

The Closing Ceremony of the XXV General Assembly of the International Union of Geodesy and Geophysics was held in the afternoon of Thursday, 7 July 2011 at the Melbourne Convention Centre, Melbourne, starting at 16:30.

### **PROGRAMME**

Remembrance of Colleagues deceased since the 2007 General Assembly

Report of the IUGG Secretary General Alik Ismail-Zadeh

Report of the IUGG Treasurer Aksel W. Hansen

Reading of the Resolutions of the Union adopted at the XXV General Assembly

Final Remarks by Tom Beer, Outgoing IUGG President

Closing Remarks by Harsh Gupta, Incoming IUGG President

**REMEMBRANCE OF COLLEAGUES DECEASED SINCE THE XXIV IUGG GENERAL ASSEMBLY**

**IUGG**

Bert Bolin (Sweden)  
Keith Cole (Australia)  
James C. I. (Jim) Dooge (Ireland)  
Pembroke Hart (USA)  
Carl Kisslinger (USA)  
Edward Lorenz (USA)  
Albert Tarantola (France)  
Valery Troitskaya (Russia/Australia)  
Gilbert Brian Tucker (Australia)

**IACS**

Keith Echelmeyer (USA)  
Fritz Koerner (Canada)  
Louis Lliboutry (France)  
Uwe Radok (Australia)  
Niels Reeh (Denmark)  
Hans Röthlisberger (Switzerland)  
Marcel De Quervain (Switzerland)

**IAG**

Lubomir W. Baran (Poland)  
Arne E. Bjerhammar (Sweden)  
Kurt Bretterbauer (Austria)  
Irene Fischer (USA)  
Werner Gurtner (Switzerland)  
István Joó (Hungary)  
Carlo Morelli (Italy)  
Leif Svensson (Sweden)  
Maria I. Yurkina (Russia)

**IAGA**

Jules Aarons (USA)  
Mario Acuna (USA)  
Mark Berdichevsky (Russia)  
Richard Doell (USA)  
Hugo Fournier (Argentina)  
Vladimir Golovkov (Russia)  
Ian Gough (Canada)  
Pembroke J. Hart (USA)  
Jim Horwitz (USA)  
Paul Kintner (USA)  
Peter M. McGregor (Australia)  
Kazuo Nagashima (Japan)\  
Takashi Oguti (Japan)  
Roy Piggott (UK)  
Martin Pomerantz (USA)  
David Rankin (Canada)  
Luijz Rijo (Brazil)  
Ingrid Sandahl (Sweden)  
Ulrich Schmucker (Germany)  
Wilfried Schroeder (Germany)

Bhisham P. Singh (India)  
Bikrama J. Srivastava (India)  
Tsutomu Tamao (Japan )  
Jean-Paul Villain (France)  
Peter Weidelt (Germany)

**IAHS**

Alfred Becker (Germany)  
Jim Dooge (Ireland)  
BertJan Heij (The Netherlands)  
Emlyn Howard Lloyd (UK)  
Zdzislaw Kaczmarek (Poland)  
Vit Klemeš (Canada)  
Jaromir (Jerry) Němec (Switzerland)  
Jerry Ritchie (USA)  
Igor Shiklomanov (Russia)  
Gian Maria Zuppi (Italy)

**IAMAS**

Joachim Joseph (Israel)  
Anthony Slingo (UK)  
Bert Bolin (Sweden).  
David Limbert (UK)  
Chuck Stearns (USA)  
David Hofmann (USA)  
Derek Cunnold (USA)  
Curtis P. Rinsland (USA)  
Byron Boville (USA)  
John Firor (USA)  
William Elliott (USA)  
Edward Lorenz (USA)  
George Cressman (USA)  
John Roads (USA)  
Anthony (Tony) Slingo (UK)  
John (Jack) Eddy (USA)  
Joanne Simpson (USA)  
Aksel Wiin-Nielsen (Denmark)  
Stephen Schneider (USA)  
Willi Dansgaard (Denmark)

**IAPSO**

Tom Allan (UK)  
Fred Culkin (UK)  
Laurie Draper (UK)  
Peter Killworth (UK)  
Johann Lutjeharms (South Africa)  
Clifford Mortimer (USA)  
Christian le Provost (France)  
Allan Robinson (USA)  
Claes Rooth (USA)  
Volfango Rupolo (Italy)  
Fritz Schott (Germany)  
Joanne Malkus Simpson (USA)

XXV General Assembly of the International Union of Geodesy and Geophysics  
Closing Ceremony

Melvin Stern (USA)  
Bruce Warren (USA)  
Daniel Wright (Canada)

**IASPEI**

Jörg Ansorge (Switzerland)  
Pierre Bernard (France)  
Luigi Burlini (Switzerland)  
Allin Cornell (USA)  
Petros Dimitriou (Greece)  
José M. Febrer (Argentina)  
Francesca Fitzko (Italy)  
Sergey V. Goldin (Russia)  
Pembroke Hart (USA)  
John H. Hodgson (Canada)  
Emilia Juhasova (Slovakia)  
George W Housner (USA)  
Sidney Kaufman (USA)  
Carl Kisslinger (USA)

Leon Knopoff (USA)  
George Leventakis (Greece)  
Vance M. Lynch (USA)  
Carlo Morelli (Italy)  
Graham Neilson (UK)  
Mikhail V. Nevsky (Russia)  
Kacper M. R. Rybicki (Poland)  
Paul Silver (USA)  
Renato Vidrih (Slovenia)  
Edward J Walter (USA)  
Michele Zacchigna (Italy)

**IAVCEI**

Wulf Mueller (Canada)  
Tom Simkin (USA)  
Jim Luhr (USA)

**REPORT OF THE IUGG SECRETARY GENERAL**  
**ALIK ISMAIL-ZADEH**  
**XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 7 JULY 2011**

Distinguished Guests, Dear Colleagues, Ladies and Gentlemen,

69 countries are members of IUGG, and we are always encouraging new members. Any country in which “independent activity in geodesy and geophysics has been developed” is eligible for IUGG membership. We believe that IUGG membership contributes to the scientific well-being of our member countries, and may lead to economic benefits through enhanced exchange of scientific and technical expertise. The Secretary General is always interesting in talking to people about country membership, and at present we are negotiating with the Kingdom of Saudi Arabia and Kazakhstan on possibilities to join the Union.

At this meeting, delegates from 49 Adhering Bodies attended one or more sessions of the Council Meeting. The IUGG Council ratified the membership of the Republic of Azerbaijan and the former Yugoslav Republic of Macedonia as Regular Members of the Union, Costa Rica and the Republic of Georgia as Associate Members.

A number of changes to the Statutes and by-Laws were suggested and approved, among them:

- Affiliate Membership of IUGG. The Affiliate Membership will provide a mechanism to formalise linkages with various international and regional organisations dealing with Earth and space sciences to promote co-operation and collaboration. Affiliate Membership is intended to be analogous to Associate Membership, but applying to organisations rather than countries.
- Fellowship of IUGG as a category of honorary membership.

IUGG appoints official liaisons to several scientific bodies where it is advantageous to both organizations. Here is the list of persons appointed:

<b>Organization</b>	<b>Liaisons 2011-2015</b>
U.N. Cartographic Office	Luiz Fortes (Brazil)
UNESCO IHP	Pierre Hubert (France)
UNESCO IOC	Stefania Sparnocchia (Italy)
WMO	Arthur Askew (Switzerland) Hans Volkert (Germany) Arnau Folch (Spain)
ICAO	William Rose (USA)

	Marianne Guffanti (USA)
PAIGH	Hermann Drewes (Germany)
CCTF	Claude Boucher (France)
CODATA	Mark Parsons (USA) Alexei Gvishiani (Russia)
COSPAR	Eric Donovan (Canada)
IRDR	Kuniyoshi Takeuchi (Japan)
ICSU Regional Office for Africa	Isabelle Ansoorge (South Africa)
ICSU Regional Office for Asia and the Pacific	Sukanta Roy (India) Sri Widiyantoro (Indonesia)
ICSU Regional Office for Latin America and the Caribbean	Jaime U. Fucugauchi (Mexico)
SCAR	Ian Allison (Australia)
SCOPE	discontinued
SCOR	Athena Coustenis (France) Eugene Morozov (Russia)
SCOSTEP	Vladimir Kuznetsov (Russia)
WCRP	Tom Beer (Australia)
WDS	Ruth Neilan (USA)

The Council appointed liaisons to the following inter-governmental and international bodies: The United Nations Cartographic Office, the UNESCO International Hydrological Program, the UNESCO Intergovernmental Oceanographic Commission, The World Meteorological Organisation, the International Civil Aviation Organisation, Pan American Institute of Geography and History, Consultative Committee for Time and Frequency, and to various inter-disciplinary bodies of ICSU and the ICSU Regional offices.

Prague (Czech Republic) was selected by the IUGG Council as the venue for the 26th IUGG General Assembly in 2015.

The IUGG budget for 2012-2015 was approved and 5 Resolutions were passed. Those will be presented to you soon. Details about these decisions will be available via the E-Journal and on our website as soon as we can manage it.

I thank the Local Organising Committee, the Australian Academy of Sciences, and The Royal Society of New Zealand for the hospitality during the XXV IUGG General Assembly. Thank all you.

**REPORT OF THE IUGG TREASURER**

**AKSEL W. HANSEN**

**XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 7 JULY 2011**

My job today is to give a brief overview of IUGG's financial status just before we are closing the XXV General Assembly. I could give you many numbers, but time does not allow this, and I guess you would not want to see them. Therefore, I'll keep it simple.

IUGG is a union with 8 associations each of them having their own economy. Here I'll give a brief report of the union only.

The Union's economy is based on dues paid by the members. 64 members in different categories pay dues

equal to 283 units/year. The price of 1 unit is now \$1,750.

The money goes to Associations and commissions, meetings, grants, administration and membership dues.

IUGG has now reserves close to 1,5 years income.

Yesterday, the Council approved the budget for 2012 – 2015.

**Adopted Budget for 2012 – 2015**

○ Incoming balance (estimate)		<b>US\$ 766.7K</b>
○ Income (95% from dues)		US\$ 2,107.0K
○ Expenditures		US\$ 2,481.5K
– Administration+misc. + ICSU	US\$ 632.0K	
– Associations	US\$ 997.5K	
– Grants/union activities	US\$ 852.0K	
○ Result		US\$ -374.5K
– Outgoing balance	<b>US\$ 392.2K</b>	

**Conclusion**

The economy of IUGG is good, and we can look forward to a 4-year period that gives new opportunities. The budget allows us to have a higher level of activity than normal for the next period, e.g. we have put money in the budget that gives new initiatives a good start.

However, we cannot know what will happen in the future. Therefore, the budget cut in the reserves is only planned for this time. If we want to continue the high activity level, we must look for funding from outside.

**READING OF THE RESOLUTIONS OF THE UNION  
ADOPTED AT THE XXV GENERAL ASSEMBLY  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 7 JULY 2011**

The Resolutions adopted by the IUGG Council constitute the most serious and enduring business of the General Assembly. These Resolutions present the findings of the Union to our Adhering Bodies and to the scientific community as a whole, and recommend actions. The Resolutions of the Union and also of the

Associations that adopted resolutions are printed in these *Comptes Rendus*. At the Closing Ceremony, each resolution was read in English by Tom Beer, and they were shown on overhead projection in English.

**FINAL REMARKS BY TOM BEER, OUTGOING IUGG PRESIDENT  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 7 JULY 2011**

IUGG Colleagues, Friends, Ladies and Gentlemen,

The XXV General Assembly has reached its closing moments. For the last two weeks we enjoyed the camaraderie of just under 4,000 geo-scientists, assembled in my home city of Melbourne to present, to listen to and study research findings, and consider the ways in which we can and should continue to carry our science ahead, expanding and improving understanding and expanding knowledge through individual and collaborative work, and making the outcome relevant to society.

It has been an exciting scientific program, spanning well over 200 sessions, emphasizing disciplinary and inter-disciplinary studies. We note with satisfaction the presence of many younger scientists, and expect them to continue to be active in the Union

The Assembly also included many organizational meetings. The Bureau and Executive Committee deliberated matters of policy and planning, and made recommendation to Council. The Council took decisions that are being reported in this session.

The Council elected the new officers of the Bureau and Finance Committee, and the Associations elected their officers. Please allow me to present the members of the 2007-2011 Bureau, Finance Committee, and Presidents and Secretaries General of the Associations.

IUGG Bureau members for 2011-2015

President: Harsh Gupta (India)  
Vice-President: Michael Sideris (Canada)  
Secretary General: Alik Ismail-Zadeh  
(Germany/Russia)  
Treasurer: Aksel Hansen (Denmark)  
Bureau Members: Isabelle Ansorge (South Africa)  
Kenji Satake (Japan)  
Pierre Hubert (France)

IUGG Finance Committee members for 2011-2015

Chair: David Collins (UK)  
Members: Jan Krynski (Poland)  
Zoltan Hajnal (Canada)  
David Rhoades (New Zealand)

Association Presidents and Secretaries General for 2011-2015

*International Association for Cryospheric Sciences*

President: Ian Allison (Australia)  
President-elect: Charles Fierz (Switzerland)

Secretary General: Andrew Mackintosh  
(New Zealand)

*International Association of Geodesy*

President: Chris Rizos (Australia)  
Secretary General: Hermann Drewes (Germany)

*International Association of Geomagnetism and Aeronomy*

President: Kathy Whaler (UK)  
Secretary General: Mioara Mandea (France)

*International Association of Hydrological Sciences*

President: Gordon Young (Canada)  
President-Elect: Hubert Savenije  
(The Netherlands)  
Secretary General: Christophe Cudennec (France)

*International Association of Meteorology and Atmospheric Sciences*

President: Athena Coustenis (Germany)  
Secretary General: Hans Volkert (Germany)

*International Association for the Physical Sciences of the Oceans*

President: Evgeny Morozov (Russia)  
Secretary General: Johan Rodhe (Sweden)

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

President: Domenico Giardini  
(Switzerland)  
Secretary General: Peter Suhadolc (Italy)

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

President: Ray Cas (Australia)  
Secretary General: Joan Martí (Spain)

Location of the 2015 IUGG General Assembly

The Council selected Prague, Czech Republic, as the site of the 2015 IUGG General Assembly. The dates of the 26th IUGG General Assembly will be announced as soon as possible but are expected to be June 2015.

As I stated in my remarks at the joint Australian and New Zealand opening session, as a young scientist my eyes were wide with admiration and delight during the

XXV General Assembly of the International Union of Geodesy and Geophysics  
Closing Ceremony

first IUGG meeting ever held in Australia in 1979. I am proud to have succeeded in bringing IUGG back to Australia after 32 years and thank all of those from both Australia and New Zealand who made it possible. I hope that there is a young scientist in the audience who has been so inspired that they will help to organise the IUGG General Assembly in the year 2043.

I have held various offices in the Union. Three years on the Bureau of IUGG, then four years as Vice President of IUGG and in the last four years as President. It has been an exciting and eventful time, that I have enjoyed so much that I can genuinely say that I am sad that the By-Laws limit the term of the President to one term.

I am, however, grateful for the opportunity to have served our scientific community as President, jointly with the Bureau:

Vice-President Harsh Gupta, Secretary General Alik Ismail-Zadeh, Treasurer Aksel Hansen, Bureau members Yun-Tai Chen, David Jackson and Ali Tealeb. A strong, dedicated and cooperative Executive Committee of Association Presidents who carefully scrutinised issues and provided wise and useful counsel, ably aided by their Secretaries General, greatly facilitated carrying out the task of leading the Union. To all these colleagues and friends I extend my gratitude for their support.



**CLOSING REMARKS BY HARSH GUPTA, INCOMING IUGG PRESIDENT  
XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 7 JULY 2011**

Thanks to President Tom Beer for steering IUGG so remarkably well. I also wish to thank the outgoing IUGG Bureau members Yun-tai Chen, David Jackson, and Ali Tealeb for guiding us for the past four years.

The XXV IUGG General Assembly has been remarkably successful. The facilities provided in the lecture halls, catering and over all conduct of the Assembly have been very satisfying. The Symposia and the Workshops were very well attended. The quality of science in the presentations has been of very high standard. More people are attending the closing ceremony of the XXV GA today than ever before. I wish we had more students participating in the Assembly. We should find ways and means to do so in the future General Assemblies.

In spite of scientific and technical developments, the loss of lives and property in natural hazards is increasing. Not even 11 years of the 21<sup>st</sup> Century have yet passed, but the total loss of human lives due to earthquakes and resultant tsunamis has almost matched the total loss during the entire 20<sup>th</sup> Century! This calls for a global joint effort to address such problems. With the passage of time the increasing importance of geosciences, in the broadest sense, is well recognized. During 2007 through 2009, four International Years related to geo-sciences were proclaimed. In the forthcoming 30<sup>th</sup> General Assembly of International

Council of Science (ICSU) to be held at Rome in late September 2011, it is likely that a major new interdisciplinary research initiative of 10 years duration on Earth System Sustainability in collaboration with other partners will be established. IUGG with its 8 International Associations dealing with Cryospheric Sciences (IACS), Geodesy (IAG), Geomagnetism and Aeronomy (IAGA), Hydrology (IAHS), Meteorology and Atmospheric Sciences (IAMAS), Oceanography (IAPSO), Seismology and Physics of the Earth's Interior (IASPEI), and Volcanology and Chemistry of the Earth's Interior (IAVCEI) shall contribute to this major initiative and other related global issues and topics for the well being of humanity and health of the Planet Earth.

It is a very healthy sign for IUGG that 5 nations made a bid for holding the XXVI GA in 2015. These were all very competitive bids. The bid from the Institute of Geophysics of the Academy of Sciences of the Czech Republic and the Czech National Committee for Geodesy and Geophysics was successful. This is a very exciting destination and I look forward to welcoming you there.

**ADMINISTRATIVE REPORTS**  
**XXV GENERAL ASSEMBLY, MELBOURNE, AUSTRALIA, 27 JUNE - 8 JULY 2011**

**QUADRENNIAL REPORT OF THE PRESIDENT**

**IUGG**

The year 2009 marked the 90th anniversary of IUGG, which was established by nine founder member countries (Australia, Belgium, Canada, France, Italy, Japan, Portugal, the United Kingdom and the United States of America) on July 28, 1919 and I was pleased on that date to be able to attend the MOCA Scientific Assembly of IAMAS, IAPSO and IACS held in Montreal and celebrate the birthday in an appropriate manner.

There have been 24 General Assemblies during that period. The first was held in Rome in 1922, the last one in Perugia in 2007, and the current one in Melbourne in 2011. The year half-way between the IUGG General Assemblies is the year in which most of the Scientific Associations that comprise the IUGG host their Scientific Assemblies. Details of these scientific assemblies can be found in the reports of the various Associations.

Though I was not able to attend the IASPEI Scientific Assembly in Capetown, or the IAHS Scientific Assembly in Hyderabad, I managed to attend all of the others. At the IAGA Scientific Assembly held in Sopron, Hungary, a large numbers of English speaking high school students had been drafted to assist the visitors. Such young people are the future of our discipline and I am pleased to see that self-organised groupings of young scientists are beginning to emerge. The Association of Polar Early Career Scientists have set up a web site (<http://apecs.arcticportal.org/>) to publicise their many activities. The Young Earth Scientists (YES, <http://www.networkyes.org/>) held a conference in Beijing in October 2009. Such groupings are to be applauded and encouraged. To encourage such activities, the Executive Committee decided to form a Capacity Building and Education Committee, which was constituted in March 2010 with Laszlo Szarka of Hungary as the Chair.

**IUGG Vision and Mission Statement**

The International Union of Geodesy and Geophysics (IUGG) is the international organization dedicated to advancing, promoting, and communicating knowledge of the Earth system, its space environment, and the dynamical processes causing change.

Through its constituent Associations, Commissions, and Services, IUGG convenes international assemblies and workshops, undertakes research, assembles

observations, gains insights, coordinates activities, liaises with other scientific bodies, plays an advocacy role, contributes to education, and works to expand capabilities and participation worldwide.

Data, information, and knowledge gained are made openly available for the benefit of society – to provide the information necessary for the discovery and responsible use of natural resources, sustainable management of the environment, reducing the impact of natural hazards, and to satisfy our curiosity about the Earth's natural environment and the consequences of human activities.

This vision and mission statement was promulgated in the November 2005 e-journal; and has provided guidance during my term as President. However times change and as they change new strategies are needed. The production of a new strategy involves extensive consultation so that the new Visioning Committee that the Executive Committee established in 2010 (chaired by Eigil Friis-Christensen) will be assisting the new President's activities.

**IUGG Membership**

Since 1919 the membership of IUGG has been based on national membership. Every four years the members meet at the General Assembly. This mode of operation has strengths but it also has weaknesses. I was distressed at the number of members that failed to attend the Perugia General Assembly and pursued the reasons for this. There were many different reasons.

In some cases visas were denied to applicants. This contravention of the ICSU code of freedom and responsibility in science was reported to ICSU and is illustrative of the difficulties that scientists face. Our own Secretary General has had considerable difficulties obtaining a visa to travel to the United States.

In a few cases failure to send a delegate to the Council meeting reflected difficulties in the local administration of IUGG. In some cases the difficulty arose because of local financial problems or restructuring of the Adhering Body. Sometimes it arose from the retirement of a long-serving Chair of a national IUGG Committee who had not managed to replenish the committee with new members.

I encourage every delegate to give some thought to their own national committee and ask themselves whether the committee needs to be reconstituted. Are

the members of the committee still active? Is there a realistic succession plan in place to handle retirements and resignations? Is the committee providing sufficient feedback to the Adhering Body?

These observations led me to examine the topic of membership more closely. Regional geophysical groupings such as the AGU, EGU and AOGS are strong, robust and vibrant but do not have a direct voice in IUGG affairs. The IUGG Executive Committee meeting set up a membership committee (chaired by Aksel Hansen) to consider the topic of membership and if considered appropriate recommend ways to:

1. develop an IUGG Fellows Program;
2. develop an IUGG Individual and Honorary Membership programs;
3. develop an IUGG Adjunct Members program (e.g., to provide a tight link between IUGG and national and regional geophysical and geoscience unions and societies);
4. develop IUGG Inactive Members program (to deal with the countries whose “observer” status is expired).
5. liaise with the IUGG Finance Committee, Statutes and By-Laws Committee, and Honors and Recognition Committee on the issues related to membership.

The membership committee built on the recommendation of the Honours committee (chaired by Victor Savinykh) that IUGG institute Fellowships or Honorary Membership as an honour for eminent geoscientists, and recommended that this be treated as a new membership category - honorary membership to be known as IUGG Fellowship. They also recommended that adjunct (or affiliate) members be admitted on the same basis as associate members. These recommendations have been incorporated into revisions to the Statutes and By-Laws that will be put to the Council.

### **IUGG Initiatives**

During this past quadrennium, the issue of geophysical data and information has assumed greater prominence. Timely access to data, the storage and retrieval of data have all been scrutinised by IUGG and by ICSU, the International Council of Science. During the past quadrennium, IUGG ran the highly successful electronic geophysical year – eGY – as one of the IGY+50 suite of activities. This has continued into the present quadrennium with eGYAfrica, a program of activities specifically designed to bridge the “digital divide” whereby continents such as Europe, America and Australia have ease of access to high speed digital communication whereas many African countries have unreliable and slow access to the internet.

The International Year of Planet Earth (IYPE), held in 2008, was another – though slightly belated - IGY+50 activity. The excellent outreach programme of the was complemented by ten science themes with two science research programmes that involved IUGG – both of which published monographs during 2010 detailing their results. Sierd Cloetingh and Joerg Negendank utilised ILP scientists to edit “New Frontiers in Integrated Solid Earth Sciences” and Tom Beer utilised scientists of the Union Commission for Geophysical Risk and Sustainability to edit *Geophysical Hazards: Minimizing Risk, Maximising Awareness*.

The climate science community received harsh criticism when some leaked e-mails from a climate science unit in Great Britain received publicity and were found to contain hostile remarks about other scientists. Various Government committees were established to investigate the situation and the overall conclusion is that even though there was no evidence of wrongdoing, climate scientists have to be much more open in future: for example by publishing all their data, including raw data and the software programs used to interpret them, to the Internet. This once again highlights the growing importance of data. I am pleased that at its 2008 meeting in Karlsruhe, the IUGG Executive established the Union Commission on Data and Information (UCDI) with Peter Fox as the inaugural Chair of the Commission. The work of UCDI will also be important in our relations with ICSU, the International Council for Science.

For a long time ICSU has had a subsidiary body, CODATA, that deals with theoretical issues related to data. But many of the concerns of the geodetic and geophysical community relate to practical concerns of data identification, sharing, availability, and long term preservation as well as information retrieval. The system of World Data Centres (WDCs) and the Federation of Astronomical and Geophysical Data Services were set up after the International Geophysical Year – and these have now been incorporated into the new ICSU World Data System.

IUGG was also concerned to discover that in 2010 the L'Aquila (Italy) Prosecutor's office indicted the members of the Abruzzi region's High Risk Committee for unintended murder in L'Aquila. The indictment is based on the failure of the Committee to warn the population before the strong earthquake of 6 April 2009 that killed about 300 people. The 24 June 2010 issue of Nature carried an item about this. On 28 June 2010 IUGG issued a “Statement on Freedom to Conduct Science and Responsibilities of Scientists” declaring it shocking and unacceptable to accuse and legally indict scientists and members of a governmental panel because they failed to make a prediction of an extreme natural event in a particular place. IUGG also issued a number of other resolutions

and statements that can be found on the IUGG web site.

### **International Council of Science (ICSU)**

IUGG adheres to ICSU, and is one of the eight international scientific unions that comprise the GeoUnions Consortium. ICSU has its General Assembly every three years. The previous General Assembly was 13-25 October 2008 in Maputo, Mozambique. IUGG is particularly fortunate in that two of our Executive Members hold positions in IUGG that entitle them to attend the ICSU General Assembly. Uri Shamir is a member of the ICSU Executive Board. Harsh Gupta is on the ICSU Committee for Science Planning and Review. Thus IUGG had four representatives at Maputo - these two officers, Alik Ismail-Zadeh the IUGG General Secretary, and myself. The next General Assembly will be in Rome in September 2011. A meeting of the constituent scientific unions is held between ICSU General Assemblies. This was held in Paris in April 2009 and was attended by myself, the Secretary-General and the Immediate Past President and provided an opportunity for the GeoUnions Consortium to meet.

Our particular concern at the ICSU GA in Maputo was to ensure that the legacy of the International Polar Year was maintained. Partly this will happen naturally. I have already mentioned the Association of Polar Early Career Scientists, which is a group of self-organised young people enthused by the dynamism of the IPY. I am pleased to note that they will be having a meeting during this General Assembly. The development of the ICSU WDS will also help to ensure that the data collected during the IPY will be appropriately managed.

IUGG has also maintained close liaison with ICSU Regional Offices. There are three of these – ROA, ROAP and ROLAC being respectively the regional offices for Africa; for Asian and the Pacific and for Latin America and the Caribbean. All three offices indicated that Natural Hazards was to be one of their high priority areas, and accordingly IUGG established the ENHANS program (Environmental Natural Hazards and Society) led by our Secretary General, Alik Ismail-Zadeh that has collaborated with the Regional Offices and established a program of international research activities.

### **Preparations for the Melbourne General Assembly**

Prof. Ray Cas, the Chair of the Local Organising Committee, has been helped in the preparations for the meeting by a firm of professional conference organisers, arinex. The scientific program committee for IUGG General Assemblies consists of the Secretaries General of IUGG and the Union Associations, the Union President, and a local Chair –

Dr Peter Manins in this case. They have all done an excellent job of dealing with the 5828 abstracts that were received.

