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IUGG BERLIN 2023



THE 28TH GENERAL ASSEMBLY
OF THE INTERNATIONAL UNION
OF GEODESY AND GEOPHYSICS

11–20 July 2023

IUGG BERLIN 2023

Together Again
for Geosciences

COMPTES RENDUS

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UNION GEODESIQUE ET GEOPHYSIQUE INTERNATIONALE
INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

XXVIII General Assembly
11 - 20 July 2023
BERLIN, GERMANY

COMPTES RENDUS

IUGG XXVIII GENERAL ASSEMBLY
11 - 20 July 2023, Berlin, Germany

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PART I

PROCEEDINGS OF THE GENERAL ASSEMBLY

OFFICERS OF THE UNION, ASSOCIATIONS, AND COMMISSIONS FOR 2019-2023

Bureau of the Union

<i>President:</i>	Kathryn Whaler	UNITED KINGDOM
<i>President-Elect:</i>	Chris Rizos	AUSTRALIA
<i>Secretary General:</i>	Alexander Rudloff	GERMANY
<i>Treasurer:</i>	Niels Andersen	DENMARK
<i>Members:</i>	Stephen McNutt	USA
	Eduard Petrovsky	CZECH REPUBLIC
	Jun Xia	CHINA

Executive Committee of the Union

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

- the Bureau (see above),
- the Immediate Past President of the Union, Michael G. Sideris (CANADA)
- the Presidents of the International Associations:

<i>IACS:</i>	Liss M. Andreassen	NORWAY
<i>IAG:</i>	Zuheir Altamimi	FRANCE
<i>IAGA:</i>	Mioara Manda	FRANCE
<i>IAHS:</i>	Berit Arheimer	SWEDEN
<i>IAMAS:</i>	Joyce E. Penner	USA
<i>IAPSO:</i>	Trevor McDougall	AUSTRALIA
<i>IASPEI:</i>	Kenji Satake	JAPAN
<i>IAVCEI:</i>	Patrick Allard	FRANCE

Finance Committee of the Union

<i>Chair:</i>	Corina Risso	ARGENTINA
<i>Members:</i>	József Ádám (2019-2022, 2022†)	HUNGARY
	Priscilla Grew	USA
	Jan Krynski (2023)	POLAND

Secretaries General of the International Associations

<i>IACS</i>	Richard Essery	UK
<i>IAG:</i>	Markku Poutanen	FINLAND
<i>IAGA:</i>	Monika Korte	GERMANY
<i>IAHS:</i>	Christophe Cudennec	FRANCE
<i>IAMAS:</i>	Steven Ackerman	USA
<i>IAPSO:</i>	Stefania Sparnocchia	ITALY
<i>IASPEI:</i>	Johannes Schweitzer	NORWAY
<i>IAVCEI:</i>	Roberto Sulpizio	ITALY

Union Commissions

Union Commission on Climatic and Environmental Change (CCEC):

<https://iugg.org/associations-commissions/commissions/cccec/>

<i>Chair:</i>	Jianping Li	CHINA
<i>Vice-Chair:</i>	Keith Alverson	CANADA
<i>Secretary-Treasurer:</i>	Tonie Van Dam	LUXEMBOURG

Union Commission on Mathematical Geophysics (CMG):

<https://iugg.org/associations-commissions/commissions/cm/>

<i>Chair:</i>	Alik Ismail-Zadeh	GERMANY
<i>Vice-Chairs:</i>	Ute Herzfeld	USA
	Malcolm Sambridge	AUSTRALIA
<i>Secretary:</i>	Ilya Zaliapin (2023†)	USA

Union Commission on Geophysical Risk and Sustainability (GRC):

<https://iugg.org/associations-commissions/commissions/grc/>

<i>Chair:</i>	John LaBrecque	USA
<i>Vice-Chairs:</i>	Vyacheslav Gusiakov	RUSSIA
	Chun-Chieh Wu	CHINA-TAIPEI
<i>Secretary/Treasurer:</i>	Yekaterina (Katia) Kontar	USA

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

www.sedigroup.org

<i>Chair:</i>	Christine Thomas	GERMANY
<i>Vice-Chair:</i>	Mathieu Dumberry	CANADA
<i>Secretary:</i>	Michael Bergman	USA

Union Commission on Data and Information (UCDI):

<https://iugg.org/associations-commissions/commissions/ucdi/>

<i>Chair:</i>	Satheesh Shenoi	INDIA
<i>Vice-Chair:</i>	Anatoly Soloviev	RUSSIA

Union Commission on Planetary Sciences (UCPS):

<https://iugg.org/associations-commissions/commissions/ucps/>

<i>Chair:</i>	Shuanggen Jin	CHINA
<i>Vice-Chairs:</i>	Nader Haghighipour	USA
	Paul Hartogh	GERMANY
<i>Secretary/Treasurer:</i>	Scot Rafkin	USA

Inter-Unions Commission

Inter-Union Commission on the Lithosphere: The International Lithosphere program (ILP)

<https://ilp.nju.edu.cn>

<i>President:</i>	Hans Thybo	NORWAY/TURKEY
<i>Secretary General:</i>	Mian Liu	USA
<i>Executive Secretary:</i>	Qin Wang	CHINA
<i>Bureau Members (Executive):</i>		
	IUGG Alexander Rudloff	GERMANY
	IUGS John Ludden	FRANCE
Chair of National Representatives	Alessandro Tibaldi	ITALY
Past President	Sierd Cloetingh	NETHERLANDS

IUGG Liaison Officers with Intergovernmental Organizations

(Principal Liaisons are marked by **bold**)

IUGG Representatives to organizations of the United Nations

United Nations Educational, Scientific and Cultural Organization (UNESCO):

International Hydrological Programme (IHP): **Christophe Cudennec** **FRANCE**
Charles Fierz SWITZERLAND

Intergovernmental Oceanographic Commission (IOC): **Denise Smythe-Wright** **UK**
Satheesh Shenoi INDIA

Section on Earth Sciences and Geo-Hazards Risk Reduction: **Alik Ismail-Zadeh** **GERMANY**
Harsh Gupta INDIA

World Meteorological Organization (WMO): **Rogert Pulwarty** **USA**
Christophe Cudennec FRANCE
Charles Fierz SWITZERLAND
Arnau Folch SPAIN
Jens Wickert GERMANY
Hua Zhang CHINA

Intergovernmental Panel on Climate Change (IPCC): **Franz Kuglitsch** **GERMANY**

International Civil Aviation Organization (ICAO): **David Schneider** **USA**
Larry Mastin USA

Committee of Experts on Global Geospatial Information Management (UN-GGIM): **Harald Schuh** **GERMANY**

IUGG Representatives on ISC Committees

Committee on Data for Science and Technology (CODATA): **Anatoly Solovyev** **RUSSIA**

Committee on Space Research (COSPAR): **Andrew W. Yau** **CANADA**
Christopher Kotsakis GREECE

Scientific Committee on Antarctic Research (SCAR): **Ian Allison** **AUSTRALIA**
John Turner UK

Scientific Committee on Oceanic Research (SCOR): Trevor McDougall AUSTRALIA
Joyce Penner USA

Scientific Committee on Solar-Terrestrial Physics (SCOSTEP): **Renata Lukianova** **RUSSIA**
Peter Pilewski USA

World Data System (WDS): **Toshihiko Iyemori** **JAPAN**
Aude Chambodut FRANCE
Kirsten Elger GERMANY

IUGG Representatives to other organizations

Consultative Committee for Time and Frequency (CCTF): **Claude Boucher** **FRANCE**
Felix Perosanz FRANCE

XXVIII General Assembly of the International Union of Geodesy and Geophysics
Officers of the Union, Associations, and Commissions for 2019-2023

Group on Earth Observations (GEO):

Michael Sideris
Chris Rizos
Kathryn Whaler

CANADA
AUSTRALIA
UK

*Pan-American Institute of Geography and History
(PAIGH):*

Laura Sanchez

GERMANY/COLOMBIA

World Climate Research Programme (WCRP):

Lisa Alexander

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Executive Secretary:
Assistant:

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Katrin Gundrum

GERMANY
GERMANY

IUGG 2023 LOCAL ORGANIZING COMMITTEE

Chair:	Prof. Harald SCHUH GFZ German Research Centre for Geosciences, GERMANY
Vice Chair:	Ms. Christine BISMUTH GFZ German Research Centre for Geosciences, GERMANY
Contact to universities and hydrological scientists:	Prof. Axel BRONSTERT Universität Potsdam GERMANY
Excursion (local):	Dr. Angelika EHLING BGR Federal Institute for Geosciences and Natural Resources GERMANY
Volunteers coordinator:	Dr. Susanne GLASER GFZ German Research Centre for Geosciences GERMANY
Contact to all Geo.X partner institutions:	Dr. Hilde GÖDDE Geo.X Research Network for Geosciences in Berlin and Potsdam GERMANY
BGR Berlin representation contact point for Ministries and other public institutions:	Uwe MEYER BGR Federal Institute for Geosciences and Natural Resources GERMANY
Chair Scientific Program Committee:	Prof. Jürgen MÜLLER Leibniz Universität Hannover GERMANY
Contact with DLR and TU Berlin:	Prof. Jürgen OBERST DLR Institute of Planetary Research / Technische Universität Berlin GERMANY
Financing and Controlling:	Mr. Claas SCHIPPMANN GFZ German Research Centre for Geosciences GERMANY
International Aspects:	Dr. Ludwig STROINK GFZ German Research Centre for Geosciences GERMANY
Sponsoring and Fundraising:	Prof. Uwe ULBRICH Freie Universität Berlin GERMANY
Media and Communication:	Mr. Josef ZENS GFZ German Research Centre for Geosciences GERMANY
German National Committee of the IUGG:	Dr. Thomas PLENEFISCH BGR Federal Institute for Geosciences and Natural Resources GERMANY
International relations, contact to UN-GGIM:	Dr. Johannes BOUMAN BKG Federal Agency for Cartography and Geodesy GERMANY

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Ms. Kristýna SLAVÍČKOVÁ, Scientific Program Manager
Ms. Iveta JINOCHOVÁ, Registration Manager
Ms. Odille PULAIN, Exhibit and Sponsorship Manager
Mr. Martin VALTER, AV & IT Manager
Ms. Karolína TYLŠOVÁ, Logistics Coordinator
Ms. Anna KONDRATENKO, Business Meetings Coordinator
Mr. Miroslav CAJTHAML, Housing Manager

REPORT OF THE CHAIR OF THE LOCAL ORGANIZING COMMITTEE, HARALD SCHUH

The 28th IUGG General Assembly (IUGG2023) was held from 11 to 20 July 2023 at the CityCube in Berlin, Germany. The German Research Centre for Geosciences Potsdam (GFZ) was the main organizer and host institution on behalf of the German National Committee of the IUGG. Its co-organizers were the Helmholtz Association, Geo.X, the Federal Institute for Geosciences and Natural Resources (BGR), the Federal Agency for Cartography and Geodesy (BKG), the GEOMAR Helmholtz Centre for Ocean Research Kiel, and the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI).

After winning the bid to host IUGG2023 the LOC was set-up in autumn 2019; in total the LOC met 23 times. Bids from five professional conference organizers (PCO) were reviewed in 2019/2020 and C-IN from Prague was selected. The COVID-19 pandemic from early 2020 till early 2023 caused a lot of open questions. For a long time, it was uncertain whether IUGG2023 should be organized as an on-site or on-line event, or whether has to be postponed or cancelled at all. This required additional negotiations with the Convention Center (Messe Berlin), IUGG, the PCO, and the various co-organizers. On behalf of the LOC, I would like to thank all the partners for the good cooperation which helped GFZ to keep the financial risks manageable.

As a result, more than 5,000 participants from 108 countries registered for IUGG2023. Of those 2,525 were regular attendees and about 1,200 were early career scientists. 661 participants received a grant in form of travel support or a waived registration. All the numbers of registrants by country and Associations can be found in Annex 1.

IUGG2023 consisted of three important parts: (i) an open Scientific Assembly, (ii) the meetings of the duly accredited delegates of the IUGG member countries (referred to as the Council Meeting); and (iii) business meetings of the IUGG, its Associations, and their scientific bodies.

The Scientific Program of IUGG2023 consisted of 795 oral and 167 poster sessions, with about 3,100 oral and about 1,300 poster presentations. The program was completed with the Gold Medal Lecture, nine Union Lectures, six special sessions on ‘Big Themes’, and four Union Symposia. The Gold Medal and Union Lectures were video recorded and are available here. The final program of IUGG2023 can be downloaded [here](#).

With 38 exhibitors, IUGG2023 marked a new exhibition record. The interested general public could visit the exhibition and the poster area for free from Friday to Sunday. Many scientists took advantage of visiting the hall together with their families and friends. During those days, the GFZ, its “geo-school” for kids, and the Planetarium of Berlin set up a special program with activities for the general public.

The Berlin-Brandenburg consortium Geo.X held a special event for young scientists at the Technical University Berlin, and an Early Career Scientist event was organized on Saturday, 15 July 2023. Both events were well received.

Observations

The CityCube Berlin was a very good venue for a conference of this size. Registration and help desks were prominent in the entrance hall, and the large hall on the first floor gave us a spacious venue for poster sessions, exhibitions, coffee breaks, poster socials, and food trucks. Oral presentations and business meetings took place in more than 30 rooms set up for audiences ranging from a few tens for the smaller events to more than 2,000 for the events in the plenary hall.

The Opening, Closing and Award ceremonies and accompanying receptions were a big success. Particular thanks go to Monique Kuglitsch our master of ceremonies of the opening ceremony and the members of *The Swingin’ Hermlins* for their lively performances of music and dance from the 1930s. The ceremonies were very well attended.

Compared to previous IUGG General Assemblies, the length of the scientific part of IUGG2023 was reduced to 8 days. Still the attendance was expensive for many delegates, even though most

Associations organized their program within 5-6 days. The registration fees were not significantly higher than those of the IUGG2019: more details of the various fee categories are given in the report of the Scientific Program Committee (SPC). At the end, IUGG2023 was carried out with a small financial surplus.

Despite of sending out more than 1,700 invitation letters in due time several registrants suffered difficulties in getting their visa in time or their visa application was denied. This resulted in a few last-minute cancellations. I was contacted by several embassies and consulates concerning visa applications, and also by immigration officers at European airports after the arrival of international delegates. Fortunately, most of the requests could be answered and solved.

The General Assembly's volunteer program was a great success, and special thanks go to the LOC's volunteer coordinator Susanne Glaser who organized together with C-IN over 150 volunteers to help with the running of IUGG2023 over its 8-day period (plus the business-meeting days before and after). The majority of the volunteers were students and postdocs in the field of geosciences, but we also welcomed a number of technical staff from GFZ and people from other universities across Germany and internationally. Volunteers were given free registrations to the conference in exchange for their assistance, a welcome package including free lunches, and their timetables were organized to permit them to attend the scientific sessions in which they were most interested in. The volunteers assisted with registration and poster organization, monitored each room where oral presentations were taking place, helped with troubleshooting of technical issues, and helped to guide delegates around the conference venue. We would like to thank all volunteers very much for their assistance.

Overall the scientific program ran very smoothly and details are given in the report of the SPC Chair. We provided a hard-copy program-at-a-glance to each participant. The sightseeing and excursion program was well attended and often sold out.

The communication between the LOC, SPC, IUGG, and the PCO was efficient and successful. We tried to make the conference website and app as seamless as possible what was greatly appreciated by the delegates, as well as the prominent photo spot (#IUGG2023) where pictures of many participants were taken.



Harald Schuh, LOC Chair (middle), together with Jürgen Müller, SPC Chair (left), and Wenbin Shen from Wuhan University (right).

Acknowledgments

The success of the 28th IUGG General Assembly was thanks to the hard work and dedication of a large number of people and organizations. I would particularly like to thank the following individuals and groups:

- the members of the Local Organizing Committee.
- the members of the Scientific Program Committee, including its Chair Jürgen Müller.
- the IUGG Bureau and Executive Committee, and the Executive Secretary Franz Kuglitsch for all his information, advice, and his participation in our exhibition booths at EGU General Assemblies and AGU Fall Meetings.
- the staff of C-IN lead by Tomas Maxa for an incredible amount of work: pre-conference organization, day-to-day running of the Assembly (including rapid troubleshooting), and post-conference logistics. All the team members of C-IN played an active and invaluable role not only during the conference but also in the scientific program management, abstract submission system and travel grant application system.
- the staff of the CityCube Berlin, and
- all the IUGG2023 volunteers.

Finally, I would like to thank the more than 5,000 conference attendees who joined us in Berlin for this General Assembly, and I wish the organizers of the 29th General Assembly all the best.

REPORT OF THE CHAIR OF THE SCIENCE PROGRAM COMMITTEE, JÜRGEN MÜLLER

1. General Aspects

The IUGG2023 Scientific Program Committee (SPC) was in charge to organize the scientific program of the 28th General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Berlin.

The SPC consisted of the Secretaries General (SsG) of IUGG's eight International Associations and the Union (see Table 1). It was chaired by Jürgen Müller who has been endorsed by the IUGG Executive Committee. For organizational matters, the SPC has been greatly supported by the IUGG2023 professional congress organizer (PCO) C-IN from the Czech Republic, especially by Kristýna Slavíčková. Occasionally as guests, representatives of the Local Organizing Committee (LOC) chaired by Harald Schuh from GFZ have been invited to SPC meetings when superior matters (like conference fees, deadlines, visa rules, etc.) were debated.

Table 1. Members of the IUGG2023 Scientific Program Committee

Name & Institution	Function
Jürgen Müller , Leibniz University of Hanover, Germany	Chair
Richard Essery , The University of Edinburgh, UK	Secretary General, IACS
Markku Poutanen , National Land Survey of Finland, Finland	Secretary General, IAG
Monika Korte , GFZ German Research Centre for Geosciences, Germany	Secretary General, IAGA
Christophe Cudennec , Agrocampus Ouest, France	Secretary General, IAHS
Steven Ackerman , University of Wisconsin-Madison, USA	Secretary General, IAMAS
Stefania Sparnocchia , CNR National Research Council, Italy	Secretary General, IAPSO
Johannes Schweitzer , NORSAR, Norway	Secretary General, IASPEI
Roberto Sulpizio , Univeristy of Bari, Italy	Secretary General, IAVCEI
Alexander Rudloff , GFZ German Research Centre for Geosciences, Germany	Secretary General, IUGG

This team has worked hard for almost three years to prepare a unique scientific program. It covered the full spectrum of geodesy and geophysics, including observation issues from space and on ground, data analysis and integration, modeling and interpretation towards a better understanding of the complex processes in the Earth's system. It tackled specialized research questions as "How can quantum technology benefit the geosciences" as well as urging themes such as "Understanding the complex interaction of geosciences and climate change". Also, topics like science education, international cooperation and the geosciences in developing countries were addressed in dedicated events, including the new format of Big Themes and Union Lectures. For details see www.iugg2023berlin.org.

2. Preparation of the Scientific Program

The SPC had its first meeting in 2021. Until the start of IUGG2023, 10 joint meetings took place. Due to traveling constraints because of the Covid pandemic, all SPC meetings were run virtually. Generally, the pandemic was a severe issue for the preparation of IUGG2023. There was some discussion at the LOC, how many conference parts should be offered for online access and how many for attendance in person only. It was finally decided that only a minor part, like the opening ceremony and Union Lectures, should be video-streamed online, but all scientific sessions should be organized exclusively on-site. Another major uncertainty concerned the expected number of participants who will really show

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Report of the Chair of the Science Program Committee

up in Berlin. When the restrictions related to the pandemic were relaxed step by step, the organization of the conference was challenged by the Russian attack of the Ukraine which again led to restrictions for attending the IUGG2023. Also, the conference fees were a major discussion topic. The SsG wanted to have them low to attract as many people as possible, where the LOC had to carefully consider the total costs, including all components and risks of such a big event. A very good solution was found with various options, offering 1-day, 4-day and all-day tickets, further split for master students, PhD students, regular attendees and those from low- or middle-income countries, see also www.iugg2023berlin.org. Finally, 5,198 scientists from 108 countries registered for the event – a new record for IUGG General Assemblies. Among them, there have been about 1200 Early Career Scientists from 57 countries.

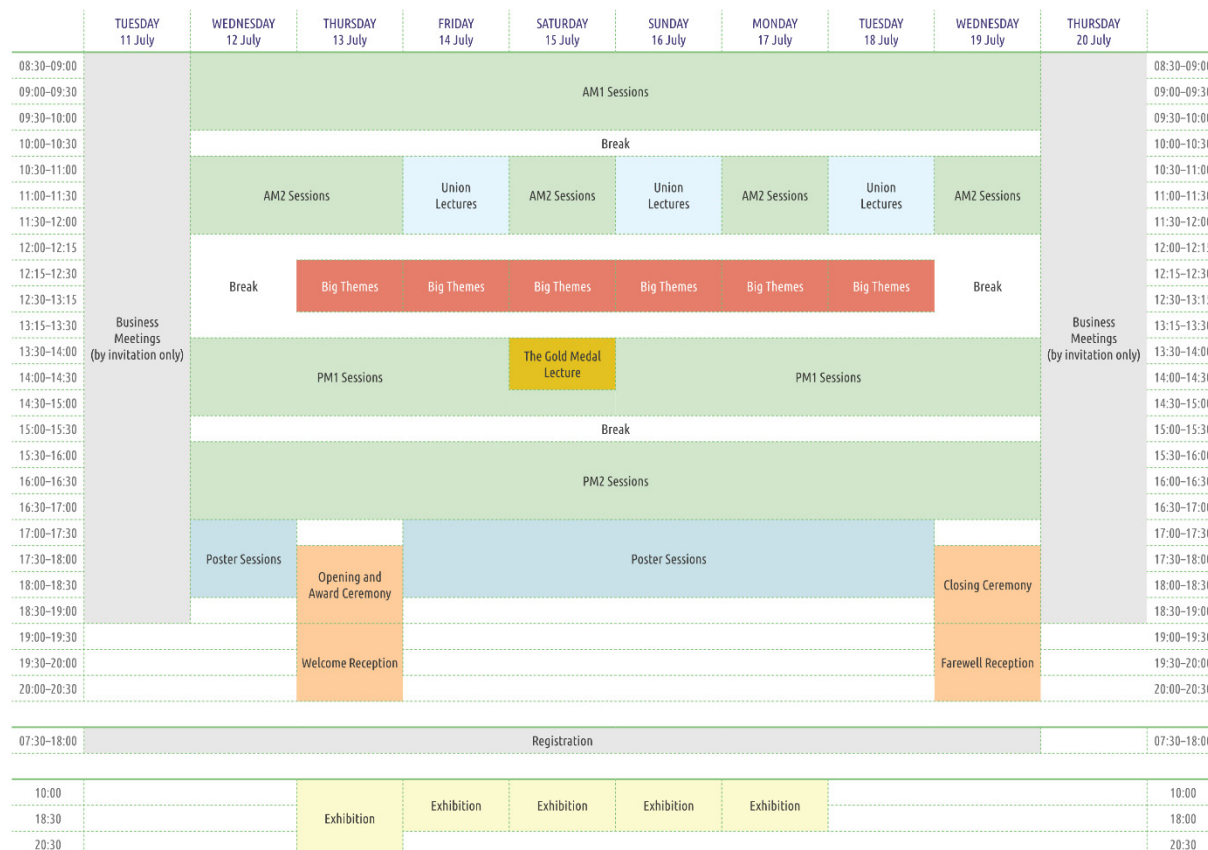


Figure 1. Scientific Program at a glance. Note the newly established discussion format “Big Themes” during the lunch breaks and the poster sessions towards the end of each day. “AM” and “PM” sessions indicate the morning and afternoon sessions – up to 28 in parallel.

Keeping the above-mentioned special circumstances in mind, the discussions on relevant topics and the organization of the scientific program were performed in the SPC meetings. Starting point for the SPC work has been the scientific programs of the General Assemblies in Montreal 2019 and in Prague 2015. In both cases, our PCO C-IN had already been in charge to support this task. So, we could benefit from their experiences and lessons learned.

On the one hand, the Association SsG were interested to keep their established structures and own specific topics covered. On the other hand, there was a strong wish of the IUGG Executive Committee to primarily organize inter-disciplinary, i.e. multi-association symposia. Step by step the symposia topics have been proposed and selected, partly joint in an iterative way, and appropriate co-convenors suggested. At the end, a very good compromise was found with about 170 symposia in total, of which 50 were joint inter-association symposia, see also Figures 1 and 2. On average, 15 individual symposia per association were organized. But some associations had much less. For example, IAG only had 6 own symposia that, however, have partly been very big. So, 94 presentations have been given in its symposium G05 *Multi-Signal Positioning, Remote Sensing and Applications*.

Besides agreeing on the various deadlines, e.g. for abstract submission and registration, another wish of the LOC was considered in the program organization, namely to enable as many oral presentations as possible. One wanted to give the scientists the possibility, especially the early career scientists to present their research “on stage”, after the long travel restrictions in the pandemic which did not allow to meet in person. As a consequence, up to 28 sessions of 90 minutes duration were run in parallel, which also caused some problems when people were interested in topics that were presented at the same time. In total, 795 oral sessions and 167 poster sessions provided the platform for scientific exchange, where then 3,100 oral presentations were given and 1,300 posters were shown. The length of an oral presentation was 15 minutes, where the about 300 solicited speakers got 30 minutes. The task to organize the scheduling of these many sessions, to define which should run in parallel and in which rooms was greatly solved by the SsG, although not always the best fitting room could be taken for each symposium.

ASSOCIATION		WEDNESDAY 12 July	THURSDAY 13 July	FRIDAY 14 July	SATURDAY 15 July	SUNDAY 16 July	MONDAY 17 July	TUESDAY 18 July	WEDNESDAY 19 July
Union	Lectures			Union Lectures AM2		Union Lectures AM2		Union Lectures AM2	
	Symposia	U01 AM1+2 & PM1+2	U02 AM1 & AM2			U03 PM1 & PM2	U04 AM1 & AM2		
IACS									
IAG									
IAGA									
IAHS									
IAMAS									
IAPSO									
IASPEI									
IAVCEI									

Figure 2. Scientific Program schedule per association considering the preferences of certain association, where, e.g., IACS symposia were organized at the beginning of the General Assembly while IAVCEI symposia were organized in the second half, and IAG symposia covered the full period.

The “Big Themes” have been introduced as a successful new event form, where topics like open science, international cooperation, diversity, inclusion and participation related to the geosciences were discussed during the lunch breaks. By putting the poster area, the exhibition booths, some coffee places and the lunch trucks in one joint central hall, excellent occasions were provided for exchange among the participants on various levels. The poster sessions were scheduled at the end of each day together with sponsored refreshments. The posters of one symposium could be shown for two days, often followed by special events like reception, early career event, etc. Again, a good measure for bringing people together.

Resume: Although it is a complex, multi-level task to organize the scientific program of an IUGG General Assembly, the result makes all efforts worth. Most important is a good communication of the SPC members as well as of the LOC and the willingness of all to find a good solution for a successful General Assembly in a joint endeavor.

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

Union Lectures

- IUGG Monitoring the Spatio-Temporal Changes in Lake Chad Basin (LCB) Using Geospatial Techniques
(Rakiya Abdullahi Babamaaji, Nigeria)
- IACS When Giants Falter: Tipping Points in Greenland and Antarctica
(Ricarda Winkelmann, Germany)
- IAG Geodesy: It's About Time
(Geoffrey Blewitt, USA)
- IAGA From Ground Water to Tectonic Plates: Imaging the Earth Across the Scales with Electromagnetic Methods
(Max Moorkamp, Germany)
- IAHS HAND Model, a Topography Driven Wet Revolution in Land Surface Sciences
(Luz Adriana Cuartas, Brazil)
- IAMAS Are People in Developing Countries Paying with Their Lives to Reduce Climate Change?
(A.R. Ravishankara, USA)
- IAPSO The UN Decade of Ocean Science for Sustainable Development – A Call for Action to Broaden the Ocean Science Agenda
(Martin Visbeck, Germany)
- IASPEI SEIS on Mars: First Legacy After 4 Years of Seismic Monitoring of Mars
(Philippe Lognonné, France)
- IAVCEI Advances in Global Volcanic Eruption Monitoring and Cataloging Using Seismo-acoustic Observation Systems
(Robin Matoza, USA)

Gold Medal Lecture

- IUGG From the IPCC AR6 to the IPCC AR7: The Physical Science Basis of Climate Change Empowering Transformations
(Valérie Masson-Delmotte, France)

Union Symposia

- U01 Geoscience and Mathematics for Sustainable Development
- U02 Artificial Intelligence for Managing Natural Hazards and Disasters
- U03 New Discoveries in Deep Interior of the Earth and Planets
- U04 New Advances in Planetary Science and Comparative Planetology

Joint Inter-Association Symposia

- JA01 Machine Learning in Geo-, Ocean and Space Sciences (IAGA, IAVCEI, IAHS, IASPEI, IAMAS, IAPSO)
- JA02 Data Assimilation and Statistical Learning in Earth and Space Sciences (IAGA, IACS, IAHS, IAMAS, IASPEI)
- JA03 Analogue Data for the Future: Preservation and Present-Day Utilization of Historical Data in the Geosciences (IAGA, IACS, IASPEI, IAHS, IAG, IAPSO)

XXVIII General Assembly of the International Union of Geodesy and Geophysics
List of Lectures and Symposia

- JA04 Marine Geodesy and Geophysics – Opportunities & Hazards (IAGA, IAG, IASPEI, IAVCEI)
JA05 Solar Influence on the Atmosphere and Climate (IAGA, IAMAS)
JA06 Long-Term Changes in the Stratosphere, Mesosphere, Thermosphere, and Ionosphere (IAGA, IAMAS - ICMA)
JA07 Interdisciplinary Observations of Pre-Earthquake Processes. The Concept of Lithosphere-Atmosphere- Ionosphere Coupling (IAGA, IASPEI (EMSEV)
JA08 Ground and Satellite Electromagnetic Observations Related to Earthquakes, Tsunami's and Volcanic Activity (IAGA, IASPEI (EMSEV), IAVCEI)
JC01 Remote Sensing of the Cryosphere (IACS, IAHS)
JC02 Declining Glacier, Snow Cover and Permafrost and Their Impacts on Downstream Hydrology (IACS, IAHS, IAG)
JC03 Coupling Processes Between the Atmospheric Boundary-Layer and Snow - Ice Surfaces: Modelling at Convection and Snowdrift-Permitting Scales (IACS, IAHS, IAMAS)
JC04/C15 Atmospheric Circulations and Surface Mass Balance of Ice Sheets (IACS, IAMAS) /Progress in Quantifying Ice-Sheet Surface Mass Balance: Past, Present and Future
JC05/M16 Atmosphere-Ocean-Sea Ice Interactions: Physical and Chemical Processes (IACS, IAMAS, IAPSO) / Atmosphere-Ocean-Sea Ice Interactions: Local Processes and Global Implications
JC06 Mountain Cryosphere Hazards (IACS, IAVCEI, IASPEI)
JG01 Interactions of the Solid Earth with Ice Sheets and Sea Level (IAG, IACS, IASPEI)
JG02 Theory and Methods of Potential Fields (IAG, IAGA)
JG03 Remote Sensing and Modelling of the Atmosphere (IAG, IAGA, IAMAS, IAVCEI,)
JG04 Satellite Gravimetry for Groundwater Monitoring (IAG, IAHS)
JG05 Geodesy for Climate Research (IAG, IAMAS, IACS, IAPSO, IAHS)
JG06 Monitoring Sea Level Changes by Satellite and In-Situ Measurements (IAG, IAPSO)
JG07 Modern Gravimetric Techniques for Geosciences (IAG, IAVCEI, IAPSO, IASPEI)
JH01 New, Large, and Open Data for the Earth and Environmental Science Community (IAHS, IAPSO, all associations)
JH02 Advances in Snow Hydrology (IAHS, IACS)
JH03 Snow in the Critical Zone (IAHS, IACS)
JH04 Anthropocene: Perspectives from and Within Geophysics (IAHS, IAMAS, IACS, IASPEI, IAVCEI, IAG, IAPSO)
JH05 Citizen Science, Crowdsourcing and Innovative Monitoring for Advancing Geo-Sciences (IAHS, IASPEI, IAGA, IACS, IAMAS)
JH06 Education & Outreach in Geosciences (IAHS, IASPEI, IAGA, IAG, IAVCEI, IACS, IAMAS, IAPSO)
JM01 Recent Advances in Regional Climate Modelling (IAMAS, IACS)
JM02 Tropical-Polar Interactions, Arctic Amplification and Its Influence on Midlatitude Weather (IAMAS, IACS, IAPSO)
JM03 Polar Regions Instrumentation (IAMAS, IACS, IASPEI)
JM04 Weather and Climate Extremes: Understanding, Modeling, Prediction, and Impacts (IAMAS, IAHS)
JM05 Earth System Models: Assessing the Earth System's State and Fate from Regional to Planetary Scales (IAMAS, IAHS, IACS, IAPSO, IAVCEI?)
JP01 Tides (IAPSO, IAHS, IAGA, IASPEI, IAG)
JP02 Arctic Ocean Physics and Biochemistry in a Changing Climate (IAPSO, IACS)
JP03 Physical and Biogeochemical Ocean and Ice Processes in the Southern Ocean: Observations, State Estimation and Modeling (IAPSO, IACS)

XXVIII General Assembly of the International Union of Geodesy and Geophysics
List of Lectures and Symposia

- JP04 Ice Sheet-Ocean Interactions: Challenges and Insights from Theory, Observations and Modelling (IAPSO, IACS, IASPEI)
- JP05 Tsunamis (IAPSO, IASPEI, IAVCEI, IAMAS, IAG)
- JP06 Electromagnetic Studies of the Ice and Ocean System (IAPSO, IACS, IAGA)
- JS01 Cryoseismology (IASPEI, IACS, IAG)
- JS02 Seismo – Geodesy (IASPEI, IAG)
- JS03 Probing the Earth’s Lithosphere: Understanding Tectonic, Volcanic, Cryotonic and Geodynamic Processes Using Geophysical Methods (IASPEI, IAG, IAGA)
- JS04 Monitoring, Imaging and Mapping of Volcanic Areas (IASPEI, IAG, IAVCEI, IAGA)
- JS05 Real-Time GNSS Data and Products Usage: Interoperability and Management Challenges (IASPEI, IAG, IAVCEI, IAPSO)
- JS06 Joint Inversion of Different Geophysical Data Sets (IASPEI, IAGA, IAG, IAVCEI)
- JS07 Geophysical Constraints on the Earth’s Deep Interior Combining Modelling and Observations (IASPEI, IAGA, IAG, SEDI)
- JS08 Advances in Heat Flow Studies: From Fundamental Geodynamic Understanding to Geothermal Energy Applications (IASPEI, IAVCEI (IHFC))
- JS09 Early Warning Systems for Geohazards (IASPEI, IAVCEI, IAHS, IAG)
- JV01 Volcano-Ice Interactions (IAVCEI, IACS)
- JV02 Dispersal of Volcanic Particulates in the Atmosphere and the Oceans (IAVCEI, IAMAS, IAPSO)
- JV03 Hunga Tonga (IAVCEI, IAMAS, IAPSO, IASPEI, IAGA, IAG)
- JV04 Volcano Seismology (IAVCEI, IASPEI)
- JV05 Strain Localisation and Seismic and Volcanic Hazards (IAVCEI, IASPEI, IAG)
- JV06 Geophysics of Solar System Planets (IAVCEI, IASPEI, IAG, IAGA)
- JV07 The Architecture of the Lithosphere in Volcanic Regions (IAVCEI, IASPEI, IAGA, ILP)

Association Symposia and Workshops

International Association of Cryospheric Sciences (IACS)

- C01 Advances in Modelling Glaciers and Ice Caps – Past Reconstructions, Future Projections, and Process-Based Studies
- C02 Glacier Changes in High Mountain Asia and the Karakoram Anomaly: Latest Insights from the Atmosphere and Cryosphere
- C03 Debris Covered Glaciers
- C04 Fast Glacier Flow: Processes, Observations and Modelling of Ice Streams, Tidewater Glaciers and Surging Glaciers
- C05 Tropical Glaciers: Mass Changes, Climate Forcing and Impacts on Indigenous Communities
- C06 New Frontiers in Paleoclimate Reconstructions and Proxy Interpretations from Ice Cores
- C07 Mass Changes of The Cryosphere – The Need for and Lessons Learned from Intercomparison Exercises
- C08 Challenges in Modeling, Monitoring and Predicting Alpine Mass Movements
- C09 Mountain Snow Cover Under Climate Change: From Past to Future
- C10 Satellite-Derived Snow Cover Products and Their Applications in Hydrology
- C11 Light Absorbing Particles on Snow and Ice
- C12 Spotlighting Divergence: Climate Change Refugia Within Snow-Dominated Catchments and Where to Find Them

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List of Lectures and Symposia

- C13 Data Driven Cryospheric Sciences: Machine Learning, Data Assimilation and Inverse Methods for the Cryosphere
- C14 Cryospheric Processes and Related Socioeconomic Impacts
- C15/JC04 Progress in Quantifying Ice-Sheet Surface Mass Balance: Past, Present and Future
- C16 IACS Early Career Awards

International Association of Geodesy (IAG)

- G01 Reference Systems and Frames
- G02 Static Gravity Field and Height Systems
- G03 Time-variable Gravity Field
- G04 Earth Rotation and Geodynamics
- G05 Multi-signal positioning, Remote Sensing and Applications
- G06 Monitoring and Understanding the Dynamic Earth with Geodetic Observations

International Association of Geomagnetism and Aeronomy (IAGA)

- A01 New Frontiers in Rock and Environmental Magnetism
- A02 Electrodynamics and Energetics of the Middle Atmosphere
- A03 Coupling Processes in the Atmosphere-Ionosphere System
- A04 Advances in Mid-Latitude, Low-Latitude and Equatorial Aeronomy
- A05 Space Weather and Electrodynamics of the Ionosphere and Atmosphere into the Polar Regions
- A06 Energetic Particle Precipitation Impacts on the Ionosphere, Upper Atmosphere, and Climate System
- A07 Radiation Belt and Ring Current: Emergence and Loss in Geospace, and the Role of the Cold Plasma Background
- A08 DIV III Reporter Review
- A09 Magnetosphere-Ionosphere-Thermosphere Coupling during Enhanced Geomagnetic Activity
- A10 The Expanding Regimes of ULF Wave Research
- A11 Magnetotail Dynamic Processes
- A12 Magnetospheric Processes
- A13 Magnetospheric Boundary Layers
- A14 Dayside Magnetosphere Interactions
- A15 Advances and Upcoming Developments in Solar and Heliospheric Physics
- A16 Waves and Turbulence in the Solar Corona and Wind
- A17 Interplanetary Shocks, Particle Acceleration, and Transport in Solar and Heliospheric Physics
- A18 Space Weather and Space Climate: Data and Models
- A19 Solar Eruptions (CMEs, Flares, Filaments), Their Source Region Evolution, and Forecast
- A20 The Rising Phase of Solar Cycle 25 and Comparisons to Previous Cycles
- A21 Satellite-Based Geomagnetic Field Measurements and Modeling
- A22 Planetary Magnetic Fields and Secular Variation at All Temporal Scales
- A23 Current Developments of Ground Geomagnetic Observations and Integration with Space Based Data
- A24 Geomagnetic Observations, Indices and Products for Space Science, Space Weather and Space Climate Applications
- A25 Geoelectric Field Measurements and Modeling for Space Weather Applications

International Association of Hydrological Sciences (IAHS)

- H01 Panta Rhei Synthesis: Change in Hydrology and Society
- H02 Detecting the Impacts of Water Management on the Spatial and Temporal Pattern of Natural Water Resources Via Observations, Models and Remote Sensing
- H03 Floods: Processes, Forecasts, Probabilities, Impact Assessments and Management
- H04 Diminishing Lakes and Wetlands: Causes Behind the Process and Actions for Recovery
- H05 Climate Change and The Water Quality
- H06 The Future of Water Resources Management
- H07 Stable Isotopes of Water in the Hydrological Cycle
- H08 A Familiar Paradigm – Climate Change and the Soil-Sediment Continuum - Resilience, Thresholds, and Adjustments
- H09 Analysis and Prediction of Hydrological Induced Disasters in High Mountain Environment
- H10 Transdisciplinary Citizen-Centred Participatory WEFE Nexus Approaches to Achieve Water, Food, Energy and Environment Security
- H11 Stochastic Hydrology with Contributions on Methodologies and Applications, for Modeling, Forecasting, Change Assessment, and Uncertainty Quantification
- H12 Extremes in Hydroclimatic Systems
- H13 Vegetation and Hydrology Interactions: A Remote Sensing Perspective
- H14 Improving Understanding of Hydrological Processes Through Water Quality
- H15 The History of Hydrology

International Association of Meteorology and Atmospheric Sciences (IAMAS)

- M01 Middle Atmosphere Symposium
- M02 Dynamics and Variability of the Warming Hole(s) in the Climate System
- M03 Climate Extremes in the Atmosphere-Land-Ocean System: Physical Processes, Predictability, Impacts and Adaptation
- M04 Past Climate Changes and Their Relevance for the Future
- M05 Atmosphere-Ocean-Ice Interactions: Physical, Biogeochemical and Biological Processes in the Ross Sea
- M06 Monsoon Systems in Rapid and Intensifying Climate Change and Their Role in Extreme Events
- M07 Earth System Response to Solar Radiation Modification: Modeling, Impacts and Uncertainties
- M08 Variability and Near-Term Predictability of the Antarctic Climate System
- M09 Geosciences for Sustainable Development CANCELLED
- M10 El Niño - Southern Oscillation and its Regional and Global Impacts
- M11 Earth's Energy Budget
- M12 Advances in Atmospheric Radiation
- M13/M14 The Year of Polar Prediction (YOPP) / Climate Change in the Polar Regions
- M15 Polar Modelling
- M17 Space Weather Influence on Polar Lower Atmosphere
- M18 60 Years of ICPM
- M19 Lightning Observations for Research and Applications in Meteorology and Climate
- M20 Lightning Physics and Effects
- M21 Thunderstorms and the Global Electrical Circuit
- M22 Cloud and Precipitation Studies

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List of Lectures and Symposia

- M23 Cloud-Radiative Interactions
- M24 Dynamics and Microphysics of Moist Convection
- M25 Cloud Nucleation Studies
- M26 Weather Modification and Small-Scale Geoengineering: Theory, Practice and Technology
- M27 Atmospheric Chemistry in the Anthropocene: From the Urban to Global Scales
- M28 Advances in Dynamic Meteorology
- M29 Dynamics of Mountain Weather and Climate: Observations, Modeling and Prediction at All Scales
- M30 Tropical Meteorology
- M31 Ocean-Atmosphere Mechanisms of Climate Variability, Change and Predictability
- M32 Sub-Seasonal to Decadal Prediction (S2S-S2D)
- M33 Diagnosing and Reducing Errors and Biases in Weather and Climate Models
- M34 Data Assimilation and Machine Learning in Earth Systems Modeling
- M35 Exploration of the Diversity of Planetary Atmospheres: From the Solar System to Exo-Planets

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

- P01 General Topics in Oceanography (physics and biogeochemistry)
- P02 Physics and Biogeochemistry of Semi-Enclosed, Shelf Seas, and Coastal Zones
- P03 Ocean Mixing Frontiers
- P04 Storm Surges, Waves, and Coastal Hazards
- P05 The Meridional Overturning Circulation
- P06 IIOE-2: A Huge Step Forward for the Indian Ocean Sciences
- P07 Unravelling New Aspects of Nutrient Cycling in the Ocean: Multi-proxy and Modelling Approaches (CXL)
- P08 Bringing Scientific and Technological Ocean Information Together for Advancement of Sustainable Development in the Framework of the UN Ocean Decade

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

- S01 Observational Seismology - Open Session
- S02 International, National, Regional and Local Networks and Earthquake Data Centers: Highlights and Challenges
- S03 Seismic Scattering and Absorption, Ambient Noise, and Monitoring Earth's Structure
- S04 Advancements in Acquisition, Processing and Interpretation of Seismological Data
- S05 Advances in Earthquake and Explosion Monitoring Using Distributed Acoustic Sensing
- S06 Pre-Instrumental Earthquake Data
- S07 Scientific Drilling and Downhole Monitoring – A Key to Understand Geohazards
- S08 Anthropogenic Seismicity
- S09 Earthquake Ground Motion and Seismic Hazard
- S10 Multi-Hazard Risk Assessment
- S11 Site Response in Urban Areas
- S12 Recent Devastating Earthquakes Including the Feb. 6, 2023 Turkey Sequence
- S13 Development, Testing and Application of Earthquake Forecasting Models
- S14 New Advances in Understanding the Earth's Crust Dynamics in the Light of Solving the Problem of Earthquake Forecasting
- S15 Boundary Layers in Earth's Mantle: Origin, Structure, and Influence on Convection

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List of Lectures and Symposia

- S16 Earthquake Source Mechanics
S17 Structure and evolution of the lithosphere in the circum-Mediterranean
S18 Integrating Seismic Tomography with Mineral Physics and Potential Fields to Describe the Crust and Upper Mantle Physical State
S19 Fabrics and Dynamics of the Lithosphere-Asthenosphere System Imaged by Seismic Anisotropy and Integrated Studies
S20 Education & Outreach to Ensure Success of Earthquake Early Warning Programmes
S21 Seismology Education and Inclusive Environments

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

- V01/V12 Studying and Monitoring Volcanic Processes through Volcano Geodesy Techniques, Approaches and Realistic Modeling
V02 Modelling and Monitoring of Volcanic Ash Clouds
V03 Uncertainty Treatment in Volcanic Hazard Analyses
V04 Integrated Approaches to Investigate Pyroclastic Density Currents
V05 Interactions Between Volcanic Eruptions and Climate
V06 Geochemical and Geophysical Responses of Magma Feeding Systems and Eruption Dynamics at Active and Quiescent Volcanoes
V07 Putting Time and Rate Constraints on Magmatic Processes - How Fast How Long
V08 Volcano Geology and Mapping, Eruptive Behaviour and Hazard Assessment from Field Studies
V09 Advanced Remote Sensing Techniques to Study Volcanic Hazards
V10 History of Volcanology and Historical Volcanology
V11 Planetary Volcanism: Remote Sensing, Rovers, Landers, Earth Analogues and Modelling
V13 Recent Advances in Volcanology
V14 Open-vent Systems - Definitions, Longevity, and Implications
V15 Interdisciplinary Approaches to Volcanic Hazards Modelling
V16 Interdisciplinary Approaches to Volcanic Hazards Modelling

Statistics

Symposia and Oral Sessions Breakdown

	No. of Symposia		No. of Oral Sessions	
Union	9	4,3%	26	4,7%
Joint	57	27,3%	137	24,8%
IACS	13	6,2%	23	4,2%
IAG	6	2,9%	47	8,5%
IAGA	21	10,0%	51	9,2%
IAHS	28	13,4%	56	10,1%
IAMAS	23	11,0%	99	17,9%
IAPSO	11	5,3%	40	7,2%
IASPEI	25	12,0%	46	8,3%
IAVCEI	16	7,7%	27	4,9%
Total	209		552	

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

**XXVIII IUGG GENERAL ASSEMBLY OPENING CEREMONY
BERLIN, GERMANY, 13 JULY 2023**

The Opening Ceremony of the XXVIII General Assembly of the International Union of Geodesy and Geophysics was held in the afternoon of Thursday, 13 July 2023 at the CityCube Berlin, Germany, starting at 17:30.

PROGRAM

Address by Harald Schuh, Chair of the Local Organizing Committee of the XXVIII IUGG General Assembly

Address by Kathy Whaler, President of IUGG

Address by Susanne Buitter, Scientific Director of GFZ German Research Centre for Geosciences

Address by Peter Gluckman, President of the International Science Council

Address by Jürgen Müller, Chair of the Scientific Program Committee of the XXVIII IUGG General Assembly

Address by Mario Brandenburg, Parliamentary State Secretary, Federal Ministry of Education and Research

ADDRESS BY THE CHAIR OF THE LOCAL ORGANIZING COMMITTEE, HARALD SCHUH

Ladies and gentlemen, dear colleagues, and friends,

It's a great pleasure for me to welcome you here on behalf of the Local Organizing Committee in Berlin to the 28th General Assembly of the IUGG. My name is Harald Schuh. I am the chair of the Local Organizing Committee. And these are the members of the Local Organizing Committee. Fifteen people from eight German institutions. Six of them from GFZ, the German Research Centre for Geosciences, which is the main organizer, together with colleagues from BGR in Hannover, BKG in Frankfurt, DLR, the German Space Agency, and also the universities here from Berlin and also the University of Potsdam.

And let me give you first a few numbers, some statistics. So far, as of yesterday, we had almost 5,000 participants. This has been a kind of dream to cross the 5,000 barrier and I'm sure we're going to make it in the next few days. Business meetings so far, we have 129 and more to come. I guess at the end, there will be between 150 and 200 business meetings. And it's one of the main reasons to gather here, to meet with your colleagues and friends in sprinter meetings and any kind of board meetings and committee meetings. And this was also the reason, the background of our slogan; probably you have seen it, "Together Again for Geosciences". The background, of course, is that we are so glad after almost four years of a gap where a meeting was not possible to see you here again and face-to-face, see you again in person.

Travel grants were provided to more than 300 people. The fees were waived for almost 400 people. Together this corresponds to almost 400,000 euros. And almost all of these grants were given to young PhD students, Early Career Scientists from developing and emerging countries. The Local Organizing Committee had 23 sessions, so we tried our best in the last four years. We also could hire 150 volunteers, and you have seen these enthusiastic young people with a green T-shirt. All of them are students, master students, or PhD students in geosciences. Thirteen of them got a full-time contract. We also sent out 1,700 invitation letters. 400 I had to sign by hand personally on paper, which was quite a tough job. And hopefully, all invitation letters were successful, and people could arrive.

There are several special events during the General Assembly. We have several events dedicated to Early Career Scientists. For instance, on Friday, tomorrow evening, there's going to be a summer get-together for Early Career Scientists organized by Geo.X, which is the consortium here in Berlin, Brandenburg, of geoscience institutions from universities, and also the GFZ. There is an Early Career Scientist social on Saturday at half-past six. And one of the lunchtime sessions with the Big Themes is dedicated to Early Career Scientists and their perspectives. That's going to be on Sunday, 12:15.

Public days, and that's also interesting because it allows free admission to the Exhibition Hall B, free of charge from tomorrow till Sunday, where people can visit and see the exhibitors and meet with colleagues. So please also inform your colleagues to come on the weekend and just visit the exhibition. And there were and are numerous field trips and tours organized. I was informed that almost all of them are sold out. Still, there are some tickets available for the Touristic City tour. But it's always worth asking whether there were some cancellations, and maybe you can jump in at the last minute.

Related events, events in connection with the General Assembly. There were several training courses, International Summer Schools at GFZ in Potsdam or other places. And there are a lot of additional visits of GFZ and other geoscientific organizations in Berlin and Brandenburg. Thanks go to the German National Committee for Geodesy and Geophysics, which brought this conference to Germany and asked the GFZ to become the main host and organizer of the conference, together with BGR, BKG, Helmholtz, Geo.X, Geomar, and Alfred Wegener Institute as co-organizers.

We have 37 exhibitors, 15 sponsors; LOC members I already mentioned. The Scientific Program Committee was chaired by Jürgen Müller. And he will present and provide more information on all the scientific sessions. And my thanks also go to our professional congress organizer, the company C-IN

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

from Prague, which has been doing a great job so far. And I'm sure this will continue, and we will have a successful meeting until next week on Thursday.

And that's the slide with the sponsors. We have silver sponsors, bronze sponsors, sponsors of the conference. Also, the DFG, the German Research Foundation, provided an additional 70,000 euros for grants for young scientists. With this, I wish you a very warm welcome to all participants and a successful conference.

ADDRESS BY THE IUGG PRESIDENT, KATHY WHALER

Distinguished guests, delegates, ladies and gentlemen,

I'd first like to start off by thanking all those who've made this possible in many days when we thought it just could not possibly happen. The LOC, the Scientific Program Committee, our professional conference organizers, all the volunteers, all the people in the associations, and everybody that allows us to meet here today.

These are and have been times of momentous change for all of us, especially in the short time since the last General Assembly in Montreal. Certainly, my presidency hasn't been the one I expected and anticipated. I'm briefly going to interject a sombre note to proceedings. Over the last four years since I began my presidency, many people have lost their lives and livelihoods to the pandemic, armed conflicts, and I don't just mean in Ukraine, and the disastrous effects of climate change; both pernicious and extreme events. Let's just take a moment to reflect and remember. Thank you.

But now we look forward as we gather here in the great city of Berlin at this excellent venue. This General Assembly is already groundbreaking. Harald has just given us the numbers, but this is a record number of participants at a General Assembly. As well as the usual symposia covering the full range of IUGG science, be that at the association, jointly, or union level, we have new types of discourse with our lunchtime Big Themes, examination of societal issues and the impact our science is making. And of course, a wonderful lineup of Union and Gold Medal Lectures.

Talking of our Big Themes, we didn't deliberately restrict the amount of seating near the lunch food trucks to get you to take your lunch into them, but of course, you're very welcome to. From the program, I also see, and Harald has outlined a wide range of other events, both business and social. By the way, it's great to hear that many of the association dinners have sold out. Through all of these activities, we can once again enjoy and reap the value of formal and informal interactions with colleagues from around the world, echoing the theme of this meeting, "Together Again for Geosciences."

Many of us carefully consider our carbon footprint in both our personal and professional lives. And IUGG has previously passed a resolution on this matter. In my travels as president, when practical, I've taken the train to meetings or chosen flights that did not involve a stopover, even if it means a more convoluted journey and used local public transportation or even walking rather than take a taxi. In consideration of all those air miles that have enabled us to gather in Berlin, let's make sure that we make every second we're here count. With this, I welcome you all to this 28th General Assembly and wish you a successful and productive meeting. Thank you.