### **Union Lectures**

I invited nine of the world's leading geo-scientists to present Union Plenary Lectures. Three of these Lectures have become eponymous lectures as memorials to Association Presidents with strong Australian connections who died in this past quadrennium.

Greg Ayers, the Director of the Australian Bureau of Meteorology in Melbourne will deliver the Tucker Memorial Lecture.

Dan Baker, Director of the Laboratory and Space Physics at the University of Colorado, will deliver the Troitskaya-Cole Memorial Lecture.

Anny Cazenave from the 'Centre National d'Etudes Spatiales' in Toulouse.

Tom Jordan, Director of the Southern California Earthquake Center, Los Angeles.

Brian Kennett of the Australian National University in Canberra.

Demetris Koutsoyiannis of the National Technical University of Athens.

Markus Rothacher of the Institute of Geodesy and Photogrammetry, Zurich.

Steve Self of the US-Nuclear Regulatory commission, Alameda.

David Vaughan of the British Antarctic Survey, Cambridge will deliver the Radok Memorial Lecture.

### **Committees**

I appointed eight committees prior to this General Assembly after due consultation with members of the Bureau and the Executive Committee, drawing largely on past office holders and their relevant experience and seeking a geographical and disciplinary balance. Four of these have already been mentioned. The other four were

**Nominating Committee: Chair:** Masaru Kono (Japan)

**Statutes and By-Laws Committee: Chair:** David Kerridge (UK)

**Resolutions Committee : Chair:** Uri Shamir (Israel)

**Site Evaluation Committee: Chair:** Michel Béland (Canada)

The Nominations Committee solicited nominations from all those eligible to nominate to the open Bureau and Finance Committee positions, and is seeking to strike a balance of experience, disciplines and

geographical distribution in preparing its slate of candidates for each position. Further nominations are still possible, as provided by the Statutes and By-Laws of the Union.

The Statutes and By-Laws Committee has been examining various issues that have arisen over the quadrennium with respect to existing Statutes and By-Laws, especially those that relate to ways to bring regional geophysical groupings into some form of affiliation with IUGG through an extension of the membership.

The Resolutions Committee will solicit proposals during the General Assembly, examine and evaluate them, and then prepare the suggested resolutions for consideration by this Council.

The Site Evaluation Committee was established to respond to the Sapporo Council's request that the invitations to host IUGG General Assemblies should be evaluated and the results presented to Council, to facilitate its decision process. The members selected for this Committee have rich experience in the organization of large IUGG meetings, including past General Assemblies. When it was discovered that Denmark had submitted a bid the original Chair, Christian Tscherning, offered his resignation. I am delighted to have six invitations to host the 2015 General Assembly from Argentina, Czech Republic, Denmark, Greece, India and the United States. The Site Evaluation Committee will hold a session, open to all members of Council, some time between the first and second Council meetings, at which the six bidders will make presentations and a short list of two finalists prepared. These two finalists will make further presentations to the Council, who shall vote to choose the successful city.

#### **Acknowledgment and Thanks**

The end of the Melbourne General Assembly will mark the end of an 11 year period during which I served on the Union Bureau (2001-2003) as Vice President (2003-2007) and President (2007-2011). It has been a challenge and a privilege, but it certainly does not bring to an end my deep involvement with the Union.

I am grateful to many individuals who have made my task easier and pleasurable. First among them is our most able Secretary General, Alik Ismail-Zadeh. He has been my constant and wise council, while carrying the burden of the daily operation. Vice-President Harsh Gupta shouldered his part of the responsibility and was available to provide advice and take action. Treasurer Aksel Hansen, who worked closely with the Finance Committee and its Chair Juan (Finco) Vilas, kept our finances in excellent shape. Members of the Bureau Yun-Tai Chen, David Jackson and Ali Tealeb provided their perspective and advice. I am most grateful to the Presidents and Secretaries General of the Associations; their lively participation in setting and carrying out the programs of their Associations and of the Union were invaluable to the well-being of the Union. The Associations' Secretaries General, who were invited to attend the Executive Committee's meeting, also constitute the Science Program Committee for this Assembly, chaired by Peter Manins. The SPC set the program and ascertained that it can be carried out successfully in this great venue of the Melbourne Convention Centre. Special recognition is due to the Local Organizing Committee for this General Assembly, chaired by Ray Cas. They have had a gigantic task, and we all hope that the Assembly will proceed to the full satisfaction of one and all.

Being able to call upon such a band of capable and committed volunteers is the greatest strength of IUGG. The Secretary General was assisted in his work by Simone Oswald, who worked part-time in the Secretariat. I had hoped that during my Presidency IUGG would have found sufficient support to appoint a full time Executive Director, but preliminary negotiations were not successful. I still believe that we need to find mechanisms to lighten the load on the honorary officers of the Union, and hope that the new Executive will be able to deal with this issue.

Lastly, I wish to acknowledge the support provided by my home institution, CSIRO, the Australian Government Scientific Research Organisation.

Tom Beer  
Melbourne, 15 February 2011

## QUADRENNIAL REPORT OF THE VICE-PRESIDENT

### IUGG

I participated in all the IUGG Bureau and Executive Committee meetings held during the quadrennium.

I was asked by the IUGG President to represent him at the IASPEI GA at Cape Town, South Africa in 2009. The scientific contents of the presentations, arrangements, lecture halls, social programs were of high standard. The Office Bearers of IASPEI and the Local Hosts put up an excellent show.

I was also asked by the IUGG President to represent him at the IAHS GA held at Hyderabad, India in September 2009. This was a large meeting as for the first time IAHS and IAH (International Association of Hydro-geologists) got together and had a very successful conference, the central theme being "Water: A vital resource under stress-How science can help".

As the Founder President of ASC (Asia Seismological Commission), and an invited speaker, I participated in ASC Meetings at Tsukuba, Japan in 2008 and Hanoi, Viet Nam in 2010. With the passage of time, ASC has grown, and has been addressing important problems. An important aspect is the training courses organized by ASC in conjunction with their bi-annual meetings for youngsters.

At the XXV IUGG GA I am the lead convener for U-12 (Geosciences and the Future of the Planet Earth) and S-06 (Recent Large/destructive Earthquakes). U-12 is specially designed to attract young scientist to the disciplines of Geodesy and Geophysics.

### UNION COMMISSIONS

The Union Commissions performed well. An effort was made to get the terms of reference of all the Union Commissions streamlined.

Recognizing that all the eight IUGG Scientific Associations are involved with data generation, storage and manipulation, the Union Commission on Data and Information (UCDI) was formed to allow IUGG to become more cohesive on the topic of data standards as well as to retain current activities with in its Associations. UCDI activities are directed to support and advance data and metadata standards across the Union. UCDI is convening U 05 at IUGG GA 2011 on Data Science/Informatics and Data Assimilation in Geophysical Models.

The main activity of the Union Commission on the Study of the Earth's Deep Interior (SEDI) is to organize a dedicated workshop every even year. The 11th SEDI Symposium was organized in Kunming, Yunan Province of China in 2008. Sessions ranged from Structure of the Core, Structure of the Mantle, Mantle Dynamics, Inner-Core, Outer Core to Deep

Interiors and Magnetic Fields of Other Planets. The 12th SEDI Symposium was held at California, USA in 2010 and the topics ranged from Structure and Chemistry of the Core and Lower Mantle to Geodynamo Theory and Observations. 135 participants of this successful symposium came from 12 countries.

Committee on Mathematical Geophysics (CMG), a Union Commission, encourages exchange of ideas and information in all areas of geophysics with emphasis of application of mathematics, statistics and computer sciences to geophysical problems. Biennial conferences are held. The 27th International Conference was held in 2008 in Norway. The conference theme was "Dynamics in Earth Systems: Flow, Fracture, and Waves". The 28th Conference was held at Pisa, Italy and the theme was "Modeling Earth Dynamics: Complexity, Uncertainty, and Validation". This was a large conference with 165 participants.

The Union Commission on Geophysical Risk and Sustainability (GRC, the GeoRisk Commission) is dedicated to promoting scientific studies for reduction of risk from natural hazards and to provide hazard data to emergency managers, policy makers etc for reducing death toll and destruction. The Commission has been very active with useful meetings and seminars being held in several countries during the quadrennium. With the passage of time the impact of natural and manmade hazards is increasing globally and the issues addressed by GeoRisk are gaining importance. During the IUGG GA at Melbourne GRC shall be convening U 02 "Grand Challenges in Natural Hazards Research and Risk Analysis.

### ICSU

During the quadrennium 2007-2011, I entered my second term as a member of the ICSU Committee on Scientific Planning and Review (CSPR). I was especially involved with programs related with the natural and man made hazards and disasters. A new program "Integrated Research on Disaster Risk" (IRDR) was developed during the period. Represented ICSU at various forums, particularly informing the development of IRDR at the ICSU GA at Maputo, Mozambique in 2008.

ICSU has created Regional Offices for Africa (ROA) at Pretoria, South Africa; Asia and Pacific (ROAP) at Kuala Lumpur, Malaysia; and for Latin America and Caribbean (ROLAC) at Brazil (moved to Mexico in 2010). Natural and man made hazard have been identified as an area needing special attention by all the three regional offices. A Committee was constituted with me as the chair by ROAP to address natural and man made hazard related issues. After very detailed discussions and interactions with a large section of

scientists, policy makers and NGOs two reports were prepared:

1. Science Plan on Hazards and Disasters: Earthquakes, Floods and Landslides.
2. Science Plan on Hazards and Disasters: Special Vulnerability of Islands.

### **IUGG and AOGS**

During the quadrennium, very good relations have been developed between Asia-Oceania Geo-science Society (AOGS) and IUGG. President of IUGG is a permanent invitee to the Executive Committee meetings of AOGS. IUGG President asked me to represent IUGG in the Executive Committee meeting of AOGS held at Hyderabad, India. AOGS is doing well. At Hyderabad over 1200 scientists from about 50 countries participated and some 1800 papers were presented. The next AOGS Annual meeting will be held at Taipei, China, in August 2011. In 2012, AOGS shall have a joint meeting with AGU at Singapore.

### **AGU**

During the quadrennium, I was a member of the AGU Committee On Public Affairs (COPA) and The New AGU: A Forum on the Future. AGU is remodeling itself to cope up with the challenges of the 21st Century. It may be useful for IUGG to have a look at our structure/bye-laws etc to make us more efficient.

### **A Common Forum**

For all the major Geophysical Unions/Societies to get together and globally address issues of common interest is the need of the hour. Discussions with AGU, EGU, AOGS indicate a possibility to do so. This would help in addressing major questions/issues and form opinions that would be respected by all and would serve the humanity.

### **A Personal Note**

The quadrennium has been scientifically productive. The Tsunami and Storm Surge Mitigation System was put in place by India by September 2007. This has performed satisfactorily for over the past three years. I was invited by Springer to design and Edit "Encyclopedia of Solid Earth Geophysics". This work has been completed and a 217 articles volume of about 1600 pages length is likely to be released during the XXV IUGG GA at Melbourne in June/July 2011.

### **Acknowledgements**

I am grateful to IUGG Bureau, particularly to Tom Beer, Alik Ismail Zadeh and Aksel Walloe Hansen and IUGG Executive Committee for very positive support and co-operation.

Harsh Gupta  
Hyderabad, 15 February 2011

## QUADRENNIAL REPORT OF THE SECRETARY GENERAL

### 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 IUGG Members Countries become members of the International Union of Geodesy and Geophysics. 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's Interior (IASPEI), and Volcanology and Chemistry of the Earth's Interior (IAVCEI). At present, there are four Unions Commissions that are dedicated to particular interdisciplinary topics: Commission on Mathematical Geophysics (CMG), Commission on Study of the Earth's Deep Interior (SEDI), Commission on Data and Information (UCDI), and Commission on Geophysical Risk and Sustainability (GRC).

### UNION ACTIVITIES

Union activities during the past quadrennium are summarized below.

- IUGG co-sponsored and took an active part in the four International Programs dedicated to the 50th anniversary of the International Geophysical Year: the International Year of Planet Earth (IYPE) as a founder member; International Polar Year (IPY) as a member of ICSU; Electronic Geophysical Year

(eGY) and International Heliophysical Year (IHY) as two programs of the Union.

- Association Scientific Assemblies were held around the world emphasizing the importance of science to benefit society: IAVCEI Assembly in Reykjavik (Iceland, 2008), IASPEI Assembly in Cape Town (South Africa, 2009), MOCA Joint Assembly of IACS, IAMAS, and IAPSO in Montreal (Canada, 2009), IAGA Assembly in Sopron (Hungary, 2009), IAG Assembly in Buenos Aires (Argentina, 2009), and IAHS Assembly in Hyderabad (India, 2009).
- Union Commissions organized several conferences and symposia: CMG conferences in Longyearbyen (Norway, 2008) and Pisa (Italy, 2010), SEDI conferences in Kunming (China, 2008) and Berkeley (USA, 2010), and GRC symposia in Barcelona (Spain, 2008), Oslo (Norway, 2008), and Torino (Italy, 2010). Also GRC took active part in the organization of ENHANS project events.
- IUGG and Union Association have been involved in the preparation of the comprehensive scientific program for the XXVth General Assembly of IUGG to be held from 27 June to 8 July 2011 in Melbourne, Australia. The assembly's program consists of twelve Union symposia, nine keynote Union speakers, Inter-Association and Association symposia and workshops. To prepare the scientific program of the assembly, the Science Program Committee met in May 2009 in Munich (Germany), in October 2009 in Melbourne (Australia) and will meet in April 2011 in Vienna (Austria).
- The Union Commission for Data and Information was set up to provide a focused and sustainable organizational structure that supports and strengthens IUGG science through integrated scientific information activities.
- Four new Union Committees on (i) Capacity Building and Education, (ii) Honours and Recognition, (iii) Membership Issues, and (iv) Visioning were set up to increase IUGG visibility worldwide.
- Seven inter-disciplinary international scientific projects (US\$79,300 in a total) were supported through the new IUGG Grants Programme.
- In 2008-2011, a total of US\$65,000 in grants to support meetings was allocated to the organizers of 43 symposia, workshops, schools or meetings in 31 different countries, most of them in developing countries.
- IUGG Bureau and Executive Committee Meetings were held in August 2008 in Karlsruhe (Germany) and in October 2009 in Melbourne (Australia); the Bureau met also in Cairo (Egypt) in October 2010.



- IUGG strengthened further its relationship with ICSU GeoUnions via cooperation in international programmes on natural hazards and health & well-being.
- As a response to the Haiti earthquake disaster, IUGG adopted the special resolution on “Science on Natural Hazards and Environmental Disasters” (29 January 2010). The statement was highlighted by ICSU as an important scientific issue related to societal needs. Two statements related to the eruptions of Eyjafjallajökull volcano in Iceland were issued by IUGG: the first statement on Volcanic Ash Clouds (20 April 2010) was distributed at the Congressional Briefings on Reducing Volcano Risks in the U.S. Senate and the House of Representatives, and the second statement on Volcanological and Meteorological Support for Volcanic Ash Monitoring (28 May 2010) was welcomed by the Executive Board of the World Meteorological Organization (WMO) and the International Civil Aviation Organization (ICAO).
- IUGG has strengthened further its relationship with the ICSU GeoUnions, UNESCO and other U.N. Institutions, and with the American Geophysical Union through cooperation in the project “Extreme Natural Hazards and Societal Implications – ENHANS” awarded by ICSU. The principal goals of the ENHANS project are (i) to improve understanding of critical phenomena associated with extreme natural events and to analyse impacts of the natural hazards on sustainable development of society; (ii) to promote studies on prediction of extreme events reducing predictive uncertainty and on natural hazards mitigation; to bring the issues into the political and economic policies; (iii) to disseminate knowledge and data on natural hazards for the advancement of research and education in general and especially in developing countries; and (iv) to establish links and networks with the international organizations involved in research on extreme natural hazards and their societal implications setting up a consortium of experts. The goals of ENHANS are achieved via scientific meetings and open forums bringing together research experts, decision makers, and disaster management, insurance agency and mass media practitioners. The project places a special emphasis on the importance of research on extreme natural hazards and disaster risk mitigation in the most vulnerable regions of the world, particularly in Latin America and the Caribbean, in sub-Sahara Africa, and in Asia and the Pacific region. Several project events were held around the world: in Iguassu (Brazil), in Cairo (Egypt), in San Francisco (USA), in Pretoria (South Africa), in Antalya (Turkey), and the final events will be held as a Union symposium and the

Open Forum in Melbourne at the IUGG General Assembly.

#### **IUGG AND THE INTERNATIONAL COUNCIL FOR SCIENCE**

IUGG has been an active participant in the International Council for Science (ICSU), including the nomination of persons for numerous panels and working groups. Those panels for which IUGG was successful 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 as a Vice Chair and earthquake engineer Dr. Omar Cardona as a Member). The Scientific Committee is chaired by climatologist Dr. Gordon McBean (a former Member of the IUGG Bureau);
- the Scientific Committee of the ICSU World Data System (seismologist Dr. Jean-Bernard Minster as the Chair and geodesist Dr. Ruth Neilan as a Member);
- the ICSU Strategic Coordinating Committee on Data and Information (space scientist Dr. Peter Fox is a Member of the Committee)

IUGG wrote letters to ICSU endorsing the admission of the International Union of Immunological Societies as a Scientific Union, and the Society for Social Studies of Science, International Union of Speleology, and International Council of Industrial and Applied Mathematics as ICSU International Scientific Associates.

IUGG took part in drafting the new report of ICSU “Regional Environmental Change: Human Action and Adaptation”, which states that the urgent need for the development and implementation of integrated tools for analysis, prediction and projection in support of the capability of environmental management to identify and respond to hazards, risks and vulnerability is critical to mitigate and adapt to regional and global environmental change hazards. President Dr. Tom Beer and Secretary General Dr. Alik Ismail-Zadeh attended the ICSU General Assembly in Maputo (Mozambique) and two meetings of the ICSU Scientific Unions, one held in Maputo (2008) and other in Paris (2010). Immediate Past President Dr. Uri Shamir was re-elected to the ICSU Executive Board at the ICSU General Assembly in Maputo, and Vice President Dr. Harsh Gupta was appointed as a member of the ICSU Committee on Scientific Planning and Review.

IUGG has appreciated the opportunity to propose or to support initiatives for ICSU grants. In 2008 IUGG supported and co-sponsored two ICSU project proposals “*Mapping GeoUnions to the ICSU*”

*Framework for Sustainable Health and Wellbeing*” (led by International Society for Photogrammetry and Remote Sensing - ISPRS) and *“Fluid Mechanics and Geophysics of Environmental Hazards”* (led by the International Union of Theoretical and Applied Mechanics - IUTAM); both projects were successful and received grants from ICSU. In 2009 IUGG supported and took active part (via UCDI and IACS) in the ICSU project proposal *“The Polar Information Commons: Establishing the Framework for Long-Term Stewardship of Polar Data and Information”* (led by the ICSU Committee on Scientific Data - CODATA) awarded by ICSU. In 2010 IUGG proposed the *ENHANS* project proposal (see above), which was granted EUR 30,000 by ICSU, and supported another project proposal *“MicroPerm - An international workshop to initiate the circumpolar integration of permafrost microbiological studies”* (led by the International Union of Geological Sciences - IUGS) also awarded by ICSU. In 2011, IUGG submitted a project proposal *“eGYAfrica - better Internet connectivity for research and education institutions in Africa”* and supported three project proposals: *“Harmonization of Scientific Data Standards within the ICSU Community”* (led by CODATA), *“Transdisciplinary Intercultural Ecological Research for Sustainability”* (led by the International Geographical Union - IGU), and *“Marine zooplankton population genetics and ocean circulation”* (led by the International Union of Biological Sciences - IUBS). The decision on the ICSU grants will be announced in April 2011.

### **IUGG AND GEOUNIONS**

During the quadrennium, IUGG collaborated actively with the seven sister international scientific unions of ICSU in the framework of the GeoUnions Consortium: the International Astronomical Union (IAU), IGU, International Union for Quaternary Research (INQUA), ISPRS, IUGS, International Union of Soil Sciences (IUSS), and the International Union of Radio Science (URSI). The GeoUnions have met 3 times (in 2008 and 2010 in Paris and in 2010 in Maputo) and identified topics of interdisciplinary interests for future collaboration as opportunities arise.

IUGG and IUGS jointly administer the International Lithosphere Programme, a major program on origin, dynamics, and evolution of the Earth’s lithosphere. IUGG collaborated with IAU and URSI as ICSU restructured its data and information portfolio, including the Federation of Astronomical and Geophysical Data Analysis Services and the Panel on World Data Centres, into the new World Data System Scientific Committee.

### **IUGG AND OTHER INTERNATIONAL ORGANIZATIONS**

IUGG cooperated with several U.N. organizations: UNESCO, Cartographic Office of the United Nations, International Civil Aviation Organization (ICAO), World Meteorological Organization (WMO), and World Water Assessment Program. IUGG via its liaison officers linked to the International Hydrological Program (IHP) of UNESCO. The International Association of Hydrological Sciences (IAHS) together with UNESCO and WMO administrate the International Hydrology Prize. The International Association of Meteorology and Atmospheric Sciences (IAMAS) and International Association of Physical Sciences of the Oceans (IAPSO) closely cooperate with Intergovernmental Oceanographic Commission (IOC). The International Civil Aviation Organization (ICAO) expressed its recognition to IUGG/IAVCEI for having completed the Eruption Source Parameters (ESP) Project and producing the on-line tools for use by the volcanic ash advisory centers. The International Association of Hydrological Science (IAHS) of IUGG has links with International Atomic Energy Agency (IAEA) through the uses of isotopes in water. IAHS established closed links through the Commission on Hydrology of the World Meteorological Organization. IAHS attends the WMO General Assembly as observers and is invited to the AWG (Advisory Working Group) meetings. More information on the topic can be found in the reports of the IUGG Liaison Officers.

### **MEMBERSHIP IN THE UNION**

As of 1 January 2011, IUGG has 69 Member Countries with distribution throughout the world as follows: Europe 34, North and Central America 4, Asia 16, Africa 6, South America 7, Oceania 2. This is four more than at the closing of the XXIVth General Assembly (Perugia, Italy, 2007).

Greece rejoined IUGG as a Regular Member. The Republic of Azerbaijan and the former Yugoslav Republic of Macedonia became new Regular Members (1 cat.) of the Union, Costa Rica and Georgia joined IUGG as Associate Members; Bulgaria moved to a Regular Member; and India enhanced its membership category. Three Associate Members became regular members (cat. 1); thanks to the Royal Society (U.K. Adhering Body to IUGG) that paid membership dues of the Democratic Republic of the Congo, Ghana, and Morocco for the last three years. Unfortunately, three countries are in observer status according to Statute 14 owing to serious arrears of payment. These matters are also discussed in the Report of the Treasurer, and will be reviewed by the Council at its next meeting.

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The current membership history is summarized in the table below.

<b>MEMBERS</b>	<b>Dates of ADMISSION &amp; TERMINATION</b>	<b>CATEGORY</b>	<b>UNITS</b>
ALBANIA	1997-2002, 2003	1	1
<i>ALGERIA</i>	<i>1971-2006</i>		
ARGENTINA	1927	3	3
ARMENIA	2000	1	1
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	1	1
BRAZIL	1922	3	3
BULGARIA	1930	1	1
<i>BURUNDI</i>	<i>1987-1995</i>		
CANADA	1919	6	10
CHILE	1924	2	2
CHINA – CAST	1977	6	10
COLOMBIA	1938-1971, 2000	1	1
CONGO D.R. (**)	2004	1	1
COSTA RICA	2010	A	0
CROATIA	1992	1	1
<i>CUBA</i>	<i>1960-1996</i>		
CZECH REPUBLIC	1993	2	2
DENMARK	1923	4	5
<i>DOMINICAN REP.</i>	<i>1957-1971</i>		
EGYPT	1924	2	2
ESTONIA	1991	1	1
<i>ETHIOPIA</i>	<i>1952-2000</i>		
FINLAND	1927	3	3
FRANCE	1919	7	15
GEORGIA	2009	A	0
GERMANY	1951	8	20
GHANA	1957-1987, 2006	1	1
GREECE	1922-2003, 2009	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>		

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LEBANON	1967-2003		
LIBYA	1979-1996		
LUXEMBOURG	1971	1	1
MACEDONIA, F.Y.R.	1995-2001, 2010	1	1
MADAGASCAR	1967-1995		
MALAYSIA	1967-2002		
MAURITIUS	2003	A	0
MEXICO	1922	2	2
MONACO	1967	1	1
MONGOLIA	1995-2001		
MOROCCO	1924	1	1
MOZAMBIQUE	1983	1	1
MYANMAR (BURMA)	1957-2003		
NEPAL	1975-1987		
NETHERLANDS	1925	4	5
NEW ZEALAND	1927	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		
SENEGAL	1960-1995		
SERBIA & MONTENEGRO (*)	1996-2006		
SIERRA LEONE	1967-1983		
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
U.K.	1919	8	20
URUGUAY	1924-2000		
U.S.A.	1919	11	35
VENEZUELA	1975-2008		
VIETNAM	1931	1	1
ZIMBABWE	1967-2000		

(\*) 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 U.S.S.R.

## ADMINISTRATION

### The Bureau

The Bureau of the Union consists of the President Dr. T. Beer (Australia), Vice-President Dr. H. Gupta (India), Secretary General Dr. A. Ismail-Zadeh (Germany/Russia), Treasurer Dr. A. Hansen (Denmark), and 3 Members: Dr. Y-T. Chen (China), Dr. D. Jackson (USA) and Dr. A. A. Tealeb (Egypt).

The Bureau met three times during the term:

- in Karlsruhe, Germany (3 – 4 August 2008)
- in Melbourne, Australia (8 – 9 October 2009)
- in Cairo, Egypt (30 October – 2 November 2010)

The Bureau will meet again in Melbourne on 26 June, 1 and 5 July 2011.

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. Possible new members, especially developing countries, and efforts to encourage dues payments were discussed and actions were taken with varying degrees of success.
- IUGG Financial Health. The state of the budget was considered at each meeting, and was found satisfactory. A draft budget for the 2012-2015 term was discussed at the Cairo meeting.
- IUGG Associations, Association Scientific assemblies and Association's activity.
- IUGG's relationship with ICSU, including the ICSU Regional Offices, Grants Programme, new initiatives on data and information (WDS) and natural hazards and disasters (IRDR).
- IUGG relationship with GeoUnions, joint programmes, statements, and projects.
- Adoption of the revised Terms of Reference for IUGG Union Commissions.
- IUGG involvements in the International Year of Planet Earth, International Polar Year, Electronic Geophysical Year, and International Heliophysical Year.
- 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.
- The 2011 General Assembly, including the chairs and members of the Nominations Committee, Statutes and By-Laws Committee, the Resolutions Committee, Site Selection Committee.

- New Union Committees on Capacity Building and Education, Honours and Recognition, Membership Issues, and Visioning, and their Terms of Reference.

### The Executive Committee

The IUGG Executive Committee (EC) formally consists of the Bureau, the immediate past President of IUGG (Dr. U. Shamir, Israel) and the Presidents of the Associations. Association Secretaries General and the Chair of the IUGG Finance Committee are always invited to attend as well, with voice but without vote. The Executive Committee met twice

- in Karlsruhe, Germany, 4 – 6 August 2008
- in Melbourne, Australia, 9 – 11 October 2009

The Executive Committee will meet again in Melbourne on 26 June, 1 and 5 July 2011.