**ADDRESS BY THE SCIENTIFIC DIRECTOR OF THE GFZ GERMAN RESEARCH
CENTRE FOR GEOSCIENCES, SUSANNE BUITER**

Dear colleagues, dear Kathy, as President of the IUGG, dear Harald as Chair of the Local Organizing Committee, dear all,

It's a real privilege to be here and welcome you to the IUGG General Assembly. Working as a geoscientist and now also a scientific director of the GFZ, I actually have a number of privileges, and they include getting to work on highly relevant and exciting topics and talking about these topics with scientists like you, and also media and citizens, and politicians. And in doing this, such topics, they bring expectations but sometimes also conflicts. These are topics that often have to do with our subsurface – fracking, mining, or storage CO₂, effects of climate change. But these themes are urgent are highly relevant to our societies. They relate to big challenges that we're facing – the climate crisis, the use of our resources.

And underlying questions that we are asked as geoscientists when we work on themes like this are worries. Worries about the future, our future lifestyle, how we treat our planet. And as scientists, do we phrase only facts or also opinions? So we may also be asked how we conduct our science and how we choose the topics that we work on. For all this, we need to be diverse in our perspectives. We need input from different cultures, from different backgrounds, from different mindsets. We also need this so we can attract talents regardless of their heritage, or their gender, or socioeconomic status. Only then can we identify topics and solutions that would fit the needs of different people and societies.

So, the IUGG General Assembly—and we've all seen the numbers, a good 5,000 participants from all over the world—the IUGG showcases such a multitude of perspectives. The multitude of perspectives that we need to provide solutions. And as the scientific director of the GFZ, the German Research Centre for Geosciences, I am proud and also grateful that the IUGG has chosen Berlin as the venue for its General Assembly. We also established the Local Organizing Committee, GFZ, and GFZ has hosted the IUGG Secretariat since 2013. Now, the GFZ, we would like to think, is the go-to place for all questions in Germany related to solid Earth.

A few months ago, we started the strategy process. Don't worry; I'm not going to bore you with the details of our strategy process. But we came up with an overriding question: What makes Earth a habitable planet? And I would like to give you a glimpse of the different aspects of this question that we tackle at GFZ. We take the pulse of our planet, we monitor it as closely as we can. We drill deep to look into the geological past, and we see Earth as a system of interconnected spheres that also interact with each other: the atmosphere, the hydrosphere, the cryosphere, geosphere, biosphere, but also the anthroposphere. We should ask, what does a habitable world really mean? Is it habitable for us, the current generation, or also habitable for future generations? And is it habitable for humans or habitable also for plants, and animals? And habitable Earth or habitable other planets? So, were other planets habitable once? And what do we actually aim for when we explore other planets? There are many questions I could ask; I'm not going to answer them. Instead, I'm going to look for answers from you, the geoscience community.

I think there's no better place to start looking for answers to such questions than here at the IUGG General Assembly. It's an event like this that our communities meet, that we meet in person, where we can reinforce connections, where we can build new networks. Bringing science forward, and also hopefully starting to answer some of the endless many questions in geodesy and geophysics. So, I would like to thank the Local Organizing Committee in particular, for the enormous effort in putting this conference together. I would like to include all the people in the background. You've seen the green T-shirts, but there is many more people who have done tremendous amounts of work to make this conference possible. I would also like to thank our partners in the IUGG, the German National Committee, and of course, our friends with their staff at the exhibition. So, welcome, thank you to all, and I wish you a wonderful conference.

**ADDRESS BY THE PRESIDENT OF THE INTERNATIONAL SCIENCE COUNCIL,
PETER GLUCKMAN**

As a president of the International Science Council, I'm very sorry I cannot be with you at your meeting in Berlin. The IUGG, of course, is much older than the ISC as, in fact, one of the founder members of ICSU, one of the predecessors of the ISC. There's a lot I want to learn from how the IUGG evolved. Because after all, just like the ISC, it's an umbrella organization comprised of a number of other bodies that, of course, serve the function of advancing science. In your case focusing on Earth science and space science. Science, which is so important as we face the issues of the Anthropocene, of climate change, biodiversity loss, ocean degradation, and Earth and space science are critical. Not on their own, but in conjunction with other natural and social scientists to advancing the human condition through both basic and applied science. It's critical that we as the scientific community think about how we work together across disciplines, across countries, across cultures, and with society and with the policy community. And of course, that's why the International Science Council was formed five years ago, integrating the natural and social sciences and the normative humanities in a single organization, which could have a much stronger global voice. But the voice is no good if it's not listened to. And so part of the ISC's strategy has to be to improve the voice of science by improving the listening to it by various bodies – governments, the multilateral system, the private sector, civil society. And that's informing our strategic plan in so many ways. The ISC is clear in its mission: to advance the voice of science with the multilateral community, to help our members have a more effective voice, either through their disciplinary bodies or through the national members, to focus on how science will enhance and change over time. Science itself is evolving. We've seen the emergence of multi-disciplinary science, of transdisciplinarity, as you'll see in a recent report, changing the nature of research assessment and so forth. And with these rapid changes happening, the ISC has chosen to form a Centre for Science Futures based in Paris, but networked beyond and out to help us think ahead over what are the issues that the science community will confront. As the role of science and society changes, expectations change. And one area which is particularly concerning to me is the change in trust in science, which has happened in a world of disinformation. In that context, the Committee for Freedom and Responsibility in Science remains critically important, but that's primarily focused on the trustworthiness of science. I think the bigger challenge, and one which the ISC is just starting to grapple with, is what do we do to enhance the trustworthiness of science as perceived by the public and policymakers alike? I do not need to rehearse all the issues of sustainability with which you, as the part of the scientific community, are intimately involved in and have a critical role to play moving ahead. But the ISC, as your voice, has a critical role to play in persuading the multilateral system where and how science can be better used. To that extent, we've launched a presence in New York, so we can have a much more effective engagement with member states, both individually and collectively in promoting the use of science and how decisions are made in the multilateral system. IUGG stands as a very, very important part of the ISC family, and its wisdom is important to us. Umbrella organizations are complex. We are finding that in establishing the ISC and yet, IUGG has shown how successful it can be as an umbrella organization. You're, of course, about 20 times older than the ISC is. And so there's a lot I would like to learn from you. I wish you well with your meeting, and I look forward to further engagement with both your board and your members over the next year and over the coming times. Best wishes from the ISC.

**ADDRESS BY THE CHAIR OF THE SCIENTIFIC PROGRAM COMMITTEE, JÜRGEN
MÜLLER**

Also warm welcome on behalf of the Scientific Program Committee.

My name is Jürgen Müller. I was the chair of this program committee, but in real life, I'm a geodesist. So what you see here are the names of the eight SGs of the eight associations and they worked hard for three years to create this fantastic program that you can enjoy during these 10 days. And I can say I was less a chair, more a moderator because there are so many individual interests of the eight associations. But at the end, somehow, we made it and created this program. Maybe also a general remark. An IUGG General Assembly is not eight association meetings on one location at the same time. It is more. It is more than the sum of the single pieces. It is really a joint endeavor to achieve an added value for the geosciences and for the geoscience community. You already have seen, and this is an old number, the participants. And I've heard today we already have more than 5,000 registered people. We have had more than 5,000 abstracts. And we have formed about 170 symposia in total. And amongst them are 50 inter-association symposia. This is 30%, the biggest ratio of inter-association symposia that we ever had. And this underlines that, that it is an interdisciplinary joint endeavor and not single association meetings. We have oral sessions, many parallel sessions. At the weekend we have up to 28 parallel sessions. In addition, 166 poster sessions. And again, in addition, the Union Lectures, the big debates and many more activities. And the scientific program, as you can imagine, covers a full spectrum of geodetic and geophysical research. That means from observation, from data analysis, from modeling, interpretation and applications just to learn more about the various processes and the acting processes of our complex system. The sessions are run by 684 conveners. And we have invited speakers – 380. And 380 out of 5,000 means it's a good mix of experts and newcomers. And what we also tried to establish, or to realize, is 70% of oral presentations. Because one of our goals was to give the scientists a platform to present the research on stage after three years of many restrictions in the pandemic. And 30% posters is also quite a good number. And it's close to the exhibition area, and I have seen it, and it's very active. A lot of traffic in the oral and the poster sessions.

Some more numbers, some more statistics on the participants. We have 1,268 Early Career Scientists and PhD students. All this is the highest number we ever had at IUGG General Assemblies. They come from 57 countries. In total we have participants from 107 countries. And the distribution, the continental distribution shown here – half of the participants come from Europe, a quarter from Asia, and a quarter from the other continents. So we are quite happy. And also, this is a sign IUGG is not only young but also global and international with all the activities. And to end my introductory words, I also want to thank Harald Schuh. We have had close contact. Harald Schuh from GFZ as the head of the LOC. But also the IUGG Office, which luckily is also hosted by GFZ in Potsdam. And I want to name Franz Kuglitsch and Alex Rudloff who really supported a lot to create this program. And to make it running, we have our Professional Congress Organizer, Harald already mentioned it, from Prague, and we are happy that they are doing so much and supporting our work. And many more, I cannot mention everybody. So now I wish you a successful IUGG General Assembly with excellent science, with good networking, with a lot of new contacts. So, let's get it started. And many thanks on behalf of the Scientific Program Committee.

**ADDRESS BY THE PARLIAMENTARY STATE SECRETARY, FEDERAL MINISTRY
OF EDUCATION AND RESEARCH, MARIO BRANDENBURG**

Dear Professor Whaler, dear Professor Buitter, dear scientists and scholars, ladies, and gentlemen,

I am very pleased that the General Assembly of the International Union of Geodesy and Geophysics (IUGG) is taking place in Germany again after 40 years. Berlin, with its universities, art and technical colleges, and numerous non-university research institutions, is an ideal venue to promote interdisciplinary international scientific exchange. I therefore encourage you to stimulate discussions with your presentations and ideas. Develop proposals for solutions that will benefit us all.

Bringing one of the world's most important geoscientific conferences to Berlin was a major interest to the Federal Ministry of Education and Research and we strongly supported it. Federal Minister Stark-Watzinger highly appreciates and supports geoscientific and natural scientific research. The geosciences are of enormous importance due to the observations of changes in the different spheres of our planet.

In the coming days, numerous scientists, i.e. all of you, will present your findings on very different processes. Be it in the Earth's interior, on the Earth's surface, in the ocean or in the polar regions and glaciers. You will exchange results and data. They will address pressing issues such as sustainable energy supplies, protection against natural hazards, securing the supply of raw materials or developing measures to combat climate change. These scientific achievements and findings are invaluable to us.

We at the Federal Ministry of Education and Research want to give new impetus to the science and research landscape. In Germany, but also worldwide. We therefore promote innovative ideas and technical innovations. In addition, national, European and non-European cooperation is indispensable in order to jointly meet the aforementioned challenges. Science and innovation are they key to creative ideas that help address the local and regional, but also the major global challenges of our time.

Science provides knowledge for action, overcomes obstacles, and answers questions. It builds bridges between society, business and politics and is our reliable compass for the future.

The recent past shows us more than ever how vulnerable our society can be and how urgently solutions and innovations are needed. Only with the help of knowledge and expertise, technology-open approaches, and the resulting innovations, as well as an efficient exchange of data and information, can we meet these challenges. This is the only way to secure a sustainable supply of energy and raw materials, minimize the impact of natural disasters and effectively combat climate change.

The program of your conference illustrates the importance of interdisciplinary Earth system research. In this context, the networking, processing and pooling of data is indispensable for the transfer of knowledge and technology to politics, industry and society. I wish you all many interesting presentations and discussions, and a successful conference full of ideas.

Thank you very much.

MINUTES OF THE COUNCIL MEETINGS
28TH GENERAL ASSEMBLY, BERLIN, GERMANY, 12-18 JULY 2023

MINUTES OF THE FIRST SESSION
WEDNESDAY, 12 JULY, 2023 (14:00 – 18:00), ROOM A5, CITY CUBE BERLIN

PARTICIPANTS

NATIONAL DELEGATES

Argentina	Ezequiel Antokoletz
Australia	Trevor McDougall
Austria	Wolfgang Lenhardt
Belgium	Philippe Huybrechts
Canada	Fiona Darbyshire
Chile	Pedro Castillo F. (alternate)
China	Yi-Gang Xu Zhifeng Ding (alternate)
China-Taipei	Kuo-Fong Ma
Costa Rica	Marino Protti
Croatia	Mirko Orlic
Denmark	Aksel Walløe Hansen
Estonia	Artu Ellmann
Finland	Jyri Näränen
France	Pierre Briole
Germany	Jürgen Müller
Hungary	Judit Bartholy
India	Virendra Tiwari (alternate)
Indonesia	Mohamad Arief Syafii Yan Anugrah Rahmawan (alternate)
Israel	Colin Price
Italy	Fausto Guzzetti
Japan	Kumiko Goto-Azuma
New Zealand	Dionne Hansen
Poland	Jan Krynski
Portugal	Fernando Carrilho
Romania	Constantin Stefan Sava
Slovenia	Polona Vreca
South Africa	Isabelle Ansorge
Spain	Marcelino Valdes Perez de (alternate)
Sweden	Per Holmlund
Switzerland	Charles Fierz (alternate)
Thailand	Kriengkrai Boonter Sarayut Yousamran
United Kingdom	Kate Heal
United States of America	Efi Foufoula (alternate)

LISTENER (OBSERVER COUNTRY)

Brazil	Marcelo Sousa De Assumpcao
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MEMBERS OF THE EXECUTIVE COMMITTEE

IUGG President	Kathy Whaler
IUGG President-Elect	Chris Rizos
IUGG Secretary General	Alexander Rudloff
IUGG Treasurer	Niels Andersen
IUGG Bureau Member	Stephen McNutt
IUGG Bureau Member	Eduard Petrovsky
IUGG Bureau Member	Jun Xia
IAG President	Zuheir Altamimi
IAGA President	Mioara Manda
IASPEI President	Kenji Satake
IAVCEI President	Patrick Allard
IUGG Immediate Past President	Michael G. Sideris

MEMBERS OF THE FINANCE COMMITTEE

Chair	Corina Risso
Member	Priscilla Grew

SECRETARIAT

IUGG Executive Secretary (Minute Taker)	Franz Kuglitsch
IUGG Assistant	Katrin Gundrum

GUESTS OF THE PRESIDENT

CMG Chair	Alik Ismail-Zadeh
IACS Vice-President	Ming Hu Ding
IACS Vice-President	Andrew Mackintosh
IAGA Secretary General	Monika Korte
IAHS Secretary General	Christophe Cudennec
Nominating Committee, Chair	Harsh Gupta
Bureau Member, Candidate Inkomati Usuthu Catchment Management Agency, South Africa	Athena Coustenis Tendai Sawunyama

**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. Delegates from 34 member countries were present at the opening. Delegates from 33 member countries were eligible to vote. The total number of countries eligible to vote was 45 (73 minus 14 in observer status minus 14 in associate status). The quorum (15) was reached.

Kathy Whaler welcomed all participants to the Council Meeting. She proposed to appoint Katrin

Gundrum, Monika Korte, and Michael G. Sideris as the three tellers for voting matters. Charles Fierz, Council Delegate of Switzerland, proposed, seconded by Fiona Darbyshire, Council Delegate of Canada, to accept the three tellers. A vote by hand was conducted. The Council Delegates accepted the proposal unanimously.

Kathy Whaler noted that the Council Meetings are voice-recorded to write the minutes.

2. Approval of the Agenda

Franz Kuglitsch presented the agenda of the Council Meeting. He mentioned that most of the supporting material was shared with the Council Delegates in advance and that all supporting material and presentations for each agenda item is available [here](#). Virendra Tiwari, Council Delegate of India, proposed, seconded by Wolfgang Lenhardt, Council Delegate of Austria, to accept the agenda. A vote by hand was conducted. The Council Delegates approved the [agenda](#) unanimously.

3. Approval of the Minutes of the Council Meeting in Montreal (2019)

Franz Kuglitsch presented the minutes of the 2019 Council Meeting. He mentioned that, in October 2019, the minutes were distributed to the participants of the 2019 Council Meeting for their comments. Minor changes for revision were received. Marino Protti, Council Delegate of Costa Rica, proposed, seconded by Isabelle Ansoorge, Council Delegate of South Africa, to approve the minutes of the 2019 Council Meeting. A vote by hand was conducted. The [minutes](#) were approved unanimously.

4. Reports of the IUGG Officers

President Kathy Whaler

Kathy Whaler summarized the major Union activities since 2019 as detailed in her [quadrennial report](#). The presentation she gave can be downloaded [here](#).

She highlighted (i) the impacts of COVID-19 and the war in Eastern Europe on IUGG, (ii) the IUGG Centennial Celebrations in 2019, (iii) the collaboration of IUGG with the Abdus Salam International Centre for Theoretical Physics (ICTP), (iv) the involvement of IUGG in the International Year of Basic Science for Sustainable Development (IYBSSD), the International Union of Geological Sciences Deep-Time Digital Earth (DDE) Programme, and the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO), and (v) all the meetings which she attended to represent IUGG.

Secretary General Alexander Rudloff

Alexander Rudloff summarized the Union activities since 2019 as detailed in his [quadrennial report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the communication strategy of IUGG incl. the new website, social media activities, and developments in the E-Journal (IUGG's monthly newsletter), (ii) the involvement of IUGG in the ISC GeoUnions Standing Committee on Disaster Risk Reduction, (iii) the collaboration with the Global Geoscience Societies, (iv) preparation for the IUGG General Assembly 2023, and (v) 10th Anniversary of the IUGG Secretariat at the GFZ German Research Centre for Geosciences. He thanked Franz Kuglitsch for his long-standing service as Executive Secretary.

Treasurer Niels Andersen

Niels Andersen summarized his report on the financial status of the Union as detailed in his [quadrennial report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the role of the Treasurer within the IUGG Governance and its collaboration with the Finance Committee, (ii) the Treasurer's responsibilities and tasks, (iii) and initiatives due to recent international developments.

President-Elect Chris Rizos

Chris Rizos summarized the major activities of the six Union Commissions as detailed in his [quadrennial report](#). The presentation he gave can be downloaded [here](#).

The six Union Commissions are:

- Commission on Climatic and Environmental Change (CCEC),
- Commission on Mathematical Geophysics (CMG),
- Commission on Geophysical Risk and Sustainability (GRC),
- Committee on the Study of the Earth's Deep Interior (SEDI),
- Commission on Data and Information (UCDI), and
- Commission on Planetary Sciences (UCPS).

He mentioned that the Union Commissions shall be reviewed by the Executive Committee at each General Assembly. Therefore, two surveys were conducted. In 2020, the Union Commission Officers were asked to answer questions about the Union Commissions' performance and future plans. In 2022, the Association Officers were asked to answer questions regarding their expectations from Union Commissions and the role of Association Representatives in Union Commissions to improve the Associations/Union Commissions engagement. At the Executive Committee Meeting on 11 July 2023, the Union Commission Chairs were invited to

present their Union Commission activities and future plans to the Executive Committee. The Executive Committee agreed that the Union Commissions should mention their goals, work programs, and the role of Association Representatives in their Terms of Reference for (2023-2027).

Marino Protti, Council Delegate of Costa Rica, raised the question whether there should be maximum number of terms of how long a Union Commission can be active. He asked the Bureau Members to keep this in mind.

Kate Heal, Council Delegate of the United Kingdom, asked how the operations of IUGG have changed during the last quadrennium (e.g., due to COVID-19). The IUGG Officers noted that many Business Meetings were organized online and the overall experience was very good. However, sometimes the global distribution of IUGG Officers made it difficult to find an appropriate time to meet and enough time for longer discussions. Meetings between the IUGG Secretariat and the Treasury are only held online and very efficient. In contrast, the IUGG2023 Local Organizing Committee decided to organize an on-site only event, which was mainly to re-connect scientists and due to financial reasons. Several Associations decided to organize their last Scientific Assemblies online or as a hybrid.

Marino Protti, Council Delegate of Costa Rica, proposed, seconded by Colin Price, Council Delegate of Israel, to accept the reports of the IUGG Officers. A vote by hand was conducted. The Council Delegates accepted the reports unanimously.

5. Matters of Membership

Niels Andersen summarized the current status of the IUGG member countries. The presentation he gave can be downloaded [here](#) (slide 2).

IUGG currently has 73 members countries incl. 59 Regular Members (14 of them in observer status) and 14 Associate Members accounting for a total number 278 units. He noted that over the last two decades the number of paid units has decreased from almost 300 to around 250.

Alexander Rudloff mentioned that the admission of [Latvia](#) as an Associate Member still needs the final approval of the Council and that an application for Associate Membership was received from [Paraguay](#). The presentation he gave can be downloaded [here](#) (slides 3-6).

Admission of the following members was ratified:

- Latvia as a Regular Member (Cat. 1)
- Paraguay as Associate Member

Wolfgang Lenhardt, Council Delegate of Austria, proposed, seconded by Jürgen Müller, Council Delegate of Germany, to approve the admissions of Latvia and Paraguay as IUGG member countries. A vote by hand was conducted. The Council Delegates accepted the admissions unanimously.

6. Report of the Nominating Committee

Harsh Gupta, Chair of the Nominating Committee, gave the report of the Nominating Committee as detailed in his [report](#). The presentation he gave can be downloaded [here](#).

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 for 2023-2027 were:

IUGG Bureau

President-Elect: [Alik Ismail-Zadeh](#) (Germany)
[Mioara Mandea](#) (France)
Secretary General: [Alexander Rudloff](#) (Germany)
Treasurer: Niels Andersen (Denmark)

Bureau Members (Position #1):

[Athena Coustenis](#) (France)
[Stephen McNutt](#) (USA; was re-nominated by the USA and supported by Australia, Canada, Costa Rica, and Denmark; the Nominating Committee recommended to place him under Position #1; the re-nomination procedure follows IUGG By-Law 10b)

[Eduard Petrovsky](#) (Czech Republic)

Bureau Members (Position #2):

[Virendra Tiwari](#) (India)
[Yi-Gang Xu](#) (China)

Bureau Members (Positions #3):

[Andrew Mackintosh](#) (Australia)
[Corina Risso](#) (Argentina)

IUGG Finance Committee

Position #1: [Archana Bhattacharyya](#) (India)

Position #2: [Priscilla Grew](#) (USA)

Position #3: [Jan Krynski](#) (Poland)

Each candidate was invited to present a statement to the Council supporting their candidature. All except Stephen McNutt and Archana Bhattacharyya made their statements. Those for Stephen McNutt and Archana Bhattacharyya were made in the Second Session of the Council Meeting on 15 July 2023, with Priscilla Grew presented that for Archana Bhattacharyya. The statements are available by clicking the names above.

Kathy Whaler invited the Council Delegates to nominate more candidates for the IUGG Bureau and Finance Committee in the next 48 hours.

Franz Kuglitsch mentioned that votes on the nominated candidates will be taken in the Third Session of the Council Meeting. The CVs and motivations to be elected from all the candidates are available [here](#).

7. Report of the Statutes and By-Laws Committee

Charles Fierz, Chair of the Statutes and By-Laws (SBL) Committee, gave the report of the SBL Committee as detailed in his [report](#). The presentation he gave can be downloaded [here](#).

He recommended the Council to accept three changes to the SBL:

(i) One of the three additional Bureau Members should be an early-career scientist (Statute 8)

A vote by hand was conducted. The Council Delegates accepted the change of Statute 8 with 24 votes in favor, one vote against, and no abstentions. Several Council Delegates suggested to consider adding extra clauses about inclusion (e.g., gender balance) in future.

(ii) Proposals for changes to the SBL may be made not only by member countries and by the IUGG Bureau, but also by the SBL Committee (Statute 24)

A vote by hand was conducted. The Council Delegates accepted the change of Statute 24 with 24 votes in favor, no votes against, and four abstentions.

(iii) Positions in the Bureau and the Finance Committee, and the position of Association Presidents, can only be held by scientists from Member Countries whose subscription has been paid up to the end of the calendar year preceding their taking of office (By-Law 10e)

A vote by hand was conducted. The Council Delegates accepted the change of By-Law 10e with 28 votes in favor, no votes against, and no abstentions.

Charles Fierz recommended the Bureau to review the Guidelines on IUGG Administration and to see whether there is some worth in adding parts of them to the By-Laws.

He mentioned that in 2017, the Bureau decided to reformat the SBL to make reading and understanding easier. The SBL Committee has now finished its work on reformatting the SBL. He recommended the Bureau to soon present the reformatted version to the Council for final discussion and approval by e-voting.

The approved IUGG SBL 2023 can be accessed [here](#).

8. Report of the Site Comparison Committee on the proposals to host the XXIX General Assembly in 2027

Fiona Darbyshire, Chair of the Site Comparison Committee, gave the [report](#) of the Site Comparison Committee. The presentation she gave can be downloaded [here](#).

IUGG received two bids to host the XXIX General Assembly in 2027 to be chosen between:

- [Honolulu HI, USA](#)
- [Incheon, Rep. of Korea](#)

In her report, the proposals were shortly introduced and compared against the criteria published in the [Guidelines for IUGG General Assemblies](#). There was no need for personal site visits.

Fiona Darbyshire noted that both bids fulfil the criteria and will be presented by the bidders in the Third Session of the Council Meeting on 18 July 2023.

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

MINUTES OF THE SECOND SESSION
SATURDAY, 15 JULY 2023 (09:00 – 13:00), ROOM A5, CITY CUBE BERLIN

PARTICIPANTS

NATIONAL DELEGATES

Argentina	Ezequiel Antokoletz
Australia	Trevor McDougall Xiaoli Deng (alternate)
Belgium	Philippe Huybrechts
Canada	Fiona Darbyshire
Chile	Pedro Castillo F. (alternate)
China	Yigang Xu Zhifeng Ding (alternate)
China-Taipei	Kuo-Fong Ma
Costa Rica	Marino Protti
Croatia	Mirko Orlic
Czech Republic	Jan Simkanin (alternate)
Denmark	Aksel Walløe Hansen
Estonia	Artu Ellmann
Finland	Jyri Näränen
France	Pierre Briole
Germany	Jürgen Müller
Greece	Ilias Tziavos
India	Virendra Tiwari (alternate)
Indonesia	Mohamad Arief Syafii Yan Anugrah Rahmawan (alternate)
Israel	Colin Price
Italy	Fausto Guzzetti
Japan	Kumiko Goto-Azuma
Korea, Rep.	Sang-Mook Lee
Luxembourg	Norman Teferle
Mexico	Miguel Angel Santoyo
New Zealand	Dionne Hansen
Norway	Liss M. Andreassen (alternate)
Poland	Jan Krynski
Portugal	Fernando Carrilho
Romania	Constantin Stefan Sava
Slovakia	Juraj Janak (alternate)
Slovenia	Polona Vreca
South Africa	Isabelle Ansorge
Spain	Marcelino Valdes Perez de (alternate)
Sweden	Per Holmlund
Thailand	Kriengkrai Boonter Sarayut Yousamran
United Kingdom	Kate Heal Richard Essery (alternate)
United States of America	Aaron Velasco

LISTENER (OBSERVER COUNTRY)

Brazil	Marcelo Sousa De Assumpcao
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MEMBERS OF THE EXECUTIVE COMMITTEE

IUGG President	Kathy Whaler
IUGG President-Elect	Chris Rizos
IUGG Secretary General	Alexander Rudloff
IUGG Treasurer	Niels Andersen
IUGG Bureau Member	Stephen McNutt
IUGG Bureau Member	Eduard Petrovsky
IUGG Bureau Member	Jun Xia
IAG President	Zuheir Altamimi
IAGA President	Mioara Manda
IAHS President	Berit Arheimer
IASPEI President	Kenji Satake
IAVCEI President	Patrick Allard
IUGG Immediate Past President	Michael G. Sideris

MEMBERS OF THE FINANCE COMMITTEE

Chair	Corina Risso
Member	Priscilla Grew

SECRETARIAT

IUGG Executive Secretary (Minute Taker)	Franz Kuglitsch
IUGG Assistant	Katrin Gundrum

GUESTS OF THE PRESIDENT

IACS Secretary General	Richard Essery
IAGA Secretary General	Monika Korte
IAHS Secretary General	Christophe Cudennec
IAMAS Vice-President	John Burrows
IASPEI Secretary General	Johannes Schweitzer
IAVCEI Secretary General	Roberto Sulpizio
ILP Past President	Sierd Cloetingh
U.S. Adhering Body, Contact Person	Deborah Glickson
Inkomati Usuthu Catchment Management Agency, South Africa	Tendai Sawunyama

9. Greetings; Presentation of the credentials

The Second Session of the Council Meeting was called to order at 09:00 with a roll call of delegates. Delegates from 37 member countries were present, 36 eligible to vote. The total number of countries eligible to vote was 45 (73 minus 14 in observer status minus 14 in associate status). The quorum (15) was reached.