Decisions at the Executive Committee meetings included the following:

- Adopted a new IUGG Grant Programme and approved the funding of the inter-disciplinary international projects.
- Adopted the Terms of Reference for Union Commissions.
- Adopted new IUGG meeting guidelines.
- Appointed Dr. Ian Allison (Australia) as the IUGG liaison to SCAR (ICSU Scientific Committee on Antarctic Research), because Dr. V. Papitashvili (USA) stepped down from the position of IUGG liaison.
- Approved the Memorandum of Understanding between IUGG and the Local Organizing Committee for the XXV IUGG General Assembly.
- Approved the membership of the IUGG Committees.
- Approved a statement endorsing and encouraging ICSU to ensure the standing and continued operation of the geophysical and astronomical services under guidance of the competent Unions and their Associations.
- Approved nominations to relevant ICSU Committees (CSPR, IRDR, WDS).
- Endorsed IUGG cooperation with GeoUnions in programmes on health & well-being and natural hazards.
- Endorse the IUGG President and the Secretary General to make contacts with AGU/EGU President and AGU/EGU Executive Director to discuss on strengthening cooperation between unions to benefit geophysics and society.
- Endorsed the World Stress Mapping Service application to the ICSU Federation of Astronomical and Geophysical Data Services (ICSU-FAGS).

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- Endorsed IUGG special resolution on “Science on Natural Hazards and Environmental Disasters”, statements on “Volcanic Ash Clouds”, on “Volcanological and Meteorological Support for Volcanic Ash Monitoring”, and on “Freedom to Conduct Science and Responsibilities of Scientists”.
- Endorsed the applications for IUGG Membership (Azerbaijan, Costa Rica, Georgia, Greece, FYR Macedonia).
- Established the Union Commission on Data and Information.
- Established an *ad hoc* committee to investigate the appeal of the Japanese National Committee for IUGG regarding the IAGA election in 2007.

### 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 Web page
- Conducted ballots by correspondence concerning the admission of Azerbaijan, Costa Rica, Georgia, Greece, FYR Macedonia, as Members of the Union and corresponded with a number of

countries (Azerbaijan, Burkina Faso, Costa Rica, Georgia, Greece, Kazakhstan, FYR Macedonia, Mongolia, Saudi Arabia, Senegal, Singapore, Ukraine, United Arab Emirates, Uzbekistan) regarding potential membership.

- Issued the calls for support of meetings and interdisciplinary projects, and facilitated the awards.
- Facilitated the work of the IUGG Nominations, Statutes and By-Laws, Site Evaluation committees as well as the new IUGG Honours and Recognition and Membership Issue 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.
- Attended meetings of the ICSU Federation of Astronomical and Geophysical Data Analysis Services (FAGS) in 2008, ICSU Unions meetings in 2008 and 2010, and the ICSU General Assembly in 2008.
- Supported the Scientific Programme Committee and the Local Organizing Committee in preparations for the 2011 General Assembly.

### 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:

<b>2007</b>	16-21 September	Conference organized by the Russian National Committee for IUGG	Suzdal, Russia *
	17 October	Business meeting with the President of the German Adhering Body	Cologne, Germany *
	29-30 November	Business meeting of the German National Committee for IUGG	Leipzig, Germany *
	9-17 December	AGU Fall Meeting: Committee on International Participation	San Francisco, USA *
<b>2008</b>	22-24 April	ICSU FAGS meeting	Paris, France
	15-19 June	IUGG CMG conference	Longyearbyen, Norway *
	19-22 July	IUGG GRC symposium	Barcelona, Spain *
	7-12 August	IGC, IUGG GRC symposium, and IYPE Board Meeting	Oslo, Norway *
	4-9 October	CODATA Conference	Kiev, Ukraine *
	17-26 October	ICSU General Assembly	Maputo, Mozambique *
	14-22 December	AGU Fall Meeting: Committee on International Participation, Convocation of Geophysical Societies	San Francisco, USA *

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<b>2009</b>	9-15 January	IASPEI Scientific Assembly	Cape Town, South Africa *
	9-11 March	UNESCO – IYPE Opening ceremony	Paris, France
	21-24 April	EGU General Assembly: meeting with EGU officers and CTBTO reps.	Vienna, Austria *
	19-20 May	XXV General Assembly SPC meeting	Munich, Germany
	23-29 May	AGU Joint meeting: Meeting with the Chair of the Canadian National Committee for IUGG	Toronto, Canada *
	30 May- 7 July	Conference organized by the Russian National Committee for IUGG	Pereslavl-Zalesky, Russia *
	9-12 July	CTBTO conference: meeting with the CTBTO reps.	Vienna, Austria *
	9-12 September	Conference on Marmara Sea: Meeting with the Secretary General of the Turkish National Committee for IUGG	Istanbul, Turkey *
	6-15 October	IUGG Bureau and EC meetings	Melbourne, Australia
	15-18 October	ILP conference on TOPO-Europe: meeting with the ILP President and ILP Secretary General	Heidelberg, Germany *
	18-22 November	IYPE Closing Ceremony and Board Meeting	Lisbon, Portugal *
	26-27 November	Business meeting of the German National Committee for IUGG	Hanover, Germany *
	<b>2010</b>	14-20 February	AGU Chapman Conference on Extreme Events – Meeting with the IUGG Vice President.
21-25 February		IUGS Executive Committee meeting	Paris, France
6-10 April		ICSU Unions meeting	Paris France *
2-7 May		EGU General Assembly: meeting with the Association SsG, attendance of the ILP business meeting, meeting with reps. IYPE, UNESCO and CTBTO.	Vienna, Austria *
6-12 June		IUGG CMG conference	Pisa, Italy *
3-4 July		ISPRS Centenary General Assembly	Vienna, Austria
4-7 July		IUGG GRC symposium	Torino, Italy *
2-3 August		Meeting with the President of the German National Committee for IUGG and the President of the GFZ-Potsdam	Potsdam, Germany
7-15 August		ENHANS symposium	Iguassu, Brazil *
29 October – 3 November		IUGG Bureau meeting	Cairo, Egypt
12-17 December		AGU Fall Meeting: ENHANS symposium, Convocation of Geophysical Societies	San Francisco, USA *
<b>2011</b>	15-22 January	ENHANS workshop	Pretoria, South Africa *

Note: \* = Travel paid (in full or partially) by the German Research Foundation (DFG) via the special travel grant to the IUGG Secretary General or 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 four years, especially President Tom Beer. I am very thankful to the Vice-President Harsh Gupta, Treasurer Aksel Hansen, Past President Uri Shamir, and the Bureau Members Dave Jackson, Yun-tai Chen, and Ali Tealeb 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 its Union Associations.

The office of the Secretary General has been hosted by the Karlsruhe Institute of Technology – the Geophysical Institute, and was financially supported by two grants from the German Research Foundation (Deutsche Forschungsgemeinschaft - DFG) in cooperation with the German National Committee for Geodesy and Geophysics (NKG). The grants permitted the hire of a part-time assistant who helped to manage the database, to correspond with the Member Adhering Bodies and IUGG officers, and to prepare reports and mailings. During the past 4 years, it has been my pleasure to work with Katina Rogers (for the first year) and then with Simone Oswald, whose

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support of the duties of the Secretariat cannot be underestimated. I have appreciated Simone's language skills, German discipline, talent, humor, and friendship. Also I thank our web-master Dr. Dmitry Krupsky for redesigning the IUGG webpage and keeping it as well as related Internet pages updated. I have been 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  
Karlsruhe, 15 February 2011



## QUADRENNIAL REPORT OF THE TREASURER

### Introduction

This report will be presented to the Council at the upcoming XXV IUGG General Assembly in Melbourne, Australia. 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 2004 – 2007 quadrennium (each year + accumulated) compared to the budget, (attachment 1).
- 2) A preliminary accounting for the present quadrennium 2008 – 2011 (each year + accumulated), (attachment 2).
- 3) The 2008-2011 budget from Perugia 2007, (attachment 3).

This procedure for reporting on the finances is a continuation of what was done at the General Assembly in Perugia in 2007. With the General Assemblies normally taking place in 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 Melbourne the final accounting for the quadrennial report for 2004 – 2007 will be shown.

At the time of writing the preliminary report for 2008-2011 includes the year 2011 budget as a substitute for the accounting for the same year. In Melbourne in July it will be possible to present a better estimate of the accounting for 2011.

The budget for the period 2008 to 2011 is presented in attachment no. 3. At the Bureau meeting in Karlsruhe, 2008, the Perugia budget was adjusted slightly.

### The final accounting for 2004 - 2007

The year 2003 turned out to be much better than anticipated at the General Assembly in Sapporo in July 2003. The balance ended up being more than USD 100,000 higher than presented as the estimate then. This was mainly due to improved payment of dues to the Union. And during the period 2004-07 the members paid almost 200,000 more in dues. Also the interest was high. All in all, the balance at the end of the period was more than USD 300,000 higher than anticipated in the budget. (see attachment 1)

### The preliminary accounting for the years 2008 – 2011 Income:

The first 3 years of the budget period 2008 – 2011 show higher income than given in the budget:

- 1: the members have paid more dues in 2009

- 2: IUGG received a significant surcharge in Perugia as in Sapporo 4 years earlier.

- 3: interest was lower. In 2010 it was negative! It is very variable following the market. IUGG has

made a significant amount of money in USD due to variable exchange rates.

- 4: For the first time in many years there was a drop in the price of 1 unit from 2009 to 2010. In 2011 it is again back to the 2009 level.

The number of members withdrawing from IUGG is only 3 in the present quadrennium. But IUGG has admitted 5 new members. Therefore, IUGG has now 69 members (January 1st, 2011), although there are problems with maintaining good contact to a few of our members.

In 2008 the Royal Society introduced a program to aid African countries in participating in the activities of unions like IUGG. This resulted in payments of dues for 3 former A-members of IUGG.

During the quadrennia 1992-1995, 1996-1999 and 2000-2003 the actual number of units paid to IUGG went down from 1170 over the first 4 year period to 1066 in the last. The preliminary number for 2008-11 is 1059 (On February 16, 2011). I expect the number to go up during 2011. We therefore hope that the decline has stopped with the expectation that it will increase slightly in the coming period.

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.

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

Finally, it should be mentioned that in the quadrennium IUGG has welcomed a new association, International Association of Cryospheric Sciences, IACS. In Perugia it was decided that IUGG would add \$20K extra each year to smooth the introduction. The process is now completed and it is anticipated that the extra allocation is not necessary anymore for the coming quadrennium.

### Expenditures:

If we compare budget and accounting line by line we notice a good resemblance between the two set of numbers: e.g. travel expenses and line 14 symposia. In contrast allocations to the associations (now 8

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associations) is much higher. This is due to the increased income from the members.

We have not been successful in initiating new projects under line 12, especially Geophysics in Africa.

IUGG is a supporting member of ICSU and therefore IUGG is paying dues to ICSU. In contrast to IUGG ICSU is strongly dependent on the value of EUR, but not on USD. Since 2007 IUGG has paid its contribution to ICSU in EUR. This change alone increased the expenditure with 30%. In addition, ICSU has increased the requested contributions with app. 20% in Euro. And a new dues system decided in Maputo 2009 will increase the payment even further.

**Balance:**

As explained above the year 2003 turned out to be much better than estimated in July 2003. The improvement was of the order US\$ 130,000.

Based on the above analysis it is expected that the total assets of IUGG as a union will be close to USD 750.000 by the end of 2011.

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 everybody 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 Simone Oswald, with whom I have almost daily correspondence. Also thanks to the President Tom Beer and the entire Bureau, the Presidents and Secretary Generals 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.

Aksel Walløe Hansen  
Copenhagen, March 2011

**Appendix with statistical data on IUGG**

In the following a summary of the relevant information about IUGG is given.

First of all as of January 1st, 2011, IUGG has 69 member countries (2 up as compared to 2007). IUGG has lost 3 members since early 2007, but we have welcomed 5 new members.

The 69 members represent a total of 283 units. 5 members are A-members. In early 2011 we have received payments from 53 members representing a total of 265 units for 2010. The remaining 18 units are distributed over 11 members in observer status. Since January 1st 4 members have paid the dues in arrears.

In the last quadrennium India has moved to cat. 6. Argentina moved to cat. 3, Greece returned to cat. 3.

**Membership tables  
2010/2011**

**1) Payments for 2010 and member distribution 2011**

Category	Units in Category	Number countries	Number of units	Paid 2010 (February 2011)	
				numbers	units
A	0	5	0		
1	1	25	25	19	19
2	2	13	26	10	20
3	3	7	21	5	15
4	5	6	30	6	30
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		69	283	53	265 (number of units from paid-up members only)
USD (2011 values)			495.520		

Special consideration:

Royal Society, London, established in 2008 a program to encourage African nations to become paying members of IUGG. Three members joined the program: Ghana, Morocco and D.R. Congo. The program was terminated in 2011. Croatia has sent the message that they want to return to paying membership.

**2) Countries in Observer Status (countries in arrears for 2010 and/or earlier) on January 1:**

(members that have paid dues in arrears since January 1 are shown in blue)

Cat.	Units	Countries
1	8*1	Morocco, Croatia, <b>Vietnam</b> , Armenia, Albania, Indonesia, <b>Mozambique</b> , Ghana
2	3*2	Pakistan, South Korea, Egypt
3	2*3	Greece, Philippines
6	1*10	<b>India</b>
7	1*15	<b>France</b>
Total	45 units	15 countries

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In the next table we can see that the members in observer status as of March 15 are owing a total of \$41.260. On January 1st the amount was \$53.895 higher.

For the whole period 2007-10 the amount “lost” by members withdrawing from the union is a substantial amount of money that will not be recovered.

**3) Dues in arrears as of March 15, 2011**

	2006	2007	2008	2009	2010	Total
Croatia	1.600	1.630	1.675	1.750	1.730	6.655
Armenia			1.675	1.750	1.730	3.425
Albania				1.750	1.730	3.480
Morocco				1.750	1.730	3.480
<b>Old observers</b>	<b>1.600</b>	<b>1.630</b>	<b>3.350</b>	<b>7.000</b>	<b>6.920</b>	<b>17.040</b>
						Total
Philippines					5.190	5.190
Egypt					3.460	3.460
Pakistan					3.460	3.460
South Korea					3.460	3.460
Indonesia					1.730	1.730
Ghana					1.730	1.730
Greece					5.190	5.190
<b>New observers in 2010</b>					<b>24.220</b>	<b>24.220</b>

**IUGG Members, January 1, 2011**

<b>Member Country</b>	<b>Category</b>		<b>Member Country</b>	<b>Category</b>
<b>5 adhering bodies in</b>	<b>A</b>		<b>25 adhering bodies in</b>	<b>1</b> <b>25 units</b>
Bolivia			Albania	observer 2010-11
Costa Rica			Armenia	observer 2009-11
Georgia			Azerbaijan	
Mauritius			Bosnia & Herzegovina	
Peru			Bulgaria	
			Colombia	
<b>1 adhering body in</b>	<b>11</b>	<b>35 units</b>	Croatia	observer 2007-11
USA			D.R. Congo	
			Estonia	
<b>3 adhering bodies in</b>	<b>8</b>	<b>60 units</b>	Ghana	observer 2011
Germany			Iceland	
Great Britain			Indonesia	observer 2011
Japan			Iran	
			Israel	
<b>1 adhering body in</b>	<b>7</b>	<b>15 units</b>	Jordan	
France			Luxembourg	
			F.Y.R. Macedonia	
<b>5 adhering bodies in</b>	<b>6</b>	<b>50 units</b>	Monaco	
Canada			Morocco	observer 2010-11
China			Mozambique	
India			New Zealand	
Italy			Romania	
Russia			Slovak Republic	
			Slovenia	
<b>3 adhering bodies in</b>	<b>5</b>	<b>21 units</b>	Vietnam	
Australia				
Spain				
Switzerland				
<b>6 adhering bodies in</b>	<b>4</b>	<b>30 units</b>		
Academy Sinica, Taipei				
Belgium				
Denmark				
Netherlands				
Norway				
Sweden				
<b>7 adhering bodies in</b>	<b>3</b>	<b>21 units</b>		
Argentina				
Austria				
Brazil				
Finland				
Greece	observer 2011			
Philippines	observer 2011			
South Africa				
<b>13 adhering bodies in</b>	<b>2</b>	<b>26 units</b>		
Chile				
Czech Republic				
Egypt	observer 2011			
Hungary				
Ireland				
Korea, South	observer 2011			
Mexico				
Nigeria				
Pakistan	observer 2011			
Poland				
Portugal				
Thailand				
Turkey				

  

<b>Countries withdrawn 2008-2011</b>	<b>Category</b>
<b>In 2007</b>	
Algeria	1
Serbia & Montenegro	1
<b>In 2008</b>	
Venezuela	1
<b>New members 2008-2011</b>	
<b>In 2009</b>	
Greece	3
Georgia	A
<b>In 2010</b>	
Azerbaijan	1
F.Y.R. Macedonia	1
Costa Rica	A

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**IUGG Accounting and Budget, 2004 - 2007, Final**      **Attachment 1, FINANCIAL REPORT, MELBOURNE, 2011**

in US dollars	BUDGET				Accounting 2004-2007	ACCOUNTING			
	2004	2005	2006	2007		2004	2005	2006	2007
<b>RECEIPTS</b>									
1. Membership Subscription					1 638 058	370 324	362 255	443 992	461 486
3. Assembly Surcharge					15 646	15 646			
5. Sales of Publications	200	200	200	200	1 022	200	162	349	311
6. Miscellaneous									
a. Interest	5 000	5 000	5 000	5 000	58 184	0	6 187	23 820	28 178
b. Gain on exchange					2 803	524			2 278
c. Other									
<b>7. Total Receipts</b>	<b>376 230</b>	<b>380 620</b>	<b>385 040</b>	<b>389 490</b>	<b>1 715 711</b>	<b>386 694</b>	<b>368 604</b>	<b>468 161</b>	<b>492 252</b>
8. Balance on 1/1	480 700	501 380	494 890	510 620	<b>610 568</b>	610 568	572 026	563 783	726 453
<b>EXPENDITURES</b>									
11. Administration									
11.1 Personnel	10 000	10 000	10 000	10 000	20 493	6 977	3 258	3 435	6 823
11.2 Quarters					607		170	438	
11.3 Supplies and Equipment	2 500	2 500	2 500	2 500	2 485	1 033	313		1 139
11.4 Communications	8 000	8 000	8 000	8 000	15 944	2 265	2 864	4 008	6 807
11.5 Travel, Administration only	40 000	60 000	40 000	80 000	190 809	31 336	65 735	19 090	74 648
11.6 Miscellaneous	1 000	1 000	1 000	5 000	2 627	1 382	456	444	344
11.7 Travel, representation					24 279	7 996		6 752	9 531
11.8 Publications, Printing	5 000	5 000	5 000	5 000	65				
13. General Assemblies									
13.1 Organization				10 000	29 549	24 556			4 993
13.2 Travel/grants				30 000	30 000				30 000
14. Symposia	20 000	20 000	20 000	5 000	65 005	20 000	23 000	14 005	8 000
15. Annual allocations					0				
15.1a Associations	163 350	174 910	177 110	179 320	784 045	210 158	180 680	174 737	218 470
15.1b Inter-Association Science	10 700	10 700	10 700	10 700	22 800	8 700	4 700	4 700	4 700
15.2 Assembly Surcharges									
15.3 Grants from ICSU									
16. Dues and Grants									
16.1 ICSU and APS	16 000	16 000	16 000	16 000	53 855	13 472	13 472	13 472	13 439
16.2 Inter-Union Science	29 000	29 000	29 000	29 000	116 084	29 000	29 000	29 064	29 000
17. Union									
17.1 GeoRisk, IGY+50, Liaison,...	20 000	20 000	20 000	20 000	109 708	37 488	23 220	31 000	18 000
18. Countries in Need (Inter-Ass Act.)									
GA-participation	25 000	25 000	25 000	25 000	49 952	25 018	24 934		
GA-participation				40 000	40 000				40 000
19. Miscellaneous									
19.1. Miscellaneous	3 000	3 000	3 000	3 000	908	908			
19.2. Professional services	2 000	2 000	2 000	2 000	12 417	2 492	2 841	3 135	3 848
19.3. Fees					7 487	2 389	2 023	1 168	1 907
19.4. Loss on exchange					125		82	43	
<b>19. Total Expenditures</b>	<b>355 550</b>	<b>387 110</b>	<b>369 310</b>	<b>480 520</b>	<b>1 579 224</b>	<b>425 235</b>	<b>376 848</b>	<b>305 491</b>	<b>471 650</b>
20. Balance on 31/12	501 380	494 890	510 620	419 590	<b>747 055</b>	572 026	563 783	726 453	747 055

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**2008 - 2011 PRELIMINARY REPORT**      **Attachment 2, FINANCIAL REPORT, MELBOURNE, 2011**

US dollars	BUDGET			2008-2011	ACCOUNTING			BUDGET
	2008	2009	2010		2008	2009	2010	
<b>RECEIPTS</b>								
No. Of units	260	260	260	paid units	274	276	253	
Price of 1 unit	1 660	1 695	1 730		1675	1750	1730	1750
<b>1. Membership Subscription</b>	431 500	440 600	449 700	1 885 865	438 122	536 479	452 264	459 000
<b>3. Assembly Surcharge</b>			20 000	20 000	0	0	0	20 000
<b>4. Contracts with ICSU</b>				30 000			30 000	
<b>5. Sales of Publications</b>	<b>200</b>	<b>200</b>	<b>200</b>	536	153	119	64	200
<b>6. Miscellaneous</b>								
a. Interest				34 416	16 483	5 563	-131	12 500
b. Gain on exchange	12 500	12 500	12 500	25 311	0	5 168	20 144	
c. Other (net surcharge Perugia 2007)				33 274	33 159	115	0	
c. On behalf of Associations, Perugia 2007				191 753	191 753			
<b>7. Total Receipts</b>	444 200	453 300	462 400	2 221 155	679 669	547 444	502 341	491 700
<b>8. Balances on 1/1</b>	754 800	686 450	648 800	<b>747 055</b>	747 055	784 511	883 918	854 089
<b>EXPENDITURES</b>								
<b>11. Administration</b>								
11.1 Personnel	20 000	20 000	20 000	77 726	29 120	13 779	14 827	20 000
11.2 Equipment	5 000	5 000	5 000	8 073	1 463	1 610	0	5 000
11.3 Supplies	5 000	5 000	5 000	12 316	2 904	4 412	0	5 000
11.4 Communications	8 000	8 000	8 000	13 877	78	0	5 799	8 000
11.5 Travel, Administration only	50 000	60 000	35 000	201 620	50 556	60 683	20 381	70 000
11.6 Miscellaneous	1 000	1 000	1 000	75 940	3 282	22 502	45 156	5 000
11.6a Associations, Perugia 2007				191 753	191 753			
11.7 Travel, representation	5 000	5 000	5 000	33 972	8 570	4 449	10 952	10 000
<b>12. New Initiatives</b>								
12.1 GIA, carried forward from 2006-07	50 000	50 000	25 000	65 344	10 000	5 418	24 926	25 000
<b>13. General Assemblies</b>								
13.1 Organization			10 000	10 000	0	0	0	10 000
13.2 Travel			30 000	30 000	0	0	0	30 000
<b>14. Symposia</b>	20 000	20 000	20 000	65 275	19 500	21 001	19 774	5 000
<b>15. Annual allocations</b>								
15.1a Associations	238 600	211 000	215 600	980 420	223 075	238 761	288 384	220 200
15.1b Inter-Association Science	4 700	4 700	4 700	22 676	6 190	5 932	5 855	4 700
15.2 Intr. of IACS	20 000	20 000	20 000	42 980	22 980			20 000
<b>16. Dues and Grants</b>								
16.1 ICSU	17 000	17 000	17 000	84 429	21 899	25 372	20 157	17 000
<b>17. Union activities</b>								
17.1 GRC, SEDI, CMG, Liaison Officers	28 000	24 000	28 000	77 874	14 000	10 000	29 874	24 000
16.2 Inter-Union Science (FAG S, ILP)	29 000	29 000	29 000	99 032	27 000	27 000	16 032	29 000
<b>18. Countries in need</b>								
18.1 Travel grants	0	0	0	60 000	0	0	0	60 000
<b>19. Miscellaneous</b>								
19.1 Miscellaneous				11 196	0	0	11 196	
19.2 Professional services	3 000	3 000	3 000	18 451	4 193	4 437	6 821	3 000
19.3 Fees	2 000	2 000	2 000	10 380	3 662	2 662	2 035	2 000
19.4 Loss on exchange				1 988	1 988	0	0	
<b>20. Contingencies</b>	6 250	6 250	6 250	6 250				6 250
<b>21. Total Expenditures</b>	512 550	490 950	449 550	2 201 571	642 213	448 038	532 169	579 150
<b>22. Balances on 31/12</b>	686 450	648 800	661 650	<b>766 639</b>	784 511	883 918	854 089	766 639

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## IUGG Budget 2008 - 11

### Attachment 3, FINANCIAL REPORT, MELBOURNE, 2011

Approved, 06.07.07

Totals

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

Year	2007	2008	2009	2010	2011	2008-11
Estimated unit value	\$1.630	\$1.660	\$1.695	\$1.730	\$1.765	\$1.712
Estimated number of units		260	260	260	260	<b>1040</b>
<b>INCOME</b>						
1. MEMBERSHIP DUES	486,6	431,5	440,6	449,7	459,0	1780,8
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
<b>5. TOTAL INCOME</b>		<b>444,2</b>	<b>453,3</b>	<b>462,4</b>	<b>491,7</b>	<b>1851,6</b>
6. BALANCE 1/1		<b>754,8</b>	686,4	648,8	661,6	
<b>EXPENDITURES</b>						
<b>11. ADMINISTRATION</b>		<b>94,0</b>	<b>104,0</b>	<b>79,0</b>	<b>123,0</b>	<b>400,0</b>
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	60,0	35,0	70,0	215,0
11.6 Miscellaneous		1,0	1,0	1,0	5,0	8,0
11.7 Travel, representative		5,0	5,0	5,0	10,0	25,0
<b>12. NEW INITIATIVES</b>		<b>50,0</b>	<b>50,0</b>	<b>25,0</b>	<b>25,0</b>	<b>150,0</b>
12.1 GIA, carried forward from 2006-07						50,0
<b>13. ASSEMBLIES</b>		<b>0,0</b>	<b>0,0</b>	<b>0,0</b>	<b>40,0</b>	<b>40,0</b>
13.1 Organization		0,0	0,0	0,0	10,0	10,0
13.2 Travel Grants		0,0	0,0	0,0	30,0	30,0
<b>14. SYMPOSIA</b>		<b>20,0</b>	<b>20,0</b>	<b>20,0</b>	<b>5,0</b>	<b>65,0</b>
14.1 Symposia		20,0	20,0	20,0	5,0	65,0
<b>15. ASSOCIATIONS</b>		<b>263,3</b>	<b>235,7</b>	<b>240,3</b>	<b>244,9</b>	<b>984,2</b>
15.1 Allocations		243,3	215,7	220,3	224,9	904,2
15.1a Associations		238,6	211,0	215,6	220,2	885,4
15.1b WCRP, EMSEV		4,7	4,7	4,7	4,7	18,8
15.2 Intr. of IACS		20,0	20,0	20,0	20,0	80,0
<b>16. DUES</b>		<b>17,0</b>	<b>17,0</b>	<b>17,0</b>	<b>17,0</b>	<b>68,0</b>
16.1 ICSU		17,0	17,0	17,0	17,0	68,0
<b>17. UNION ACTIVITIES</b>		<b>57,0</b>	<b>53,0</b>	<b>57,0</b>	<b>53,0</b>	<b>220,0</b>
17.1 GeoRisk, Liaison Officers, SEDI, CMC		28,0	24,0	28,0	24,0	104,0
17.2 Inter-Union Science (FAGS, ILP)		29,0	29,0	29,0	29,0	116,0
<b>18. COUNTRIES IN NEED</b>		<b>0,0</b>	<b>0,0</b>	<b>0,0</b>	<b>60,0</b>	<b>60,0</b>
18.1 Travel Grants		0,0	0,0	0,0	60,0	60,0
<b>19. MISCELLANEOUS</b>		<b>5,0</b>	<b>5,0</b>	<b>5,0</b>	<b>5,0</b>	<b>20,0</b>
19.1 Miscellaneous						
19.2 Professional Services		3,0	3,0	3,0	3,0	12,0
19.3 Fees		2,0	2,0	2,0	2,0	8,0
<b>20. CONTINGENCIES</b>		<b>6,25</b>	<b>6,25</b>	<b>6,25</b>	<b>6,25</b>	<b>25,0</b>
<b>21. TOTAL EXPENDITURES</b>		<b>512,6</b>	<b>491,0</b>	<b>449,6</b>	<b>579,1</b>	<b>2032,2</b>
22. BALANCE 12/31		686,4	648,8	661,6	<b>574,2</b>	

**Comment**

the red lines represent subtotals for each line of expenditures

17.1 GeoRisk		6	6	6	6	changed to 8k/y
Liaison Off.		14	14	14	14	
SEDI		4	4	4	4	
CMG		4	0	4	0	
17.2 FAGS		12	12	12	12	
ILP		17	17	17	17	changed to 15k/



## QUADRENNIAL REPORTS OF THE ASSOCIATIONS

### QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF CRYOSPHERIC SCIENCES

#### INTRODUCTION

The International Association for 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). In 2004 the then ICSI board put forward a proposal to the IUGG board to enhance the study of the Cryosphere within IUGG through the formation of a new independent Association for the Cryospheric Sciences. In response to this proposal, IUGG established an interim commission to replace ICSI called the Union Commission for the Cryospheric Sciences (UCCS), organized directly under IUGG. The IUGG Council voted to establish IACS at the IUGG General Assembly in Perugia, Italy in 2007. This is hence the first Quadrennial report of IACS as an independent Association.

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. Membership of the Bureau has remained stable over the first four years, consisting of President (Georg Kaser, Austria – until July 2009 whence he became immediate Past-President), President-Elect (Ian Allison, Australia – until July 2009 whence he became President),

Secretary General (Manfred Lange, Cyprus) three Vice-Presidents (Kumiko Goto-Azuma, Japan; Gino Casassa, Chile; Peter Jansson, Sweden) and the heads of five disciplinary Divisions (Glaciers and Ice Sheets, Julian Dowdeswell, UK; Snow and Avalanches, Charles Fierz, Switzerland; Marine and Freshwater Ice, Claude Duguay, Canada; Planetary and Other Ices of the Solar System, Ralf Greve, Japan; and Cryosphere, Atmosphere and Climate, Valérie Masson-Delmotte, France).

Most internal business of the Association and interaction with other scientific agencies is conducted by email. The Bureau does however meet at least once each year. The First Bureau meeting was held in Perugia, Italy in July 2007 immediately after the Association was formed, and the Second was held in Vienna in April 2008. Two Bureau meetings were held in Montreal in July 2009 in conjunction with the Joint Scientific Assembly of IAMAS/IAPSO/IACS (MOCA09, “Our Warming Planet”). In 2010 a sub-set of the Bureau met in Stockholm University, Sweden on 22-23 November. The main purpose of this meeting was to prepare information on issues related to the funding and profile of the Association that were then decided on at the Fifth formal Bureau meeting held by tele-conference on 21 December. Minutes of these meetings are available on the IACS website, [www.cryosphericosciences.org](http://www.cryosphericosciences.org). Plenary Administrative meetings with the IACS stakeholders, the cryospheric science community, were held in Perugia, Italy in July 2007 and in Montréal, Canada, on July 23, 2009.

The President and the Secretary General of IACS participated actively in the IUGG Executive Committee meeting in Karlsruhe, Germany on 5 and 6 August 2008, and the President participated in the IUGG EC meeting in Melbourne, 9-11 October 2009.

The current four-year term of most Bureau members finishes in July 2011, and a “nominating panel” of members independent of the Bureau (Jon-Ove Hagen – Norway; Konrad Steffen – USA; Qin Dahe – China) was established in June 2010 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.

IACS facilitates the transfer of research methods and explores new avenues in cryospheric science through Standing Groups and Working Groups devoted to a theme or subject and composed of experts in the particular field of study. The activities of these Groups are given in the next section.

The historical records of the International Commission on Snow and Ice have been catalogued and will be transferred to the National Snow and Ice Data Center, Boulder, for permanent archiving. A new process has been established to formalize requests for financial support from IACS for conferences and other activities.

## ACTIVITIES

### Publications and WG activities

The work of a former WG of the IACS predecessors, ICSI and UCCS, was published as the book *Snow and Climate: Physical Processes, Surface Energy Exchange and Modeling* by Cambridge University Press. Details of this work, edited by Richard L. Armstrong and Eric Brun, are available from the IACS website

Working Groups of IACS completed two further significant reference publications during 2010. *The International Classification for Seasonal Snow on the Ground*, edited by Charles Fierz and members of a now disbanded WG, was published as Technical Documents in Hydrology 83 (IACS Contribution No. 1) by the International Hydrological Programme of UNESCO. The *Glossary of Glacier and Mass Balance Terms*, edited by Graham Cogley and members of the WG on Glacier Mass Balance Terminology and Methods, was completed and will also be published by IHP/UNESCO as IACS Contribution No. 2.

A number of papers (26 total) presented during the IUGG General Assembly in Perugia, Italy on July 2-14, 2007 were published by the International Glaciological Society's *Annals of Glaciology*, Volume 48 in 2008. The volume was edited by the Chief Editor for the *Journal of Glaciology*, T.H. Jacka. More details are at: <http://www.ingentaconnect.com/content/igsoc/agl/2008/00000048/00000001>. The proceedings of the workshop on Mass Balance Modelling (see below) were also published as *Annals of Glaciology* Volume 50.

The currently active Working Groups (WG) of IACS are the WG on Glacier Mass Balance Terminology and Methods and the WG on Glacier and Permafrost Hazards in Mountains (GAPHAZ, a joint WG with the International Permafrost Association). The current Standing Groups (SG) are the Joint commission on Volcano-Ice Interactions (with the International Association of

Volcanology and Chemistry of the Earth's Interior - IAVCEI) and a newly formed Standing Group (December 2010) that is the Steering Committee of the Global Terrestrial Network for Glaciers (see below).

### Conferences and Symposia

The workshop on Mass Balance Modelling took place in Skeikampen, Norway on March 26 to 28, 2008 and was devoted to advancing numerical methodologies aimed at quantifying mass balance processes of Cryospheric entities. The workshop was jointly organized by the Norwegian Water Resources and Energy Directorate, the International Glaciological Society (IGS) in Cambridge, UK, and the World Glacier Monitoring Service (WGMS) in Zurich, Switzerland. Convenors were Liss Andreassen, Peter Jansson and Jon-Ove Hagen. During the workshop, the IACS Working Group on Mass Balance Terminology commenced its activities.

IACS was a partner with IAMAS and IAPSO in the Joint Assembly MOCA09 "Our Warming Planet" held in Montreal, Canada from July 19 to 29, 2009 (IACS Symposia were limited to July 19 to 24). The topic of the Assembly ("Our Warming Planet") attracted 1339 delegates, of whom 129 were registered as IACS delegates. As somewhat of an innovative element of the Assembly, most of the symposia were organized jointly between the three Associations. A total of 21 joint symposia on topics from embracing "Tropical Cyclones" to "Ice-cores in Paleoclimate" were held. In addition, IACS organized five symposia that were specifically geared towards the Cryospheric community. During the Assembly, 1871 papers were presented of which 1061 (62) were oral presentations, 586 (339) were poster presentations and 221 (25) were invited presentations (numbers in parentheses represent IACS presentations).

During 2010 IACS cosponsored, with funding support from IUGG Small Grants, meetings on *Southern Hemisphere Cryospheric Change*, in Valdivia, Chile and on *Cryospheric Change and its Influences in Regional Sustainable Development* in Lijiang, China and an international summer school/workshop in glaciology at the Wrangell Mountain Center, McCarthy, Alaska. IACS officers also played lead roles in the organization of the *International Polar Year Conference* in Oslo.

All IACS officers, and particularly the Secretary-General and President, have been involved in planning scientific sessions for the IUGG General Assembly in Melbourne in June/July 2011.

### Interaction with other scientific organisations

The role of IACS in providing scientific advice and oversight to the World Glacier Monitoring Service

(WGMS) has been further formalised. The WGMS, based in Zurich, collects and publishes standardized information about ongoing glacier changes under the auspices of IACS, the Federation of Astronomical and Geophysical Data Analysis Services (FAGS/ICSU), UNEP, UNESCO and WMO. The Global Terrestrial Network – Glaciers (GTN-G), a component of the Terrestrial Observation Panel for Climate of GCOS/GTOS, links WGMS with other bodies involved with observations of glacier systems and their fluctuations: the US National Snow and Ice Data Center (NSIDC) in Boulder, and the Global Land Ice Measurements from Space (GLIMS) initiative. A GTN-G Steering Group was formed in 2010 and established as a Standing Group of IACS, with the IACS Division Head for Glaciers and Ice Sheets as the chair of its Advisory Board. The WGMS has succeeded in securing long-term funding from the Swiss government, and the IACS Past-President served as a member of the selection committee for a new director of WGMS.

A Memorandum Agreement between IACS and the Scientific Committee on Antarctic Research (SCAR) and the International Arctic Science Council (IASC) was signed on July 8, 2008. This MoU outlines procedures to be followed by IASC, SCAR and IACS that are intended to “...combine their efforts in cryospheric activities (to be decided by mutual agreement) so as to raise the level of impact of all three organizations in terms of making scientific advances and of advising policy makers, as well as to avoid duplication...”. Georg Kaser (President 2007-2009) attended the SCAR Delegate Meeting in Moscow, Russia, July 2008 as an observer. Ian Allison (President 2009-2011) was subsequently appointed as the formal IUGG Delegate to SCAR and participated in their Delegate Meeting in Buenos Aires, Argentina in July 14-16, 2008.

A number of IACS officers submitted a proposal to the Chairs of Working Group I of the Intergovernmental Panel on Climate Change (IPCC) on the treatment of the cryosphere in the IPCC Fifth Assessment Report: this was welcomed by the chairs. Several IACS officers, and many others from our scientific community, are now active as lead authors in the Fifth Assessment Report.

Georg Kaser (IACS, President 2007-09) was invited to participate in the meeting of the Scientific Steering Group of the Climate and Cryosphere (CliC) project in Geneva, December 2008, and to present IACS to its delegates. CliC is a major research project of the World Climate Research program (WCRP) aimed 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 close to IACS’ goals and objectives.

Charles Fierz (Division Head) represented IACS at regular telephone conferences among “Cryospheric Managers” in order to coordinate activities among the leading organisations (IACS, CliC, IGS, EGU, AGU) dealing with ice and snow issues and scientific meetings. Although these coordinating meetings have now stopped, there are plans to reinstate them.

#### **Other activities**

Georg Kaser (President 2007-2009) participated in an UNESCO led mission to Nepal. This was to commence organization of a glacier mass balance training course in Nepal in the framework of the *Hindu Kush Himalayan - Flow Regimes from International Experimental and Network Data* (HKH-FRIEND) project. IACS offered to coordinate the trainers' group as well as the content and the background material to be used. The latter was based on the publication: *A manual for monitoring the mass balance of mountain glaciers*, Kaser et al. (eds.), 2003, which was produced in the framework of an earlier course

Georg Kaser also played the unique role of officially ending the *Expédition Glaciologique Internationale au Groenland* (EGIG), nearly 60 years after it was initiated. EGIG was started in the early 1950s as a pioneering initiative under the auspices of IACS’ predecessor ICSI. Its objective was to regain momentum in polar research after World War II. In the course of the 1950s and 1960s, under the leadership of Dr. Paul-Emile Victor, a number of expeditions to the Greenland Ice Sheet were undertaken and provided the foundation for many later investigations. The project had never been formally finished until Kaser wrote to the former members and declared EGIG to be officially ended.

#### **PLANNED FUTURE ACTIVITIES**

A new WG on *Flow law for polycrystalline ice* has been approved and will be established in 2011. An improved constitutive relationship for ice is particularly important in developing better models of the response of ice sheet systems to anthropogenic climate change. New WGs on *Quantitative Snow Stratigraphy* and on *Polar Surface Features* are also under consideration. The GAPHAZ WG is to be reconstituted as a Standing Group which will provide liaison to the IUGG Commission on Geophysical Risk and Sustainability (GeoRisk).

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IACS, with its partners the Scientific Committee on Antarctic Research and the International Arctic Science Committee, is planning a two day symposium prior to the ICSU General Assembly in Rome in September 2011. This will address all aspects of polar science, with a focus on the functioning of the Earth System in the Arctic and Antarctic, the major drivers of pervasive change and the as yet unaddressed research issues in these regions. These global issues will be considered in the polar regions within the context of the ICSU Grand Challenges and as a legacy of the International Polar Year 2007-2008.

Planning has also commenced for a Joint IAMAS/IACS Assembly in Davos, Switzerland in 2013 (DACA-13, the Davos Atmosphere and Cryosphere Assembly 2013). The theme of the conference will be *Ice and Air: Process Interactions*. A Swiss National Organizing Committee has been established and a logo and web-site are in preparation and should be ready for release at IUGG 2011 in Melbourne.

Ian Allison, IACS President  
Manfred Lange, IACS Secretary General

## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF GEODESY

### INTRODUCTION

The main objective of IAG is to study all geodetic problems related to Earth observation and global change. This includes the determination of reference systems, gravity field, Earth rotation, surface positions and crustal deformation, and sea level. To accomplish the objectives, IAG is divided into four Commissions, fifteen 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 2007 in Perugia. The list of national correspondents forming the IAG Council was regularly updated in contact with the IUGG Secretary General. Doubtful nominations (double, questionable) were cleared up. 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 IAG EC meetings were held during the legislative period from 2007 to 2010: Perugia 2007, San Francisco 2007, Vienna 2008, San Francisco 2008, Buenos Aires 2009, Vienna 2010, and San Francisco 2010. The meeting summaries were published in the IAG Newsletter in the IAG Journal of Geodesy (Springer-Verlag) and are available online in the IAG Homepage (<http://www.iag-aig.org>) and 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, and the Editor in Chief of the Journal of Geodesy. 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 2009 in Buenos Aires, the

preparation of the Symposia with IAG participation during the IUGG General Assembly 2011 in Melbourne, 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 regular teleconferences and met in general before each of the IAG Executive Committee meetings. The President and Secretary General participated in the IUGG Executive Committee Meetings in Karlsruhe, 4-6 August 2008 and in Melbourne, 9-11 October 2009. The Bureau members represented IAG at various international scientific meetings and in several anniversaries, e.g. the 50<sup>th</sup> anniversary of Bundesamt für Geowissenschaften und Rohstoffe, Hannover, Germany, 25 November 2008, the 50<sup>th</sup> anniversary of the International Cartographic Association, Bern, Switzerland, 9-10 June 2009, the 10<sup>th</sup> anniversary of the International VLBI Service (IVS), Bordeaux, France, 25-26 March 2009, the Centenary of the International Society of Photogrammetry and Remote Sensing (ISPRS), Vienna, Austria, 4 July 2010.

### ACTIVITIES

#### IAG Office

The former IAG Central Bureau was renamed IAG Office according to the new IAG Bylaws adopted in Perugia 2007. As a result of the election of the new Secretary General, it moved with all the files including budget, homepage and databases from Copenhagen, Denmark, to Munich, Germany in the second half of 2007. The main task of the office is the administrative organization of all IAG business and events. This includes the budget management, the record keeping of the individual IAG memberships, 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 Homepages.

Specific duties were the preparation and execution of the IAG Scientific Assembly 2009 and the IAG part of the IUGG General Assembly 2011, the edition of the Geodesist's Handbook 2008 as the organizational guide of IAG with the complete description of the IAG structure (reports, terms of reference, documents), and the Mid-Term Reports 2007–2009 (Travaux de l'AIG Vol. 36). Publications of the Journal of Geodesy and the

Proceedings in the IAG Symposia series, both in Springer-Verlag, were supervised. Travel grants were assigned to young scientists for participation in many IAG sponsored symposia.

### **Communication and Outreach Branch (COB)**

The main task of the COB is 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. Since July 2010 the IAG newsletter is also sent to the Presidents and Secretaries General of the IUGG Associations and JBGIS members. 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 2008.

### **Commissions and Inter-Commission Committee**

The four IAG Commissions and the Inter-Commission Committee on Theory compiled their final reports 2003 – 2007, the new structure descriptions for the period 2007 – 2011, and the mid-term reports 2007 – 2009 for publication in the IAG Reports (Travaux de l'AIG) and the Geodesists Handbook. They are maintaining their individual Homepages. Most of the Commissions held several symposia, workshops and other meetings during the period 2007-2011 (see below). They organized symposia at the IAG Scientific Assembly 2009 and the IUGG General Assembly 2011.

### **Services**

There are fifteen IAG Services which may be split into three general fields: geometry (IERS, IDS, IGS, ILRS, IVS), gravity (IGFS, ICGEM, IDEMS, IGeS, BGI) and combination (IAS, IBS, BIPM, ICET, PSMSL). All of them maintain their own Homepages and data servers and hold their administrative meetings (Directing Board or Governing Board, respectively). They compiled their final reports 2003-2007, the new terms of reference for the period 2007 – 2011, and the mid-term reports 2007-2009 for publication in the IAG Reports (Travaux de l'AIG) and the Geodesists Handbook. Most Services held international meetings (see below).

### **Global Geodetic Observing System (GGOS)**

GGOS became a new component as the "flagship of IAG" in 2007. The mission of GGOS is to advance geodetic observing methods for Earth and planetary system science by defining and advocating for the establishment of the geodetic infrastructure; improving the quality and accessibility of geodetic observations and products; coordinating interaction between the IAG Services, Commissions, and stakeholders; and educating the

scientific community about the benefits of geodetic research and the public about the fundamental role of geodesy in society.

The GGOS Reference Document (330 pages) was published in Springer-Verlag in 2009. It contains many individual articles with a description of all aspects of the Global Geodetic Observing System written by a very large number of authors. A total of 10 GGOS Steering Committee meetings were held in the period 2007 - 2010, and several GGOS Workshops and Retreats were performed. GGOS is representing IAG as a participating organization in the Group on Earth Observation (GEO) and participated in the GEO Plenary Assemblies and other GEO and GEOSS meetings. A GGOS Inter-Agency Committee is being established to support the sustainability of GGOS.

### **Coordination with other organisations**

IAG maintains close cooperation with several organizations outside IUGG. There were meetings on a regular basis 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, with IAG represented in TC211 Geographic Information / Geomatics), Joint Board of Geospatial Information Societies (JBGIS), United Nations Offices for Outer Space Affairs (UN-OOSA, with participation in Space-based Information for Disaster Management and Emergency Response, UN-SPIDER, and International Committee on Global Navigation Satellite Systems, ICG).

### **Meetings**

Important meetings of IAG components and sponsored IAG meetings were in 2007 – 2010:

- Workshop on Conventions, Sèvres, France, September 17-19, 2007.
- Joint Internat. GRACE Science Team Meeting, Potsdam, Germany, Oct. 15-17, 2007;
- Unified Analysis Workshop, Monterey, CA, USA, December 5-7, 2007;
- International VLBI Service (IVS) 5th General Meeting and Analysis Workshop, St. Petersburg, Russia, 03-07 March 2008;
- Several Sessions co-organized by the Commissions at the EGU General Assembly, Vienna, Austria, 13-18 April 2008;
- FIG/IAG Symposium "Measuring the Changes", Lisbon, Portugal, 12-15 May 2008;
- SIRGAS General Meeting 2008, Montevideo, Uruguay, 26-29 May 2008;
- International GNSS Service Workshop, Miami Beach, Florida, USA, 02-06 June 2008;
- 7<sup>th</sup> International e-VLBI Workshop in Shanghai, China, 16-17 June 2008;

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- Commission 4 participation in the FIG Working Week, 14-19 June 2008, Stockholm;
- Sub-commission 1.3a EUREF Symposium, Brussels, Belgium, 18-20 June 2008;
- Symposium Gravity, Geoid and Earth Observation, Chania, Greece, 23-27 June 2008;
- Sessions at the 37<sup>th</sup> COSPAR General Assembly, Montreal, Canada, 01-05 July 2008;
- 16<sup>th</sup> International Symposium on Earth Tides, Jena, Germany, 01-05 September 2008;
- Journées 2008 “Systèmes de référence spatio-temporels”, Dresden, Germany, 22-24 September 2008;
- 9<sup>th</sup> European VLBI Network Symposium, Bologna, Italy, 23-26 September 2008;
- 16<sup>th</sup> International Workshop on Laser Ranging, Poznan, Poland, 13-17 October 2008;
- International DORIS Service (IDS) Workshop, Nice, France, 12-14 November 2009;
- Several Sessions co-organized by the Commissions at the AGU Fall Meeting, San Francisco, California, USA, 15-19 December 2008.
- 3<sup>rd</sup> Workshop Deformation and Gravity, Lanzarote, Spain, February 23–26, 2009;
- Workshop on Radio Frequencies and Feeds, Wettzell, Germany, March 18–21, 2009;
- 10<sup>th</sup> Anniversary of International VLBI Service, Bordeaux, France, March 25, 2009;
- International VLBI Service (IVS) Workshop, Bordeaux, France, March 26, 2009;
- 5<sup>th</sup> IVS Technical Operations Workshop, Westford, USA, April 27–30, 2009;
- European Reference Frame (EUREF) Symposium, Florence, Italy, May 27–30, 2009;
- Training School on GIA Modelling. Gävle, Sweden, June 1–5, 2009;
- 8<sup>th</sup> International Workshop on e-VLBI Science, Madrid, Spain, June 22–26, 2009;
- Global Geodetic Observing System Workshop, Espoo, Finland, June 23–26, 2009;
- VII Hotine-Marussi Symposium Theoretical Geodesy, Rome, Italy, July 6–10, 2009;
- IAG-SIRGAS School on Reference Systems, Bogotá, Colombia, July 13-17, 2009;
- 16<sup>th</sup> Advisory Board on the Law of the Sea (ABLOS) conference, Nusa Dua Bali, Indonesia, August 4–5, 2009;
- IAG Scientific Assembly 2009, Buenos Aires, Argentina, Aug. 31 – Sept. 4, 2009;
- SIRGAS General Meeting, Buenos Aires, Argentina, August 31 – September 4, 2009;
- International Geoid School, Buenos Aires, Argentina, Sept. 7–11, 2009;
- ILRS Technical Workshop on SLR Tracking, Metsovo, Greece, Sept 14–19, 2009;
- International Earth Rotation and Reference Systems Service (IERS) Workshop on EOP Combination and Prediction, Warsaw, Poland, October 19–21, 2009;
- 2009 Workshop on the North American Geoid, Boulder, USA, October 21–23, 2009;
- GGOS Intergovernmental Committee, Frankfurt, Germany, November 2–3, 2009;
- Second GGOS Unified Analysis Workshop, San Francisco, USA, Dec. 11–12, 2009;
- International VLBI Service for Geodesy and Astrometry (IVS) 2010 General Meeting, Hobart, Australia, February 07-14, 2010;
- V Congreso Internacional de Agrimensura, Havana, Cuba, March 02-05, 2010;
- Geophysics, Geodesy and Tectonics of the North Africa Plate Boundary for Better Earthquake and Tsunami Hazard Assessment, Algiers, Algeria, May 15-21, 2010;
- European Reference Frame (EUREF) Symposium, Gävle, Sweden, June 02-06, 2010;
- Second Workshop on Application of Artificial Intelligence and Innovations in Engineering Geodesy, Braunschweig, Germany, June 16, 2010;
- Beacon Satellite Symposium, Barcelona, Spain, June 07-11, 2010;
- IAG School on Reference Frames, Mytilene, Lesvos, Greece, June 07-12, 2010;
- IAG Symposium on Terrestrial Gravimetry: Static and Mobile Measurements, St. Petersburg, Russia, June 22-25, 2010;
- 10<sup>th</sup> International Geoid School, St. Petersburg, Russia, June 28 – July 02, 2010.
- IGS Workshop and Special Workshop on Vertical Rates from GPS, Newcastle, UK, June 28 – July 2, 2010;
- 15<sup>th</sup> General Assembly of WEGENER, Bogazici University, Istanbul, Turkey, September 14-17, 2010;
- 2<sup>nd</sup> General Assembly of the IGFS - International Gravity Field Service, Fairbanks, Alaska, USA, September 20-22, 2010;
- IAG Commission 1 Symposium 2010. Reference Frames for Applications in Geosciences (REFAG2010), Marne-La-Vallée, France, October 04-08, 2010;
- 9<sup>th</sup> International e-VLBI Workshop, Perth, Australia, October 10-20, 2010;
- IGCP 565 Workshop 3: Separating Hydrological and Tectonic Signals in Geodetic Observations, Reno, Nevada, USA, October 11-13, 2010;
- International DORIS Service (IDS) Workshop, Lisbon, Portugal, October 21-22, 2010;
- Observing and Understanding Earth Rotation, Shanghai, China, October 25-28, 2010;
- Sixth ABLOS Conference, Monaco, Monaco, October 25-27, 2010;
- Second SIRGAS School on Reference Systems, Lima, Peru, November 08-10, 2010;

- SIRGAS 2010 General Assembly, Lima, Peru, November 11-12, 2010.

### **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:

- 132: VI Hotine-Marussi Symposium on Theoretical and Computational Geodesy (2008);
- 133: Observing our Changing Earth, Proceedings of the IAG General Assembly (2009);
- 134: Geodetic Reference Frames, Proceedings of Commission 1 Symposium (2009);
- 135: Gravity, Geoid and Earth Observation, Proc. of Commission 2 Symposium (2010).

The proceedings of the IAG Scientific Assembly in Buenos Aires 2009 were compiled and are in press.

The Reference Book on GGOS was published as a monograph in Springer-Verlag, and the IAG Reports (Travaux de l'AIG) 2007 – 2009 were published by the IAG Office.

### **Awards, anniversaries, obituaries**

The following medals and prices have been awarded:

- Levallois Medal to C.C. Tscherning, Denmark (2007);
- Bomford Prize to M. Furuya, Japan (2007);
- Young Author Award to Steffen Schön, Germany (2007);
- Order of Merit of the Federal Republic of Germany to Hermann Drewes (2008);
- Young Authors Award to Franziska Wild-Pfeiffer, Germany (2009).

The following anniversaries were celebrated with IAG participation:

- 70<sup>th</sup> Birthday of the former IAG and IUGG President, Helmut Moritz, in Berlin, 15 November 2008;
- 10<sup>th</sup> Anniversary of the International VLBI Service for Geodesy and Astrometry, Bordeaux, France, 25 March 2009;
- 50<sup>th</sup> Anniversary of the German IUGG adhering body "Bundesamt für Geowissenschaften und Rohstoffe", Hannover, 25 November 2008.

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

- Carlo Morelli, Trieste, Italy (2008);
- Lubomir Włodzimierz Baran, Poland (2009);
- Kurt Bretterbauer, Austria (2009);
- Werner Gurtner, Switzerland (2009);
- Irene Fischer, USA (2009);
- Leif Svensson, Sweden.