Kathy Whaler announced that Stephen McNutt was re-nominated as a candidate for Bureau Member

(2023-2027) and invited him to present his [statement](#) to the Council.

Kathy Whaler further mentioned that Priscilla Grew received the [statement](#) of Archana Bhattacharyya and invited Priscilla Grew to present the statement to the Council.

Franz Kuglitsch presented the [final slate of candidates](#) for Bureau and Finance Committee (2023-2027).

Jürgen Müller, Council Delegate of Germany, proposed, seconded by Trevor McDougall, Council Delegate of Australia, to accept the final slate of candidates for Bureau and Finance Committee (2023-2027). A vote by hand was conducted. The Council Delegates accepted the final slate unanimously.

10. Reports by Association Presidents

The IUGG Association Presidents and the IAMAS Vice President reported on the activities of the Associations from 2019-2023. The Council Delegates were asked to note the reports of the Associations.

IACS

Liss Andreassen summarized the activities of IACS as detailed in the [IACS Quadrennial Report](#). The presentation she gave can be downloaded [here](#).

She highlighted (i) IACS administration and structure, (ii) the IACS code of conduct, (iii) IACS communication, (iv) current IACS activities, (v) the involvement of early career scientists, and (vi) planned activities for 2023-2027 incl. the preparations for the IACS-IAMAS-IAPSO Joint Assembly to be held in Busan, Republic of Korea, in 2025. She suggested to reduce the length of IUGG General Assemblies to 5-6 days, with the activities of all Associations taking place concurrently.

IAG

Zuheir Altamimi summarized the activities of IAG as detailed in the [IAG Quadrennial Report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the IAG administration and structure, (ii) the main IAG activities (2019-2023) incl. its commission, services, and projects, (iii) IAG communication, outreach, and publication, and (iv) the composition of the IAG Executive Committee (2023-2027).

IAGA

Mioara Mandea summarized the activities of IAGA as detailed in the [IAGA Quadrennial Report](#). The presentation she gave can be downloaded [here](#).

She highlighted (i) the IAGA administration and structure, (ii) the main IAGA activities (2019-2023)

incl. the IAGA-IASPEI Joint Assembly, which was held virtually in 2021, and other meetings, and (iii) IAGA communication, outreach, and publications.

IAHS

Berit Arheimer summarized the activities of IAHS as detailed in the [IAHS Quadrennial Report](#). For this, she presented the new [IAHS website](#).

She highlighted (i) the IAHS community with more than 10,000 individual members, (ii) IAHS, communication, outreach, and publications, (iii) IAHS administration and structure, (iv) IAHS awards, (v) the IAHS Scientific Assembly 2022, which was organized in Montpellier, France, (vi) IAHS initiatives, (vii) the involvement of Early-Career Scientists in IAHS activities, and (viii) the IAHS scientific decades *Panta Rhei* and *Science for Solutions*.

IAMAS

John Burrows summarized the activities of IAMAS as detailed in the [IAMAS Quadrennial Report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the IAMAS administration and structure, (ii) the implementation of the IAMAS strategic plan 2019-2027, (iii) the Virtual Atmosphere-Cryosphere-Oceanography seminar series (VACO 2021) in 2021, (iv) major activities of the IAMAS Commissions, and (v) IAMAS Awards.

IAPSO

Trevor McDougall summarized the activities of IAPSO as detailed in the [IAPSO Quadrennial Report](#).

He highlighted (i) the IAPSO administration and structure, (ii) the Virtual Atmosphere-Cryosphere-Ocean seminar series (VACO-21) 2021, (iii) IAPSO supported meetings 2019-2021, (iv) IAPSO awards, and (v) major activities of the IAPSO Best Practice Groups, Working Groups, Commissions and Services.

IASPEI

Kenji Satake summarized the activities of IASPEI as detailed in the [IASPEI Quadrennial Report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the IASPEI business meetings, (ii) IASPEI scientific meetings incl. the IAGA-IASPEI Joint Assembly, which was held virtually in 2021, the assemblies of the regional commissions, summer schools, training courses, and workshops, (iii) IASPEI communication and outreach, (iv) IASPEI awards, and (v) ongoing preparations for future meetings incl. the IAGA-IASPEI Joint Assembly to be held in Lisbon, Portugal, in 2025.

IAVCEI

Patrick Allard summarized the activities of IAVCEI as detailed in the [IAVCEI Quadrennial Report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the IAVCEI administration and structure, (ii) IAVCEI individual membership, (iii) IAVCEI communication, outreach, and publications, (iv) IAVCEI Commissions and Networks, (v) IAVCEI scientific meetings incl. the IAVCEI Scientific Assembly held in Rotorua, New Zealand, in 2023, (vi) IAVCEI awards, and (vi) planned activities for 2023-2027.

11. Report on Scientific and Educational programs

International Lithosphere Program (ILP)

Sierd Cloetingh, ILP Past President, summarized the activities of ILP as detailed in the [ILP Quadrennial Report](#). The presentation he gave can be downloaded [here](#).

He highlighted (i) the history and administration of ILP, (ii) major activities of the ILP Task Forces and Coordinating Committees, and (iii) ILP awards.

Science Education Program with the Abdus Salam International Centre for Theoretical Physics (ICTP)

Alexander Rudloff reported about the cooperation between IUGG and the Abdus Salam International Centre for Theoretical Physics (ICTP). The presentation he gave can be downloaded [here](#).

He highlighted (i) the history of ICTP and its cooperation with IUGG, (ii) the IUGG supported workshops (2019-2023), and (iii) the plans of the Bureau to continue the cooperation with ICTP for 2024-2027.

The Council Delegates supported the extension of the Science Education Program in cooperation with ICTP for 2024-2027. A new memorandum of understanding should be signed by the end of 2023.

12. Relations with ISC

Kathy Whaler summarized the IUGG relations with the International Science Council (ISC). The presentation she gave can be downloaded [here](#).

She highlighted (i) her participation in ISC events incl. the World Science Forum 2019 in Budapest, Hungary, the ISC Extraordinary General Assembly 2021, which was held online, and the mid-term meeting 2023 in Paris, France, and (ii) IUGG's nominations of candidates for the ISC Governing Board (2022-2024), ISC delegations, and the ISC Fellowship.

She clarified that ISC has not yet launched any grant programs to support research projects.

13. IUGG Liaison Officers to International and Intergovernmental Organizations.

Franz Kuglitsch introduced the Partner Organizations of IUGG and presented the current IUGG Liaison Officers (2019-2023). The presentation he gave can be downloaded [here](#).

He mentioned that the Quadrennial Reports (2019-2023) of all the IUGG Liaison Officers were received and made available in the [supporting material](#).

Colin Price, Council Delegate of Israel, proposed, seconded by Isabelle Ansoerge, Council Delegate of South Africa, to accept the Quadrennial Reports (2019-2023) of the IUGG Liaison Officers. A vote by hand was conducted. The Council Delegates accepted the reports unanimously.

Franz Kuglitsch also presented the proposed candidates for IUGG Liaison Officers (2023-2027) and invited the Council Delegates to review the candidates and to report any comments or concerns to him. A final decision on the IUGG Liaison Officers (2023-2027) should be made during the Third Session of the Council Meeting on 18 July 2023.

Finally, Franz Kuglitsch mentioned possible new partner organizations incl. the UN-GGIM Subcommittee on Geodesy and the ISC Regional Offices for Africa, Asia-Pacific, and Latin America and the Caribbean, and the need for additional Liaison Officers, which can be appointed later by e-voting.

14. Report of the IUGG Finance Committee

Corina Risso summarized the major activities of the Finance Committee as detailed in the [Quadrennial Report of the Finance Committee](#). The presentation she gave can be downloaded [here](#).

She highlighted (i) administration and structure of the Finance Committee, (ii) the role of the Finance Committee, (iii) membership issues, and (iv) strategies to get new member countries and to raise membership categories. She thanked Jan Krynski for serving as an 'ad-interim' member of the Finance Committee for the period from January 2023 until July 2023. This step was necessary after the passing of József Ádám in December 2022.

15. Presentation of the 2024-2027 Budget

Niels Andersen discussed the draft IUGG Budget 2024-2027, which can be downloaded [here](#).

He went through the budget line by line and highlighted the significant changes. The economic situation of IUGG is sound and the net balance allows IUGG some flexibility. The budget 2024-2027 will allow for increased expenditures of the Union on scientific programs and grants. Around

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75% of the total budget is reserved for scientific activities, from which about 45% is distributed among the Associations, and about 30% is spent by IUGG on Symposia Support, the Grants Program, Union Activities etc. Around 25% of the total budget is reserved for administration.

Niels Andersen invited the Council Delegates to review the draft budget and to report any comments

or concerns to him. A final vote to adopt the 2023-2027 budget should be made during the Third Session of the Council Meeting on 18 July 2023.

The Second Session of the Council Meeting closed at 12:30.

MINUTES OF THE THIRD SESSION
TUESDAY, 18 JULY 2023 (15:00 – 18:00), ROOM A5, CITY CUBE BERLIN

PARTICIPANTS

NATIONAL DELEGATES

Argentina	Ezequiel Antokoletz
Australia	Trevor McDougall
Austria	Wolfgang Lenhardt
Belgium	Philippe Huybrechts
Canada	Fiona Darbyshire
Chile	Pedro Castillo F. (alternate)
China	Yigang Xu Zhifeng Ding (alternate)
China-Taipei	Kuo-Fong Ma
Costa Rica	Marino Protti
Croatia	Mirko Orlic
Czech Republic	Vojtech Palinkas
Denmark	Aksel Walløe Hansen
Finland	Jyri Näränen
France	Pierre Briole
Germany	Jürgen Müller
Greece	Ilias Tziavos
India	Virendra Tiwari (alternate)
Indonesia	Mohamad Arief Syafii Yan Anugrah Rahmawan (alternate)
Israel	Colin Price
Italy	Fausto Guzzetti
Japan	Kumiko Goto-Azuma
Korea, Rep.	Sang-Mook Lee
Latvia	Jānis Kaminskis Armands Celms (alternate)
Luxembourg	Norman Teferle
Mexico	Miguel Angel Santoyo
Netherlands	Peter J.G. Teunissen (alternate)
New Zealand	Dionne Hansen
Norway	Tormod Kværna Liss M. Andreassen (alternate)
Poland	Jan Krynski
Portugal	Fernando Carrilho
Romania	Constantin Stefan Sava
Slovakia	Juraj Janak (alternate)
Slovenia	Polona Vreca
Sweden	Per Holmlund
Switzerland	John Clinton
Thailand	Kriengkrai Boonter Sarayut Yousamran
United Kingdom	Kate Heal
United States of America	Aaron Velasco

LISTENER (OBSERVER COUNTRY)

Brazil	Marcelo Sousa De Assumpcao
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MEMBERS OF THE EXECUTIVE COMMITTEE

IUGG President	Kathy Whaler
IUGG President-Elect	Chris Rizos
IUGG Secretary General	Alexander Rudloff
IUGG Treasurer	Niels Andersen
IUGG Bureau Member	Steven McNutt
IUGG Bureau Member	Eduard Petrovsky
IUGG Bureau Member	Jun Xia
IAG President	Zuheir Altamimi
IAGA President	Mioara Manda
IASPEI President	Kenji Satake
Immediate Past President	Michael G. Sideris

MEMBERS OF THE FINANCE COMMITTEE

Chair	Corina Risso
Member	Priscilla Grew

SECRETARIAT

IUGG Executive Secretary (Minute Taker)	Franz Kuglitsch
IUGG Assistant	Katrin Gundrum

GUESTS OF THE PRESIDENT

IASPEI Secretary General	Johannes Schweitzer
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16. Greetings; Presentation of the credentials

The Third Session of the Council Meeting was called to order at 15:00 with a roll call of delegates. Delegates from 39 member countries were present, 38 eligible to vote. The total number of countries eligible to vote was 45 (73 minus 14 in observer status minus 14 in associate status). The quorum (15) was reached.

Kathy Whaler announced that a group photo will be taken after this session.

17. Adoption of the 2024-2027 Budget

The Council was asked to vote on the 2024-2027 Budget. Niels Andersen summarized the headline numbers and mentioned that no further comments were received. The presentation he gave can be downloaded [here](#).

The ballots to vote on the 2024-2027 Budget were distributed among the Council Delegates. The votes on financial matters were weighted by the countries categories of membership. 37 votes representing 230 units were received. The results are given below.

In favor: 230 Against: 0 Abstain: 0

The 2024-2027 Budget was adopted unanimously.

18. Election of IUGG Officers

Kathy Whaler explained the procedures for the election of the members of the IUGG Bureau and Finance Committee for the term 2023-2027 and referred to the [final slate of candidates](#).

The ballots to vote were distributed among the Council Delegates. The votes required a simple majority of all ballots cast. During the period while votes were being counted, Virendra Tiwari, Council Delegate (alternate) of India, and Kate Heal, Council Delegate of the United Kingdom, presented their national reports. All national reports received are available [here](#).

The results of the votes for members of the IUGG Bureau and Finance Committee meant that the following candidates were elected:

President-Elect	Mioara Manda (FRANCE)
Secretary General	Alexander Rudloff (GERMANY)
Treasurer	Niels Andersen (DENMARK)
Bureau Member, Position 1	Athena Coustenis (FRANCE)
Bureau Member, Position 2	Virendra Tiwari (INDIA)
Bureau Member, Position 3	Andrew Mackintosh (AUSTRALIA)
Finance Committee Member, Position 1	Archana Bhattacharyya (INDIA)
Finance Committee Member, Position 2	Priscilla Grew (USA)
Finance Committee Member, Position 3	Jan Krynski (POLAND)

Chris Rizos (AUSTRALIA), President-Elect (2019-2023), will become President (2023-2027).

The actual voting distributions are given in the following:

Candidate	Votes	Abstain
Alik Ismail-Zadeh for President-Elect	15	
Mioara Manda for President-Elect	22	
Alexander Rudloff for Secretary General	37	
Niels Andersen for Treasurer	36	1

Athena Coustenis for Bureau Member, Position 1	16	
Stephen McNutt for Bureau Member, Position 1	10	
Eduard Petrovsky for Bureau Member, Position 1	11	
Virendra Tiwari for Bureau Member, Position 2	22	
Yi-Gang Xu for Bureau Member, Position 2	14	
Andrew Mackintosh for Bureau Member, Position 3	19	
Corina Risso for Bureau Member, Position 3	18	
Archana Bhattacharyya for Finance Committee Member, Position 1	34	3
Priscilla Grew for Finance Committee Member, Position 2	36	1
Jan Krynski for Finance Committee Member, Position 3	35	2

Since no simple majority was reached for Bureau Member, Position 1, a second round of voting was conducted between Athena Coustenis and Eduard Petrovsky, giving:

Candidate	Votes
Athena Coustenis for Bureau Member, Position 1	24
Eduard Petrovsky for Bureau Member, Position 1	12

The President congratulated the successful candidates and thanked all those on the slate for their willingness to serve.

19. Presentations of the proposals to host the XXIX General Assembly in 2027. Selection of the venue.

Fiona Darbyshire, Chair of the Site Comparison Committee, mentioned that the Bureau received two bids to host the XXIX IUGG General Assembly incl. [Honolulu HI, USA](#) and [Incheon, Rep. of Korea](#). She invited the presenters of both bids to give a presentation of not more than 20 minutes to the Council Delegates. Ten minutes were offered for questions and answers.

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Each bidding team for the 2027 General Assembly should only attend the Council Meeting for presenting its own proposal. The Council Delegates of the Rep. of Korea and the USA. are welcome to listen to the presentations of both bidders.

Following this, the Council was asked to vote on these two venues. The voting results are given in the following:

2027 General Assembly Venue	Votes
Honolulu HI, USA	15
Incheon, Rep. of Korea	22

Therefore, the XXIX IUGG General Assembly will take place in Incheon, Rep. of Korea, in 2027.

20. Renewal of the IUGG Liaison Officers for 2023-2027

Franz Kuglitsch presented the names of proposed IUGG Liaison Officers (2023-2027) to the Council Delegates and mentioned that no further comments were received. The presentation he gave can be downloaded [here](#).

Marino Protti, Council Delegate of Costa Rica, proposed, seconded by Trevor McDougall, Council Delegate of Australia, to appoint the proposed IUGG Liaison Officers for 2023-2027. A vote by hand was conducted. The following candidates were appointed unanimously:

Organization	Liaison Officers 2023-2027
ISC Committee on Data for Science and Technology (CODATA) and ISC World Data System (WDS)	Kirsten Elger (GERMANY) Masahito Nosé (JAPAN)
ISC Committee on Space Research (COSPAR)	Christopher Kotsakis (GREECE) Simon Wing (USA)
ISC Scientific Committee on Antarctic Research (SCAR)	Thomas Bracegirdle (UK) Andrew Mackintosh (AUSTRALIA)
ISC Scientific Committee on Oceanic Research (SCOR)	Andrea Flossmann (FRANCE) Hans van Haren (NETHERLANDS)
ISC Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)	Michael Kosch (SOUTH AFRICA) Peter Pilewskie (USA)

UNESCO Earth Sciences	Patrick Allard (FRANCE) Mari Paz Miralles (USA)
UNESCO International Hydrological Program (UNESCO-IHP)	Liss Marie Andreassen (NORWAY) Christophe Cudennec (FRANCE)
UNESCO Intergovernmental Oceanographic Commission (UNESCO-IOC)	Denise Smythe-Wright (UK)
World Meteorological Organization (WMO)	Roger Pulwarty (USA) Sara Barsotti (ICELAND) Christophe Cudennec (FRANCE) Minghu Ding (CHINA) Eugene Rozanov (SWITZERLAND) Jens Wickert (GERMANY) Hua Zhang (CHINA)
United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)	Harald Schuh (GERMANY)
International Civil Aviation Organization (ICAO)	Samantha Engwell (UK) David Schneider (USA)
Intergovernmental Panel on Climate Change (IPCC)	Franz Kuglitsch (GERMANY) Jianping Li (CHINA)
World Climate Research Programme (WCRP)	Lisa Alexander (AUSTRALIA)
Consultative Committee for Time and Frequency (CCTF)	Sebastien Merlet (FRANCE)
Pan American Institute of Geography and History (PAIGH)	Laura Sanchez (GERMANY/COLOMBIA)
Group on Earth Observations (GEO)	Alexander Rudloff (GERMANY)

21. Presentation and adoption of the Resolutions

Michael G. Sideris, Chair of the Resolution Committee, reported about the draft resolutions received by the Resolution Committee. Each resolution was then examined by the Resolution Committee and carefully considered by the Executive Committee before being brought to the Council. Five resolutions plus one traditional resolution of thanks of IUGG to the organizers of IUGG2023 were put on screen, read and commented upon by Michael G. Sideris. He welcomed questions and comments by the Council Delegates.

Resolution 1: Improving Protection of Geodetic Observatories from Active Radio Services.

Resolution 2: Sustained Terrestrial Water Storage (TWS) Monitoring by Dedicated Gravity Satellite Constellations.

Resolution 3: Sharing Geophysical Data across Borders.

Resolution 4: Weather and Climate Engineering Based on the Addition of Aerosol Particles.

Resolution 5: Preservation and Dissemination of and Enhanced Access to Analogue Records.

Resolution 6: Thanks.

Kathy Whaler then asked the Council Delegates to accept the resolutions.

Wolfgang Lenhardt, Council Delegate of Austria, proposed, seconded by Mirko Orlic, Council Delegate of Croatia, to accept the proposed resolutions. A vote by hand was conducted. The resolutions were accepted unanimously and can be accessed [here](#).

Closing remarks

Alexander Rudloff presented some first reflections on the XXVIII General Assembly, which can be accessed [here](#).

Kathy Whaler thanked the Council Delegates, tellers, committee members, and organizers of the General Assembly for their help and assistance to make the assembly such a success. She declared that the Council of Delegates to the XXVIII General Assembly was adjourned at 18:00.

Respectfully submitted by Franz Kuglitsch

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IUGG Budget 2024 - 2027, approved by IUGG Council 18 July 2023, Berlin

Except for the unit numbers all figures are in thousands of US dollars

Price of 1 unit is increased with 3,3% pr year

The estimated number of units is lower than the total number of all registered members (278), because empirically it is known that not all members pay their dues in a given year.

Year	2023	2024	2025	2026	2027	2024-2027	2020-2023
Estimated unit value	\$2.375	\$2.455	\$2.535	\$2.620	\$2.705	\$2.455-\$2.705	\$2.060-\$2.180
Estimated number of units	260	260	260	260	260	1040	1040
INCOME						Budget	Budget
		2024	2025	2026	2027	2024-2027	2020-2023
1. MEMBERSHIP DUES	617,5	638,3	659,1	681,2	703,3	2681,9	2204,8
2. ASSEMBLY SURCHARGE						0,0	20,0
3. ROYALTIES		0,2	0,2	0,2	0,2	0,8	0,8
4. MISCELLANEOUS (interest)		20,0	20,0	20,0	20,0	80,0	0,4
5. TOTAL INCOME		658,5	679,3	701,4	723,5	2762,7	2226,0
6. ANNUAL INCOMING BALANCES		900,0	849,3	788,9	760,3	900,0	662,0
EXPENDITURES							
		2024	2025	2026	2027	2024-2027	2020-2023
11. ADMINISTRATION		144,0	164,0	144,0	169,0	621,0	442,0
12. SCIENCE AND EDUCATION INITIATIVES		80,0	80,0	80,0	80,0	320,0	280,0
13. ASSEMBLIES		0,0	0,0	0,0	210,0	210,0	110,0
14. SYMPOSIA		100,0	100,0	100,0	0,0	300,0	75,0
15. ASSOCIATIONS		308,8	319,2	329,6	340,6	1298,1	1081,6
16. DUES		32,0	32,0	32,0	32,0	128,0	128,0
17. UNION ACTIVITIES		39,0	39,0	39,0	39,0	156,0	156,0
18. FEES		3,0	3,0	3,0	3,0	12,0	32,0
19. CONTINGENCIES		2,5	2,5	2,5	2,5	10,0	10,0
20. TOTAL EXPENDITURES		709,3	739,7	730,1	876,1	3055,1	2314,6
21. ANNUAL OUTGOING BALANCES		849,3	788,9	760,3	607,7	607,7	573,4

NOTE 17.1 Union commissions CMG, SEDI, CCEC, UCPS, GRC, UCIDI
17.2 Inter-Union Science ILP



Council Delegates, Executive Committee Members, and Guests of the IUGG Council Meeting, 18 July 2023, Berlin, Germany

OFFICERS OF IUGG AND THE UNION ASSOCIATIONS FOR 2023-2027

BUREAU OF THE UNION

<i>President:</i>	Chris Rizos	AUSTRALIA
<i>President-Elect:</i>	Mioara Manda	FRANCE
<i>Secretary General:</i>	Alexander Rudloff	GERMANY
<i>Treasurer:</i>	Niels Andersen	DENMARK
<i>Members:</i>	Athena Coustenis	FRANCE
	Andrew Mackintosh	AUSTRALIA
	Virendra Tiwari	INDIA

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, Michael G. Sideris (CANADA)
- the Presidents of the International Associations:

<i>IACS:</i>	Liss M. Andreassen	NORWAY
<i>IAG:</i>	Richard Gross	USA
<i>IAGA:</i>	Andrew Yau	CANADA
<i>IAHS:</i>	Berit Arheimer	SWEDEN
<i>IAMAS:</i>	Andrea Flossmann	FRANCE
<i>IAPSO:</i>	Hans van Haren	NETHERLANDS
<i>IASPEI:</i>	Michelle Grobbelaar	SOUTH AFRICA
<i>IAVCEI:</i>	Costanza Bonadonna	SWITZERLAND

FINANCE COMMITTEE OF THE UNION

<i>Chair:</i>	Jan Krynski	POLAND
<i>Members:</i>	Archana Bhattacharyya	INDIA
	Priscilla Grew	USA

SECRETARIES GENERAL OF THE INTERNATIONAL ASSOCIATIONS

<i>IACS:</i>	Richard Essery	UNITED KINGDOM
<i>IAG:</i>	Daniela Thaller	GERMANY
<i>IAGA:</i>	Monika Korte	GERMANY
<i>IAHS:</i>	Jean-Marie Kileshye Onema	SOUTH AFRICA
<i>IAMAS:</i>	Keith Alverson	USA
<i>IAPSO:</i>	Silvia Blanc	ARGENTINA
<i>IASPEI:</i>	Johannes Schweitzer	NORWAY
<i>IAVCEI:</i>	Ulrich Kueppers	GERMANY

**RESOLUTIONS ADOPTED AT THE XXVIII GENERAL ASSEMBLY
BY THE UNION - 18 JULY 2023
XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 11 - 20 JULY 2023**

IUGG Resolution 1: Improving Protection of Geodetic Observatories from Active Radio Services

The International Union of Geodesy and Geophysics,

Considering

- that the United Nations General Assembly Resolution 69/266 “A global geodetic reference frame for sustainable development” invites member states “to commit to improving and maintaining appropriate national geodetic infrastructure as an essential means to enhance the global geodetic reference frame”, and
- that the Global Geodetic Observing System (GGOS) of the International Association of Geodesy (IAG) is based on geodetic observatories employing radio telescopes for the method of Very Long Baseline Interferometry (VLBI) which is fundamental for the Global Geodetic Reference Frame (GGRF),

Acknowledging

- that a multi-national best-effort endeavour to provide the needed products has been carried out by the International VLBI Service for Geodesy and Astrometry (IVS) since 1999, and
- that the IVS is developing a new observing system, the VLBI Global Observing System (VGOS), to improve and enhance the global network capabilities in order to meet the accuracy goals needed for geodesy in the context of sustainable development,

Noting

- that the use of the electromagnetic spectrum is administered globally by the International Telecommunication Union (ITU), depending on inputs from national administrations,
- that the electromagnetic spectrum is a limited resource, and the increasing number of ground and space-based transmitters endanger the undisturbed VLBI observations of cosmic radio sources in the universe, and hence endanger the GGRF, and
- that there is no supra-national administration for the protection of global networks such as the global network of geodetic observatories,

Urges

the affiliated scientific associations to advocate spectrum management issues at national, regional and international administration levels for the protection of their interests in the use of the electromagnetic spectrum.