Michael Sideris, IAG President  
Hermann Drewes, IAG Secretary General



## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY

### ACTIVITIES

**Outstanding frontiers of research in geomagnetism and aeronomy** in the period 2007-2010 have included a wide range of new results, in a very diverse domains of geomagnetism and aeronomy, as: understanding of solar processes, solar-terrestrial interactions including those that influence climate; space weather and its implications for space-based infrastructure and exploration; 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 Field Research" in securing continuous satellite mapping of the Earth's magnetic field, culminating with preparation for Swarm mission – to be launched in 2012; geomagnetic precursors and signals associated with earthquakes and volcanoes; contribution in modelling the core field and its secular variation and acceleration at the core-mantle boundary; progress in understanding the origin and behaviour of the main core through numerical dynamo simulations; 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; use of mineral magnetic properties to monitor environmental effects; and major advances in instrumentation, data acquisition, and sharing of information and services, often in real-time or near-real time. 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 predictions of catastrophic events.

### ASSEMBLIES

#### XXIVth IUGG General Assembly

IAGA held its General Assembly during the first week of IUGG 2007 in Perugia, i.e. between July 2 and July 7 in accordance with the decision to reduce the length of the IAGA assemblies from two weeks to one that was taken by the Conference of Delegates in Toulouse. The IAGA-led scientific programme consisted of 56 symposia, of which 3 were Union symposia, 12 joint symposia with other Associations, and 41 were IAGA-only symposia. The number of papers presented at the IAGA symposia was 1327 (1367 were submitted). The number of IAGA registrants in Perugia was 669.

#### XIth IAGA Scientific Assembly in Sopron

More than 830 people participated in this event. The Scientific Assembly covered all scientific fields of interest in the Association, with 56 sessions and 2 inspiring Association Lectures. The number of contributions was significant, 1250 papers of which 796 were scheduled as oral presentations and 454 as posters. 2009 being the last year of the IGY+50 anniversary years, the Hungarian website of International Year of Planet Earth (IYPE) included brochures about the IYPE themes in the Hungarian language as well as the information about another International Year held in 2007/2009. The role of the Local Organizing Committee (LOC) in outreach and the press program was extremely useful. The Assembly, full of exciting scientific results, was held in a framework of social interaction not only between the scientists, but also with the town inhabitants and its great cultural atmosphere.

### ADMINISTRATION

#### New leadership of IAGA

The Conference of Delegates elected a new Executive Committee for the quadrennium 2007-2011 and new leaders for the Divisions and Commissions and their Working Groups were appointed by the Executive Committee and confirmed by the Conference of Delegates. In November 2007 Vladimir Papitashvili had to resign from his membership in the IAGA EC as a consequence of having accepted a permanent position as Program Director in the US National Science Foundation, which might lead to conflicts of interest. The EC appointed in his stead Daniel Baker, Director of the Laboratory for Atmospheric and Space Physics at the University of Colorado, USA. In August 2009, Mioara Manda, member of EC, has been elected as Secretary General of IAGA. The EC appointed in her place Toshihiko Iyemori, Graduate School of Science, Kyoto University, Japan.

#### Changes of the composition of the Executive Committee

A proposal to change the composition of the Executive Committee to provide more opportunities for IAGA scientists to serve on the Committee had been proposed by the Australian Delegation and an amendment had been presented by the Executive Committee. The Conference of Delegates decided to eliminate one of the Vice Presidents and the past President position, thereby opening up for two new members of the

Committee, and to shorten the duration of service of persons in the top positions. The necessary modifications of the Statutes and Bylaws that this decision gave rise to were also decided.

## **ADDITIONAL ASSOCIATION MATTERS**

### **Topical meetings**

In the four year period 2007-2010, IAGA sponsored 23 topical meetings covering large parts of the IAGA science. The IAGA financial contributions amounted to a total of USD 35500, directed mainly at helping young and needy scientists attend.

### **IGY+50 and eGY**

The 50year anniversary of IGY has been celebrated by IUGG and IAGA in Perugia. Special attention has been paid to the development and program realization of an integrated intellectual geoinformation for geomagnetic data; the application of modern technologies to the analysis of vast quantities of time series of observations; and the development of databases and scientific knowledge. IAGA has been one of the main sponsors of eGY (the Electronic Geophysical Year) and a strong supporter of IHY (International Heliophysical Year). Much effort has gone into preparations for these projects. IAGA played a lead role in establishing cooperation and articulating mutual support among the four internal science year initiatives: the International Polar Year (IPY), IUGS's International Year of Planet Earth, IHY, and eGY.

### **Global Science Information Commons**

The UN (three World Summits for the Information Society), GEO/GEOSS, ICSU, CODATA, IUGS, AGU, EGU and many other bodies have a shared vision of a global (geo)science commons that will serve our information and service needs for the future. IAGA, largely through eGY, has lent strong support to these efforts and a link between IUGG, CODATA, and GEOSS.

### **IAGA medals and awards**

*The IAGA Medal in Recognition of Valued Service to the IAGA Community* was awarded by the IAGA Executive Committee in 2007 to Toyohisa Kamei of the World Data Center for Geomagnetism in Kyoto and in 2009 to Ole Rasmussen of the Danish Meteorological Institute.

Dr. Frank Lowes was unanimously elected *Honorary Member of IAGA* by the Conference of Delegates.

The following young scientists received the *Young Scientists Award* over the period 2007-2010: Gilda Currenti, Anna Kanukhina, Zuzana Kratinova, Eva Macusova, Tracy Moffat-Griffin, Klaus Reuter, Joanna Roszkowska-Remin, Annika Seppälä. The award consists of support to participate in the IAGA/IUGG Assembly.

### **Publications**

For the first time, IAGA plans to have the outcome of the Assembly published in cooperation with Springer Science and Business Media B.V. IAGA Special Sopron Book Series reflect the 5 divisions of IAGA in their broadest sense: (I) Internal Magnetic Fields, (II) Aeronomic Phenomena, (III) Magnetospheric Phenomena, (IV) Solar Wind and Interplanetary Field, and (V) Geomagnetic Observatories, Surveys and Analyses. The five book volumes have been developed and planned for 2010/2011 (two being already published in 2010).

**IAGA News 4447**, containing information about the IAGA activities and the Executive Committee, decisions have been distributed annually, and can be found at the IAGA web site ([www.iugg.org/IAGA](http://www.iugg.org/IAGA)).

Eigil Friis-Christensen, IAGA President  
Mioara Manda, IAGA Secretary General

## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES

The main activities involving IAHS as a whole have been the IUGG General Assembly (Perugia, Italy, 2007), the IAHS-IAH Joint International Convention (Hyderabad, India, 2009) and preparations for the *Melbourne* IUGG General Assembly.

During the past four years, the IAHS Bureau had met in Perugia/Italy (8 and 14 July 2007), in Paris/France (8 June 2008), in Hyderabad/India (6 and 12 September 2009) and in Paris/France (4 July 2010). The minutes of all these meetings are available on the IAHS Web Site.

The *PUB* (Prediction in Ungauged Basins) Working Group is the major IAHS initiative operating throughout the decade of 2003-2012, established with the primary aim of reducing uncertainty in hydrological predictions. It is a 'grass-roots' movement intended to engage the interest of hydrologists around the world, and has grown to encompass an enormous variety of approaches and settings.

*PUB* aims to encourage a paradigm shift in the methods used to predict streamflow, sediment and water-quality variables, away from traditional methods reliant on statistical analysis and calibrated models, and towards new techniques which are based primarily on improved understandings and representations of physical processes within and around the hydrological cycle. Specific areas of interest include flood estimation, climate variability and drought, erosion and sedimentation, snow- and ice-melt, nutrient fluxes and eutrophication issues, land-use and salinity.

The *PUB* decade has been divided into five biennia 2003-2013;

- 1st Biennium, 2003-2005 - Initiation:  
Chair - Murugesu Sivapalan, now at University of Illinois at Urbana-Champaign
- 2nd Biennium, 2005-2007 - Growth:  
Chair - Jeff McDonnell, Oregon State University
- 3rd Biennium, 2007-2009 - Taking Stock:  
Chair - Günter Blöschl, Technical University of Vienna
- 4th Biennium, 2009-2011 - Consolidation:  
Chair - John Pomeroy, University of Saskatchewan
- 5<sup>th</sup> Biennium will commence in Melbourne

Goals of the 4th Biennium:

- To enhance communication within the scientific community, and dialogue with the applications community

- To encourage the inclusion and analysis of regional efforts and varying perspectives
- To maximize the predictive value of available data
- To incorporate process structure, variability and emergence into predictive approaches
- To improve realism in conceptual approaches
- To encourage uptake and evaluation of new measurement and information technologies for basin inputs and characterization
- To develop improved models that reflect recently improved hydrological understanding

The International Hydrology Prize, awarded annually on an individual basis in recognition of an outstanding contribution to the science (a joint IAHS-UNESCO-WMO initiative) has been awarded to Prof. Desmond E. Walling (UK) in 2007, to Mr Jean Margat (France) in 2008, to Prof. Keith Beven (UK) in 2009 and to Prof. Murugesu Sivapalan (Australia) in 2010.

The IAHS Tison Award was established in 1982 and aims to promote excellence in research by young hydrologists. The Award is granted for an outstanding paper published by IAHS. In 2007 it has been awarded to Dr C. Cudennec (France) and Ms H. Badhraâ (Tunisia), in 2008 to Dr G. Lahaa (Austria), in 2009 to Y. Hirabayashi, S. Kanae and S. Emori (Japan) and in 2010 to A. Valéry, V. Andréassian and C. Perrin (France)

Publication is an important sector of activity for IAHS. This is undertaken within the framework of IAHS Press, located in Wallingford (UK) with the generous support of the Centre for Ecology and Hydrology and managed by *Cate Gardner*. IAHS Press publishes the *Hydrological Sciences Journal* with 8 issues a year since 2010 (6 before) and about 12 papers per issue. The Journal is directed by *Z.W. Kundzewicz* (IAHS Editor) and *D. Koutsoyannis*. We are pleased to report that the Journal's five year Impact Factor 2009 reached 1.9, on a par with the best water-related journals. A publication contract has been signed with Taylor and Francis who now distribute the Journal both electronically and as hard copies and provided IAHS Press with modern and effective tools for submission, reviewing and editing.

In the 2007-2010 period IAHS Press also published 31 Red Books that give a general and synthetic view of the IAHS' scientific activity:

- *PUB* Kick-Off Meeting, Edited by D. Schertzer, P. Hubert, S. Koide & K. Takeuchi, IAHS Publ. 309 available in Open Access on the IAHS web site.

XXV General Assembly of the International Union of Geodesy and Geophysics  
Quadrennial Reports of the IUGG Associations and Union Commissions

- Water in Celtic Countries: Quantity, Quality and Climate variability, Edited by J. P. Lobo Ferreira & José M. P. Viera, IAHS Publication 310.
- Methodology in Hydrology, Edited by Liliang Ren, Qiongfang Li, Danrong Zhang & Jun Xia, IAHS Publ. 311.
- A New Focus on Groundwater–Seawater Interactions, Edited by Ward Sanford, Christian Langevin, Maurizio Polemio & Pavel Povinec, IAHS Publ. 312.
- Quantification and Reduction of Predictive Uncertainty for Sustainable Water Resources Management, Edited by Eva Boegh, Harald Kunstmann, Thorsten Wagener, Alan Hall, Luis Bastidas, Stewart Franks, Hoshin Gupta, Dan Rosbjerg & John Schaake, IAHS Publ. 313.
- Water Quality and Sediment Behaviour of the Future: Predictions for the 21st Century, Edited by Bruce W. Webb & Dirk De Boer, IAHS Publ. 314.
- Changes in Water Resources Systems: Methodologies to Maintain Water Security and Ensure Integrated Management, Edited by Nick van de Giesen, Xia Jun, Dan Rosbjerg & Yoshihiro Fukushima, IAHS Publ. 315.
- Remote sensing for environmental monitoring and change detection, Edited by Manfred Owe & Christopher Neale, IAHS Publ. 316.
- Reducing the Vulnerability of Societies to Water Related Risks at the Basin Scale, Edited by Andreas Schumann & Markus Pahlow, IAHS Publ. 317.
- Glacier Mass Balance Changes and Meltwater Discharge, Edited by P. Ginot & J.E. Sicart, IAHS Publ. 318.
- Hydrological Sciences for Managing Water Resources in the Asian Developing World, Edited by Xiaohong Chen, Yongqin David Chen, Jun Xia & Hailun Zhang, IAHS Publ. 319.
- Calibration and Reliability in Groundwater Modelling Credibility of Modelling, Edited by J.C. Refsgaard, K. Kovar, E. Haarder & E. Nygaard, IAHS Publication No 320.
- Groundwater - Surface Water Interaction: Process Understanding, Conceptualization and Modelling, Edited by C. Abesser, Thorsten Wagener & Gunnar Nuetzmann, IAHS Publication No 321.
- Hydrological Research in China: Process Studies, Modelling Approaches and Applications, Edited by Dawen Yang, Fuqiang Tian, Lihua Tang & Zhiyu Liu, IAHS Publ. 322.
- Rivers Basins - from Hydrological Science to Water Management / Les bassins versants - de la science hydrologique à la gestion des eaux, Edited by I. Tchiguirinskaia, S. Demuth & P. Hubert, IAHS Publication No 323.
- Groundwater Quality: Securing Groundwater Quality in Urban and Industrial Environments, Edited by Michael G. Trefry, IAHS Publ. 324.
- Sediment Dynamics in Changing Environments, Edited by Jochen Schmidt, Tom Cochrane, Chris Phillips, Sandy Elliott, Tim Davies & Les Basher, IAHS Publ. 325.
- Hydrology in Mountain Regions : Observations, Processes and Dynamics, Edited by Danny Marks, Regine Hock, Michael Lehning, Masaki Hayashi and Robert Gurney, Proceedings of a Symposium held in Perugia, Italy, July 2007, IAHS Publ. 326.
- Role of Hydrology in Water Resources Management, Edited by Hans-Jurgen Liebscher, Robin Clarke, John Rodda, Gert Schultz, Andreas Schumann, Lucio Ubertini & Gordon Young, Proceedings of a symposium held in Capri, Italy, October 2008, IAHS Publ. 327.
- Ecohydrology of surface and groundwater dependant systems : Concepts, methods and recent developments, Edited by Martin Thoms, Kate Heal, Eva Bogh, Antonio Chambel and Vladimir Smakthin, Proceedings of symposium JS1 held in Hyderabad, India, September 2009, IAHS Publ. 328.
- Trends and sustainability of groundwater in highly stressed aquifers, Edited by Makoto Taniguchi, Alyssa Dausman, Ken Howard, Maurizio Polemio and Elango, Lakshmanan, Proceedings of symposium JS2 held in Hyderabad, India, September 2009, IAHS Publ. 329.
- Improving integrated surface and groundwater resources management in a vulnerable and changing world, Edited by Günther Blöschl, Nick van de Giesen, D. Muralidharan, Liliang Ren, Frédérique Seyler, Uttam Sharma & Jaroslav Vrba, Proceedings of symposium JS3 held in Hyderabad, India, September 2009, IAHS Publ. 330.
- Hydroinformatics in hydrology, hydrogeology and water resources, Edited by Ian Cluckie, Yangbo Chen, Vladan Babovic, Lenny Konikow, Arthur Mynett, Siegfried Demuth & Dragan A. Savic, Proceedings of symposium JS4 held in Hyderabad, India, September 2009, IAHS Publ. 331.
- New approaches to hydrological prediction in data sparse regions, Edited by Koray Yilmaz, Ismail Yucel, Hoshin V. Gupta, Thorsten Wagener, Dawen Yang, Hubert Savenije, Christopher Neale, Harald Kunstmann and John Pomeroy, Proceedings of symposium HS2 held in Hyderabad, India, September 2009, IAHS Publ. 333.

XXV General Assembly of the International Union of Geodesy and Geophysics  
Quadrennial Reports of the IUGG Associations and Union Commissions

- Groundwater and Climate in Africa, Edited by R. Taylor, Callist Tindimugaya, Michael Owor & Mohammad Shamsudduha, Proceedings of a meeting held at Kampala (Uganda), June 2008, IAHS Publ. 334.
  - Hydrological Modelling and Integrated Water Resources Management in Ungauged Mountainous Watersheds, Edited by Wei-Lin Xu, Tian-Qi Ao & Xin-Hua Zhang, Proceedings of a meeting held at Chengdu (China), November 2008, IAHS Publ. 335.
  - Status and Perspectives of Hydrology in Small Basins, Edited by Andreas Herrmann & Sybille Schumann, Co-edited by Ladislav Holko, Ian Littlewood, Laurent Pfister, Piet Warmerdam & Ulrich Schröder, IAHS Publication 336.
  - Sediment Dynamics for a Changing Future, Edited by Kazimierz Banasik, Arthur J. Horowitz, Philip N. Owens, Mike Stone & Des E. Walling, IAHS Publication 337.
  - Hydrocomplexity: New Tools for Solving Wicked Water Problems, Proceedings of the Xth Kovacs Colloquium, Edited by Shahbaz Khan, Hubert Savenije, Siegfried Demuth and Pierre Hubert, IAHS Publication 338.
  - Land Subsidence, Associated Hazards and the Role of Natural Resources Development, Edited by Dora Carreón-Freyre, Mariano Cerca & Devin I. Galloway, Technical editor: J. Jesús Silva-Corona, IAHS Publication 339.
  - Global Change : Facing Risks and Threats to Water Resources, Proceedings of the 6th World FRIEND Conference, Edited by Eric Servat, Siegfried Demuth, Alain Dezetter & Trevor Daniell, Co-edited by: Ennio Ferrari, Mustapha Ijjaali, Raouf Jabrane, Henny Van Lanen & Yan Huang, IAHS Publication 340.
- In addition, IAHS Press regularly compiles and distributes free of charge the IAHS Newsletter (three or four issues per year). Two books have been published in the “Blue Books” Series:
- *Climate and the Hydrological Cycle*, Edited by Marc Bierkens, Han Dolman & Peter Troch, Foreword by Jim Shuttleworth (Special Publication No. 8) in 2008, and
  - *Leonardo da Vinci's Water Theory*, by L. Pfister, H.H.G. Savenije & F. Fenicia (Special Publication No. 9) in 2009.

The New Series “*Benchmark Papers in Hydrology*”, launched in 2006 and directed by Jeff Mc Donnell, published four new titles during the quadrennium:

- Evaporation, Selection, Introduction and Commentary by John Gash & Jim Shuttleworth (2007)

- Groundwater, Selection, Introduction and Commentary by Mary P. Anderson (2008)
- Rainfall-Runoff Modelling, Selection, Introduction and Commentary by Keith Loague (2010)
- Riparian-zone Hydrology and Biogeochemistry, Selection and Commentary by T.P. Burt, G. Pinay & S. Sabater (2010)

An important effort has been undertaken to make freely available on line all “old” IAHS Publications, namely those that are more five years old. This effort reached its goals and 287 Red Books are presently available on line, representing more than 110,000 pages of hydrological literature. The effort has been extended in 2006 to the *Hydrological Sciences Journal*. At the present time 52 volumes (from the beginning in 1956 to 2007) are available on line.

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

Our close and traditional cooperation with agencies of the UN System has been continued during the last four years:

An IAHS representative or delegation has been invited to and attended the various meetings of the *UNESCO International Hydrological Programme*: IHP Bureau meetings and IHP Councils (Paris, June 2008 and Paris, July 2010). IAHS and UNESCO also jointly organized two sessions of the traditional Kovacs Colloquium:

- 9<sup>th</sup> Kovacs Colloquium (Paris, 6-7 June 2008) “River Basins – From Hydrological Science to Water Management” (Red Book 323)
- 10<sup>th</sup> Kovacs Colloquium (Paris, 2-3 July 2010) “Hydrocomplexity: New Tools for Solving Wicked Water Problems” (Red Book 338)

An IAHS representative or delegation has also been invited to and attended major WMO events such as sessions of WMO Congress, the Commission of Hydrology, the CHy Advisory Working Group and the WMO Executive Council. Our long-standing efforts to organize a joint conference on Hydrometry have been successful and this conference is scheduled to be held in Manaus (Brazil) in September 2011.

Information about all IAHS activities is available on the WEB at <http://iahs.info>.

Arthur Askew, IAHS Past President (2007-2009)  
Gordon Young, IAHS President  
Pierre Hubert, IAHS Secretary General

## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF METEOROLOGY AND ATMOSPHERIC SCIENCES

### 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.

### ADMINISTRATION

The current IAMAS bureau was elected during the IUGG/IAMAS assembly in Perugia in 2007. The bureau members from 2007-2011 are:

Prof. Guoxiong Wu, President  
Prof. Anne Thompson, Vice-President  
Prof. Maria Assunção Faus Silva Dias, Vice-President  
Dr. Hans Volkert, Secretary General  
Prof. John Turner, Deputy Secretary General

During the IAMAS-IAPSO-IACS joint assembly in Montreal in 2009 (MOCA-09), the IAMAS Executive Committee (EC) appointed Hugo Berbery as the financial auditor to monitor the IAMAS finances. Hugo will continue to serve this position and report to the EC during IUGG/IAMAS 2011 in Melbourne.

The IAMAS bureau has been working in an open and cooperative fashion since its first day of election. IAMAS Secretary General Hans Volkert advocated a "Co-Co-Co" working motto, i.e. "communication, cooperation & continuity", which is welcomed and accepted by all the IAMAS officers. Besides communication by email, IAMAS bureau members have regular telephone conferences. In this way, the bureau members can quickly process commissions' request, provide necessary support to science activities, and innovate policies, regulations and notice that can promote and coordinate international atmospheric and climate research. IAMAS' ten commissions also report to IAMAS bureau annually. Through

their involvement in the international research, IAMAS/IUGG is well represented.

The IAMAS bureau members also met in person to exchange ideas. The President and the Secretary General took part in the IUGG EC meeting in 2008 in Karlsruhe and the IUGG EC meeting in Melbourne in October 2010 for the initial planning of the IUGG-Assembly there in June/July 2011. The Secretary General also visited the President's base in Beijing on his way back and met with Past President MacCracken there. The Secretary General and his deputy also met in person dealing with plans for the website transfer and revision.

### ACTIVITIES

Here a brief selection of the activities is reported; the full compilation of commission reports will be posted on [www.IAMAS.org/Reports.html](http://www.IAMAS.org/Reports.html).

### IAMAS

IAMAS participated and organized two major assemblies from 2007-2010.

In 2007, IAMAS held 29 Joint symposia and 20 IAMAS-only symposia, at the 24<sup>th</sup> IUGG Assembly in Perugia, 2-13 July. IAMAS also convened two special evening Union symposia on "the different parts of the recent IPCC report" and on "The Effects of Aerosol Pollution on Precipitation". 1049 scientists had registered via the web, 636 of them arrived in Perugia, including 179 students. The IAMAS also proposed to IUGG two resolutions: "*the effect of aerosol pollution on precipitation*" and "*the urgency of addressing climate change*". Both were endorsed by IUGG.

In 2009, IAMAS had its assembly jointly organized with IAPSO and IACS (MOCA) in Montreal from 19-29 July. About two thirds of the 1400 registered participants came from IAMAS. They contributed to 20 (of 21) joint symposia and to 18 IAMAS-only symposia. The general opinion prevailed that the overall organisation by our Canadian hosts was excellent with a compact, but spacious venue and a carefully designed interlocking schedule comprising two well attended plenary sessions, up to 11 parallel sessions with IAMAS-contributions, and ample time for daily mid-afternoon discussion at posters. The local support by our Canadian colleagues was truly outstanding.

### Some other IAMAS activities include:

- The Secretary General joined an initiative of honorary members of IOC and IRC to highlight the catalysing role of IAMAS

commissions for advancing over decades international science programmes (cf. OHRING et al. 2009; <http://ams.allenpress.com/archive/1520-0477/90/11/pdf/i1520-0477-90-11-1669.pdf>), with reference to IAMAS Publ. No. 1 about the IRC-development over 100 years.

- The China National Committee (CNC) for IAMAS/IUGG sponsored and organized an international workshop on “Asian Summer Monsoon and its Role on Global Stratosphere-Troposphere Exchange” in Lhasa, China, on 21-23 July 2010; cf. IUGG e-journal (Volume 11, No. 1).
- IAMAS liaisons to SCOR, SCAR and WCRP all participated in the scientific committee meetings of SCOR, SCAR and WCRP and IAMAS/IUGG is well represented in these organizations through their active involvement.

#### **Highlights of the IAMAS ten commission activities are:**

**ICACGP** participated and organized symposia in the 24<sup>th</sup> IUGG General Assembly (2007), IGAC conference (2008), and IGBP Congress (2009), and organized the 12<sup>th</sup> Symposium of CACGP jointly with the 11<sup>th</sup> Science Conference of the International Global Atmosphere Chemistry (IGAC) Project in 2011. In Europe through the participation of ICACGP members in the EU ACCENT Network of Excellence, ACCENT support ICACGP and IGAC recommendations for students to attend international science meetings and related activities. ICACGP elected a new office in 2010.

**ICAE** organized its quadrennial international conference, 13<sup>th</sup> International Conference on Atmospheric Electricity, in China in 2007. ICAE has published 6 issues of its newsletters. The ICAE website has been re-located with its new address [www.icae.jp](http://www.icae.jp).

The current office of **ICCL** was re-elected in 2007 for the period 2007-2011. Both President (Keith Alverson) and the Executive Secretary (Neil Holbrook) participated in the Global Oceans Conference 2010 (GOC2010) held at UNESCO in Paris from 3-7 May 2010 – this being the Fifth Global Conference on Oceans, Coasts, and Islands [[www.globaloceans.org/](http://www.globaloceans.org/)]. Michael MacCracken, past president of IAMAS and of ICCL, was attended the awarding of the 2007 Nobel Peace Prize to the Intergovernmental Panel on Climate Change and to former US Vice President Al Gore in Oslo, Norway, Dec 10, 2007. He also attended many meetings with geo-engineering sessions.

About 400 scientists including 80 students attended the **ICCP** 2008 Cancun conference with support from the WMO (15000 CHF), IAMAS (\$5000) and

from the IUGG (\$2000). The money was used to support 32 students and young scientists (16 women and 16 men).

The **ICDM** approved its first official set of bylaws during its meeting in Perugia in 2007. After the meeting, the bylaws were approved by the relevant governing bodies and are now in force. The ICDM was sole sponsor of five symposia in MOCA-09 in Montreal, sponsored two jointly with other IAMAS commissions, and was involved with three MOCA-09 joint symposia.

**ICMA** co-sponsored following activities from 2006-2010: the 37<sup>th</sup> COSPAR Scientific Assembly in 2008 and MOCA-09 in 2009; the 5<sup>th</sup> IAGA/ICMA/CAWSES Workshop on Long-Term Changes and Trends in the Atmosphere, in 2008; the 9<sup>th</sup> ICMA Workshop on Layered Phenomena in the Mesopause Region (LPMR) in Stockholm in 2009; the 6<sup>th</sup> IAGA/ICMA/CAWSES-II workshop “Long Term Changes and Trends in the Atmosphere” in 2010; ICMA opened its new webpage at the following new URL: <http://www.icma-iamas.org/>

**IO3C** signed a “Letter of Agreement” with WMO for the establishment of an ad hoc expert team that will assess ozone absorption cross sections used in atmospheric observations. An ozone theme meeting on ozone absorption cross-sections was jointly organized by WMO, IGACO-O3/UV, IO3C and the Network for Detection of Atmospheric Composition Changes (NDACC) at WMO Headquarters in 2009. Publication of the volume “Twenty years of ozone decline”, Springer, includes articles presented by leading scientists in the ozone field at the Symposium for the 20th Anniversary of the Montreal Protocol, jointly organized by the UNEP, IO3C, the Academy of Athens and the Mariolopoulos-Kanaginis Foundation, held in Athens in 2007. IO3C Members were strongly involved in the 2010 WMO Ozone Assessment, which was published on January 2011. The Ozone Assessment is available at [http://www.unep.ch/ozone/Assessment\\_Panels/SAP/index.shtml](http://www.unep.ch/ozone/Assessment_Panels/SAP/index.shtml).