Resolves

- to support the introduction and conservation of local radio quiet zones or local coordination zones around the VLBI global network stations; and
- to bring this Resolution to the attention of the Director of the United Nations Statistical Commission (UNSC), to the Director of the United Nations Office for Outer Space Affairs (UNOOSA) and to the Secretary General of the ITU.

IUGG Resolution 2: Sustained Terrestrial Water Storage (TWS) Monitoring by Dedicated Gravity Satellite Constellations

The International Union of Geodesy and Geophysics,

Considering

- the interest of the IUGG scientific community to understand the processes of changes in global Terrestrial Water Storage (TWS), comprising all the water storage on the Earth's continental areas in frozen and liquid state, including ice caps, glaciers, snow cover, soil moisture, groundwater and the storage in surface water bodies and the interaction with ocean mass and sea level,
- that satellite gravimetry missions are a unique observing system to directly measure TWS on a regional to global scale,
- the ongoing efforts of national and international institutions and space agencies to extend the GRACE/GRACE-FO program of record that runs already for more than two decades and enhance it with improved satellite gravimetry products, and
- the significant efforts of the International Association of Geodesy (IAG) in developing and maintaining fundamental geodetic products, in particular snapshots of the Earth's time-variable gravity field providing TWS maps for scientific and societal benefits,

Acknowledging

the adoption by the IUGG of Resolution 2 in Prague 2015 on Future Satellite Gravity and Magnetic Mission Constellations, and the adoption of TWS as a new Essential Climate Variable (ECV) in the implementation plan 2022 of the Global Climate Observing System (GCOS),

Noting

- that satellite gravimetry missions such as GRACE and GRACE-FO successfully demonstrated the ability to globally observe the spatial and temporal variations of TWS from time-variable gravity on all continental areas,
- that improved temporal and spatial resolution and significantly increased accuracy are urgently needed by the user community and by operational services for, e.g., flood and drought monitoring and forecasting and water resources management, and
- that new technologies have been developed (such as laser ranging interferometry) or are currently being investigated (such as quantum gravimetry),

Urges

national and international space agencies and decision makers to

- implement and maintain long-term sustained observing systems of the Earth's time-variable gravity field realized by dedicated gravity satellite constellations with improved measurement technology to enable new science and applications of enormous societal benefit; and
- evolve them into sustainable operational services in the longer term.

IUGG Resolution 3: Sharing Geophysical Data across Borders

The International Union of Geodesy and Geophysics,

Noting

- that geopolitical conflicts create restrictions in sharing geophysical data across borders for scientific use, and
- that the above restrictions have negative impact on international scientific research, services and collaboration,

Recognizing

- that sharing geophysical data across borders is an international norm, and
- that sharing geophysical data can enhance their scientific returns and benefit the entire world, including nations that are involved in geopolitical conflicts,

Urges

- National Committees and relevant national bodies to take necessary actions in their respective countries to support sharing of geophysical data across borders; and
- the International Science Council (ISC) and other relevant international bodies to support national authorities, including those involved in geopolitical conflicts, in efforts to share geophysical data across borders.

IUGG Resolution 4: Weather and Climate Engineering Based on the Addition of Aerosol Particles

The International Union of Geodesy and Geophysics,

Considering

that anthropogenic greenhouse gas (GHG) emissions are increasing, leading to multi-decadal increases in global average temperature and other weather and climate impacts,

Recognizing

- that progress has been made in the understanding of the role of aerosol particles (AP) in Earth's weather and climate,
- that approaches to counteract the climate change of anthropogenic origin involving the interaction of AP with the atmosphere have been proposed, and
- that these concepts have become part of the discussion of weather and climate intervention (WCI) or geoengineering, the deliberate intervention in the regional and large-scale planetary environment of a nature and scale intended to counteract anthropogenic climate change and its impacts,

Acknowledging

- that scientific research on detailed AP-based WCI techniques is relatively new and the current level of scientific knowledge about their feasibility and effects is poorly understood,
- that AP-based WCI can potentially damage biodiversity, ecosystems, agricultural production, water security, ecological services for society and sustainable development inside as well as outside target regions, and
- that given the current state of understanding, AP-based WCI cannot be considered a complement to or replacement for other mitigation approaches,

Noting

that in addition to fundamental science questions, any attempt at AP-based WCI gives rise to societal, ethical, legal and governmental issues,

Recommends

further research on the fundamental science and possible efficacy of AP-based WCI schemes, conducted in an open and independent manner that engages public participation, is used to assess properly the potential risks of regional and global climate change both with and without AP-based WCI.

Urges

- the research community and policymakers to consider and address the societal, ethical, legal and governmental implications of AP-based WCI and fully engage all stakeholders in the decision-making process; and
- the development of effective and inclusive national and global governance frameworks that can address and manage all these considerations, prior to any WCI activity.

Resolves

that currently AP-based WCI cannot be considered an acceptable complement to

- the rapid implementation of required large reductions in GHG and short-lived climate pollutants; and
- greatly enhanced resilience to mitigate the increasingly serious problem of global warming.

IUGG Resolution 5: Preservation and Dissemination of and Enhanced Access to Analogue Records

The International Union of Geodesy and Geophysics,

Considering

the need for historical data preservation and open access in Earth sciences, and the risk of loss of large volumes of such data despite ongoing efforts devoted to their preservation,

Noting

- that the digital management of analogue data (seismograms, magnetograms, marigrams, meteorograms, etc.) will undoubtedly improve their future preservation and add a wealth of information to our analysis,
- that the management of analogue data is a challenging task for many scientific communities, and that some crucial data have already been lost forever, and
- the impending retirement of the last generation of geoscientists familiar with the use of analogue data, along with the loss of knowledge on how these data were recorded, calibrated, and analysed,

Recognizing

- the interdisciplinary consensus that all Earth science data, ranging from the deep Earth interior to the outer atmosphere, should be preserved, open, and freely accessible to the scientific community,
- the increasingly multidisciplinary nature of geoscience research,
- the rising value of long-term data series in geosciences for their long-term variability and short-term extremity,
- the increasing capabilities of modern computational infrastructure to facilitate storage, management, and access of data and information, and
- the growing recognition of the importance and benefits of the standardization of scientific data formats,

Encourages

the scientific community and their scientific bodies worldwide

- to participate continuously in the improvement of analogue data recovery, preservation, digitization, and open distribution using established standards and digital repositories to bridge the existing digital divide between researchers who only use digital records and those who are familiar with analogue ones;
- to document properly and include the procedures originally used to generate these records in their associated metadata; and
- to develop improved tools for their use.

Urges

- the International Science Council, UNESCO, WMO, and other relevant international bodies to assist national authorities in this mission;
- the funding agencies to support the effort to rescue valuable analogue data; and
- the scientific community to contribute to the development of unified standards as well as the coordination of digital repositories and their compatibility among themselves and with the WDS guidelines/policies while following FAIR principles.

IUGG Resolution 6: Thanks

The International Union of Geodesy and Geophysics

Resolves

To record gratefully its appreciation for the organization, arrangements, and hospitality at its 28th General Assembly.

On behalf of all participants the Council expresses its warm thanks to the Local Organizing Committee, the Scientific Program Committee, the main organizer and host German Research Centre for Geosciences (GFZ) and its co-organizers: the Helmholtz Association, Geo.X, the Federal Institute for Geosciences and Natural Resources (BGR), the Federal Agency for Cartography and Geodesy (BKG), the GEOMAR Helmholtz Centre for Ocean Research Kiel and the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), the professional conference organizer company C-IN, and all others for making the 28th General Assembly an outstanding success in the beautiful city of Berlin.

**RESOLUTIONS ADOPTED AT THE XXVIII GENERAL ASSEMBLY
BY THE IUGG ASSOCIATIONS
XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 11 - 20 JULY 2023**

IAG resolution for the International Terrestrial Gravity Reference System (ITGRS)

The International Association of Geodesy,

Noting,

- The importance of an International Terrestrial Gravity Reference System (ITGRS) for geodesy and geosciences,
- That with state-of-the-art absolute gravimeters a relative accuracy of 10^{-8} and better is achievable;

Acknowledging,

- The IAG resolution No. 9.2 and 16.3 adopted at the 18th IUGG General Assembly in Hamburg in August 1983, recommending the use of a common standard atmosphere and the zero-tide concept;
- The IAG Resolution No. 2 for the establishment of a global absolute gravity reference system adopted at the 26th IUGG General Assembly in Prague in July 2015,
- The IAG Resolution No. 4 on the establishment of the Infrastructure for the International Terrestrial Gravity Reference Frame, adopted at the 27th IUGG General Assembly in Montreal in July 2019,

Resolves,

- That the definition of the ITGRS be based on the instantaneous acceleration of free-fall expressed in SI and related to the zero-tide concept, a standard atmosphere, and Earth orientation in the ITRS (International Terrestrial Reference System),

Recommends,

- That the ITGRS be adopted as the reference system for gravity acceleration in geosciences and metrology,

Requests,

- That Commission 2 (Gravity Field) together with IGFS (International Gravity Field Service), BGI (International Gravimetric Bureau) and IGETS (International Geodynamics and Earth Tide Service) prepare and disseminate guidelines and conventions for the establishment of the International Terrestrial Gravity Reference Frame (ITGRF) as the realization of the ITGRS.

IAGA Resolution No. 1 (2023): Sharing geomagnetic field data across borders

IAGA,

Noting

- that geopolitical conflicts create restrictions on sharing geomagnetic and aeronomic data across borders for scientific use; and
- the above restrictions negatively impact international scientific collaboration and research;

Recognizing

- that sharing of geomagnetic and aeronomic data across borders is an internationally established norm; and
- sharing geomagnetic and aeronomic data enhances the scientific benefits for the entire world, including nations that are involved in geopolitical conflicts;

Acknowledges

- that IUGG, International Science Council (ISC) and other relevant international bodies support national authorities, including those affected by geopolitical conflicts, in efforts to share geomagnetic and aeronomic data across borders; and
- that IAGA has passed multiple resolutions concerned with open access to scientific data, including geomagnetic and aeronomic ones [e.g. 1, 2, 3, 4];

Urges

- national committees to take necessary actions in their respective countries to ensure sharing of geomagnetic and aeronomic data across borders; and
- ISC, relevant national and international authorities to continue supporting them in this effort.

[1] 1991 IAGA Resolution No. 1: Global observation network and data exchange

[2] 1999 IAGA Resolution No. 5: WIPO and free access to databases

[3] 2005 IAGA Resolution No. 1: Open access to scientific data

[4] 2011 IAGA Resolution No. 4: De-classifying magnetic anomaly data

IAPSO Resolution:

IAPSO action plan to implement IUGG Resolution 1: “Reducing the Carbon Footprint by the Research Community” ([link](#))

At the Berlin IUGG General Assembly in July 2023 IAPSO adopted the following action plan to reduce its carbon footprint. As a constituent association of IUGG, IAPSO hosts a major in-person scientific meeting every two years, one of which is in conjunction with the General Assembly of IUGG held every 4 years. In-person meetings bring many benefits, including networking opportunities as well as time for in-depth discussion of scientific and administrative issues. IAPSO supports the continuation of air travel to these bi-annual meetings, although IAPSO will work to reduce its overall carbon footprint through some specific actions, including:

- Meeting locations should be optimised to reduce travel (for example by holding meetings at or near transport hubs or global population centres).
- IAPSO assemblies should encourage and facilitate hybrid online engagement to complement the in-person programme.
- IAPSO encourages the use of ground transportation instead of air travel, and prefers meeting sites that can be reached in under eight hours by ground transportation for most participants.
- From July 2023, IAPSO will participate only via videoconference for any standalone IUGG business meetings not held during an IUGG General Assembly. In-person participation may be supported only in exceptional cases if the business meeting site can be reached by train or other ground transportation.
- IAPSO will continue to hold its annual bureau meetings via teleconferencing or as a hybrid meeting.

This IAPSO carbon footprint action plan is based on one developed and adopted by IACS. The background to the IACS action plan can be found at the following link <https://cryosphericsscience.org/about/resolutions/>.

IASPEI Resolution 1: Seismic resilience and disaster preparedness in earthquake-prone countries

Recognising

the vulnerability of many countries around the world to earthquake hazard, such as the 2023 Türkiye-Syria earthquakes that led to almost 60 000 deaths,

IASPEI

Suggests

the establishment of a dedicated working group (WG) to bring together experts from earthquake-prone countries to share experiences, best practices and lessons learned, in order to improve seismic risk reduction strategies.

Recommends

that the topics of seismic risk reduction strategies and earthquake resilience be increasingly considered in international training workshops, especially those involving scientists in emerging countries, in order to enhance the capacity of disaster preparedness in earthquake-prone countries.

IASPEI Resolution 2: Thanks

Recognising

the enormous efforts required to prepare and run the 28th IUGG General Assembly,

IASPEI

Thanks and Congratulates

the Local Organising Committee and its Chair, Prof. Harald SCHUH, as well as the Scientific Program Committee and its Chair, Prof. Jürgen MÜLLER, for their excellent organisation that has resulted in a memorable meeting.

XXVIII IUGG GENERAL ASSEMBLY CLOSING CEREMONY

The Closing Ceremony of the XXVIII General Assembly of the International Union of Geodesy and Geophysics was held in the afternoon of Wednesday, 19 July 2023 at the City Cube Berlin, starting at 17:30.

PROGRAM

Remembrance of Colleagues deceased since the 2019 General Assembly

Report of the IUGG Secretary General, Alexander Rudloff

Report of the IUGG Treasurer, Niels Andersen

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

Final Remarks by the Outgoing IUGG President, Kathryn Whaler

Closing Remarks by the Incoming IUGG President, Chris Rizos

REMEMBRANCE OF COLLEAGUES DECEASED SINCE THE XXVII IUGG GENERAL ASSEMBLY

- József Ádám (1950-2022)*, IAG, IUGG
Ahmet Aksoy (1932-2020), IAG
Laike Mariam Asfaw (1945-2020), IASPEI
Wolfgang Augath (1943-2023), IAG
Alfredo Lahsen Azar (1939-2022), IAVCEI
Vladislav Babuška (1937-2021), IASPEI
Alan Edward Beck (1928-2021), IHFC
Patricio Bernal, IAPSO
Rodrigue Blais (1941-2019), IAG
Gerd Boedecker (1944-2022), IAG
Andrzej Borkowski (1959-2021), IAG
Fritz Brunner (1943-2022), IAG
Bob Christiansen (1935-2022), IAVCEI
Duane Champion (1949-2023), IAVCEI
Roberto Cioni (1946-2020), IAVCEI
Martha Navarro Collado (1960-2022), IAVCEI
Egizio Corazza (1935-2020), IAVCEI
Kenneth Creer (1925-2020), IAGA
Paul J. Crutzen (1933-2021), IAMAS
Wilhelmus P.M. de Ruijter (1952-2023), IAPSO
Peter S. Eagleson (1928-2021), IAHS
Bjørn Engen (1941-2022), IAG
Will Featherstone (1967-2022), IAG
Sergey A. Fedotov (1931-2019), IAVCEI
Karl Fuchs (1932-2021), ILP
Peter Fox (1959-2021), UCDI
Jill Gash, IAHS
Marek Grad (1951-2020), IASPEI
Erik Grafarend (1939-2020), IAG
Rudolf Gutdeutsch (1930-2021), IASPEI
Eduardo Gutierrez (1962-2020), IAVCEI
Assia Harbi (1964-2021), IASPEI
Donald V. Helmberger (1938-2020), IASPEI
Josef Horalek (1948-2023), IAGA
Pierre Hubert (1943-2020), IAHS, IUGG
Jozef Hus (1942-2020), IAGA
Ion Ilies (1956-2022), IASPEI
David D. Jackson (1943-2023), IASPEI, IUGG
Jerzy Jankowski (1933-2020), IAGA
Otoniel Matias Gomez (1955-2019), IAVCEI
Juhani Kakkuri (1933-2022), IAG
Yohsuke Kamide (1943-2021), IAGA
Edgar Kausel (1934-2021), IASPEI
Steve Kenyon (1957-2021), IAG
Chris King (1949-2022), IAGA
Jan Kozak (1938-2022), IASPEI
Miroslav Krs (1928-2023), IAGA
William H. K. Lee (1942-1922), IASPEI
Heidy Mader (1961-2022), IAVCEI
Frank Marzano (1963-2022), IAVCEI
C. Dan Miller (1942-2021), IAVCEI
Kiyoo Mogi (1929-2021), IASPEI
Roberto Molina Garza (1960-2021), IAGA
Peter Molnar (1943-2022), IASPEI
Helmut Moritz (1933-2022), IAG, IUGG
Ivan I. Mueller (1930-2023), IAG
Robin Muench (1943-2021), IAPSO
Dezső Nagy (1930-2020), IAG
Iohan Neuner (1951-2021), IAG
Bogdan Ney (1935-2020), IAG
Alexey V. Nikolaev (1934-2019), IASPEI
Doron Nof (1944 - 2022), IAPSO
Kenji Notsu (1947-2019), IAVCEI
Giovanni Occhipinti (1976-2021), IAPSO
Mityasu Ohnaka (1940-2021), IASPEI
Özden Özdemir (1946-2022), IAGA
Basil (Vasilis) Papazachos (1930-2022), IASPEI
Raymond Pollard, IAPSO
Hans R. Pruppacher (1930-2020), IAMAS
David Thomas Pugh (1943-2022), IAPSO
Richard Henry Rapp (1937-2020), IAG
Lowall Allan Rasmussen (1937-2021), IACS
Jane Read, IAPSO
Wolfgang Roether (1936-2022), IAPSO
Dieter Seidl (1938-2021), IASPEI
Tadahiro Sato (1945-2021), IAG
António Serralheiro (1927-2021), IAVCEI
Alexander Anatolievich Soloviev (1947-2021), IASPEI
Günter Stangl (1952-2020), IAG
Peter Steinhauser (1941-2021), IAGA
Konrad Steffen (1952-2020), IACS
Akio Takagi (1925-2020), IAVCEI
Roman Teisseyre (1929-2022), IASPEI
Wimpy Tjetjep (1953-2021), IAVCEI
John Stewart Turner (1930-2022), IAPSO
Seiya Uyeda (1929-2023), IASPEI, IUGG
George Veis (1929-2022), IAG
Frances Watkins, IAHS
Tatiana B. Yanovskaya (1932-2019), IASPEI
Ilya Zaliapin (1973-2023), CMG
Hans Zijderveld (1934-2022), IAGA
Dorel Zugrăvescu (1930-2019), IAGA

REPORT OF THE IUGG SECRETARY GENERAL, ALEXANDER RUDLOFF
XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 19 JULY 2023

Program Highlights



Scientific sessions	640 in 28 meeting rooms (4 live streams)
Oral presentations	3.109
PowerPoint	2.606
PDF	496
Video presentations	7
Total slides	68.003
Total volume	94,4 GB
Poster presentations	1.330
Business meetings	138

Gold Medal & Union Lectures



Big Themes



Early Career Scientists Social Event



IUGG Welcomes LATVIA and PARAGUAY



IUGG Executive Committee 2023-2027



EXECUTIVE COMMITTEE										
PRESIDENT	PRES.-ELECT	SEC. GENERAL	TREASURER	MEMBER	MEMBER	MEMBER	EXECUTIVE SEC.	PAST PRESIDENT		
AUSTRALIA	AUSTRALIA	FRANCE	GERMANY	GERMANY	FRANCE	AUSTRALIA	INDIA	GERMANY	UK	
ASSOCIATION PRESIDENTS										
IACS	IAG	IAGA	IAHS	IAMAS	IAPSO	IASPEI	IAVCEI			
			(since 2021)			(since 2021)				

IUGG Association Secretaries General 2023-2027



IACS



Richard Essery
UK

IAG



Daniela Thaller
Germany

IAGA



Monika Korte
Germany

IAHS



Jean-Marie Kileshye Onema
Congo, Rep. of. / South Africa

IAMAS



Keith Alverson
Canada

IAPSO



Silvia Blanc
Argentina

IASPEI



Johannes Schweitzer
Norway

IAVCEI



Ulrich Kueppers
Germany

IUGG Finance Committee 2023-2027



Archana Bhattacharyya
IAGA
INDIA

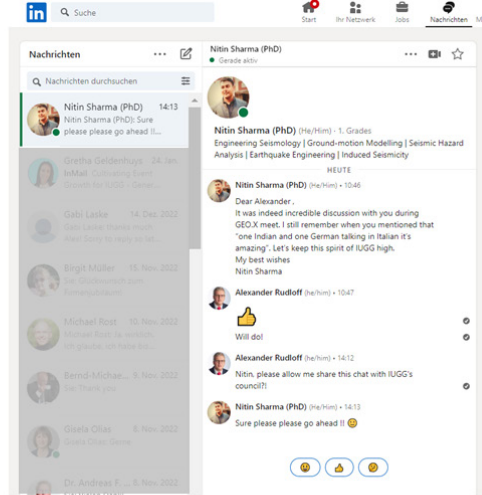


Priscilla Grew
IAVCEI & IAHS
USA



Jan Krynski
IAG
POLAND

SG's Personal Highlight



REPORT OF THE IUGG TREASURER, NIELS ANDERSEN
XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 19 JULY 2023

IUGG budget 2024-27 General Comments



- The activities of IUGG are primarily based on payment of country membership dues and some minor direct and indirect contributions
- IUGG has presently 74 members, 59 of them are paying dues
- The annual amount of dues is approximately USD 675K
- The budget of IUGG is in USD, i.e. USD is our basic currency
- Yesterday, the IUGG Council approved the IUGG budget 2024-27

IUGG budget 2024-27 Overview



Expected balance January 1 st , 2024	900K USD
Income in the period	<u>2.762K USD</u>
At our disposal	3.662K USD
Expenditures planned	3.055K USD
Balance December 31 st , 2027	607K USD

IUGG budget 2024-27 Expenditures on main activities



Total Expenditures	3.055K USD
Associations	1.298K USD
IUGG grants, meetings, workshops	500K USD
Outreach, education	320K USD
Union commissions	156K USD
International relations, ISC	128K USD
Travel (Bureau, liaisons), administration	653K USD

READING OF THE RESOLUTIONS OF THE UNION ADOPTED AT THE XXVIII GENERAL ASSEMBLY XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 19 JULY 2023

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 Michael Sideris, and they were shown on overhead projection in English.

FINAL REMARKS BY THE OUTGOING IUGG PRESIDENT, KATHRYN WHALER
XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 19 JULY 2023

First of all, my profound and heartfelt thanks for all who have made this a superb meeting. In particular, the Local Organising Committee and the Scientific Programme Committee, ably supported by the Association Presidents. But also all of you, the attendees who have presented your research, supported others presenting theirs, and contributed to the ‘business’ of the Union. I hope you will leave here with renewed research energy and ideas, enhanced networks, and happy memories.

In a moment, I’m going to ask the new President to give his inaugural speech, something I did at the end of our last General Assembly in Montreal. Earlier today I made the mistake of looking back at my slides from 4 years ago! So, if I were to be given a score card on progress on the agenda I outlined then, how would I fare? The honest answer is, not terribly well, though I would argue the intervention of the pandemic gives me something of an excuse. However, I can see the strides we have taken towards greater involvement of early career scientists in the Union, and in turn the Union has increased its support for them. We continue the ‘great debate’ about the length of our General Assembly, but we have just established a small Working Group to consider the way forward, so hopefully debate can be turned into principles, from which can follow decisions and action. One of our Big Themes was on Open Science, and we will continue to work with the International Science Council, or ISC, on this. However, I can already see how it is being adopted in many of our Workshops, Schools, Topical and Regional meetings where practical activities use open source software and data. This in turn advances our attempts to reduce the gap between the achievements of and opportunities for researchers in the global south and north, as does our increased use of digital technology so that virtual participation is more often possible. However, four years ago, I also mentioned the increasing difficulty in, and cost of, obtaining visas; since the pandemic, the time taken for a visa decision to be made has added to the factors disproportionately disadvantaging scientists from the global south. This is an issue high on the agenda of the ISC, which is better placed to tackle it than us. The International Year of Basic Science for Sustainable Development has provided an excellent platform for supporting fundamental research addressing the Sustainable Development Goals, and for using the results of that research to address societal needs, and I’m pleased we’ve been able to provide financial support for several innovative projects.

So, let me finish by saying that it has been my greatest privilege and honour to serve as your President for the last four years.

With this, I formally Close the 28th IUGG General Assembly by inviting the incoming President to give his inaugural speech.

CLOSING REMARKS BY THE INCOMING IUGG PRESIDENT, CHRIS RIZOS

XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 19 JULY 2023

My first words as president of the IUGG: Thank you. *Danke Schön*. It is an immense honour for me to be IUGG President. I will work hard on your behalf to “*Make IUGG Great Again*” (MIGA). Perhaps trademark that statement? Print it on IUGG T-shirt merchandise? *No! just joking!*

There is no time here to detail issues I believe we should address, or actions to take. *That is for another time*. So let me just make some general comments.

The last four years have been difficult for all of us as individuals, but also for transnational organisations such as the IUGG. However the Bureau and Executive Committee have done an excellent job of keeping the IUGG ticking along. I especially want to acknowledge the leadership of President Kathy Whaler, Secretary General Alex Rudloff, Executive Secretary Franz Kuglitsch, the Treasurer Niels Andersen, and the work of the Bureau, Association & Union Commission officers.

So how did I find my way to this role? Well it’s a long story... *for another day*. I have been asked why I’d want to take on this role. *Isn’t it too much work they ask?* My answer: I hope not unbearable, or with unpleasant surprises! But let me state here that the “engine room” of the IUGG has 8 strong Associations doing amazing work – through their globally dispersed individual academics, national institutions, working groups, and services, operating around the clock. *In effect: “The IUGG never sleeps!”*

My role is to ensure the IUGG officers provide strategic leadership, and, perhaps most importantly, uses its resources, expertise, networks and authority, to: (1) further the goals of the Geoscience disciplines that it represents, (2) to address global geo-challenges through scientific investigations and advocacy, (3) and to make available products and services for the benefit of science and society.

We cannot avoid trying to articulate answers to some fundamental questions, such as. Is the IUGG healthy? Is it still relevant? *Well look at this General Assembly!* Not just the number of attendees, but the breadth and quality of the outputs of the IUGG community, the depth of engagement with international and national bodies, the strength of its relationships with space agencies and other critical research infrastructure providers, and so on. Often this is not as apparent as the excellent work of individual researchers that is showcased at gatherings such as this. *But this drive for wider engagement and impact is in the IUGG’s DNA.*

Finally, what can you expect from me? Do I have an agenda? *Not really!* I expect no less than that we (the IUGG leadership group) maintains flexibility but acts strategically. Is able to identify opportunities and issues, react to stimuli, be curious, ambitious, agile and respectful. The IUGG has history, we have principles, we have proud achievements, we interact with extraordinary scientists, the pace of advancement of our disciplines is unprecedented, and we have a Mission,....