**ICPAE** has benefited from the extremely successful space missions such as CASSINI-HUYGENS, MARS EXPRESS, and VENUS EXPRESS. ICPAE sponsored two symposia at MOCA-09 and several other meetings from 2007-2010, namely: EGU 2010 (Vienna, Austria, 2-7 May), AOGS 2010 (Hyderabad, India, 5-9 July), COSPAR 2010 (Bremen, 18-25, July), EPSC 2010 (Rome, Italy, 20-25 Sept), DPS (3-8 October, Pasadena), AGU (13-17 Dec 2010). ICPAE co-sponsored the publication of the Planetary and Space Sciences Special issue and contributed to the special section of Journal of Geophysical Research (Planets) “Venus Express: Results of the Nominal

Mission” (2009). ICPAE members played a leading role in putting together and editing of the special issue of Journal Geophysical Research “Venus Express: results of the nominal mission” that included more than 40 original papers and was published in 2010 as a book. Also, ICPAE members are participating in proposals and studies for future space missions to planetary objects from the space agencies (NASA, ESA), such as EJSM-Laplace, TSSM, TAE, Saturn Probes, EVE, etc.

**ICPM** sponsored two symposia at MOCA-09. The primary activity of ICPM in 2010, in conjunction with other organizations, was to organize the International Workshop on Antarctic Clouds (<http://polarmet.osu.edu/workshops/iwac/>) that was held at the Byrd Polar Research Center of The Ohio State University, July 15-16, 2010. The workshop presentations (online at the above website under Program) are being turned in a review manuscript for the Reviews of Geophysics. ICPM will endorse efforts to develop an Antarctic Reanalysis Project. It is hoped that ICPM can take a lead in coordinating such a project, especially the international data exchange component. It is hoped that in Melbourne 2011 an IUGG resolution supporting this project can be passed.

**IRC** elected 19 new members in regular elections held during December 2008. Early in 2009 the officers introduced a new IRC website ([www.irc-iamas.org](http://www.irc-iamas.org)) which allows members to login and update their personal and working group information, as well as add items of news and events to share with the community. IRC sponsored 4 symposia at MOCA-09. At present the IRC is composed of 42 members from 18 countries. The Commission has eight active working groups and

three associated groups. At the 2010 Annual Business Meeting held on 22 July 2010 in Bremen, Germany during COSPAR, IRC members voted to hold the 2012 International Radiation Symposium in Berlin, Germany, 5-12 Aug 2012. The IRC submitted five reviewer/author nominations for IPCC AR5. Other Meetings and Activities IRC members co-organized or participated in 2010 include: ITSC-17, 11<sup>th</sup> BSRN Scientific Review and Workshop, the 11<sup>th</sup> Biennial HITRAN Conference, AMS, 3<sup>rd</sup> Asia Pacific Radiation Symposium.

#### **FUTURE ACTIVITIES**

IAMAS set up a statutes revision committee and a nomination committee in 2009. Both committees have been working during the past one and a half year and will lead important discussions in the IAMAS EC meetings during IUGG2011. With a complete revision of the statutes and a newly elected bureau, IAMAS will embrace a new era of opportunities and challenges. IAMAS is also intending to set up an award to recognize the achievement of young scientists. The details will be discussed and hopefully approved at the EC meeting and then written into the revised IAMAS statutes and by-laws. The first award would be given at IAMAS-IACS 2013 joint assembly in Davos, Switzerland (DACA-13 in short). Many of IAMAS commissions will also organize workshops in between IUGG2011 and DACA-13.

Guoxiong Wu, IAMAS President  
Hans Volkert, IAMAS Secretary General



## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION FOR THE PHYSICAL SCIENCES OF THE OCEANS

### 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://iapsoweb.net/db/>

### ADMINISTRATION

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

In December 2010 the LOC for the Joint (IAPSO, IAHS and IASPEI) Assembly in Gothenburg, Sweden, 22-26 July 2013, was formed. The three Secretaries General of the three Associations visited the venue for the Assembly and had a first meeting with representatives of the LOC.

### ACTIVITIES

IAPSO participated in the IUGG General Assembly 2007 in Perugia, Italy. Twelve IAPSO-only symposia and 3 joint symposia were organised by IAPSO. About 300 attendees were registered as IAPSO scientists.

The 2009 assembly, MOCA-09, was arranged jointly with IAMAS and IACS. Ten IAPSO symposia and 21 joint symposia were organised. The total number of attendees was 1338, out of which 337 were registered as IAPSO scientists. IAPSO funded 22 grants to scientists from developing countries.

The IAPSO President and Secretary General participated in one SCOR meeting every year: August 2007 in Bergen, Norway; October 2008 in Woods Hole, USA; October 2009 in Beijing, China; and September 2010 in Toulouse, France. One important task during the SCOR meetings is to decide which of the annually proposed SCOR working groups to fund. A review of current working groups is also undertaken.

In August 2008 an IAPSO Vice President (D. Smythe-Wright) and the Secretary General participated in the IUGG Executive Committee Meeting in Karlsruhe, Germany.

In May 2009 the Secretary General met with the other IUGG Secretaries General in Munich to start the planning of symposia for IUGG2011.

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/LOICZ/IAPSO WG 122 (Co-chaired by G.M.E. Perillo and J. Syvitski): "Mechanisms of Sediment Retention in Estuaries". Publication: Special Issue of *Estuarine, Coastal and Shelf Science*, Volume 87(2), pp. 175-366, 2010.
- SCOR/IAPSO WG 127 (Chaired by T.J. McDougall): "The Thermodynamics and Equation of State of Seawater". This WG has now completed their extensive work, which involved the introduction of the Gibbs potential function for seawater and a new salinity formulation called Reference Salinity (SR), expressed in g/kg. The new formulation for the thermodynamics of sea water is published as: IOC, SCOR and IAPSO, 2010: *The international thermodynamic equation of seawater – 2010: Calculation and use of thermodynamic properties*. Intergovernmental Oceanographic Commission, Manuals and Guides No. 56, UNESCO (English), 196 pp. It is also available electronically from <http://www.TEOS-10.org>.
- SCOR/IAPSO WG 129 (Chaired by John Johnson): "Deep Ocean Exchange with the Shelf". The results of this WG are published in a special issue of *Ocean Science*; see [http://www.ocean-sci-discuss.net/special\\_issue27.html](http://www.ocean-sci-discuss.net/special_issue27.html). It is important to note that several early career scientists from Africa participated in some of the meetings of this WG, thanks in part to IUGG support.
- SCOR/IAPSO WG 133 (Co-chaired by T. Rossby and K. Kim): "OceanScope". This

WG held its second meeting in London 12-14 April 2010, and is currently writing up a public document outlining the work plan for this ocean measurement program.

- SCOR/WCRP/IAPSO WG 136 (Co-chaired by L. Beal and A. Biastock): "The Climatic Implications of the Greater Agulhas System". This WG held its first meeting 20-21 February 2010 in Portland Oregon. At a future WG meeting in Mauritius, scientists from a number of African countries are planning to attend, again thanks to IUGG support.
- A SCOPE/SCOR/IAPSO book "Watersheds, Bays, and Bounded Seas" was published in 2009. The former IAPSO President, Paola Malanotte-Rizzoli, was one of the editors.

#### **IAPSO Commissions and Services:**

- Commission on Mean Sea Level and Tides, hosted by the Proudman Oceanographic Laboratory, UK. Website: [www.pol.ac.uk/psmsl/](http://www.pol.ac.uk/psmsl/)
- An IAPSO co-sponsored publication related to the above Commission: *Sea-Level Rise and Variability*. Edited by John A. Church, Philip L. Woodworth, Thorkild Aarup & W. Stanley Wilson. 2010. Blackwell Publishing Ltd.
- Tsunami Commission (Joint with IASPEI and IAVCEI). Website: [www.iaspei.org/commissions/JCT.html](http://www.iaspei.org/commissions/JCT.html)
- GeoRisk Commission (Joint with IAMAS, IAHS, IASPEI and IAVCEI). Website: [www.iugg-georisk.org/](http://www.iugg-georisk.org/)
- Permanent Service for Mean Sea Level, hosted by Proudman Oceanographic Laboratory, UK. Website: [www.pol.ac.uk/psmsl/](http://www.pol.ac.uk/psmsl/)
- IAPSO Standard Seawater Service, hosted by OSIL, Havant, Hampshire, UK

#### **Prince Albert 1 Medal**

In connection with the assemblies IAPSO selects a winner of the Prince Albert I Medal. Prof. Russ Davies, Scripps Institution of Oceanography, USA, was presented the Medal in Perugia 2007, for "excellence in physical and/or chemical oceanography". Prof Harry Bryden, University of Southampton, UK, was presented the Medal in Montreal 2009 "...in recognition of his fundamental contributions to understanding the ocean's role in

the global climate system." Dr. Trevor McDougall from CSIRO Marine and Atmospheric Research, Hobart, Australia has been selected to receive the medal in Melbourne 2011 for "his outstanding work on (1) important and fundamental problems of ocean fluid dynamics over the full range of ocean scales, and (2) the thermodynamic properties of seawater".

#### **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 2007, this Medal was awarded to Dr. Catia Motta Domingues from Brazil, for her presentation of the paper entitled "Towards more accurate estimates of the thermosteric sea level rise" at the IUGG General Assembly in Perugia. In 2009, the Medal was awarded to Dr. Bamol Ali Sow from Senegal for his oral presentation "Simulation of the Senegalese and Mauritanian Upwelling: How are the Winds actually Driving SST Variability and Water Mass Renewal?" at MOCA-9 in Montreal.

#### **Members of the IAPSO Executive Committee (EC) for 2007-2011:**

President:	Lawrence Mysak, Canada
Secretary General:	Johan Rodhe, Sweden
Past President:	Shiro Imawaki, Japan
Vice Presidents:	Denise Smythe-Wright, UK Eugene Morozov, Russia
Treasurer:	Fred Camfield, USA Isabelle Ansong, South Africa
EC Members:	Silvia Blanc, Argentina W. John Gould, UK John Middleton, Australia Temel Oguz, Turkey Stefania Sparnocchia, Italy

Lawrence Mysak, IAPSO President  
Johan Rodhe, IAPSO Secretary General  
January 2011

## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR

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 Quadrennium and other information are posted on the IASPEI website, <http://www.iaspei.org/>.

### **IASPEI 2007 General Assembly at Perugia (Italy)**

For its 2007 Perugia General Assembly IASPEI arranged 10 IASPEI-related symposia and workshops, 17 Inter-association symposia and workshops - out of which 8 were IASPEI-led - and 2 Union symposia (High-performance computations in geosciences and Early warning of natural hazards). Moreover, 11 official IASPEI meetings were held. Details can be found in the IUGG 2007 Conference Comptes Rendus. IASPEI had almost 1200 abstracts presented, of which 562 oral and 637 posters. At least 458 participants were officially IASPEI affiliated, but the number of IASPEI participants is estimated at more than 700. The adopted resolutions can be viewed on the IASPEI website.

### **IASPEI 2009 Scientific Assembly at Cape Town (South Africa)**

IASPEI organized its 35<sup>th</sup> Scientific Assembly in Cape Town, South Africa, from January 10 to 16, 2009. It was held in an excellent venue, the centrally located Cape Town Convention Centre. The Local Organizing Committee under the leadership of Gerhard Graham and Michelle Grobbelaar, consisted of members of the Council of Geosciences, University of Witwatersrand and others also from neighboring countries.

There were 347 participants from 60 countries registered for the Assembly. Eighty three of them were students, young researchers and researchers from less-developed countries who were partially sponsored.

Three Keynote lectures were delivered at the Assembly: Tom Jordan talked on "Earthquake Forecasting and Prediction: Progress in Model Development and Evaluation"; Raoul Madariaga discussed "Earthquake Dynamics: from source to radiation"; and Guust Nolet presented "Seismic tomography and the dilemma of the Earth's heat budget".

The 32 symposia of the programme covered the spectrum of research related to IASPEI Commissions and current "hot" topics in seismology, in a total of 335 oral and 106 poster

presentations. These included, a session on "Capacity building and capturing undergraduate students to Geophysics/Seismology", and two well-attended Panel discussions convened by R. Musson on: "Seismic Hazard: Living with Uncertainty" and "Earthquake Prediction: What the Future Holds". Several IASPEI commission and working group meetings were organized during the Assembly.

The Local Organizing Committee, with the determinant support of the South-African Council for Geoscience, did a great job ensuring a smooth management and enjoyable social moments. Several pre- and post-conference fieldtrips were also organized.

A Summer school was organized in conjunction with the IASPEI Scientific Assembly and held during the week after the conference ended, attended by 27 fully sponsored, mostly African participants.

The products of IASPEI Scientific Assembly in South Africa, including adopted resolutions, abstract volumes, keynote lectures, and useful meeting data are available at <http://www.iaspei.org/>.

The next IASPEI Scientific Assembly, after the General Assembly in connection with the IUGG 2011 one in Melbourne, Australia, will be held in Göteborg, Sweden, in July 2013 together with IAPSO and IAHS.

### **Asian Seismological Commission (ASC) meetings**

#### **ASC2008, Tsukuba, Japan**

The Asian Seismological Commission (ASC) 2008 7<sup>th</sup> General Assembly was held, in conjunction with the Seismological Society of Japan (SSJ) 2008 Fall Meeting, from 24 to 27 November 2008 in Tsukuba, Japan, at the Tsukuba International Congress Center.

This was the first joint meeting of ASC with a national seismological society and resulted in a big success, thanks to the joint organization and the efforts of the SSJ to raise the necessary funding. About 760 scientists (more than 600 from Japan) from 39 countries and regions have participated to the well-organized conference, which was structured in 22 thematic sessions. The ASC has received from IUGG (through IASPEI) a financial support. The full conference report is available on the ASC website: <http://www.asc1996.com/>

### **ASC2010, Hanoi, Vietnam**

The 8th General Assembly of the Asian Seismological Commission was held during November 8-10, 2010 in Hanoi, Vietnam. 287 from 32 countries participated to the well-organized conference that had its venue at the Vietnam Academy of Science and Technology. 70 Participants received full or partial grants from LOC. 208 abstracts were printed in the *ASC2010 Programme and Abstracts*, 150 posters and 117 reports were scheduled. The gala dinner on the boat cruising the big Hanoi lake was unforgettable.

The conference was preceded by a Pre-Assembly Training Course on Seismic Hazards and Disasters in Asia, attended by 20 participants. Eleven participants took part to the Post-Assembly Field Trip to the Red River Fault Zone. Evidences of seismic activities along the Red River fault zone (its Vietnamese segment) during the late Tertiary-Quaternary period were presented through the tectonic evolution by structural analysis of fractured pebbles in Miocene conglomerates and Morphotectonic study of active faults.

The venue of the next 2012 ASC conference will be: Ulaan Bataar, Mongolia.

### **European Seismological Commission (ESC) meetings**

#### **ESC2008, Hersonissos, Crete Island, Greece**

The European Seismological Commission (ESC) held its 31<sup>st</sup> General Assembly in Hersonissos, Crete Island, Greece. About 450 scientists have participated to the conference, which was structured in 28 sessions organized within 12 thematic areas. The conference organizer was the Institute of Geophysics of the National Observatory of Athens under the leadership of Prof. Gerassimos Papadopoulos.

The conference report is available on the ESC website: <http://www.esc-web.org/>

#### **ESC2010, Montpellier, France**

The 32<sup>nd</sup> General Assembly of the European Seismological Commission was held during September 6-10, 2010 in Montpellier, France.

A record attendance of 739 from 63 countries is a clear evidence of a successful event. The total attendance includes 701 registered participants, 8 master students from Montpellier University who followed keynotes and 29 high-school students and their teachers who presented their experiments in seismology on Friday morning. The gala dinner was attended by 350 people.

From a questionnaire distributed to participants the major highlight of the conference was the scientific program, perceived as attractive. Also the many keynotes given have been appreciated and as well as the extension of the topics beyond core seismological fields. The videos of the keynotes are available online at: <http://www.emsc-csem.org/News/esc2010/>

The Young Seismologist Training Course 2010 followed the conference and took place in the period 13 – 17 September 2010. The venue of the Course was the University Montpellier 2, and the title of the course was **Urban Seismology**. There were 19 participants from 17 countries. IASPEI provided as usual some financial support.

The venue of the next 2012 ESC conference will be: Moscow, Russia.

### **Other major initiatives with IASPEI Participation**

#### **International Scientific Studies conference (ISS-2009), June 2009, Vienna, Austria**

IASPEI participated with its President and Secretary General to the International Scientific Studies conference (ISS-2009) organized by the CTBTO in June in Vienna. Peter Suhadolc was one of the panelists. The ISS-2009 evaluated the capability and readiness of the Comprehensive Nuclear-Test-Ban Treaty's (CTBT) verification regime to detect and locate nuclear explosions worldwide and addressed relevant scientific and technical developments since the Treaty opened for signature in 1996, in particular the International Monitoring System and the on-site inspection regime. The conference consisted of plenary sessions, keynote speaking sessions, panel discussion sessions, thematic presentation sessions, poster sessions and exhibitions. It was attended by diplomats, officials, scientists, representatives from non-governmental organizations and the media. The ISS Scientific Panel consisted of Coordinators who were responsible for overseeing the work undertaken within the above topic areas and reviewed the scientific contributions submitted. The Coordinators for Seismology were: Prof. Wu Zhongliang and Prof. Barbara Romanowicz.

#### **AGU Meeting of the Americas, August 2010, Iguassu Falls, Brazil**

The AGU Joint Assembly (or "Meeting of the Americas") had a total of 2012 participants. There were 19 two-hour oral sessions and 11 poster sessions in Seismology or co-sponsored by Seismology. All major South American seismology groups were represented in the meeting.

The IASPEI logo was shown in both the AGU and the local webpage. It was also printed in the AGU

program book and in the folder distributed to all participants. Student support IASPEI gave a total of US\$ 6,000.00 to support attendance of Latin American graduate students.

The total number of student applications in the Seismology section was 18. Nine of these applications were from South American students: 3 from Argentina, 4 from Chile, 2 from Brazil. We selected six students: three from Argentina and three from Chile, all of them doing a Ph.D. program.

### **Global Earthquake Model**

The IAEE-IASPEI Joint Working Group on the International Alliance of Seismology and Earthquake Engineering Professional Associations activities were related to one of its missions: the GEM project, a global risk assessment initiative. P Suhadolc has been elected in the Governing Board of the GEM Foundation as IASPEI representative and has attended several meetings in 2009 and 2010, in June at Hohenkammer (Munich), in December in Paris, in June 2010 in Washington, in December 2010 in Singapore. The GEM initiative is progressing extremely well and a number of Projects have been assigned to groups of the seismological worldwide community to study basic seismological input data for seismic hazard assessment.

### **Other IASPEI-supported meetings**

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

- 10th International Workshop on Modeling of Mantle Convection and Lithospheric Dynamics, September 2-7, 2007, Carry-le-Rouet, France.
- International Trainings Course on Array Seismology, June 30 – July 3, 2007, Arezzo (Italy).
- IRIS Seismological Workshop ‘Managing Waveform Data and Related Metadata for Seismic Networks’, October 21-26, 2007, Kuala Lumpur, Malaysia
- International Scientific Conference to mark the 50th Anniversary of the Founding of the Geophysical Observatory of Addis Abeba University, November 1- 4, 2007, Addis Abeba, Ethiopia.
- 38<sup>th</sup> European Seismological Commission General Assembly: Young Scientists Training Course, September 2008, Chania, Greece.
- 7<sup>th</sup> Asian Seismological Commission General Assembly: ASC International Trainings School, November 2008, Tsukuba (Japan).
- WG Subduction Zones in Less-developed Countries, WG meeting at IAVCEI2008 Scientific Assembly, August 17-22, 2008,

Reykjavik, Iceland.

- The Second International Seminar on Prediction of Earthquakes Prediction, Lisbon, Portugal, 29-30 April, 2009.
- International Symposium on Earthquake Seismology and Earthquake Predictability, Beijing, China, May, 2009; organized by the Seismological Society of China and the Institute of Geophysics, CEA.
- Workshop: From Core to Crust: Towards an Integrated Vision of Earth's Interior July 20 – 24, 2009, Trieste, Italy, at The Abdus Salam International Center for Theoretical Physics
- Advanced Workshop on Evaluating, Monitoring and Communicating Volcanic and Seismic Hazards in East Africa, August 17 - 28, 2009, Trieste, Italy, at the Abdus Salam International Center for Theoretical Physics.
- The International Geodynamics meeting at Suzdal, near Moscow, August 2009 with topics ranging from crustal dynamics to core convection.
- IRIS Seismological Workshop ‘Managing Waveform Data and Related Metadata for Seismic Networks’, November 8-16, 2009, Cairo, Egypt.
- The 11th International Workshop on Modeling of Mantle Convection and Lithospheric Dynamics held in Braunwald, Switzerland from June 28 to July 3, 2009.
- The VIII International Workshop ‘Physics and Forecasting of Rock Destruction’, Saint Petersburg, Russia, from 24 to 29 May 2010.
- The IRIS Workshop on ‘Managing Waveform Data & Related Metadata for Seismic Networks’, Foz do Iguacu, Brazil, 13-19 August 2010.
- 13th Business Meeting of IASPEI/IAGA/IAVCEI Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV), October 6, 2010, Chapman University, California, USA. The deployment of equipment for joint studies of electromagnetic, seismic and deformation of Taal volcano near Manila in the Philippines has been partly supported by IASPEI.

### **Meetings and activities in 2011**

- IUGG2011 General Assembly, Melbourne, Australia. June 28 – July 7, 2011.
- The Fourth International Symposium on the effects of Surface Geology on Seismic Motion will be held in Santa Barbara, California, USA in August 2011.
- Seismotectonics and Seismic Hazards in Africa, a session at the CAG23, 7 - 14 January, 2011, Johannesburg, South Africa.
- Short course on Waveform Inversion for local earthquakes. OVSICORI Institute, Universidad

Nacional de Costa Rica, Heredia, Costa Rica.  
Fall 2011.

- International Symposium on Geophysical Imaging with Localized Waves, Sanya, Hainan Island, China. July–August 2011.
- 12th International Workshop on Modeling of Mantle Convection and Lithospheric Dynamics. Groß Dölln, Germany. August 20 to 25 2011

### Scientific Programmes and Projects

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*), is continuing under the guidance of Willie Lee. IRIS is archiving the scanned seismograms.

Several projects have been completed, let us recall a major one: *Collecting and Scanning Seismograms in Support of the USGS/CMG Tsunami Hazard Potential in the Caribbean Project* (August, 2006 to December, 2007)

Recently, an IUGG-funded IASPEI-ISC Project *Networking of world seismologists (Improving Geophysical Science Link to the Society during Natural Extreme Events, Especially in Developing Countries)* has started.

IASPEI and ISC will develop and maintain a worldwide registry of seismologists & geophysicists willing to serve as a point of contact in countries with and without affiliation to IUGG, with a particular focus to developing countries. This registry will be readily available for scientific & research institutions, governmental bodies, charitable and relief organizations and media following natural extreme events such as earthquakes and tsunami.

IASPEI has set up a Scientific Advisory Board (SAB) for the GEM hazard global component project *Global Instrumental Earthquake Catalogue* under the leadership of ISC. IASPEI has received financial support from this grant for this activity. The money is intended mainly for reimbursing the SAB members and for related IASPEI administration.

### Publications

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 the website, <http://www.academicpress.com/quake>.
- *New Manual of Seismological Observatory Practice* provides the essential scientific and technical fundamentals, reveals their inter-relationships, and motivates observatory personnel to do their jobs as carefully as possible. An electronic version is being prepared.

### IASPEI Newsletter

Finally, during the past quadrennium IASPEI has upgraded its old bulk E-Mail System to broadcast timely announcements about forthcoming meetings and other information of interest to IASPEI members. Since a few years it is distributed as *IASPEI Newsletter* in a new vest as a pdf file both by e-mail and posted on the IASPEI website. Past copies can be downloaded from the IASPEI website. In the quadrennium 2007-2010 there were 20 issues distributed worldwide.

### IASPEI Website

IASPEI has its own website [www.iaspei.org](http://www.iaspei.org) maintained by the webmaster Alice Walker. It is foreseen that in 2011 the domain will move from the USA to a new server at BGS, UK.

Zhongliang Wu, IASPEI President  
Peter Suhadolc, IASPEI Secretary General

## QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR

The International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) represents the primary international focus for: (1) research in volcanology, (2) efforts to mitigate volcanic disasters, and (3) research into closely related disciplines, such as igneous geochemistry and petrology, geochronology, volcanogenic mineral deposits, and the physics of the generation and ascent of magmas in the upper mantle and crust.

Volcanology over the last 25 years has increased greatly its status as a fundamental discipline in the earth sciences. Its concerns reach from the deep roots of volcanic systems where magma is generated in the Earth's mantle, to the upper atmosphere which was formed originally- and is still being modified - by volcanic eruptions. Furthermore, only part of the scientific interests of IAVCEI centres on active volcanism. Much of the work undertaken to understand volcanic processes is carried out on dormant or extinct volcanoes and in ancient volcanic areas. The earliest crust-forming processes on Earth were volcanic, and large portions of Archaean terrains- the greenstone belts-are entirely volcanic. A small, but dedicated part of the scientific community also studies volcanic processes on the Earth's Moon and on planets such as Mars and Venus.

IAVCEI is one of the eight IUGG associations. It is run by an Executive Committee whose membership changes every four years. The Executive Committee determines policies for the Association, enacting them through a series of Commissions and Task Groups. IAVCEI aims to be outward-looking, seeks relationships with other international scientific organisations, and participates in international scientific projects. It aims also to maintain a robust publishing policy, encouraging the presentation of high calibre, volcanological research results, mainly through its premier international journal the *Bulletin of Volcanology*.

### Members

The number of IAVCEI paid individual members during the period considered has been 764, and the number of Life Members has increased from 45 to 72.

### Administration

The election of the IAVCEI officers for the term July 2007 to July 2011 was held in May 2007 by postal ballot of IAVCEI individual members and national correspondents. The new officers of IAVCEI for 2007-2011 were officially presented during the IAVCEI General Assembly held on July

13<sup>th</sup>, 2007, coinciding with the IUGG GA in Perugia, Italy. The new officers are:

President: Setsuya Nakada (Japan)  
Vice-Presidents: Anita Grunder (USA)  
Hugo Moreno (Chile)  
Secretary-General: Joan Martí (Spain)  
Members of Executive Committee:  
Piero Dellino (Italy)  
Juan Manuel Espindola (México)  
James White (New Zealand)  
Marta Calvache (Colombia)  
Past President: Oded Navon (Israel)  
Editor Bull Volc: John Stix (Canada)

One meeting of the IAVCEI Executive Committee was held in 2007, in November in Shimabara, Japan coinciding with the Cities on Volcanoes 5 meeting. The EC met again during the IAVCEI's Scientific Assembly that was held in Reykjavik, Iceland, August 18-22, 2008. During the meeting IAVCEI awards were presented to the following IAVCEI members: The Krafft Medal (for contribution to community) to Christopher G. Newhall, the Wager Medals (outstanding contribution) to Alessandro Aiuppa and Joachim Gottsman, the George Walker Awards (for outstanding recent graduates) to Diana C. Roman and Fukashi Maeno, the Thorarinsson Medal (fundamental contribution) to Robert Stephen John Sparks.

IAVCEI Executive Committee activities during 2009 and 2010 have all been carried out through email exchange among the EC members. These have included:

- Revision of IAVCEI Finances, funding support, and potential funding sources and strategies. The control of IAVCEI finances is now clear and all funds have been transferred to an unique official account in Barcelona (Spain) and the rest of accounts have been closed.
- Revision of the existing commissions, past activities and future plans. Three new commissions have been accepted by the EC during this period: Caldera Volcanism, Volcano-Ice Interaction, and Basaltic Volcanism
- The website has been revised and updated
- A contract has been signed with Volcano Video Productions (USA) and NHK International (Japan) companies in order to transform the IAVCEI videos (Reducing Volcanic Risk and Understanding Volcanic Hazards) into DVDs.