We live in complex, messy, uncertain world (and I don’t mean only in a physical sense). For example, we need to deal with the *Big Issues of our day*. Such as address the reduced trust in science (by politicians and the public), be more inclusive (in multiple ways), more open, and increase the visibility of the Geosciences in general. *And this is but an incomplete list.*

There is so much that is going right, that we can be positive about, and yet so much to do. We will continue to contribute to an increased understanding of our Earth’s processes, and strive (hopefully) to address the challenges of our ever-changing, and surprising Earth.

It is an exciting time to be a Geoscientist! For me, it is this bright but challenging future that excites me, and will motivate me as your new President. So, please, keep up the good work!

Thank you. And I wish you safe travel home.

ADMINISTRATIVE REPORTS
XXVIII GENERAL ASSEMBLY, BERLIN, GERMANY, 10-20 JULY 2023

QUADRENNIAL REPORT OF THE PRESIDENT

IUGG

This quadrennial period has been dominated by two events: the covid-19 pandemic and Russian invasion of Ukraine. At every level, including as individuals and organisations such as IUGG, we were unprepared for both, and they have had and continue to have profound and far-reaching consequences.

The pandemic caused face-to-face meetings to all but cease for several years, resulting in the cancellation or postponement of many planned Meetings, Assemblies, Workshops and Conferences within the IUGG family. Many actions proposed under the 2016-2023 IUGG Strategic Plan could not be undertaken as envisaged. At the 27th GA in Montréal, Canada, Council passed a resolution urging action by the research community to evaluate and reduce its carbon footprint. The pandemic led to a temporary reduction in carbon emissions, including those associated with IUGG activities. Many such activities that previously had been undertaken face-to-face were effectively conducted online. The impact on and response by different sections of the research community to these enforced changes has varied enormously. On-line activity cannot fully replace in-person meetings, and there has been a gradual resumption of face-to-face formats, and the introduction of hybrid meetings. The effectiveness of new modes of working and meeting, and the carbon and other impacts of them, are still to be evaluated. The results of this enforced experiment can be used to inform IUGG working practices that minimize carbon footprint whilst retaining the desirable aspects of in-person interaction.

IUGG supported the statement by the International Science Council (ISC) condemning the Russian invasion of Ukraine. IUGG follows ISC guidelines so does not discriminate against individual scientists on the basis of nationality. However, financial sanctions and restrictions mean that Russian scientists may not be able participate in meetings. They also prevent IUGG from accepting the annual subscription from the Russian Academy of Sciences (the adhering body), and therefore Russia is currently in observer status. Shortly after

the invasion began, IUGG provided a grant to the Polish Academy of Sciences (the Polish adhering body) to support displaced Ukrainian scientists.

The first meeting of the new Bureau was held on 18th July 2019 at the 27th GA in Montréal. The immediate past Secretary-General and Treasurer attended as guests. Business included a review of the GA, noting that it had been successful but some ‘flagship’ events, notably that at which the Early Career Scientist Award recipients had presented, were poorly attended, and that there was a large number of poster ‘no shows’. The Opening Ceremony was considered overly long. It was agreed to distribute a questionnaire to attendees. Transitions from the recently retired Secretary-General and Treasurer, both of whom had provided exceptional service over long periods, to the new post holders, were discussed.

Bureau had accepted an invitation from the IUGG National Committee to hold a subsequent meeting in the Republic of Korea, but that was unable to go ahead owing to the pandemic. Instead, Bureau met online on 25 June 2020, 2 July 2020, 4 December 2020, 10 March 2021, 20 May 2021 and 31 August 2021, and then in person 20-21 September 2022 in Berlin/Potsdam (Jun Xia would have joined online but was unable to attend owing to illness). A major ongoing agenda item for the online meetings was the 28th GA, especially the format it might take, the Memorandum of Understanding between IUGG and the local host (GFZ, Potsdam), and the financial risk each would bear. In December 2020 Bureau agreed to move the website from Russia to GFZ, Potsdam, redesign it, and bring it into line with the European General Data Protection Regulation. Although the new website is still not complete, the structure and functionality is much improved, and I have received several positive comments. Bureau designated Christophe Cudennec, IAHS Secretary General, and Ms. Nilay Dogulu, IAHS Early Career Scientist Representative, as observers (on behalf of IUGG) for the UNESCO Open Science special committee meeting, which took place in Paris, France in May 2021. Bureau evaluated grant applications for two rounds that closed in June 2020 and April 2022,

and made seven awards. Bureau agreed to invite the UC Chairs to an Executive Committee meeting in 2023 to give their quadrennial reports in person and have discussions with the Associations. In preparation for this, the President-Elect has been investigating the status and operation of the UCs, their interaction with the Associations and their future proposed activities.

At the last meeting, the Messe Berlin City Cube, the location for the 28th GA, hosted Bureau for the first day and gave us a tour of the facilities. The second day of the meeting was hosted by GFZ, Potsdam. By invitation, two additional people attended this Bureau Meeting: Corina Rosso, Chair of the Finance Committee, who provided a Finance Committee report and contributed to a discussion on membership issues, and the Deputy Treasurer. Neither the Chair of the Scientific Programme Committee nor the Chair of the Local Organising Committee (LOC) of the 28th GA was available to attend, but the Chair of the Science Programme Committee sent a report, and Christine Bismuth, Vice-Chair of the LOC joined the meeting to update Bureau and answer questions. The International Centre for Theoretical Physics (ICTP) liaison to IUGG, Abdelkrim Aoudia, joined online to present and discuss plans for continuation of cooperation between IUGG and ICTP. In light of the IUGG Resolution on carbon footprint, Bureau agreed that at all future in-person meetings we should justify the accepted carbon dioxide footprint of travelling and urge colleagues to make the meeting as productive as possible. Bureau approved a proposal that former Treasurer Aksel Hansen be made Assistant Treasurer, so as not to lose his extensive knowledge from 20 years as Treasurer and to assist the Treasurer with day-to-day business, as the workload of the Treasury is increasing. More generally, Bureau noted that, with just two permanent staff, the Executive Secretary and Assistant, the human resources available to IUGG are limited, and more are needed to professionalise the Union. During the financial review, some anomalies in member's subscriptions were noted, where the annual contributions are not commensurate with metrics used to indicate the amounts that should be paid. Finance Committee and Bureau intend to address this in the next quadrennium. In reviewing our liaisons and representatives to other organisations, Bureau noted that some are inactive, which is unfortunate as it means that IUGG is missing opportunities for

cooperation, and that these organisations are less likely to know about relevant IUGG activity.

Executive Committee (EC) met twice, in person on 18 July 2019 at the 27th GA, and 15-16 September 2022 online. At the first meeting, the new EC members briefly introduced themselves. A review of the GA noted, in addition to the items mentioned above, that a significant number of IASPEI travel grants were turned down with awardees not attending the GA. IUGG Standing Committees were discussed, and EC decided not to renew the Honors and Recognition, and Outreach, Committees, the former because the IUGG Awards Program is now well developed, the latter because its remit was too broad and unfocused. Associations should propose as diverse a set of names as possible for the other Standing Committees. Planning for the 28th GA during the pandemic, the length of GAs in the future, and our carbon footprint, were significant items of discussion at the second meeting. EC is adopting a streamlined agenda for its next Business Meetings in Berlin, to allow more time for meaningful discussion. Associations will provide their reports in advance rather than presenting them at a meeting.

I must note that very sadly Jozsef Adam passed away in late 2022 during his term of office on the Finance Committee. Jan Krynski very kindly agreed to join the Committee as an ad interim member. Jan had previously 'stepped up to the mark' in 2017 following the untimely death of the Finance Committee Chair David Collins by taking over his role, so IUGG owes him a double debt of gratitude.

Changes to the Statutes and Byelaws at the 26th GA in Prague that allowed electronic voting between GAs, and scientists from non-member countries to hold most positions within the IUGG have been put to good use, as two votes were taken electronically during this quadrennial. The membership of IUGG Committees is now more diverse as a result of relaxing the conditions on scientists eligible for election.

At the 27th GA in 2019 in Montréal, the Council passed a resolution recommending the International Terrestrial Reference Frame, developed and maintained by the International Association of Geodesy, to the user community, following its long and varied use as a standard.

Progress on the 2016-2023 Strategic Plan largely stalled owing to the pandemic. An evaluation will shortly be undertaken and a decision will be made on the way forward for the new quadrennial.

Normally our Associations would have held Scientific Assemblies (SAs) in 2021, the mid-year between IUGG GAs. After considerable uncertainty owing to the pandemic, including postponements and changes to format, in 2021 IAG held a hybrid SA in Beijing, China, IAGA and IASPEI held an online joint SA organised by CSIR-NGRI in Hyderabad, and IACS, IAMAS and IAPSO held a joint Virtual Assembly comprising talks by invited speakers. Both IAHS and IAVCEI deferred their SAs until they were able to hold them in person. IAHS met in Montpellier, France in 2022 and IAVCEI in Auckland, New Zealand in early 2023, though with significant weather-related travel disruption for a number of participants. I addressed the Inaugural Ceremony of the joint IAGA-IASPEI SA. I appreciate the substantial efforts made by many within the IUGG community to hold these events under extremely trying circumstances.

The astute reader will have noted the plethora of terminology used to describe new ways of meeting and interacting that became popular during the pandemic, such as in-person, face-to-face, hybrid, and webinar. IUGG intends to make a set of recommendation to rationalize its usage.

Union Commissions

Activities of the Union Commissions were severely restricted by the pandemic. Two, the Committee on Mathematical Geophysics (CMG) and Studies of the Earth's Deep Interior (SEDI) traditionally hold biennial science meetings in even number years (when GAs and SAs do not normally occur). CMG did not hold a meeting in 2020, but held a hybrid meeting in the Republic of Korea in 2022, with the Local Organising Committee headed by Sang-Mook Lee, Chair of the National Committee for IUGG. I recorded a welcome greeting for the Opening Ceremony and participated in a discussion panel on 'Basic Science and Mathematics for Sustainable Development'. Its first Vladimir Keilis-Borok Medal for mid-career scientists, established by IUGG Bureau, was awarded to Frederik Simons (Princeton University, USA) for 'his outstanding contributions to mathematical geophysics and development of

cutting-edge mathematical methods in geoscience data analysis'. Taipei, Republic of China was the intended venue for the 2020 SEDI meeting, but it was postponed to 2022. As travel restrictions were still in place there in 2022, the event was switched to Zurich, Switzerland.

The Commission on Geophysical Risk and Sustainability (GRC) has continued its work on a GNSS Tsunami Warning System for the Oceania region of the South Pacific. Having joined the Sendai Landslides Partnership in 2015, IUGG became a signatory of its follow-up, the Kyoto Landslide Commitment 2020 (KLC2020), in 2020, which I signed and spoke at during the launching ceremony in 2020. It was intended to open the World Landslides Forum 5 (WLF5), but this was postponed because of the pandemic. The rescheduled WLF5 was also affected by the pandemic and became a hybrid meeting, where I provided a greeting. I also wrote a Foreword to Volume 1, Issue 1 of the open access journal 'Progress in Landslide Research and Technology'. Issues 1 and 2 make up the two founding issues published with IUGG support. The GRC represents IUGG within the KLC2020, and John LaBreque, the GRC Chair, participated in a high level panel discussion at WLF5.

The other three Commissions, Union Commission on Data and Information, Union Commission on Climate and Environmental Change, and Union Commission on Planetary Sciences, have had little formal activity during this quadrennial, but members of their Executive Committees have undertaken Commission-relevant tasks such as giving talks, convening sessions, co-organizing meetings and workshops, acting as panel discussion moderators and participating in meetings of organizations such as UNESCO and the International Science Council, including as IUGG liaison officers. In addition, the Commission on Climate and Environmental Change submitted an application to a special IUGG grants round connected with the International Year of Basic Sciences for Sustainable Development, which is discussed in more detail below.

All Commissions are involved in organising and co-sponsoring symposia at the upcoming GA. As noted above, they have also all been engaging with the President-Elect, and their Chairs will join an EC meeting.

IUGG Centennial

The past President wrote about plans to celebrate the IUGG Centennial in his report of the previous quadrennium. My first, and remarkable, duty as President, for which I feel enormously privileged, was when those plans came to fruition at a wonderful day at UNSECO, Paris in July, 2019. During the Opening Ceremony we heard from a number of distinguished guests, and we presented commemorative plaques to other Unions and agencies with which we cooperate and collaborate. His Serene Highness Prince Albert II of Monaco accepted Honorary Membership of the Union, and spoke eloquently and movingly about the history of the Union, including the involvement of his great-great-grandfather, Prince Albert I, and his own interest in protecting the world's oceans. There were sessions on 'Earth and Space Sciences and Society' and 'Earth Science for Sustainable Development' followed by lively moderated panel discussions on 'Strengthening International Cooperation in Science and Education in a Multi-Cultural World' and '21st Century's Triad: Sustainable Development, Climate Change and Disaster Risk Reduction', again with distinguished contributors. We presented all attendees with a Special Issue of the open access journal 'History of Geo- and Space Sciences', entitled 'The International Union of Geodesy and Geophysics: from different spheres to a common globe', guest edited by Alik Ismail-Zadeh (Secretary-General 2007-2019) and Jo Ann Joselyn (Secretary-General 1999-2007), covering the history of the Union, prospects for its next century, and articles about each of the eight Union Associations. After my closing remarks, we were treated to a musical performance by the PhiloGaïa Orchestra of Institut de Physique du Globe de Paris, led by Dr Nobuaki Fuji, entitled 'We love our Planet!', with accompanying video images. The day concluded with a cocktail reception. UNESCO was an excellent venue, and we were very well looked after by the staff there. We have received a Centenary Scroll from Royal Society of London, the UK adhering body, and many letters of thanks for the commemorative plaques.

International Science Council (ISC)

IUGG has continued its significant involvement with the ISC. In November 2019, at the World Science Forum in Budapest, Hungary, I (and past Secretary-General Alik Ismail-Zadeh) had a

meeting with the then ISC CEO Heide Hackmann and Senior Communications Officer Alison Meston to discuss matters such as the ISC 2019-2021 Action Plan, IUGG priorities, relations between IUGG and ISC, our shared vision, and IUGG's longer term expectations of the ISC. In 2021, the Secretary-General and I participated in an ISC Extraordinary General Assembly, convened to discuss constitutional and related matters. The Assembly voted on a number of changes to its Statutes and Rules of Procedure, including some proposed by IUGG, and also elected an Elections Committee, designed to ensure smoother running of the organisation. Later in the year, I participated, with the President-Elect as I was unable to join all the sessions, in its General Assembly, voting for the Officers and Ordinary Members of a new Governing Board (covering the period until 2024, when the next General Assembly will take place). Unfortunately, our nominee, Domenico Giardini, was not successful, but there are a number of representatives from the geosciences on the new Board. Later in the year, I also met with a member of the high-level steering group appointed by ISC to discuss the role that the ISC currently plays and could play in the future in global policy, and to learn about the experiences and expectations of ISC Members in informing policy-making at national and global levels. This was part of an ISC initiative to develop a strategy for the Council to strengthen its impact at the global science-policy interface. Since 2022, I have been participating in online meetings for ISC members with the President, Peter Gluckman. He has summarized major efforts underway (e.g. forming new and enhancing existing relationships with UNESCO), and held Q&A sessions; they are being held quarterly, and the next is scheduled for April. I also attended a meeting as a member of his Informal Advisory Group, where he was interested in hearing about priorities of members, and feedback on ISC activities. I was invited to attend the annual meeting of the European Members of the ISC in London in 2022, where there were speakers and panel discussions on 'Science advice and sustainability' and 'Crisis preparedness and the challenges of scientific advice'.

I shall attend an Extraordinary General Assembly in April 2023 to vote upon small further changes to the Statutes and Rules of Procedure to bring them into line with French law on non-profit organizations.

The ISC's Committee on Freedom and Responsibility in Science has issued a number of statements on issues such as on ethical action and best practice during the pandemic, the Russian invasion of Ukraine, and the exclusion of women from university education in Afghanistan. We have reproduced some of these in our e-journal. I find the Committee's guidelines and statements extremely helpful in navigating complex issues IUGG must face. As noted above, this guidance was invoked to address participation of Russian scientists in IUGG activities. Several times during this quadrennial, IUGG has been invited to support ISC declarations. In general we have done so, but on one occasion declined as we had some concerns over the wording, which were conveyed to ISC.

An example of a statement we did support was on Open Science, and in 2022 the IAHS Secretary-General Christophe Cudennec joined an ISC delegation to UNESCO where a recommendation to member states on Open Science was developed. Following on from this, an opinion piece co-authored by Christophe, Mehda Sud and Geoffrey Boulton from ISC was published in the (open access) Hydrological Sciences Journal of the IAHS. Open Science and Open Data, as embodied by the Findable, Accessible, Interoperable, and Reusable (FAIR) digital asset principles, are essential if we are to achieve the Sustainable Development Goals, and any and all steps IUGG can take towards them are to be welcomed.

IUGG successfully nominated Christophe Cudennec as an expert for the ISC delegation to the United Nations Water Conference 2023, and he contributed to a Policy Brief issued by ISC in advance of the conference. He is also under consideration as an IUGG nominee for the ISC-UNEP Foresight Expert Panel.

IUGG successfully nominated past President Harsh Gupta for ISC Fellowship, supported by the International Union of Geological Sciences.

IUGG nominated Keith Alverson for the Standing Committee on 'Outreach and Engagement', but he was not selected.

I will attend the mid-term meeting of ISC members in May, in Paris. The Agenda is still being developed, but the theme is 'Capitalizing on Synergies in Science'.

The President has accepted my invitation to give a welcome address at the GA in Berlin.

Symbiosis with other cognate organisations

IUGG is a member of the nine GeoUnions of the ISC, namely, the International Astronomical Union, the International Cartographic Association, International Geographical Union, the International Union of Quaternary Research, the International Society for Photogrammetry and Remote Sensing, the International Union of Geodesy and Geophysics, the International Union of Geological Sciences (IUGS), the International Union of Soil Sciences, and International Union of Radio Sciences. They promote Earth and Space Sciences within the ISC, but also in the UN and other international bodies. The GeoUnions met the day after our Centennial celebrations in Paris at the ISC offices. A main item of discussion was a joint science initiative around the Sustainable Development Goals. Meeting during the pandemic has been challenging, including the cancellation of a planned meeting at the 2020 EGU meeting in Vienna, but several online meetings have been held. Based on the GeoUnions' recommendation, the ISC GeoUnions Standing Committee on Disaster Risk Reduction has been established, and our Secretary-General is its co-Chair. We also agreed to hold a series of webinars relevant to the International Year of Basic Sciences for Sustainable Development, planning that there be a speaker from each GeoUnion. Alik Ismail-Zadeh, who was on the governing board of ISC, proposed successfully that this be an ISC Distinguished Lecture Series webinar, and the first two have been held in early 2023, with the next scheduled for April.

In December 2018, IUGS adopted its flagship big, open access science programme Deep-time Digital Earth (DDE). Past President Harsh Gupta and I sit on its Science Board, which met in Busan, Republic of Korea in January 2020 and in Paris, France in November 2022 (a meeting I was unable to attend). The Science Board has reviewed proposals for funding by DDE and progress on projects already awarded funding, as well as overall DDE strategy. At the behest of IUGS, IUGG agreed to be part of a DDE Advisory Board, similar to the high-level governance model for the joint IUGG-IUGS International Lithosphere Programme, but it has not been enacted.

The American Geophysical Union invited IUGG and a number of other global geosciences societies and unions to a meeting at which a set of four Task

Teams (TTs) was established, namely Support Early Career and Student Communities, Inclusion and Representation in Geosciences, Public Engagement and Outreach to Raise Awareness of Earth and Space Sciences (ESS), and Advocate for the ESS in Global and Domestic Policies. The Secretary-General and I have ensured that IUGG is represented at almost all meetings of these TTs, which are held online monthly or bi-monthly. As a group, besides holding wide-ranging discussions on matters of common interest (such as impacts of covid-19, carbon footprint especially associated with meetings, policies on Russian scientist involvement in our activities after the invasion of Ukraine) and sharing best practice, we issued a statement on Earth Day last year, and have agreed another for this year's Earth Day. We have also prepared a survey of Early Career Scientists which will soon launch, and are in the final stages of planning a webinar on food security. We hope to link in to some of the TT activities during the GA in Berlin, especially the Big Themes.

Abdus Salam International Centre for Theoretical Physics (ICTP)

The Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste has been an important capacity building and education partner for IUGG since 2011. Our previous Memorandum of Understanding (MoU) with ICTP was renewed in September 2019. At short notice I was unable to go for the signing ceremony, which coincided with the IUGG-sponsored Advanced Workshop on Earthquake Fault Dynamics, but immediate past Secretary-General Alik Ismael-Zadeh was also attending and signed on IUGG's behalf. As with all activities, this quadrennium's events were seriously impacted by the pandemic; most were postponed and one switched to online. The online event that went ahead, the Virtual Workshop on Data Assimilation and Inverse Problems in Geophysical Sciences, in October 2021 was significantly oversubscribed, and attendees were chosen to be from a broad set of nationalities, especially from the global south, and had a good gender balance. I joined the start to give a greeting. The lectures from this Workshop are to be published as the 5th book in the Special Publications of the IUGG series under our agreement with Cambridge University Press. The second event for this quadrennium will be held in July 2023, in Kigali, Rwanda, entitled Joint ICTP-

EAIIFR-IUGG Workshop on Computational Geodynamics: Towards Building a New Expertise Across Africa. With the widespread availability of open source software, these workshops provide attendees with experience and expertise with codes that they are subsequently able to use in their own research, in line with Open Science goals. We have agreed a new programme with ICTP which will be covered by an MoU to be signed later this year, probably during the IUGG-sponsored Summer School on Earthquake Mechanics. Also, Abdelkrim Aoudia from ICTP will be involved in the Education and Capacity Development (North-South Dialogue) Big Theme at the 28th GA.

International Year of Basic Sciences for Sustainable Development (IYBSSD)

The idea of the International Year of Basic Sciences for Sustainable Development (IYBSSD) was formed as I began my Presidential term, spearheaded by Michel Spiro, President of the International Union of Pure and Applied Physics (IUPAP). The aim was to have an International Year that coincided with the centennials of IUPAP and the International Mathematical Union, and midway through Agenda 2030 that is associated with the Sustainable Development Goals (SDGs). IUGG was one of the founding members and I have attended almost all Steering Committee virtual meetings since. From my perspective, it fits in very well with the interests and science priorities of IUGG. We have already noted how well most science areas of IUGG map on to the Sustainable Development Goals – in fact, most are not achievable without input from IUGG areas. We also know that it is crucial to maintain the underpinning science base that enables progress on societal issues. Hence the IYBSSD is a fantastic initiative and opportunity for IUGG.

A resolution for the year to be established was submitted to UNESCO's Executive Board by Jordan, supported by Vietnam, Russia and Nigeria, in October 2019, and it was adopted by UNESCO's General Conference in November 2019. A resolution submitted by Honduras to the UN General Assembly in December 2021 was approved by consensus and the year was proclaimed.

The Executive Secretary and I attended the Opening Ceremony at UNESCO in Paris in July 2022. A team had been hired to make a series of

video clips from interviews with attendees, including myself, where we were asked to indicate links between research and sustainable development, how the research directly concerns society, and our wishes for the International Year. The videos are available on the IYBSSD website and YouTube channel. The Closing Ceremony will be at CERN in September/October 2023. As the International Year draws to its end, there are plans to turn it into a Decade.

As part of IYBSSD, IUGG ran a special grants round, and awarded a total of \$65,000 to 8 projects. Each had to be cosponsored by at least two Associations or Commissions. The projects that will receive funding are ‘Sixth Meeting of ITU/WMO/UNEP Focus Group on AI for Natural Disaster Management’ (IAMAS, IAG), ‘Towards creating and launching the Network for African Volcanologists’ (IASPEI, IAVCEI), ‘Improving earthquake preparedness through geoscience education in the Himalaya’ (SEDI, IASPEI, International Lithosphere Program), ‘Heat Flow Summer School & Workshop’ (IAPSO, IASPEI, IAVCEI), ‘Celebrating the 80th anniversary of Parícutin volcano (Michoacán, Mexico): Preserving our heritage and preparing for future eruptions’ (IAVCEI, IASPEI), ‘Geosciences for Sustainable Development’ (CCEC, IAPSO), ‘2023 Glacial Isostatic Adjustment Training School’ (IACS, IASPEI) and ‘Workshop in Geodesy and SAR’ (IAG, IASPEI). Although some of these are part of a series of events, the stipulations of this grants round meant that the activities and intended outputs were focussed around the IYBSSD. It is gratifying to see these projects get underway.

Already noted IUGG events as part of IYBSSD are the panel discussion during the CMG Conference in 2022, and the series of GeoUnions webinars that began in 2023. There will be a flagship event in Kigali, Rwanda in May 2023 with the theme Basic Science – A Light for Africa (as it coincides with the UN Day of Light); I proposed several speakers from the IUGG community who will participate in the meeting.

Preparations for the 28th GA in Berlin and selection of award winners

Preparations for the next IUGG GA, to be held under the theme ‘Together Again in Geosciences’ in Berlin in July 2023, have been ongoing since the location was selected by Council in 2019. For this

purpose, I have appointed the members of the Nominating Committee (Chair: Harsh Gupta), Resolutions Committee (Chair: Michael Sideris), Site Comparison Committee (Chair: Fiona Darbyshire), Fellow Selection Committee (Chair: Andrew Yau), Gold Medal Committee (Chair: Tom Beer), and Early Career Scientist Awards Committee (Chair: Katrin Schröder).

The pandemic has thrown all the usual work on, and ways of planning for, the GA into disarray, with great uncertainty as to how, and even if, the GA would proceed. Unsurprisingly, GFZ Potsdam, with whom we intended to sign a MoU, were concerned about the financial risk. After much negotiation, and with a return to something approaching normalcy and a greater sharing of the financial risk, we concluded a satisfactory agreement and the MoU was signed during the Bureau Meeting in September 2022. The work of the Local Organizing Committee (LOC), chaired by Harald Schuh, and the Scientific Program Committee (SPC), chaired by Jürgen Müller and aided by the SGs of the eight Associations and the Secretary General and Executive Secretary of the IUGG, has nevertheless progressed very well, including the organization and scheduling of sessions and special events, invitations to dignitaries, and the selection of Union lecturers. For the first time, there will be a series of Big Themes, using a new format of short introductory presentations, a moderated panel discussion, and audience interaction. They will take place over 90 minutes during the lunch break. Examples not already mentioned include Early Career Scientists – Needs, Wishes and Demands, and Open Science, Open Data and Open Software. I have invited nine prominent scientists to deliver Union Lecturers: Rakiya Abdullahi Babamaaji (IUGG), Ricarda Winkelmann (IACS), Luz Adriana Cuartas (IAHS), A.R. Ravishankara (IAMAS), Max Moorkamp (IAGA), Martin Visbeck (IAPSO), Geoffrey Blewitt (IAG), Philippe Lognonné (IASPEI) and Robin Matoza (IAVCEI). Shamila Nair-Bedouelle, Assistant Director-General of Natural Sciences at UNESCO, had previously accepted an invitation, but she has had to withdraw.

Our 10 winners of the Early Career Scientist awards, selected by Early Career Scientist Awards Committee for their outstanding research in Earth and space sciences and for international research cooperation, will receive their (a newly-designed glass) awards and deliver talks during the GA.

They are: Mohd Farooq Azam (Glaciology/Hydrology, Indian Institute of Technology – Indore, India), Jana H. Börner (Geomagnetism, Freiberg University of Mining and Technology, Germany), Jayashree Bulusu (Geomagnetism, Indian Institute of Geomagnetism, India), Johan Gaume (Glaciology, Swiss Federal Institute of Technology, Switzerland), Jose Tàrsilo Girona Hernandez (Volcanology, University of Alaska Fairbanks, USA), Natalya Gomez (Glaciology/Ocean Sciences, McGill University, Canada, Patrick Hupe (Atmospheric Sciences/Seismology, Federal Institute for Geosciences and Natural Resources, Germany), Christina Karamperidou (Atmospheric Sciences, University of Hawaii, USA), Xingxing Li (Geodesy, Wuhan University, China), Norimitsu Nakata (Seismology, Lawrence Berkeley National Laboratory and Massachusetts Institute of Technology, USA).

On the recommendation of the IUGG Fellows Selection Committee, the IUGG Bureau announced the seven Union Honorary Members/Fellows elected for their exceptional contributions to international cooperation in geodesy or geophysics and their eminence in the field of Earth and space sciences. They are: Antonio J. Busalacchi (Oceanography/Climatology, University Corporation for Atmospheric Research, USA), Toshiyuki Hibiya (Oceanography/Climatology, The University of Tokyo, Japan), Paolo Papale

(Volcanology, National Institute of Geophysics and Volcanology – Pisa, Italy), Makoto Taniguchi (Hydrology, Research Institute for Humanity and Nature, Japan), Peter Teunissen (Geodesy, Delft University of Technology, Netherlands). The Gold Medal Committee selected Valerie Masson-Delmotte (Université Paris Saclay, France) as the 2023 IUGG Gold Medal winner for her leading role in deep ice core climate-record projects, unravelling isotope deposition on polar snow, and for your outstanding contributions to increasing society's awareness of climate change. All winners will be officially acknowledged and recognized during the Awards Ceremony of the centennial GA in Montreal.

Miscellaneous

I had the pleasure to speak at several events overseas that were organized by or with strong

involvement of the country's National Committee. In October 2019, I spent 5 days as guest of the National Geophysical Research Institute in Hyderabad, India. I was Guest of Honour at their Foundation Day and gave a keynote lecture, and participated in the 2nd triennial Federation of Indian Geosciences Associations (FIGA) Congress they hosted afterwards, where 100 years of IUGG and AGU were celebrated both during the inaugural session and at a special plenary session of the meeting. The theme of the Congress was 'Geosciences for Sustainable Development Goals' and I appreciate receiving material for this from the Associations that contributed to my presentation in the special session. I participated again, this time virtually, at the 3rd triennial FIGA Congress in Dehradun, India in November 2022, on 'Geosciences of Himalaya for Sustainable Development', with a talk on 'Basic Geoscience for Sustainable Development' as part of an International Development session. I provided a video greeting for the 4th Congress of China Geodesy and Geophysics (CCGG), held in hybrid mode in Qindao, China in 2021, with the theme 'Maritime Silk Road and Earth System Sciences'. I shall do the same for the 5th CCGG, to be held in Wuhan, China in April 2023 focussed on 'Earth System Sciences and Large River Sustainable Development'. The 4th CCGG attracted over 3300 participants and a similar number is expected at the 5th CCGG. Also in China, in 2022 I provided a greeting for the China Earthquake Administration Conference on Earthquake Science and Technology in Beijing. These conferences take place every 5 years to review the progress of earthquake science and technology in China and worldwide, as well as to release guidelines for the next 5 years.

In November 2019, I attended the World Science Forum (WSF) in Budapest, Hungary. There I participated in events as part of the UNESCO Anniversary Year of Roland Eötvös' death: co-moderating a WSF side event entitled 'Outcomes of the Roland Eötvös Commemorative Year', with formal presentations and discussion, followed by the launch of the book 'The Eötvös experiment in its historical context', and attending the Opening Ceremony of the Eötvös 100 University Exhibition, with a tour of the exhibition. I was presented with a commemorative coin minted to mark the year, and also received a copy of 'The Eötvös experiment in its historical context' as well

as ‘The Roland Eötvös commemorative album’, which was launched the following week. I also met the new Director of ICTP, Atish Dabholkar, who took up his post that month, and caught up with Daya Reddy, then ISC President.

In 2022, I gave a keynote presentation on ‘AI for Natural Disaster Management’ in a Workshop organized by the ITU/WMO/(UNEP) Focus Group, where I highlighted the role artificial intelligence is playing in the work of our Associations and Commissions, and mentioned the 28th GA. Thanks to those Associations who provided material.

The Deutsche Geophysikalische Gesellschaft celebrated its centenary in 2022, with an event in Berlin coinciding with the Bureau Meeting in Berlin/Potsdam, so I was delighted to give a short congratulatory message in person, where I was able to highlight Germany’s contributions to geophysics and geodesy, and to the IUGG, and mention another forthcoming important event in Berlin, namely the 28th GA!

Shortly thereafter I spent the weekend in Monaco at a multi-disciplinary colloquium to commemorate the centenary of the death of His Serene Highness Prince Albert I in 1922. His Serene Highness Prince Albert II gave a short talk in the Opening Session, and attended the Closing session. It was intended to be a longer event in 2022, but the pandemic forced the postponement and the shortened format. Prince Albert I was important in the early history of IUGG, having been one of the four first Vice-Presidents, and President of what became IAPSO. During the meeting, I met with several staff from the Musée Océanographique, which holds archive material related to this. I presented them and the Centenary Committee with a message from IUGG commemorating the event. I was fascinated by one presentation in the section on Prince Albert I’s scientific interests, on his friendship with Francisco Afonso Chaves, who was Director of the Meteorological Service of the Azores, and also made oceanographic, geomagnetic, seismological and geodetic measurements there in the early 20th century.

I accepted an invitation to be a member of the Scientific Programme Committee (SPC) for the Science and Technology Conference of the Comprehensive Test Ban Treaty Organisation (CTBTO) that will take place in Vienna in June

2023. At a 3-day meeting of the SPC in May-June 2022, we drafted objectives for the conference, and agreed five themes, with titles, keywords and scopes. Subsequently, I have reviewed abstracts for the sub-theme ‘Synergies with Global Challenges’. I will take part in a panel discussion on ‘Introduction of the synergies between professional societies and the CTBTO’ at the meeting.

Finally, I have written several letters of support, including for the African Light Source, a European Union Horizon 2020 topic on scientific data exploitation, a European Space Agency (ESA) proposal for a nano-satellite constellation to measure the geomagnetic field, and a joint ESA-NASA satellite gravity mission, where it is useful to have relevant IUGG resolutions to quote.

Acknowledgements and Thanks

I would like to thank all colleagues in the Bureau and Executive Committee for their staunch commitment to the IUGG in this unusual and exceptionally challenging quadrennium, including attending online meetings at highly unsociable hours. I’m grateful to President-Elect Chris Rizos for Chairing Bureau Meetings when I have been unavailable on two occasions. His organizational and leadership skills were apparent from his work in the previous Bureau when he Chaired the Visioning Committee and Task Force 100, and organized various events for the centennial anniversary. As President-Elect, he has also demonstrated an unerring knack of being able to get to the crux of an issue, and has offered invaluable advice. Bureau underwent a huge change at the start of the quadrennium with the departure from office of the previous Secretary General, Alik Ismail-Zadeh, and Treasurer, Aksel Hansen, who between them had 32 years of service! Both worked with their successors, Alex Rudloff and Niels Andersen respectively, to ensure a smooth transition. The new incumbents have taken to their roles with apparent ease and demonstrable success, though I know they have devoted an enormous amount of time and energy to them, and I’m delighted that they are willing to stand for another term. Besides a host of responsibilities as Secretary General, Alex is also IUGG’s representative on the International Lithosphere Program Bureau and co-Chair of the ISC GeoUnions Standing Committee on Disaster Risk Reduction. The smooth running of all our business is down to the exemplary work of our

Executive Secretary/Assistant Secretary General, Franz Kuglitsch, and his Assistant, Katrin Gundrum. Franz, with over a decade of service, has been the ‘font of all knowledge’ and ‘keeper of the corporate memory’, and I have depended on him heavily. Also, he has never complained despite my procrastination and tardiness! Bureau Members Steve McNutt, Eduard Petrovsky, and Jun Xia have contributed thoughtfully and diligently to our business. Everyone has been a team player, and they have made my time as President enormously enjoyable.

As a heavily decentralized body, with much of its activity bound up in the work of the Associations and Commissions, IUGG depends on the tireless work of the Association Presidents and Secretaries General, and the Chairs of the Union Commissions and Committees. The Associations have done a truly remarkable job of keeping activity going as far as possible and maintaining engagement through the pandemic. Their dedication to the Union is very much appreciated. I also appreciate their willingness to challenge (politely) the way we conduct business, e.g. concerning the carbon footprint and length of meetings. I also express my appreciation to the Associations' Secretaries General and the Science Program and Local Organizing Committees, chaired by Jürgen Müller

and Harald Schuh, respectively, and Harald's Vice-Chair, Christine Bismuth, for their work preparing for the 28th GA in Berlin, which has probably been the most difficult the Union has ever organized.

The GFZ German Research Centre for Geosciences in Potsdam has been hosting the IUGG Secretariat since 2013 and funds the positions of Franz Kuglitsch and Katrin Gundrum together with the German Research Foundation (DFG); since 2019 GFZ has provided further and considerable ‘in kind’ support since Alex Rudloff, Harald Schuh and Christine Bismuth, who devote substantial time to IUGG business, are employed there. This significant underpinning support is very gratefully acknowledged.

I feel confident that the efforts of those acknowledged above, and many others, leave the Union in good shape as I hand over the Presidency. We have come through an exceptionally challenging time, and many have been and still are directly affected by the global events of the past few years, but this has highlighted how much we can achieve in the face of adversity. I wish the new leadership every success.

Kathryn A. Whaler, IUGG President

QUADRENNIAL REPORT OF THE PRESIDENT-ELECT

As a member of the IUGG's Bureau and Executive Committee, I participated in the Bureau and EC meetings held in Montreal (2019) and Berlin (2022), and in several online (i.e. "Zoom") meetings held when the COVID pandemic restricted travel, and hence face-to-face meetings. Due to the restraining impact of COVID, activities that would ordinarily be undertaken by the President-Elect were not possible. For example, there was no call on me to stand-in for the IUGG President at opening ceremonies of conferences, nor attend meetings of external organisations or entities with which the IUGG has close links, that ordinarily require regular (or occasional) face-to-face meetings of office-bearers.

As an ex-officio member of the Statutes and By-Laws Committee, I participated in email correspondence concerning proposed changes to Statutes and By-Laws, to be submitted to the IUGG Council at the General Assembly in 2023. The most substantial activities undertaken by me during the Quadrennial have been related to the Union Commissions. The remainder of this Quadrennial Report therefore is concerned with the Union Commissions.

The President-Elect oversees the Union Commissions, of which there are six:

- Union Commission on Climatic and Environmental Changes (CCEC)
- Union Commission on Mathematical Geophysics (CMG)
- Union Commission on Geophysical Risk and Sustainability (GRC)
- Union Commission on the Study of the Earth's Deep Interior (SEDI)
- Union Commission on Data and Information (UCDI)
- Union Commission on Planetary Sciences (UCPS)

The reports of the UCs are presented separately, hence only brief comments regarding the survey undertaken during this Quadrennial will be presented here. The context for this survey is that although the appointment of each UCs leadership group, its terms of reference and/or work programme, and the budget and activity reporting obligations, is overseen by the IUGG, there is no explicit requirement for a review or audit of each

UC on a regular basis (see, e.g., "Guidelines for Union Commissions"). It was decided that during this Quadrennial that a review be undertaken in two phases:

1. Survey questionnaire to be completed by each Union Commission (with follow-up questions where appropriate); that sought responses on each UC's goals, its operations, its relations with IUGG Associations and external bodies, the impact of COVID, and future strategic initiatives.
2. Survey questionnaire to be completed by each Association.

The first survey questionnaire was sent to the Chairs of the UCs on 17 September 2020, with a deadline of 31 October 2020. The responses were collected and analysed. The major findings are summarised below:

- The COVID pandemic indeed impacted on the work of all UCs, primarily in the cancellation of face-to-face meetings, especially of long-planned workshops and symposia.
- On the question of „How would you describe the interactions between your UC and the Associations?“, the responses were illuminating, e.g.: the interaction is primarily through shared membership, and for each UC there was (as expected) strong interactions with one (maybe two or three) Association(s), and effectively none with other Associations.
- On the nature of interactions with external (non-IUGG) organisations, the extent of interactions varied from none to links with some UN bodies or other societies, but none could be considered as critical or substantial.
- The quality of the UC websites also varied considerably, but hardly any would be considered being up-to-date, or even informative of the UC's work.
- With the easing of restrictions due to COVID, all UCs were planning meetings and participating in symposia planning, including the forthcoming IUGG GA2023.
- Finally, with regard to whether UCs were developing a long-term „signature

project“, hardly any UC had any plans to undertake activities beyond what it currently planned (such as organising meetings and symposia).

Whether explicitly stated, or implied, each UC had a “history” of strong interaction with a small community of scientists (often represented by one or two Associations). It seemed that apart from this strong thematic link the quality of the engagement between UCs and Associations was directly related to the effectiveness of the “liaison officer” appointed by the Association to a UC.

Each UC was sent a follow-up email at the end of 2020, probing further specific issues related to strategic initiatives and the nature of the engagement of each UC with IUGG Associations. To be honest, the quality of the responses (received between February and August 2021) was highly variable, and provided additional impetus to the preparation of the second questionnaire.

The second survey questionnaire was finalised on 21 January 2022, and sent to each of the eight IUGG Associations, with a deadline of 28 February 2022. The first question asked how the Associations “mapped” into the UCs (recognising there are no clean one-to-one correspondence of topic interests across UCs and Associations). The Associations that were identified as having links with UCs are listed below:

- CCEC – IACS, IAMAS, IAPSO
- CMG – IACS, IAGA, IAPSO, IASPEI
- GRC – IAG, IASPEI, IAVCEI
- SEDI – IAG, IAGA, IASPEI
- UC DI – IAGA, IAVCEI
- UCPS – IACS, IAG

On the question concerning the most important UC-Association interactions or engagements, the most common response was meetings or symposia co-organised by UC and Association. Some were regular, high-profile meetings/symposia, others were “once-off” opportunistic events. Other joint initiatives included editing a book, and co-organising scientific sessions at Association Scientific Assemblies or IUGG General Assemblies. Several Associations mentioned the importance of “data management” (within the purview of the UC DI), however they could not articulate how to address data issues via the current UC structure.

Two questions were asked concerning how UC-Association interactions could be “improved”, one an open-ended question, the other specifically how the IUGG could facilitate such an improvement. With respect to the former, there was a lack of “visibility” of UC activities, scope of interests or expertise, within Associations, implying that “liaison” between UC and Association executive committees (or leadership group) was largely absent. With regard to what the IUGG could do to “improve” interactions, similar sentiments were expressed. That is, UC-Association engagement at the very least should be manifest by joint organisation of conference sessions. By the IUGG insisting on this base-level interaction, it may facilitate deeper engagement in other activities or initiatives, implying that the IUGG Bureau has a role in “kick-starting” such a process.

Continuing this theme of co-organisation of meetings of scientists, two questions focussed on how the UCs could assist the Associations in developing the scientific programme at Association SAs and IUGG GAs (in particular, the Union Symposia at IUGG GA2023). Many of the responses echoed earlier feedback about expectations (of engagement) and process (how to facilitate this joint activity).

A summary document of the Association survey questionnaire responses was sent to the UCs 12-13 June 2022, with feedback requested by end June 2022. The feedback is summarised below:

- Some UCs provided no response, and others undertook a process to seek feedback from UC members.
- UCs that responded seemed surprised at the „negative“ Association comments.
- In general Associations seemed to be under the impression that the UCs were (somehow) meant to „service“ the Associations. Negative comments generally flowed from this misconception.
- There is a highly variable level of interaction between Associations and UCs that is largely correlated to the effectiveness of the „liaison officer“ linking an Association to each of the (relevant) UCs (as mentioned earlier).

The IUGG Bureau considered the results of the survey questionnaires, and the following actions were agreed to:

XXVIII General Assembly of the International Union of Geodesy and Geophysics
Quadrennial Reports of the IUGG Officers

1. Clearer guidelines on the roles and responsibilities of the liaison officers, similar to „Guidelines for IUGG Liaison Officers to International and Intergovernmental Organizations“.
2. Promote the unique value of several regular (biennial, etc) long-standing meetings and conference sessions organised by UCs (in particular CMG and SEDI) to all Associations.
3. Investigate the possibility of the other UCs organising similar high-profile meetings to CMG and SEDI, or at the very least, co-organising SA or GA scientific sessions.
4. Harmonise the „Terms of Reference“ of each UC so as to, e.g., clarify the governance structure, the liaison arrangements between the UC and Associations, tasks and objectives of the UC, etc. (See UC ToRs at http://www.iugg.org/about/commissions/UnionCommissions_ToR_2019-2023.pdf)
5. Invite the chairs of each UC to attend the Executive Committee meeting at IUGG GA2023.
6. Undertake a more comprehensive review of each UC to determine whether it is still making worthwhile contributions, or whether it should be terminated.
7. Consider how the roles and objectives of the UCs can be incorporated into the IUGG SBLs.

Chris Rizos, IUGG President-Elect

QUADRENNIAL REPORT OF THE SECRETARY GENERAL

Foreword

In view of the "detailed" report of our President, I can allow myself to focus on the most important issues from the perspective of the Secretary General and the Secretariat.

Reality

As already mentioned, this four-year period was dominated by two events: firstly, the Covid 19 pandemic, which, depending on the region, dominated everyday life precisely between early 2020 and the first part of 2023, and secondly, the Russian invasion of Ukraine in February 2022. The pandemic brought travel to a complete standstill, but also "promoted" new formats, online meetings and conferences, webinars, etc. The consequences of the war are not yet foreseeable in detail.

Meetings

Due to the covid pandemic, my participation in scientific meetings was comparatively limited. Apart from the Centennial celebrations in Paris at the end of July 2019, there was the American Geophysical Union (AGU) meeting in San Francisco in December 2019, where I represented IUGG at several focussed meeting. At the end of January 2020, I was able to congratulate colleagues in Ljubljana on the 25th anniversary of their Slovenian National Committee. The trip to the International Geological Congress (IGC) of IUGS in New Delhi planned for spring was by then already cancelled. It was not until 2021 that travel activities began again: European Geosciences Union (EGU) in Vienna in May, the International Centre for Theoretical Physics (ICTP) in Trieste in October. In 2022, things continued much more actively: EGU, as always in Vienna in April, European Seismological Commission (ESC) in Bucharest, the funeral service and burial of Helmut Moritz, Vice-President and President of IAG and President of IUGG, in Graz in November and the AGU in December, for the first time in Chicago. In 2023, three more trips took place: In March to UNESCO for the 50th anniversary of the International Geological Correlations Program (IGCP), in April to Vienna (EGU) and in June to Edinburgh. The last trip concentrated on preparations for the General Assembly.

Not to be forgotten at this point are the participations at national level, be it at the National Committee NKGG (annually), at the German Geophysical Society DGG (100th anniversary 2022, annual meeting in Bremen 2023), or other occasions.

Media and Communication

The flagships in terms of communication are definitely the website and our eJournal, which is published regularly at the beginning of each month. In the meantime, activity via the so-called social media channels, be it Twitter, LinkedIn or Facebook, has also increased significantly. Now a few more details:

The IUGG website was (still) hosted in Russia when I took over. I quickly agreed with the Bureau that we wanted to change this situation in the medium term. In 2021, we had already started planning, only the implementation was still missing. After 24 February 2022, the move then became a necessity, which was successfully completed in July 2022. At this point I thank our previous webmaster Dmitry Krupsky in Moscow, and welcome our new one, Jan Schubert in Postdam.

The Editorial Board of the eJournal has consisted of Tom Beer, Franz Kuglitsch, and Chris Rizos, since I took over as Editor in Chief in September 2019. The "Axis Australia Europe" proved to be very effective. We rarely needed more than 48 hours for the initial review. My idea for the focus series on the "People at the Forefront", in which we introduced colleagues in more than 20 portraits, was very well received. Without exception, all issues were published on the first of every month! Our thanks for this go to Franz Kuglitsch.

Joint Activities

At this point, I would like to mention three activities, the first of which has developed very well despite - or perhaps even because of - the pandemic.

Together with AGU, EGU, IUGS, JpGU and other Global Geoscience Partners, we have set up four so-called Task Teams:

- Support Early Career and Student Communities,

- Inclusion and Representation in Geosciences,
- Public Engagement and Outreach to Raise Awareness of Earth and Space Sciences (ESS),
- Advocate for the ESS in Global and Domestic Policies.

President Whaler and I ensured that the IUGG was represented almost always at all meetings. In terms of networking, this continues to be a very successful and productive measure. Visible products of this collaboration were the Earth Day Statements 2022 and 2023, and a webinar on Food and Water Security. I am already looking forward to the next topics, including an early career researcher survey, and thank AGU very much for their management support.

Another activity was the Standing Committee for Disaster Risk Reduction, or ISC GeoUnions SC DRR for short, established by eight of the nine GeoUnions of the International Science Council (ISC). Here, the main activity began in 2020, with four online meetings, the production of so-called policy briefs and an internet presence. In 2021, eight more online meetings followed, as well as ideas for special forums at conferences and joint publications. Unfortunately, the momentum then slackened somewhat until it died out completely in mid-2022.

In the Bureau of ILP, the International Lithosphere Programme - a joint activity of IUGS and IUGG - I have had the pleasure of representing the "parent generation" together with IUGS President John Ludden since 2020. Our main task is to advise and make recommendations to the operational management.

Preparations for the 28th GA in Berlin

The preparation of the 28th General Assembly in Berlin, planned for July 2023, was mainly characterised by concern in the first years: Will the GA be able to take place at all, and if so, in what format?

Ex-officio, I was a member of the Scientific Programme Committee (SPC), chaired by Jürgen Müller. As a guest, I was invited to participate in the Local Organisation Committee (LOC), which I did for the majority of the 23 meetings.

Now the GA will start in a few days; hard to believe after all the imponderables. I am very excited, also

about the newly developed format of the so-called "Big Themes" - a one-hour discussion format on important topics of science, the Union and society.

And - last point here - whether it will be possible to achieve a new attendance record in the history of IUGG.

Travel

For the sake of transparency, I list here once again my travel activities of the last four years, insofar as they were reimbursed or (partially) financed by the IUGG:

- 2019 | Paris/FR, IUGG Centennial
Copenhagen/DK, Meeting IUGG Treasurer
San Francisco/US, AGU Fall Meeting
- 2020 | Ljubljana/SLO, 25th Anniversary of the Slovenian NC
- 2021 | Vienna/AT, EGU Meeting
Trieste/IT, Visit to ICTP
- 2022 | Bucharest/RO, ESC Meeting
Graz/AT, Funeral Helmut Moritz
Chicago/US, AGU Fall Meeting
- 2023 | Paris/FR, UNESCO, IGCP Event
Vienna/AT, EGU General Assembly
Edinburgh/UK, Meeting IUGG President

It has always been a honour and pleasure for me to represent the Union.

Acknowledgements and Thanks

I would like to thank the members of the IUGG Bureau, first and foremost our President! The open reception after my election in Montreal was very pleasant, the exchange always honest, direct and constructive.

The cooperation with Franz Kuglitsch is the key to success. Without his support and knowledge it would simply not be possible!

Finally, I would like to thank my employer, the GFZ German Research Centre for Geosciences in Potsdam. It has hosted the IUGG Secretariat since 2013 and finances the positions of Franz Kuglitsch and Katrin Gundrum, the latter jointly with the German Research Foundation (DFG). We are very grateful for their understanding of the extensive time invested in IUGG business.

Alex/ander Rudloff, IUGG Secretary General

QUADRENNIAL REPORT OF THE TREASURER

Introduction

This report will be presented to the Council at the upcoming XXVIII IUGG General Assembly in Berlin, Germany, July 2023. 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:

- The final accounting of the 2016 – 2019 quadrennium (year by year + accumulated) compared to the budget (Attachment 1)
- A preliminary accounting (first 3 years) for the present quadrennium 2020 – 2023 (year by year + accumulated) (Attachment 2)
- The 2020-2023 budget from Montreal 2019 (Attachment 3)

This procedure for reporting on the finances is a continuation of what was done at the General Assemblies in Montreal in 2019 and earlier.

With the General Assemblies normally taking place in the middle of the last year of a budget period it is not possible to give a full report on the finances of the present quadrennium. Instead it is accepted to present it at the next GA together with a preliminary accounting for the present quadrennium. Therefore in Berlin the final accounting for the quadrennial report for 2016 – 2019 will be shown.

For comparison the budget for the period 2016 to 2019 is given in attachment 3.

The final accounting for 2016 - 2019

The overall result of the period 2016-2019 was in agreement with the budget. Both the total income and the total expenditure differed only by a few percent. The final balance is higher than shown in the budget simply because we started out in 2016 with a higher balance.

Some deviations are, however, seen for the individual lines in the accounting. One major difference is line 13.2. The money allocated to travel grants for the General Assembly in Montreal is placed under line 19.1, countries in need. The higher amount is balanced by the income line 5.c which represents a special and unexpected grant from Canada to travel grants.

Another major change is line 18.4. The low expenditure reflects a change in the IUGG policy of supporting scientific programs outside IUGG. This support was finally taken out of the budget for 2020-2023.

The amount allocated to liaison officers was already reduced in the budget. And is further reduced in the accounting.

The expenses in connection with 100 yr celebration in Paris on July 29, 2019 was not included in the budget. IUGG Bureau decided to organize the event in the light of the higher than budget balance brought forward from the previous period.

Preliminary accounting for 2020 - 2023

Overall view:

The financial situation of the first three years of the period is characterized by an accumulation of funds due to the impact of the COVID 19 pandemic: much less travelling and much fewer projects than planned were carried out during the three years. The income from membership dues are close to the budget value, see line 1.

One major difference between budget and accounting are the lines 4.c and 11.7. These two lines have been introduced in the accounting due to normal good accounting practice to show that IUGG is now hosting the finances of the International Lithosphere Programme, ILP. The two lines cancel each other as ILP money paid into IUGG accounts is moved to the special ILP account.

During the pandemic IUGG funds increased to more than \$1M, that is more than double the normal turn over during one quadrennium. This money is expected to be spent during 2023 and to a large degree in the period 2024-2027, where a deeper than normal cut in the balance is proposed.

The price of 1 unit:

The price in 2023 of IUGG's basic unit is USD 2,375, which is about 10% higher than estimated four years ago. The increase in the price of 1 unit is caused by an unusual high US inflation in 2021 and especially in 2022.

Since 2004/2005 we 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. Over time the increase of the index is close to 2%, with a few exemptions.

In the budget proposal for the coming period we have used a slightly higher increase per year than 2%, but lower than the 8-9% during 2022, allowing for a higher inflation than over the last quadrennia.