- Negotiations with Elsevier addressed to incorporate the Journal of Volcanology and Geothermal Research as an official Journal of IAVCEI in conjunction with Bulletin of Volcanology (Springer) have been initiated by the SG.
- The President and the SG participated in the IUGG EC meeting held in Melbourne (Australia) in September 2009 where the organisation and scientific program for IUGG 2011 were discussed.
- The IAVCEI scientific program for IUGG GA 2011 has been elaborated in collaboration with Prof. Ray Cas, Local Chairman and member of IAVCEI
- The former editor of Bulletin of Volcanology, Dr. John Stix, decided to leave his position for personal reasons in 2010 and has been replaced by Dr. James White, who is currently working on the reorganisation of the Editorial Board of Bulletin of Volcanology

Foreseen activities for 2011:

- Full revision of the IAVCEI Statutes and By Laws and approval in the General Assembly to be held in Melbourne during the IUGG GA
- Completion of the reorganisation of IAVCEI Commissions.
- Election of the new Executive Committee for the period 2011-2015. The new members will be officially presented during the General Assembly to be held in Melbourne during the IUGG GA.

### Webpage

The former IAVCEI web page has been completely modified and periodically updated. Membership renewal can now be done automatically through the webpage. An official IAVCEI mailing list has been created and it is used to distribute among the IAVCEI members the information relative to the association. The volcano list administered by Arizona State University that reaches >2700 people is still used to distribute general information related to volcanology.

### IAVCEI Research Grants

As result of an agreement reached by the EC in 2008, a public call for proposals was open in August 2009 in order to receive proposals on research projects addressing topics closely related to the main objectives of IAVCEI. After a process of review among the EC members, two proposals were funded by IAVCEI with a maximum of 20000 € each.

### Newsletters

Six issues of the newsletter "IAVCEI News" have been published through the website.

### Meetings, workshops and courses

- Cities on Volcanoes 5 (November 2007, Shimabara, Japan)
- International Conference "Commemorating the 25th Anniversary of the 1982, Eruption of El Chichón Volcano, Chiapas, Mexico" (March 2007, Chiapas, México)
- IAVCEI Workshop on Surtseyan Volcanism, Western US (October 2007, Vancouver, USA)
- IAVCEI Scientific Assembly (August 2008, Reykjavik, Iceland).
- 2n Collapse Caldera Workshop (México, October 2008)
- 16th International Field Course of Central Andes (Argentina, November 2008)
- Colima International meeting (Mexico, February 2009)
- Volcanic Gases Commission meeting (Mexico, March 2009)
- 3rd Maar Conference (Argentina, April 2009)
- ICTP Evaluating, Monitoring and Communicating Volcanic and Seismic Hazard in East Africa, Trieste, Italy, August 2009)
- Jorullo International meeting (Mexico, September 2009)
- Advances in studies of volcanic plumes and pyroclastic density currents (Clermont Ferrand, France, October 2009)
- 17th International Field Course of Central Andes (Argentina, November 2009)
- 7th Workshop on Volcanic Lakes, (17-21 March 2010, Costa Rica)
- Cities on Volcanoes 6 (Tenerife, Spain, June 2010)
- State of the Arc (SOTA) 2010 (Santorini, Greece, 19-25 September 2010)
- III International workshop on Caldera Volcanism (La Reunión, France, October 2010)
- 18th International Field Course of Central Andes (Argentina, November 2010)
- Ash Dispersal Forecast and Civil Aviation (Switzerland, October 2010)

Forthcoming meetings, workshops and courses in 2011 are:

- 11<sup>th</sup> Field Workshop on Volcanic Gases (Kamchatka, Rusia, 5-9 April) (Commission on Volcanic Gases)
- Sufriere Hill Volcano 15+ years on (Montserrat) (Commission on Explosive Volcanism)



XXV General Assembly of the International Union of Geodesy and Geophysics  
Quadrennial Reports of the IUGG Associations and Union Commissions

- Analysis of Probabilistic Volcanic Hazards (Buffalo, USA, 16-19 May, Commission on Explosive Volcanism)
- IAVCEI General Assembly (Melbourne, Australia, 27 June-8 July) (IAVCEI)

Setsuya Nakada, IAVCEI President  
Joan Martí, IAVCEI Secretary General  
31 January 2011

## QUADRENNIAL REPORTS OF THE UNION COMMISSIONS

### QUADRENNIAL REPORT OF THE IUGG COMMISSION ON DATA AND INFORMATION

#### Preamble

The International Union of Geodesy and Geophysics (IUGG) through its Union Commission for Data and Information (UCDI) strongly supports the use and development of standards for data, metadata and vocabulary exchange in advancement of IUGG science, education and outreach.

IUGG's eight scientific Association currently have standards activities ranging from digital cartographic data, spatial hydrological data sets, geochemical data, wave data, polar metadata profiles, geomagnetic data exchange, geodetic data, formats for seismic data, and community convention adoption of climate data and metadata formats.

UCDI was formed to allow IUGG to become more cohesive on the topic of data standards, as well as to retain current activities in its Associations, noting that in some cases metadata and vocabulary activities are sub-critical. UCDI activities and outcomes are directed to support and advance data and metadata standards across the Union.

The IUGG UCDI is coordinating IUGG's contribution to this initiative especially during the 2011 IUGG General Assembly in Melbourne, Australia and the 2011 ICSU General Assembly in Rome Italy. IUGG is strongly supporting participation of IUGG experts in this project. IUGG UCDI works closely with CODATA, other International Scientific Unions, and the International Council on Scientific and Technical Information (ICSTI).

#### IUGG2011 Union Session U05

UCDI is convening a Union session 05 at the IUGG 2011 General Assembly in Melbourne, Australia, entitled: Data science/informatics and data assimilation in geophysical models (climate, oceanography, hydrology, solid Earth).

Session Description: Science has fully entered a new mode of operation. Data science (including e-science) defined as a combination of science, informatics, computer science, cyberinfrastructure and information technology is changing the way all of these disciplines do both their individual and collaborative work. IUGG scientists are facing global problems of a magnitude, complexity and interdisciplinary nature that progress is limited by available knowledge and skills that are required to solve these problems. At the heart of this new way of doing science, especially experimental and

observational science but also increasingly computational science, is the generation of data. As a result, new opportunities exist for the assimilation of data into a variety of geophysical models that span several geoscience disciplines.

The goal of this session is to assess the current state of data science and informatics effort in support of IUGG science and inform IUGG scientists, as well as indicate successful progress made to date and the challenges that presently exist.

Conveners: Peter Fox (RPI), Charles Barton (ANU), Mark Parsons (NSIDC), Adelina Geyer Traver (CIMNE), Roger Proctor (UTas), Richard Swinbank (UK MetOffice). Co-Conveners: Ruth Neilan (JPL/NASA), Alik Ismail-Zadeh (KIT).

While planning for the meeting is still underway, 8 oral talks and 13 posters are under consideration for the programme.

#### CODATA participation, cooperation

In part due to the history behind the formation of UCDI, there have been very close collaborative ties to CODATA at the Assembly level, at CODATA meetings, in proposal preparation as well as with the CODATA Task and Working Groups. Refer to the Quadrennial CODATA liaison report by Barton & Fox for complete details. The strong participation and cooperation is expected to continue over the next four years.

#### ICSU proposal preparation (new)

IUGG together with four other scientific unions (IUGS, IAU, IUCr, IUPAC) and the International Council for Scientific and Technical Information (ICSTI) collaboratively prepared a proposal with CODATA entitled: "Making Sense of the ICSU Role in Scientific Data Standards". The proposal for EUR 30,000 was submitted to the ICSU Grants Programme on Dec. 1, 2010.

The project supports the overall ICSU goal related to data and information, i.e., to facilitate a coordinated global approach to scientific data and information that ensures equitable access to quality data and information for research, education and informed decision-making. It also responds to the Strategic Plan's call for the development of new inter-union initiatives and for facilitating interactions between scientists from different disciplines and between developing and developed countries. Specifically, the project will facilitate greater transparency, accessibility, and

interoperability of data standards--and thereby a wide range of data--across the ICSU family.

Proposal objective: Scientific data are being generated at an ever-increasing rate and effective data management, sharing and integration are critical for future scientific progress. Effective management of data and their integration across disciplines requires selection of common appropriate standards.

Several ICSU international scientific unions have recognized their important role in the definition of discipline-specific standards and have created bodies responsible for advising on standards best practices. Some discipline-specific progress has been made, but these activities are not aligned and there is duplication of effort. To this end the goal is to facilitate better integration and awareness of data standards activities among this community.

In order to reach this the Project proposes the implementation of the following objectives:

- (1) Identify data standards and standards activities across the ICSU family.
- (2) Liaise with relevant international standards organizations, ISO, OGC, for example, to establish a stronger relationship and to identify opportunities for alignment with activities within the ICSU community.
- (3) Establish a readily accessible ICSU standards registry with supporting information.
- (4) Bring together standard experts from ICSU bodies to inventory best practice, identify gaps and opportunities and to develop a "roadmap" for harmonizing activities both within and with ISO and other international authorities.

### PIC

UCDI is very active in the ICSU funded and CODATA-led Polar Information Commons (PIC) – see the PIC website at <http://polarcommons.org/> for all details on this activity. Mark Parsons (UCDI) attended the PIC workshop entitled: “The Polar Information Commons, Life after Oslo” in Oslo in June 2010. PIC has been active in promoting best practices in data sharing, citation and attribution for geoscience data. Mark Parsons will also present PIC progress at the Union session in Melbourne. PIC’s impact is beginning to be noticed, as Nature has just published a Special on Data Sharing. <http://www.nature.com/news/specials/datasharing/index.html>

### eGYAfrica

eGYAfrica is a bottom-up initiative by African geoscientists and others to secure better Internet connectivity in their institutions. IUGG and IAGA are currently the main sponsors. The Association of African Universities and ICSU's Regional Office

for Africa are expanding their commitment to eGYAfrica and serve on the Executive Committee. Communication is through meetings, email services, a website, and an electronic newsletter.

The Executive Committee, appointed in 2010 to serve for 2 years comprises: Victor Chukwuma, Nigeria (Chair), Alem Mebrahtu (Secretary), Charles Barton (Intl liaison), Boubakar Barry (Association of Africa Universities), Daniel Nyanganyura (ICSU-ROA, Editor), Larry Amaeshi, Les Cottrell (PingER Project), Monique Petitdidier (European Grid Initiative), and Gilbert Rochon (IEEE).

Meetings attended by eGYAfrica members at which papers about eGYAfrica were presented and discussion/planning meetings are:

- Jul 2007. IUGG General Assembly, Perugia, Italy
- Nov 2007. IHY-SCINDA Workshop, Addis Ababa, Ethiopia
- Dec 2007. “Internet & Grids in Africa”, Montpellier, France
- Mar 2008. eGY General Meeting, Boulder, USA
- May 2008. IST-Africa, Windhoek, Namibia
- Nov 2008. IGY+50 meeting, Tsubuka, Japan
- Nov 2008. Africa Regional IHY School, Nsukka, Nigeria, Tsubuka, Japan
- Apr 2009. EGU, Vienna, Austria (Cyber-infrastructures in Africa, a joint eGYAfrica/UCDI session).
- Jun 2009. IHY-SCINDA Workshop, Livingstone, Zambia
- Jun 2009. Intl Conf: Electronic Geophysical Year In Russia: State of the Art and First Results, Pereslavl-Zalessky, Russia
- Jul 2009. IEEE-IGARSS meeting, Cape Town
- Feb 2010. 2nd Euro-Africa Cooperation Forum on ICT Research, Addis Ababa, Ethiopia
- Jun 2010. “Science with Africa” meeting, Addis Ababa, Ethiopia
- Jul 2010. UN SPIDER (Office of Space Applications) Workshop "Building on Regional Space-based solutions for disaster management for Africa", Addis Ababa, Ethiopia
- Nov 2010. IST-Africa, Durban, South Africa. Discussions were held with S. Muhongo and V. Chukwuma about establishing and Africa Geophysical Union as a counterpart to AGU, EGU, AOGS, and JpGU.

At the forthcoming IUGG2011 in Melbourne, Australia, eGYAfrica is organising Union Session U11: Geoscience in Africa.

The foundations of national eGYAfrica action groups are forming in Algeria, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Nigeria, Rwanda, Senegal, and South Africa. At the same time,

reference information and documentation that can be used to make a case for investing in Internet connectivity is being accumulated on the website – e.g., policy statements, case histories, questionnaire results, presentation resources, contact information, and a catalog of other organisations, programs and initiatives that share the aim of reducing the digital divide in Africa.

A key planning workshop funded by an IUGG grant was held in Accra, Ghana 24-25 November 2010. It was attended by a core of 12 persons from 7 countries with the twin objectives of reviewing National Research and Education Network (NREN) developments in Africa and planning the next steps for eGYAfrica. The steps identified are

- (1) raise awareness about the digital divide issue and the cost-benefits of investing in Internet connectivity in higher education and research institutions,
- (2) develop national groups of concerned scientists and others who will engage with decision makers,
- (3) collaborate with other bodies and programs who share the objective of reducing the digital divide, and
- (4) collect information and measurements of Internet performance via the PingER Project to be used as the basis for making the case for better interconnectivity.

A full report about the workshop, which includes an action plan for eGYAfrica is on the eGYAfrica website: [www.egy.org/egyafrika.php](http://www.egy.org/egyafrika.php). An application has been submitted for an ICSU grant for the next eGYAfrica Workshop to be held in Kenya, 2012.

#### **SCID, SCCID and WDS involvement**

ICSU's Strategic Committee on Information and Data (SCID; 2006-2008) and Strategic Coordinating Committee on Information and Data (SCCID; 2009-present) have had strong representation from IUGG and UCDI. Fox is a member of both committees, Ruth Neilan served on SCID, Bernd Richter serves on SCCID and Mark Parsons has been strong resource for the committee's deliberations. Bernard Minster also serves as the WDS representative on SCCID. The SCID report led to the reformation of the World Data Centres into the World Data System and prompts nations and international Unions to create or designate high-level organization units focused on issues of data and information. The preliminary SCCID report will be available in early April 2011 and will be reported on at the U05 session at the IUGG General Assembly by Fox.

The ICSU World Data System Scientific Committee (WDS-SC) held its administrative meetings around the 22nd International CODATA

Conference in South Africa in 2010. In addition, the WDS-SC organized three scientific sessions within the framework of the scientific conference on Data Publishing in the context of the World Data System; ICSU World Data System: International Building Blocks; and The ICSU World Data System: a Disciplined or Undisciplined Initiative? A special keynote session on Strategic Planning on Data and Information issues took place within the conference preceded by key note presentations from Bernard Minster, Chair of the WDS-SC and Kari Raivio, Vice-President, ICSU. For information on this and much more see <http://www.codata2010.com/scientific-program.php>. UCDI members, particularly Ruth Neilan, are very active in the WDS-SC representing IUGG Association interests.

#### **Collaboration with IUGS/CGI**

UCDI via its chair (Fox) have developed collaborative relations with the International Union for Geological Science's Commission on Geoscience Information (CGI) via their chair (Kristine Asch (BGR)) and CODATA delegate John Broome (NRCAN). Fox was invited and attended a CGI workshop in Berlin in 2010 to represent IUGG/UCDI. Collaborative relations are expected to continue over the next four years, especially in relation to the ICSU proposal noted earlier.

#### **New relations with ICSTI**

In part due to activities with ICSU starting with its priority area assessment (PAA on Data and Information), the SCCID, the formation of the World Data System, and CODATA's evolving direction, new collaborative relations have formed with the International Council for Scientific and Technical Information (ICSTI, [www.icsti.org](http://www.icsti.org)), an organization that "offers a unique forum for interaction between organizations that create, disseminate and use scientific and technical information. ICSTI's mission cuts across scientific and technical disciplines, as well as international borders, to give member organizations the benefit of a truly global community." Starting in 2009 with the ICSTI summer meeting in Ottawa which was strongly supported by the Canadian National Committee for CODATA, Fox gave an invited plenary presentation entitled: "Xinformatics, Data Science and the Full Life Cycle of Data, Information and Knowledge in the Earth and Space Sciences", supporting IUGG/UCDI visibility within ICSTI. Subsequently, ICSTI approached IUGG with an invitation to become a member of ICSTI. The acceptance is pending IUGG EC approval. As an additional activity, Fox was invited to the Winter ICSTI workshop in Redmond, WA to speak on visualization. It is expected that

collaborative relations with ICSTI will continue to expand over the next four years.

#### **Web site up**

The initial Commission website presence was established in 2008 ([www.iugg-ucdi.org](http://www.iugg-ucdi.org) reserved) and web hosting secured, and web content early in 2009.

#### **Workshop and outreach**

Several European outreach activities for UCDI were held as splinter meetings at the European Geosciences Union meetings in 2009 and 2010. See PIC workshop details above.

#### **Selected Publications linked to UCDI activities**

- Baker, D., Barton, C., Peterson, W. and Fox, P. 2008, Informatics and the 2007–2008 Electronic Geophysical Year, EOS Volume 89, number 48, pp. 485–500.
- Baker, D.N. and C.E. Barton (2009). EGY: progress in global Earth and space science informatics. *Data Science Journal*, 8, 226-232.
- Barton C.E., C. Amory-Mazaudier, B. Barry, V. Chukwuma, R. L. Cottrell, U. Kalim, A. Mebrahtu, M. Petitdidier, B. Rabiou, and C. Reeves (2009). eGY-Africa: Addressing the digital divide for science in Africa. *Russian Journal of Earth Sciences*, vol 11, # 1, 2009, Digital Object Identifier (DOI) 10.2205/2009ES000377
- Barton, C.E., R. Smith, and R. Weaver (2010). Data practices, policy, and rewards in the information era demand a new paradigm. *Data Science Journal*, 9, pages IGY 95 – 99.
- Boubakar, B., C. Barton, V. Chukwuma, L. Cottrell, U. Kalim, M. Petitdidier, and B. Rabiou (in press). eGY-Africa: better Internet connectivity to reduce the digital divide. *Proceedings of the IST-Africa Conference, Durban, May 2010.*
- Peterson W.K., D.N. Baker, C.E. Barton, P. Fox, M. Parsons, and E. CoBabe-Ammann (in press). The Electronic Geophysical Year (eGY). *Encyclopedia of Solid Earth Geophysics*, 2nd Edition, Van Nostrand.

Peter Fox, Chair  
Adelina Geyer Traver, Secretary  
21 February 2011

## QUADRENNIAL REPORT OF THE IUGG COMMISSION ON GEOPHYSICAL RISK AND SUSTAINABILITY

### INTRODUCTION

The past four years were characterized by many severe disasters. In 2007 adverse weather caused river flooding with notable adverse effects on 105 million people in China. In 2008 a tropical cyclone hit Myanmar and cost some 140 000 lives. In the same year both, severe winter weather, affecting the livelihoods of more 77 million people, and an earthquake causing material damage of 80 billion \$US hit China. It was only in January 2010 that one of the deadliest natural disasters of the recent time, an earthquake, devastated large parts of Haiti killing more than 230 000 people. Later in the year 2010 large parts of China were afflicted by heavy flooding affecting more than 130 million people. Altogether there is an increase in the occurrence of naturally induced disasters calling for improvements in all fields of science to benefit society.

### ADMINISTRATION

#### Membership

##### President

*Kuniyoshi Takeuchi* (IAHS), Japan

##### Vice-Presidents

*Vladimir Kossobokov* (IASPEI), Russia

*Ramesh Singh* (IAPSO/IASPEI), USA

##### Secretary General

*Gerd Tetzlaff* (IAMAS), Germany

##### Treasurer

*Paula Dunbar* (IAPSO), USA.

##### Past President

*Alik Ismail-Zadeh* (IASPEI), Germany

##### Members

*Tom Beer* (IAPSO), honorary Commissioner, Australia

*Hermann Drewes* (IAG), Germany

*Harsh Gupta* (IASPEI), India

*Slava Gusiakov* (IAPSO), Russia

*David Jackson* (IASPEI), USA

*A. Jayawardena* (IAHS), China

*Evgeny Kontar* (IAPSO), USA

*Susan McLean* (IAGA), USA

*Steve McNutt* (IAVCEI), USA

*Uri Shamir* (IAHS), Israel

*Martin Funk* (IACS), Switzerland

#### Business meetings

Three GRC business meetings were held in 2007, 2008, and in 2010.

1. In Perugia in July 2007, the first business meeting was held on occasion of the 24<sup>th</sup> IUGG General Assembly. The main points of concern were the upcoming International Year of the Planet

Earth and the preparation of the ICSU program IRDR with several GRC commissioners involved.

2. The GeoRisk Commission (GRC) business meeting was held in Oslo on 10 August 2008 on the occasion of the International Geological Congress. The Commission's recommendations on the improvement of the report issued by the ICSU Panel on Natural and Human-induced Environmental Hazards and Disasters were taken into consideration by the ICSU Panel. G. Mulugeta and A. Konare (ICSU Regional Office for Africa) were invited to present the basic ideas related to the natural hazards and disaster risk activities in Africa. Further reports covered the activities and the progress made in the ICSU Regional Office for Asia and Pacific (by H. Gupta), the formation of a comprehensive tsunami data bank (V. Gusiakov), and a project aimed at the quantification of earthquake forecasts (D. Jackson).

3. The third meeting was held in January 2010 at the IASPEI Scientific Assembly in Cape Town, South Africa, and considered several important topics related to the disaster risk reduction in the African continent.

#### GRC Terms of Reference

The following GRC Terms of Reference were revised and approved by the IUGG Bureau in 2009.

- The IUGG Union Commission on Geophysical Risk and Sustainability (short name: Georisk Commission, and acronym, GRC) was established by decision of the IUGG Executive Committee in August 2000.
- The purpose of the Georisk Commission is to promote scientific studies aimed at reducing risks from natural hazards in an increasingly urbanized world. The GRC shall facilitate communication between scientists through meetings, workshops, publications, websites etc., between scientists and decision makers, and between scientists and the general public.
- The scope of GRC shall include research and knowledge dissemination on all types of geophysical hazards and their mitigation measures. The hazards shall include but not limited to floods and droughts, landslides and debris flow, earthquakes and tsunami, volcanic eruptions, fires, windstorms, magnetic storms and other natural or human induced environmental hazards. The GRC shall also promote and foster research activities on scientific aspects of geophysical hazards and risk minimization as well their societal impacts.
- The GRC shall collaborate with geo-risk

- related research organizations and programs such as of ICSU's and UN's.
- Membership of GRC shall include nominated representatives of IUGG Associations. Each Association may nominate up to 2 members.
  - Term of office of the GRC members shall be 4 years, but may be extended for a further period of not more than 4 years. Replacement of members shall be in a staggered manner in order to ensure efficient and continuous functioning of the Commission.
  - Prior an IUGG General Assembly GRC shall elect from among its members a President, two Vice Presidents (on the basis of geographical location and research expertise), a Secretary and a Treasurer and inform the IUGG President on the results of the election. The list of GRC officers is subject to approval by the IUGG Bureau and their term of office shall start immediately after the IUGG General Assembly.
  - The GRC shall meet during IUGG General Assemblies and at scientific events it organizes.
  - The GRC shall appoint an Advisory Board of no more than five members comprising of experts in the field of natural hazards and risks, past members of the Commission who have had dedicated and exemplary service to the Commission, and representatives from relevant international, regional and national organizations. Their term of office shall be 4 years initially but may be extended for a further period of not more than 4 years. Replacement of members shall be in a staggered manner in order to ensure efficient and continuous functioning of the Board. The Board shall advise on (i) strategy in development of research on natural hazards and risk, and (ii) cooperation between IUGG and other organizations on problems related to natural hazards, risks and sustainability. The Board shall provide guidance and constructive criticisms to help charter the future direction of the commission activities.
  - GRC shall submit annual activity and financial reports to the IUGG Secretary General.
  - GRC shall have access to IUGG fund allocation.
  - GRC shall be reviewed by the Executive Committee of IUGG every 4 years.
  - GRC terminates its activities by the decision of the IUGG Executive Committee.

## ACTIVITIES

### Scientific meetings

Several scientific meetings were organized by the GRC members.

### 1. IUGG-ESOF Symposium “The Planet Earth”

The International Mini-Symposium “The Planet Earth” was held on 22 July in Barcelona, Spain on the occasion of the Euroscience Open Forum (ESOF), which provided both the European and the international science and business communities with an open platform for debate and communication. It was an opportunity to discuss and influence the future of research and innovation in Europe and elsewhere by involving all main stakeholders: scientists, business executives and policy-makers. The symposium highlighted the importance of geosciences and celebrated the International Year of Planet Earth (IYPE). V. Kossobokov of the Russian Academy of Sciences, Vice President of the IUGG GeoRisk Commission and co-organizer of the meeting, opened the symposium. E. de Mulder, IYPE Executive Director, E. Banda, ES President, and A. Ismail-Zadeh, IUGG Secretary General, welcomed the meeting participants. Three lectures were presented by distinguished scientists: R. Hemley, Director of Geophysical Laboratory, Carnegie Institution of Washington (USA); V. Mosbrugger, Director of Senckenberg Research Institute, Frankfurt (Germany), and G. Haug, Professor of the ETH Zurich (Switzerland).

### 2. MegaSymposium “Minimising Risk: Maximising Awareness”

The MegaSymposium “The Hazards Theme of the International Year of Planet Earth (IYPE): Minimising Risk: Maximising Awareness” was held on 7-8 August 2008 in Oslo at the 33<sup>rd</sup> International Geological Congress and organized by T. Beer (Australia) together with K. Takeuchi (Japan) and R. Chadha (India). The meeting was designed to link the four main research questions of the IYPE Hazards Theme with the five action items of the UN-ISDR Hyogo Framework for Action. This was done at both a disciplinary and a geographic level. As there was general agreement that the time span of the IYPE (either one or three years) was insufficient time, the proposed ICSU programme on Hazards (now known as Integrated Research on Disaster Risk) is seen as the natural continuation of the IYPE research work. In addition to the main invited papers, shorter presentations were also made by scientists working on IYPE Hazards projects related to landslides, seismic faults, and major catastrophes over geological time scales. Springer has agreed to publish the proceedings as part of the IYPE Book Series.

### 3. Symposium “Disaster Prediction and Management”

The Symposium, co-sponsored by IUGG and EUROSCIENCE and organized by the IUGG

GeoRisk Commission and the Euroscience Working Group “Science and Urgent Problems of Society”, was held on 6 July 2010 in Turin, Italy. The symposium attracted the attention of the mass media and representatives various fields of knowledge. Four speakers gave invited talks. G. Panza (Italy) spoke about new approaches in seismic hazard and risk assessment. J. Zlotnicki (France) spoke about volcano hazards analysis and mitigation using various geophysical techniques. V. Kossobokov (Russia) spoke about the statistical approach to the analysis of extreme natural events and about their predictability. A. Ismail-Zadeh (Germany) emphasized the importance of the research on extreme natural hazards and discussed the societal impact of natural disasters. The German Radio SWR2 broadcast the interview with the participants of the symposium on 11 July.

#### **4. ENHANS symposia on natural hazards and disaster risks in Latin America and the Caribbean**

The first ENHANS events took place at the Meeting of the Americas in Iguassu, Brazil on 9–10 August 2010. The project “Extreme Natural Hazards and Societal Implications – ENHANS” is sponsored by ICSU and co-sponsored by several international and intergovernmental organizations (<http://www.enhans.org>). The symposium on Natural Hazards and Disaster Risks in Latin America and the Caribbean was convened by O. Cordona (Colombia), A. Ismail-Zadeh (Germany), and V. Kossobokov (Russia). A. Lavell (Costa Rica) spoke about the new multidisciplinary research programme of ICSU “Integrated Research on Disaster Risk” and discussed the content and significance of the programme when looking at concrete examples of the social construction of risk in the Latin American and Caribbean region. T. Gibbs (Barbados) presented his view on meteorological hazards and associated risks in the Caribbean. The talk was followed by the presentation “A scaling criterion to estimate and compare the volcanic hazard among different volcanoes” by S. De La Cruz-Reyna (Mexico). O. Perez (Venezuela) spoke about earthquake activity and associated hazards in South America and the Caribbean and about the socio-economic impact of severe earthquakes in these regions. I. Alcantara-Ayala (Mexico) discussed the anatomy of landslides disasters and presented case studies from Mexico and other South American countries. A. Soloviev (Russia) discussed problems in seismic hazard assessment and earthquake predictability, and V. Kossobokov continued the discussion on the predictability of extreme events presenting the paper “Natural Hazards At Extreme: Predictive Understanding Versus Complex Reality”. O. Cardona (Colombia) spoke about indicators of

disaster risk and risk management in the Americas. F. Romanelli (Italy) presented scenario-based seismic hazard assessment methodology and its implication to hazard evaluation in Valparaiso. Two oral sessions of the symposium were continued as a poster session of 25 papers.

The symposium was followed by a Town Hall meeting on “Natural Hazards in Latin America and Caribbean (LAC): From Risk to Opportunity by Partnership of Science and Society”. The meeting focused on the following aspects: How can science (both natural and social) and society form a partnership for disaster reduction? How can a science and society partnership convert natural disaster risk to opportunity? What are the urgent issues of disaster risk in LAC cities and regions under intensifying natural and social pressure? A. Lavell (Latin American Social Sciences Faculty – FLACSO and LA RED, Costa Rica; member of the ICSU Scientific Committee “Integrated Research on Disaster Risk” and ICSU Regional Office for LAC), K. Alverson (Director, Global Ocean Observing System, Intergovernmental Oceanographic Commission of UNESCO), and P. Boccoardo (Director, ITHACA, and Professor of Politecnico di Torino, Italy) talks at the Town Hall meeting. J. Urrutia Fucugauchi (AGU International Secretary) and A. Ismail-Zadeh (IUGG Secretary General) moderated the town hall meeting’s discussion. Two panellists, I. Alcantara-Ayala (Vice-President of the International Geographical Union) and M. McPhaden (President of the American Geophysical Union), mentioned how professional societies can assist in mitigation of natural hazards and disasters.

#### **5. ENHANS Symposium “Natural Extreme Events: Modeling, Prediction and Mitigation” and related events**

The Symposium was held on 13 December 2010 at the Fall Meeting of the American Geophysical Union (AGU) and was a part of the activity in the framework of the ICSU project “Extreme Natural Hazards and Societal Implications – ENHANS”. The symposium had three scientific sessions and was attended by more than 300 experts in various fields of extreme natural hazards and disaster risk experts. The sessions were chaired by I. Zaliapin (USA) and A. Ismail-Zadeh (Germany). Daniel Baker (Colorado University, Boulder, USA) spoke on the predictability and mitigating impacts of extreme space weather events. Storm surge, as a globally distributed risk, was the topic of the talk by Hans von Storch (University of Hamburg, Germany). Upmanu Lall (Columbia University, New York, USA) explained why flooding was severe in 2010. Thomas Jordan (University of Southern California, Los Angeles, USA) spoke



about new large-scale numerical simulations to forecast extreme earthquake ground motions, whereas Steven Sparks (University of Bristol, UK) gave a talk on extreme volcanic eruptions and discussed their return period, impact and implications. Rowan Douglas (Willis Research Network, London, UK) spoke about how re/insurance and public science interact to manage risk of extreme events for societal benefit. The 2010 AGU Natural Hazards Focus Group Graduate Research Awardee Ning Lin (Massachusetts Institute of Technology, Cambridge, USA) spoke on a hurricane risk assessment related to wind damage and storm surge. Fausto Guzzetti (University of Perugia, Italy) discussed landslide hazard, vulnerability and risk assessment and emphasized importance of methodology for risk assessment, its limits and challenges. Kenji Satake (University of Tokyo, Japan) spoke about tsunami modeling, forecast and warning. The poster session (20 papers) presented a variety of topics related to natural hazards, extreme events, theory, modeling, prediction and mitigation. The culminating event of the symposium was a keynote lecture on “Society’s Growing Vulnerability to Natural Hazards and Implications for Geophysics Research” by Julia Slings (Met Office, U.K.)

## **6. ENHANS Workshop in Pretoria, South Africa**

The ENHANS International Workshop “Extreme Natural Hazards and Disaster Risk in Africa” provided an opportunity for the research community of the African countries and international experts to discuss and analyze major topics related to extreme natural events and disaster risk. The workshop served as a platform to establish links and networks between African experts with relevant international organizations. The workshop was hosted by the Aon Benfield Natural Hazard Centre, University of Pretoria, and was based on invited presentations by African and foreign experts in natural hazards and disaster risk analysis. The Workshop’s scientific program can be found at the workshop’s web-page: <http://www.technoscene.co.za/hazardsws>. The Workshop’s participants adopted the following recommendations to governments and funding institutions in cooperation with the relevant ICSU bodies, United Nations agencies and other international entities. The full text of the recommendations will be soon available at the ENHANS web-page: <http://www.enhans.org/showcasing/africa.php>. The Pretoria workshop was highlighted in the U.N. SPIDER Newsletter <http://www.un-spider.org/news-en/4847/2011-02-04t123100/un-spider-enhans-international-workshop-%E2%80%9Cextreme-natural-hazards-and>

the Insurance Journal <http://www.insurancejournal.com/news/international/2011/02/03/183169.htm>, and the University of Pretoria <http://web.up.ac.za/default.asp?ipkCategoryID=3523&ArticleID=6252>

GRC commissioners organized sessions and/or presented on the whole spectrum of the risk and disaster on many other scientific meetings.

## **Projects**

The ENHANS is a project of the International Council for Science (ICSU) led by the International Union of Geodesy and Geophysics. ENHANS supporting partners are the American Geophysical Union (AGU), the International Geographical Union (IGU), the International Society for Photogrammetry and Remote Sensing (ISPRS), the International Union of Geological Sciences (IUGS), the International Union of Theoretical and Applied Mechanics (IUTAM), the Scientific Committee of the Program “Integrated Research on Disaster Risk” (IRDR), and the Global Ocean Observing System (GOOS) of IOC-UNESCO. The ICSU Regional Offices for Africa (ROA), Asia & the Pacific (ROAP), and Latin America and the Caribbean (ROLAC) are involved in the relevant parts of the project providing links to the regions.

The principal goals of the ENHANS project are (i) to improve understanding of critical phenomena associated with extreme natural events and to analyze impacts of the natural hazards on sustainable development of society; (ii) to promote studies on the prediction of extreme events reducing predictive uncertainty and on natural hazards mitigation; to bring the issues into political and economical policies; (iii) to disseminate knowledge and data on natural hazards for the advancement of research and education in general and especially in developing countries; and (iv) to establish links and networks with the international organizations involved in research on extreme natural hazards and their societal implications setting up a consortium of experts of ICSU Unions and several major intergovernmental and multi-national organizations involved in the project. The goals of ENHANS will be achieved via scientific meetings and open forums bringing together research experts, decision makers, and disaster management, insurance agency and mass media practitioners. The project will place a special emphasis on the importance of research on extreme natural hazards and disaster risk mitigation in the most vulnerable regions of the world, particularly in Latin America and the Caribbean, in Africa, in the Middle East, in Asia, and the Pacific region.

The ENHANS Project (<http://www.enhans.org>) started in 2010 with GRC having a leading role therein, with A. Ismail-Zadeh as the project coordinator.

**Publications** (directly related to the GRC activities)

- Ismail-Zadeh, A. T., and T. Beer (Eds.), 2007. *Georisk: Interactions between Science and Society*, Springer, Heidelberg.
- Tom Beer (Ed.), 2010. *Geophysical Hazards: Minimizing Risk Maximizing Awareness*, Springer, Heidelberg.
- The conference Proceedings “Risk and Planet Earth” edited by Dölemeyer A., Zimmer J., and Tetzlaff G., Schweizerbarth, 2010. There is a wealth of articles in scientific journals addressing all aspects of risk and disasters.

#### **Participations and representations**

GRC members contributed to several conferences and events on a broader scale, such as The Global Platform meetings in Geneva in 2007 and 2009, as well as the 3<sup>rd</sup> World Climate Conference (WCC3) in Geneva in 2010.

GRC-members serve as chairs and members of some most relevant organizations in the risk analysis and risk reduction:

- UNISDR (United Nations International Strategy for Disaster Reduction) with Harsh Gupta a member of the Science Commission;
- International Year of the Planet Earth (2007-2010) with Tom Beer the member responsible for the theme “Hazards”.

- Kuniyoshi Takeuchi serves as a vice chair of the Science Committee of the ICSU program “Integrated Research on Disaster Risk” IRDR.
- Alik Ismail-Zadeh serves as a chair of the Natural Hazards Focus Group of the American Geophysical Union (AGU)

There are many more memberships in national and international organizations and bodies than can be presented here.

#### **PLANNED FUTURE ACTIVITIES**

The plans comprise (co-)organizing

- a Special Session on “Natural Hazards and Disaster Risks in the Middle East Region” at the Conference on “GeoInformation for Disaster Management” in Turkey on 03-08 May 2011;
- a Union Symposium “Grand challenges in Natural hazards research and risk analysis” and
- an Open Forum “Natural hazards : from risk to opportunity by partnership of science and society” at the XXV IUGG General Assembly Melbourne.

GRC-members plan to contribute to the 3<sup>rd</sup> ISDR Global Platform Meeting in Geneva to be held from 08 to 13 May 2010. Furthermore the contacts to the events organized by IRDR will be considered for contributions.

Kuniyoshi Takeuchi, Chair  
Gerd Tetzlaff, Secretary  
Alik Ismail-Zadeh, Immediate Past Chair

## QUADRENNIAL REPORT OF THE IUGG COMMISSION ON MATHEMATICAL GEOPHYSICS

### INTRODUCTION

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

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

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

### ADMINISTRATION

The following are current officers of the Union Commission on Mathematical Geophysics:

Chair: Daniel Rothman (USA)  
Secretary General: Claudia Pasquero (ITALY)  
Vice-Chair: Einat Aharonov (ISRAEL)  
Vice-Chair: Eli Tziperman (USA)

During the XXIV IUGG General Assembly in Perugia, Italy, 2007, the Committee had a business meeting with participation of CMG officers (Dan Rothman, MIT, Cambridge, USA; Einat Aharonov, Weizmann Institute, Israel), representatives from the Associations (Augusto Neri, INGV, Pisa, Italy; Dick Peltier, Univ. of Toronto, Canada; Paola Malanotte-Rizzoli, MIT, Cambridge, USA; Daniel Schertzer, Univ. Pierre et Marie Curie, Paris,

France), and the IUGG Secretary General, Alik Ismail-Zadeh (Russian Academy of Science, Moscow, Russia). Most of the discussion concerned the scientific organization of 2008 CMG conference. There have also been discussions on involvement of new CMG officers to replace resigning vice-chair Antonello Provenzale (CNR, Torino, Italy).

Another business meeting took place on June 17th, 2008 in Longyearbyen, Norway, during the semiannual Conference on Mathematical Geophysics. Among the participants, CMG officers (Dan Rothman, MIT, Cambridge, USA; Einat Aharonov, Weizmann Institute, Israel), representatives from the Associations (Dick Peltier, Univ. of Toronto, Canada; Yehuda Ben Zion, University of Southern California, Los Angeles, USA), and the IUGG Secretary General, Alik Ismail-Zadeh (University of Karlsruhe, Germany). At the meeting, the candidacies for the location of the next Conference, to be held in 2010, were discussed. In particular, an articulated candidacy was presented by representatives of the Italian Institute of Geophysics and Vulcanology, Pisa, Italy, that was unanimously and enthusiastically chosen. The latest business meeting was held on June 8th, 2010 in Pisa, Italy, during the 27th Conference on Mathematical Geophysics. Among the participants, CMG officers (Dan Rothman, MIT, Cambridge, USA; Einat Aharonov, Weizmann Institute, Israel; Claudia Pasquero, UCI, Irvine, USA), representatives from the Associations (Yehuda Ben Zion, IASPEI; Mathias Holschneider, IAGA; Augusto Neri, IAVCEI ), the IAGA Secretary-General (Mioara Mandea), and the IUGG Secretary General, Alik Ismail-Zadeh, (University of Karlsruhe, Germany). Possible locations and chair of local organizing committee for the next meeting, to be held in 2012, were discussed. It was decided to give preference to people who had previously participated to the CMG Conference, to allow continuity, to contact them and take a final decision before Fall 2010. The possibility of having the next Conference outside Europe and North America was discussed, and Alik Ismail-Zadeh informed about the possibility of receiving extra funding for organizing a conference in Africa. The possibility of having a partial overlap with a SETI (Solid Earth Deep Interior) Conference was also discussed. The issue will be further investigated, considering the positive reaction from CMG. Finally, it was decided to constitute a mailing list for people interested in Mathematical Geophysics. The most updated version of the list will be kept by the CMG Secretary.

The location of the next Conference to be held in June 2012 has later been chosen as Edinburgh, Scotland, UK.

## ACTIVITIES

The principal activities of the CMG are to sponsor a biennial conference on theoretical geophysics and to host sessions at the IUGG General Assembly.

1) At the XXIV IUGG General Assembly in Perugia, Italy (2007), the Committee on Mathematical Geophysics co-sponsored a Union Symposium on “Modeling and simulations of geophysical flows: present and future”, convened by Augusto Neri (INGV, Pisa, Italy), Einat Aharonov (Weizmann Institute of Science, Israel), George Bergantz (University of Washington, USA), and Oleg Melnik (Moscow State University, Russia). The program of the session included the following oral contributions:

Einat Aharonov, Weizmann Institute, Israel, *Long runout landslides: the role of frictional heating and hydraulic diffusivity*  
Barmin Alexey, Moscow State Univ., Russia, *Cyclic behaviour in lava dome building eruptions*  
Piero Dellino, Univ. of Bari, Italy, *Large-scale experiments on the mechanics of pyroclastic flows*  
Yosef Dufek, *Modeling the dynamics of turbulent multiphase gravity currents: the importance of geologically diverse boundary condition*  
Deniz Ertas, ExxonMobil, Santa Barbara, USA, *Bulk rheology of dense granular flows*  
Taras Gerya, ETH, Zurich Switzerland, *Numerical modeling and visualization of subduction processes*  
Michael Herzog, LPSY, Lausanne, Switzerland, *Numerical Plume Modeling with ATHAM: Volcanic Eruptions Columns and beyond*  
Michael Manga, U. California, Berkeley, USA, *Integrating multi-scale observations with macroscopic models of explosive volcanic eruptions*  
Todesco Micol, INGV, Bologna, Italy, *Modeling of hydrothermal fluid circulation in active volcanic areas*  
Paolo Papale, INGV, Pisa, Italy, *Modeling the fluid dynamics of multicomponent compressible magma in sub-surface volcanic environment*  
Jeremy Phillips, Univ. of Bristol, UK, *Laboratory analogue investigation of the dynamics of vulcanian eruptions*  
Daniel Rothman, MIT, Cambridge, MA, USA, *Channelization driven by subsurface flow: models, observations, and experiments*  
Andy Woods, BPI, Cambridge, UK, *On In Situ Dissolution of Evaporites.*

2) The 27th International Conference on Mathematical Geophysics was held in June 15–20, 2008 in Longyearbyen, Norway, on the Svalbard

Island. The conference theme was “Dynamics in Earth Systems: Flow, Fracture, and Waves”. The local organizing committee was chaired by Eirik Flekkoy, University of Oslo. Detailed information can be found on the conference website <http://www.fys.uio.no/cm2008/>.

There were 58 participants, including about a half senior scientists and a half students and young scientists. Their provenience indicates a success of this Conference, that was able to really put together investigators from different fields and from different countries (organizers were very happy about the participation of people from Africa and from South America), united by the common interest for the Earth and by the mathematical tools they use for studying and understanding it.

The program of the conference included the following sessions:

- Fracture, ranging from ice sheets to earthquakes;
- Climate and evolution in Earth
- Subsurface flows, pattern formation and granular flows
- Surface flows in Atmospheric and Ocean dynamics

Invited lectures included:

- ‘Collective behavior of earthquakes and faults: Continuum-discrete transition, progressive evolutionary changes and different dynamic regimes’, Yehoda Ben-Zion, University of Southern California, Los Angeles, USA.
- ‘The physics of quicksand and quickclay landslides’, Daniel Bonn, University of Amsterdam, The Netherlands
- ‘The dynamics of the onset of frictional slip’, Jay Fineberg, Hebrew University of Jerusalem, Israel
- ‘River deltas and vegetated dunes’, Hans Hermann, ETH, Zurich, Switzerland
- ‘Scaling laws of subcritical fracture’, Ferenc Kun, University of Stuttgart, Germany
- ‘Diffusion and fragmentation processes in ice crystal dynamics’, Mogen Høeg Jensen, Niels Bohr Institute, Copenhagen, Denmark
- ‘Solid-solid phase transitions and the roughening of stylolites’, Joachim Mathiesen, PGP, University of Oslo, Norway
- ‘What is wrong with earthquake physics?’, Amos Nur, Stanford University, USA
- ‘Subsurface-atmosphere and the astronomical theory of ice ages on Mars’, Norbert Schorghofer, University of Hawaii, Honolulu, USA
- ‘Dynamic, material and geometrical heterogeneities in earthquake physics’, Bruce Shaw, Lamont Doherty Earth Observatory, Palisades, NY, USA

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- ‘*Space and time correlations in the activity of fracture front dynamics: A comparison to the statistics of slip and seismicity of natural faults*’, Renaud Toussaint, Ecole et Observatoire des Science de la Terre, Strasbourg, France
- ‘*Snap, buckle, break and melt*’, John S. Wettlaufer, Yale University, USA

3) The 28th International Conference on Mathematical Geophysics was held in June 7-11, 2010 in Pisa, Italy. The conference theme was “Modeling Earth Dynamics: Complexity, Uncertainty, and Validation”. The local organizing committee was chaired by Augusto Neri, Italian Institute for Geology and Vulcanology (INGV) and IAVCEI representative at CMG. Detailed information can be found on the conference website <http://cmg2010.pi.ingv.it>.

The attendance was particularly large: there were 165 participants, including senior scientists, students and young scientists. A special session dedicated to the memory of prof. Alberto Tarantola was able to put together scientists and philosophers to discuss how science in general, and climate change in particular, is communicated to the public.

The program of the conference included the following sessions:

0. Can our models only predict the irrelevant? (Special Session in honor of Prof. Tarantola)
1. Geophysical fluid dynamics I - Volcanoes
2. Geophysical fluid dynamics II - Sub-surface and surface flows
3. Geophysical fluid dynamics III - Atmosphere and ocean
4. Brittle deformation and computational seismology

5. Geodynamics and geomagnetism
6. Environmental systems and climate
7. Quantifying the uncertainty in Earth Systems

Keynote lectures included:

- *Modeling coupled fluid-grain deformation, with implications for landslides, fault-zones, and liquefaction* by David Sparks
- *Multi-scale approach to seismic inverse scattering and applications in Earth's upper mantle transition zone* by Marteen V. de Hoop
- *Settling plankton settling* by Claudia Pasquero
- *The maintenance of stratification in the ocean and atmosphere: from conveyor belts to geostrophic turbulence* by Geoffrey Vallis
- *Confirmation and Testing of Scientific Models, Revisited* by Wendy Parker
- *Predictive Modeling of Processes on the Surface of the Earth Doesn't Work* by Orrin Pilkey
- *Forecasting large earthquakes and eruptions: is it a scientific issue?* By Warner Marzocchi
- *Limitations of global terrestrial biosphere models used for future climate projections* by Victor Brovkin
- *The Risk Management Perspective in Climate Change* by Roger Cooke
- *Extracting Insight from Predictions of the Irrelevant: Can the Diversity in Our Models Inform Our Uncertainty of the Future?* By Leonard Smith.

4) The 29th International Conference on Mathematical Geophysics will be held in June 2012 in Edinburgh, Scotland, UK and the local organizing committee will be chaired by Mark Naylor (University of Edinburgh).

Dan Rothman, Chair  
Claudia Pasquero, Secretary

## QUADRENNIAL REPORT OF THE IUGG COMMISSION ON THE STUDY OF THE EARTH'S DEEP INTERIOR

### INTRODUCTION

SEDI is an international scientific organization dedicated to the Study of the Earth's Deep Interior. The scope of SEDI includes the core and lower mantle, but interest may extend to the surface, for example, in the study of mantle plumes or dynamics of descending lithospheric slabs. The scientific questions and problems of interest to SEDI include: 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 (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). As such, it cuts across the traditional discipline-oriented bounds of the Associations of the IUGG [such as the International Association of Geodesy (IAG), the International Association of Geomagnetism and Aeronomy (IAGA), the International Association of Seismology and Physics of the Earth's Interior (IASPEI), and the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)] which normally study the Earth from a particular point of view. The intent of SEDI is to amalgamate all sources of data and all points of view to generate the most coherent and consistent picture of the workings of the Earth's deep interior.

### ADMINISTRATION

SEDI Officers are traditionally elected during IUGG General Assemblies at a dedicated business meeting. Since the 2007 IUGG General Assembly in Perugia, Italy, SEDI has been chaired by Gauthier Hulot (IPGP, France), vice-chaired by Satoru Tanaka (JAMSTEC, Japan), with Michael Bergman (Simon's Rock College, USA) acting as Secretary-General. Its membership rose from about 550 to about 605, as recorded on the email list used to broadcast information related to SEDI activities, upcoming meetings, funding opportunities, and academic openings.

### ACTIVITIES

SEDI's main activity is the organization of a dedicated workshop every even year and two such meetings were organized in 2008 and 2010. 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 11<sup>th</sup> SEDI Symposium was organized in Kunming, Yunnan Province, China (July 27-31, 2008) by a Local Organizing Committee chaired by Prof. Rongshan Fu from the University of Science and Technology of China, with support from a SEDI international program committee. Funding for the meeting came from IUGG; the US NSF; INSU/CNRS (France); The National Natural Science Foundation of China (NSFC); University of Science and Technology of China (USTC); Earthquake Administration of Yunnan Province, Institute of Geology and Geophysics, Chinese Academy of Science; and Institute of Geodesy and Geophysics, Chinese Academy of Science. 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. The sessions were: Structure of the Core, Structure of the Mantle, Mantle Dynamics, Inner-Core Outer-Core Mantle Coupling, Laboratory Modeling of Deep Earth Processes, Core Dynamics, Observations and the Geodynamo, and Deep Interiors and Magnetic Fields of Other Planets. 92 scientists participated, including students, and despite the long distance from Europe and North America, the symposium was well attended by the international community who could interact with the Chinese scientific community.

The 12<sup>th</sup> SEDI Symposium brought the community back to the Americas. It was held in UCSB, California, USA, July 18-23 2010, overlapping

with a 7-week CIDER (Cooperative Institute of Deep Earth Research, <http://www.deep-earth.org/workshop09.html>) program sponsored by NSF/CSEDI. It was very successfully organized by a Local Organizing Committee led by Barbara Romanowicz (UC Berkeley, Chair) and involving Ralph Archuleta (UCSB), Jonathon Aurnou (UCLA), Bruce Buffett (UC Berkeley), Louise Kellogg (UC Davis), Guy Masters (UCSD) and Toshiro Tanimoto (UCSB). Support for the meeting came from several sources including IUGG, the US NSF and INSU/CNRS (France). A website was set up and is still accessible at <http://www.deep-earth.org/2010/sedi2010.html>. As in 2008, the symposium was organized around eight sessions led by discussion leaders. This time each session had one lead review talk and two shorter more focused talks, followed by ample time for discussion of posters and key scientific issues. These eight sessions were: Structure and Chemistry of the Core and Lower Mantle, Seismic Observation of the Earth's Deep Interior, Mantle Convection and Dynamics, Cycling of Volatiles through the Deep Earth, Physical and Chemical Interaction Between the Core and the Mantle, Core Dynamics: short-period waves to long-term evolution, Geodynamo Theory and Observations, and Deep Interiors of Other Planets and Small Bodies. About 135 participants attended, coming from twelve different countries (Bulgaria, Canada, Czech Republic, France, Germany, India, Ireland, Japan, Switzerland, Turkey, 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 2008 and 2010 Zatman Lectures were respectively given by Mathieu Dumberry (University of Alberta, Canada) on "Geodetic constraints on core dynamics and core-mantle interactions" and James Roberts (Johns Hopkins University) on "Effects of giant impacts on the mantles and cores of Mars and Mercury".

In 2008 the Doornbos prize was awarded to Nicolas Gillet (LGIT, France) for his experimental, theoretical and observational modeling work in the field of Geomagnetism; John Hearn (UBC, Canada) for his major contributions to our understanding of deep mantle processes; and Ligang Li (Chinese Academy of Sciences, at the Shanghai Astronomical Observatory, Shanghai, China) for his work in theoretical modelling of core convection and the geodynamo. In 2010 it was

awarded to Michael Le Bars (IRPHE, France) for pioneering laboratory models of planetary mantle and core fluid dynamics; Sang-Heon Dan Shim (MIT, USA) for systematic studies of mineral phase transformations and thermoelastic properties at high temperatures and pressures, with an emphasis on elucidating the role of the post-perovskite transformation in the deep mantle; and James Wookey (University of Bristol, UK), for innovative analysis of seismic data to reveal seismic anisotropic structure, with a view to constraining physical mechanisms of deformation and fabric formation in the Earth's deep interior.

Another important tradition of SEDI is that proceedings of the symposia be published in a peer-reviewed international journal. A SEDI 2008 Special Issue was already published in *Physics of the Earth and Planetary Interiors* (Volume 178, N°1-2, 2010), and contributions from the SEDI 2010 symposium are now under review. It will also be published in a special issue of *Physics of the Earth and Planetary Interiors*.

The timing and location of the next SEDI Symposium are traditionally finalized during business meetings held at the previous SEDI edition. In 2010, after some presentations, discussions and votes, it was agreed that the next (13<sup>th</sup>) SEDI workshop would be held in Leeds, UK, July 1-6 2012.

In 2009, SEDI also endorsed a very successful workshop on "Geodynamical Phenomena: From Field, Observational, Computational, Seismological and Rheological Perspectives" (18-23 August, 2009) organized with IUGG support, by Alexander Gliko (IFZ, Institute of Physics of the Earth, Chair of the LOC) and David Yuen (University of Minnesota, USA, Chair of the International Committee), in Suzdal, Russia. It attracted 71 participants with a foreign participation of around 32, which included representatives from U.S.A., China, Japan, Australia, Belarus, Germany, Switzerland, Israel, Ukraine, France, Denmark, Norway and Sweden (see <http://marina.geo.umn.edu/suzdal>).

In addition, between 2007 and 2010, SEDI co-sponsored various scientific sessions at IUGG, the American Geophysical Union and other major meetings, such as the Meeting of the Americas (Foz de Iguassu, Brazil, August 8-13 2010). A Union Session to be held at the forthcoming 2011 IUGG General Assembly has also been organized, 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).

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**ANNOUNCEMENTS**

As the 2011 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.

Gauthier Hulot, Chair  
Satoru Tanaka, Vice-Chair  
Michael Bergman, Secretary