Interest

It should be mentioned that the present world wide inflation has the consequence that the bank used by IUGG is now again paying interest, as of early 2023. After several years with no interest paid, in fact IUGG has paid negative interest for a short period.

Membership issues and income:

IUGG has 73 members (January 1, 2023). Please, see appendix 1 for details. One more than 4 years earlier.

During the last period IUGG has not experienced any country having left the union explicitly. The policy followed now has been to urge members in arrears to pay their debts and resume their normal paying status. Instead of asking them to leave the union. Therefore in the table of members there are some countries which have been in observer status longer than 4 years.

IUGG has welcomed Latvia as a new member, from 2023 as a paying member. And Israel has moved to category 2.

Two members are in a special situation because of international sanctions imposed on money exchanges. They have therefore not been able to pay their dues.

The union has gradually over several periods been losing units paid as dues by members. In the period 2008 - 2011 a total of 1102 units were paid. For the last complete period, the number is 1060. For the year 2022, the number is 248, 10 units lower than the corresponding year 2018. There are signs that the decrease is levelling out.

Balance:

Based on the a detailed analysis of income and expenditure in 2023 it is expected that the total assets of IUGG at union level will be close to USD 900.000 by the end of 2023. As mentioned above this is more than one year's turnover. And must come down by initiating projects in the coming

quadrennium compensating for the low activity during the COVID years.

IUGG is financially based on the USD. It is therefore worth mentioning that the US dollar has been relatively stable during the last quadrennium. With smaller fluctuations than during previous periods. Compared to EURO the highest fluctuations have been of the order +/- 10% and most of the time lower than that.

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

However, it is very important that IUGG takes the necessary steps to keep its members in the union and at the same time attract new members. The problem of keeping the members in the union is becoming more and more visible. It needs the full attention of the union and the member countries.

Commitments:

In 2022 IUGG has made two commitments:

- IUGG 2023 in Berlin: a guarantee of up \$300K has been given to LOC for the unlikely event that IUGG2023 results in a deficit.
- The former webmaster Dmitry Krupski has been guaranteed a payment of \$3,6K for 6 months work when money transfers with Russia again are allowed.

Acknowledgements:

I want to thank everybody I have been in contact with as IUGG Treasurer. In particular, I will send my sincere thanks to President Kathryn Whaler and the other members of the Bureau. I have always enjoyed the almost daily contact with Secretary General Alexander Rudloff and Executive Secretary Franz Kuglitsch. Also thanks to the Presidents and Secretary Generals-Treasurers of the Associations and the various union commissions and committees.

I have had a close and very good cooperation with the Finance Committee and its chair Corina Risso. I want to express my deepest appreciation of the relationship.

Last, but not least I will thank former IUGG treasurer Aksel Walløe Hansen for an exceptional help and an excellent cooperation on a daily basis.

Niels Andersen, IUGG Treasurer

Appendix

- 1) Membership statistics

Attachments:

- 1) Final accounting 2016 – 2019
 2) Accounting, 3 years of the period 2020-2023
 3) Budget 2020–2023, approved Montreal 2019
-

Appendix 1)

Membership statistics

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

First of all as of January 1, 2023, IUGG has 73 member countries (1 up compared to 2019). IUGG has welcomed 1 new member, Latvia, now a cat 1 member.

Israel has moved to cat 2 in 2021.

The 73 members represent a total of 278 units. 14 members are A-members, the same as in 2019. The 278 units represent a total of USD 660.250.

In early July 2023 we have received full payments from 44 members representing a total of 248 units for 2022. The missing units are distributed over 14 members with various lengths of time spent in observer status.

The total amount of dues in arrears is USD 217.345 (July 5, 2023).

Over time, it is a substantial amount of money that is not paid by members in observer status. It happens often that these members withdraw without paying their debt.

Membership table 2022/2023

Payments for 2022 and member distribution 2023

Category	Units for Category	Number countries	Units in Category	Paid 2022 (July 2023)	
				numbers	units
A	0	14	0		
1	1	18	18	9	9
2	2	17	34	13	26
3	3	5	15	4	12
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		73	278	44	248

(number of units from paid-up members only)

14 members are in observer status, representing 29 units in arrears.

Status of IUGG Members as of July 1, 2023

Countries in arrears with payments of dues are put in observer status, indicated in the table below with the first year without full payment.

Member Country	Category	Member Country	Category
14 adhering bodies in	A	5 adhering bodies in	3 15 units
Bolivia		Argentina	
Peru		Austria	
Mauritius		Brazil	observer, 2021
Georgia		Finland	
Albania		South Africa	
Armenia			
D.R. Congo		17 adhering bodies in	2 32 units
Ghana		Chile	
Morocco		Czech Republic	
Bosnia & Herzegovina		Egypt	observer, 2019
Serbia		Greece	
North Macedonia		Hungary	
Uruguay		Ireland	
Nicaragua		Israel	
		Korea, South	
1 adhering body in	11 35 units	Mexico	
USA		New Zealand	
		Nigeria	observer, 2014
3 adhering bodies in	8 60 units	Pakistan	observer, 2019
Germany		Poland	
Great Britain		Portugal	
Japan		Saudi Arabia	observer, 2016
		Thailand	
1 adhering body in	7 15 units	Turkey	
France			
5 adhering bodies in	6 50 units	18 adhering bodies in	1 18 units
Canada		Algeria	observer, 2022
China		Azerbaijan	observer, 2015
India		Bulgaria	observer, 2021
Italy		Colombia	
Russia, special case	observer, 2022	Costa Rica	
		Croatia	
3 adhering bodies in	5 21 units	Estonia	
Australia		Iceland	observer, 2021
Spain		Indonesia	
Switzerland		Iran, special case	observer, 2011
		Jordan	observer, 2017
6 adhering bodies in	4 30 units	Latvia	
Academia Sinica, Taipei		Luxembourg	
Belgium		Mozambique	observer, 2019
Denmark		Romania	
Netherlands		Slovak Republic	
Norway		Slovenia	
Sweden		Vietnam	observer, 2016

Attachment 1, Final accounting 2016-2019

2016 - 2019 FINANCIAL REPORT

BUDGET					ACCOUNTING						
2016	2017	2018	2019	2016	2017	2018	2019	2019			
RECEIPTS					RECEIPTS						
Membership Subscription	523,800	534,600	545,400	553,500	2,157,900	2,127,745	509,991	552,563	538,566	526,626	1. Member
Contributions with ICSU					0			0			2. Contra
5. Sales of Publications								1,050			134
5. Miscellaneous								112,733			
a. Interest	0	37						55			-1
b. Gain on exchange	0	4,273						7,598			3,326
c. Other	0	105,153						105,153			0
d. Cash in hand								1,172			1,172
Total Receipts	523,800	643,123	624,800	643,123	2,157,900	2,127,745	509,991	552,563	538,566	526,626	510,124
EXPENDITURES					EXPENDITURES						
11. Administration								400,000			474,371
11.1 Personnel	13,026	11,136	11,947	14,305	56,000	57,000	58,000	59,000	56,000	57,000	58,000
11.2 Equipment	1,158	1,801	306	252	1,000	1,000	1,000	1,000	1,000	1,000	3,517
11.3 Supplies	816	45	166	103	4,000	4,000	4,000	4,000	4,000	4,000	1,180
11.4 Communications	634	87	0	1,064	4,000	4,000	4,000	4,000	4,000	4,000	3,000
11.5 Travel, Administration only	55,400	89,485	70,240	97,825	65,000	80,000	65,000	85,000	65,000	85,000	312,949
11.6 Miscellaneous	1,036	5,478	7,473	37,036	1,000	1,000	1,000	5,000	1,000	5,000	
11.7 Support services	37,415										
11.8 Exchange											
11.9 Travel											
12. New Initiatives											
12.1 Publications											
12.2 Conferences											
12.3 General Assemblies											
12.4 Organization											
13.2 Travel											100,000
14. Symposia								20,000	20,000	20,000	0
15. Annual allocations								24,144	25,233	27,292	26,456
16. Dues and Grants											
16.1 ICSU											
17. ICSU grants											
17.1 MAGNIO											
18. Union activities											
18.1 GRC, SEDI											
18.2 Joint Union											
18.3 Liaison Off											
18.4 International											
18.5 New comm											
19. Countries in ne											
19.1 Travel Gra											
20. Fees											
20.1 Profession											
20.2 Bank fees											
21. Contingencies											
22. Loss on exch											
Total Expenditures	130,936	199,801	165,725	165,725	130,936	199,801	165,725	165,725	165,725	165,725	165,725
Balance end of 2019	422,864	422,864	422,864	422,864	422,864	422,864	422,864	422,864	422,864	422,864	422,864

Attachment 3, IUGG Budget 2020-2023

IUGG Budget 2020 - 23

Presented at Council meeting no. 2, to be approved at last council meeting on July 16

— except for the unallocated figures all figures are in thousands of US Dollars

Year	2019	2020	2021	2022	2023	2020-2023	2016-2019
Estimated unit value	\$2,020	\$2,060	\$2,100	\$2,140	\$2,180	\$2,060-\$2,180	\$1,940-\$2,050
Estimated number of units	260	260	260	260	260	1040	1080

INCOME			2020	2021	2022	2023	Budget	Budget
			2020-2023	2016-2019				2016-2019
1. ASSEMBLY SURCHARGE	20						20,0	20,0
2. ASSEMBLY SURCHARGE								
3. DONATIONS	0,4							
4. MISCELLANEOUS (Grants)							76,9	76,9
5. TOTAL INCOME	587,1	2226,0	2178				535,9	546,3
6. INCOMING BALANCE 2020	651,0	662,0					662,0	642,8

EXPENDITURES			2020	2021	2022	
			2020-2023	2016-2019		
11. ADMINISTRATION	125,0	442,0	440			
11.1 Personnel	15,0	60,0	60			
11.2 Equipment	1,0	4,0	4			
11.3 Supplies	4,0	16,0	16			
11.4 Communication	5,0	17,0	17			
11.5 Travel	90,0	320,0	335			
11.6 Miscellaneous	10,0	25,0	8			
12. SCIENCE AND INTERNATIONAL COOPERATION	70,0	160,0	160			
12.1 Education and outreach	30,0	120,0	80			
12.2 Science	40,0	160,0	80			
13. ASSEMBLIES	110,0	110,0	70			
13.1 Organizational expenses	10,0	10,0	10			
13.2 Travel Grants	100,0	100,0	60			
14. SYMPOSIA	5,0	25,0	25,0	0,0		
14.1 Symposia	5,0	25,0	25,0	0,0		
15. ASSOCIATIONS	52,6	267,8	273,0	278,2	1081,6	1059
15.1 Allotments	52,6	267,8	273,0	278,2	1081,6	1059
16. DUES	32,0	32,0	32,0	32,0	128,0	120
16.1 IUGG	32,0	32,0	32,0	32,0	128,0	120
17. UNION ACTIVITIES	39,0	39,0	39,0	39,0	156,0	164
17.1 Union commissions	24,0	24,0	24,0	24,0	96,0	104
17.2 Inter-Union Science	15,0	15,0	15,0	15,0	60,0	60
18. FEES	8,0	8,0	8,0	8,0	32,0	32
18.1 Professional Services	5,0	5,0	5,0	5,0	20,0	20
18.2 Bank Fees	3,0	3,0	3,0	3,0	12,0	12
19. CONTINGENCIES	2,5	2,5	2,5	2,5	10,0	10
20. TOTAL EXPENDITURES	587,1	563,3	548,5	554,7	2314,6	2201
21. OUTGOING BALANCE 2023	659,8	642,8	651,0	673,4	659,8	

SPS, GRC, UCDI

NOTE 17.1 Union commissions
 17.2 Inter-Union Science

CMG, SEDI, CCEG, UI
 ILP

QUADRENNIAL REPORTS OF THE ASSOCIATIONS

QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF CRYOSPHERIC SCIENCES

INTRODUCTION

The International Association of Cryospheric Sciences (IACS) is the youngest Association of the International Union of Geodesy and Geophysics (IUGG), established by a vote of the IUGG Council at the 2007 IUGG General Assembly in Perugia, Italy (snow and ice research within IUGG had previously been covered by the International Commission on Snow and Ice of the International Association of Hydrological Sciences). IACS is concerned with snow and ice science and provides expert advice on cryospheric issues to governmental and non-governmental organisations. The objectives of IACS are to:

- promote studies of cryospheric subsystems of the Earth and solar system;
- encourage research in the above subjects by members of the cryospheric community, national and international institutions and programmes, and individual countries through collaboration and international coordination;
- 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;
- promote and support diversity, inclusion and equality within the field of cryospheric science, including but not limited to career stage, gender, racial and ethnic identities, and geographic origin.

ADMINISTRATION

The business of IACS is managed by a Bureau of elected officers. Bureau members serve for four-year terms, with the exception of the President, who serves for two years as President-Elect, four years as President, and two years as Immediate Past President. The members of the present Bureau, elected at the

2019 Plenary Administrative Session in Montreal, are:

President (2021-25): Liss M. Andreassen,
Norway

Immediate Past President (2021-23): Regine Hock, Norway/USA

Secretary General: Richard Essery, UK

Vice-Presidents: Minghu Ding, China

Stanislav Kutuzov, Russia

Andrew Mackintosh,
Australia

Heads of Divisions:

Snow and Avalanches: Charles Fierz,
Switzerland

Glaciers: Gwenn Flowers, Canada

Ice Sheets: Sophie Nowicki, USA

Sea Ice, Lake and River Ice: Takenobu
Toyota, Japan

Cryosphere, Atmosphere and Climate: Anaïs Orsi, France

Planetary and other Ices of the Solar System:
Christine Schøtt Hvidberg,
Denmark

The IACS by-laws have a provision that the Bureau may appoint deputy heads for divisions on request from the Division Head. The Division Head can temporarily delegate the right to vote on Bureau matters to the Deputy, but no Division can have more than one vote. Three Deputy Division Head were appointed in 2020 and 2021: Marie Dumont (Snow and Avalanches), Lauren Vargo (Glaciers), Alex Fraser (Sea Ice).

Most of the internal business of IACS and interactions with other organizations are conducted by email. To run the day-to-day business of IACS, an Executive Committee consisting of the President, Secretary General and President-Elect or Immediate Past-President holds regular teleconferences, in which all Bureau members are welcome to join. The full Bureau meets annually and there is a Plenary Administrative Session at least once during each General Assembly. There have been no opportunities to meet in person since the Bureau and Plenary meetings in Montreal in

2019, so all of these meetings have been held online this quadrennium.

An independent nomination panel (Jon Ove Hagen, chair, Norway; Mary Albert, USA; Ian Allison, Australia) was established in September 2022 to identify suitable candidates for election to the IACS Bureau for 2023-2027. The nominating panel's role is to ensure that candidates for the Bureau provide a good coverage of world regions and cryospheric disciplines. The slate of candidates will be circulated to National Committees at least three months prior to the IACS Plenary Administrative Session in Berlin on Saturday 15 July 2023.

ACTIVITIES

Membership

IACS established free individual membership in 2017, and membership reached 1000 in August 2022. Individual membership is intended to create a strong community around IACS, promoting its activities and its relationship with IUGG and the other seven constituent Associations. Specifically, IACS members receive regular information about IACS activities and opportunities, and are eligible to engage in IACS activities and bodies. This includes the possibility of receiving IACS sponsorship and financial support for workshops, training schools and other IACS-sponsored activities, as well as eligibility for IACS early-career scientist prizes. Everybody is welcome to join, including members of other IUGG associations; see <https://cryosphericsscience.org/members/membership/>.

Communications

The IACS homepage (<https://cryosphericsscience.org/>) is hosted by the World Glacier Monitoring Service in Zurich and is linked to twitter account @iacscryo (<https://twitter.com/iacscryo>). IACS newsletters feature announcements and reports of IACS activities (<https://cryosphericsscience.org/newsletter/>). Three newsletters were published in 2019, 2020 and 2021, and four in 2022.

IACS Working and Standing Groups

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. Working Groups address scientific problems that are timely and well constrained; they are normally limited to four years in duration, but may be renewed for up to a further four years with suitable justification. The Working Groups active during this quadrennium were:

- Randolph Glacier Inventory and its role in future glacier monitoring and GLIMS (2020-2023), which has the objective of automating the process of generating digital glacier outlines to support research in glacier mass balance and contributions to sea level rise.
- Regional Assessments of Glacier Mass Change (RAGMAC, 2019-2023), which brings together the research community that is assessing regional glacier mass changes from various observation technologies to come up with a new consensus estimate of global glacier mass changes and related uncertainties.
- Debris Covered Glaciers (2018-2022), which aims to advance our ability to map debris thickness, to identify the level of model complexity required to estimate sub-debris melt, and to coordinate knowledge exchange.

The Standing Group on Glacier and Permafrost Hazards in High Mountains (GAPHAZ) is joint with the International Permafrost Association and aims to:

- improve international scientific communication on glacier and permafrost hazards;
- compile knowledge related to glacier and permafrost hazards in high mountains;
- work towards greater transfer of information and improved communication between the scientific and governmental communities;
- signpost sources of advice to international and national agencies, responsible authorities and private companies;
- act as a focal point for information for international media during relevant crises.

IACS is part of the Global Terrestrial Network for Glaciers (GTN-G) Steering Committee.

GTN-G is a framework for internationally coordinated monitoring of glaciers jointly run by the US National Snow and Ice Data Center, the Global Land Ice Measurements from Space initiative and the World Glacier Monitoring Service.

IACS Joint Commissions

Joint Commissions with other IUGG Associations aim to foster collaboration and coordination on topics of overlapping interests. IACS currently has three Joint Commissions, all of which were established in 2020:

- IACS-IAG Joint Commission on Cryospheric Deformation;
- IACS-IAPSO Joint Commission on Ice-Ocean Interactions;
- IACS-IAVCEI Joint Commission on Volcano-Ice Interactions, following on from the earlier Standing Group on Volcano-Ice Interactions (2010-2019).

Joint bodies

IACS approved the creation of a Joint Body with the Mountain Research Initiative and the WMO Global Cryosphere Watch on “the status of the mountain snow cover” in 2022. The objectives of the Joint Body are to:

- provide robust information on mountain snow cover changes at a global scale;
- better understand processes of snow accumulation and ablation based on existing modelling and observational studies;
- open access to snow data for the research community and operational capacity building for understanding mountain snow cover changes and impacts.

Events and activities sponsored by IACS

IACS supports events that are of interest to the cryospheric community. Contributions typically cover part of the travel costs for early career scientists and scientists from developing countries attending cryosphere related events, or IACS awards for scientists in these categories. Proposers must be IACS members. Funding requests can be submitted for deadlines on 1 February, 1 June and 1 October and must be at least two months prior to the event that is to be supported. Proposers are

informed of decisions approximately two weeks after the deadline.

Travel restrictions and event cancellations led to a reduction in the number of applications received in the middle of this quadrennium. Nevertheless, several events were supported:

- Glacial Isostatic Adjustment (GIA) Training School, Gävle, Sweden, 26–30 August 2019
- Workshop on computational methods for snow and avalanche release mechanics, Aussois, France, 30 September – 1 October 2019
- World Meteorological Organization High Mountain Summit, Geneva, Switzerland, 29–31 October 2019
- Development of the Cryo Connect database in 2019
- 7th International Conference on Mars Polar Science and Exploration, Ushuaia, Argentina, 13–17 January 2020
- 6th Snow Science Winter School, Col du Lautaret, France, 16–22 February 2020
- 3rd Annual Meeting of the Chilean Cryosphere Society, online, 18–19 March 2021
- Juneau Icefield Research Program, Alaska, summer 2022
- International Summer School in Glaciology, McCarthy, Alaska, 7–17 June 2022
- International Symposium on Ice, Snow and Water in a Warming World (Cryosphere 2022), Reykjavík, Iceland, 21–26 August 2022
- International Mountain Conference (IMC), Innsbruck, Austria, 11–15 September 2022

To replace the cancelled BACO-21 IACS-IAMAS-IAPSO assembly, the three Associations ran an online seminar series with invited speakers and early career award winners over the same period (19–23 July 2021). IACS organized the registration and the meeting platform. Recorded presentations can be viewed at <https://www.youtube.com/channel/UCP3bCxu-NIgiINmeoHgGxEQ/videos>. In the absence of the assembly, IACS held an online Open Plenary meeting on 17 November 2021. The meeting ran twice on the same day with repeats

of the presentations to facilitate participation from different time zones.

Awards

The IACS Early Career Scientist (ECS) Prize is a cash prize of €1000 awarded every two years to two early career scientists who have published the best scientific papers on a cryospheric subject as assessed by an independent evaluation committee. The winners in 2019 and 2021 were:

- Dr David Bigelow, Simon Fraser University, Canada
- Dr Doug Brinkerhoff, University of Montana, USA
- Dr Denis Felikson, NASA Goddard Space Center, USA
- Dr Giulia Mazzotti, WSL Institute for Snow and Avalanche Research SLF, Switzerland

The Graham Cogley award was established in memory of Graham Cogley and recognizes excellence in glaciological research by early career scientists. The award was initiated and is generously sponsored by the Cogley family for a period of 20 years, and is awarded in alternate years by IACS and the International Glaciological Society. The IACS recipients in 2019 and 2022 were

- Caroline Aubry-Wake, University of Saskatchewan, Canada
- Devon Dunmire, University of Colorado, USA
- Eric Keenan, University of Boulder, USA
- Gavin Piccione, University of California Santa Cruz, USA
- Jonathon Preece, University of Georgia, USA

IACS Immediate Past President Regine Hock received the International Glaciological Society

2021 Richardson Medal and the European Geophysical Union 2022 Julia and Johannes Weertman Medal.

FUTURE ACTIVITIES

28th IUGG General Assembly, Berlin

IACS has proposed 15 symposia and six joint symposia, and is contributing to nine other joint symposia at the IUGG 2023 General Assembly. Other activities during the Assembly will include:

- Announcement of IACS Early Career Scientist Prize winners
- Selection of Graham Cogley Award winners
- Union Lecture by IACS nominee Ricarda Winkelmann (Potsdam Institute for Climate Impact Research)
- IUGG Early Career Award symposium with presentations by IACS nominees Mohd Farooq Azam (Indian Institute of Technology Indore), Natalya Gomez (McGill University, Canada) and Johan Gaume (WSL Institute for Snow and Avalanche Research SLF, Switzerland)
- Presentation of the IUGG Gold Medal to IACS nominee Valerie Masson-Delmotte
- IACS Open Administration Session and “Festa Cryospherica” dinner, 15 July 2023.

Liss M. Andreassen, IACS President
Richard Essery, IACS Secretary General

QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF GEODESY

INTRODUCTION

Geodesy is the discipline that deals with the measurement and representation of the Earth (geometry, physics, and temporal variations). The mission of the International Association of Geodesy (IAG) is the advancement of geodesy by furthering geodetic theory through research and teaching, by collecting, analysing, modelling and interpreting observational data, by stimulating technological development, and by providing consistent, time-dependent geometric and physical parameters for global change research.

The structure of IAG comprises several components: four Commissions, the Inter-Commission Committees on Theory (ICCT), Climate Research (ICCC), and Marine Geodesy (ICCM), Project Novel Sensors and Quantum Technology for Geodesy (QuGe), twelve International Scientific Services, the Global Geodetic Observing System (GGOS), and the Communication and Outreach Branch (COB).

The Commissions are divided into Sub-commissions, Study Groups and Working Groups. The Inter Commission Committees (ICCs) and the Project investigate scientific geodetic-related problems in close cooperation with the Commissions.

The Global Geodetic Observing System GGOS is a component of IAG which works with the IAG Services to provide the geodetic infrastructure necessary for monitoring the Earth system and global change research. GGOS ensures the basis to maintain a stable, accurate and global reference frame, which is crucial for all Earth observation. Services are responsible for coordinating Operation, Data and Analysis Centres which are responsible for the IAG products.

The COB provides communication, public information and outreach links, in particular via the IAG Website and the monthly Newsletters.

The IAG General Assembly, the Council, the Executive Committee, and the Office carry out the administration of IAG. The Council is composed of the delegates appointed by the national adhering bodies; the Bureau comprises the IAG President, Vice-President and Secretary General; the Executive Committee consists of 17 elected members; and the Office

assists the Secretary General in fulfilling his duties. The COB is responsible for the promotional activities of the IAG and the communication with its members. The detailed programme of the IAG is published in the Quadrennial Geodesist's Handbook, and reports are published in the bi-annual IAG Reports (Travaux de l'AIG).

ADMINISTRATION

IAG Council. The IAG Council meets bi-annually at the IUGG General Assemblies and at the IAG Scientific Assemblies. Two Council meetings took place during the IUGG General Assembly in Montreal, Canada, in July 2019. Main topics were the election of the members of the IAG Executive Committee (done by e-mail voting before the Assembly), the review and approval of the IAG Statutes and Bylaws, the approval of the IAG budget 2020-2023, and the decision on the venue of the next IAG Scientific Assembly 2021, which will be in Beijing, China, June 28 – July 2, 2021.

Due to the COVID-19 Pandemic, no Council meeting was organised related to the Scientific Assembly which was held as a hybrid meeting. Instead, there was an online meeting and voting on September 2021 to elect the venue of the 2025 IAG Scientific Assembly. The Next Council meetings will be at the General Assembly in Berlin, in July 2023.

IAG Executive Committee (EC). The voting members of the Executive Committee are composed of the IAG President, Vice-President, Secretary General, immediate Past-President, immediate Past-Secretary General, the four Commission Presidents, the President of GGOS, the President of ICCT, the President of COB, three representatives of the Services, and two members at large.

The EC 2019-2023 held its last two meetings in 2019 during the IUGG GA in Montreal. The new EC 2019-2023 had two meetings in 2019, but after that, the COVID-19 Pandemic prevented the in-person meetings until December 2022, when the first hybrid meeting was arranged in Paris. Meanwhile, online meetings were organised twice a year. Additionally, there were several information e-mails and electronic ballots as needed. The EC

meeting summaries are available on the IAG web page.

IAG Bureau. The IAG Bureau (President, Vice President, and Secretary General) discussed day-to-day topical issues and made decisions through e-mail exchanges and regular monthly online meetings.

IAG Office. The IAG Office (Secretary General, with the Treasurer and the "IAG Secretariat", a registered Society concerning financial matters) managed the Association's finances, membership matters, daily contacts to IAG, IUGG and other external contacts, correspondence, preparing meetings, minutes and notes of Council, Executive Committee and Bureau meetings, and preparing reports to IUGG.

ACTIVITIES

Due to the COVID-19 pandemic, all meeting-related activities in 2020-2022 were lower than normal. Most meetings, symposia and workshops were either cancelled, postponed or arranged as web meetings. A lot of small online meetings were organised which enabled the continuation of the activities. Towards the end of 2022 activities started gradually returning to normal.

IUGG General Assembly, Montreal Canada

The General Assembly of IUGG was held in Montreal, Canada July 8-19, 2019. All eight Associations had their administrative meetings during the meeting. The IAG Council had two meetings, on July 10 and 16 with approval of the IAG budget, resolutions, revised statutes and bylaws.

The number of registered participants was 3715 from 93 countries, and the number of abstracts submitted was 4919. A total of 210 Symposia were organised with more than 2300 oral presentations. The number of IAG-related participants was 465.

IAG offered the possibility to submit a full paper of the presentation in the IAG-renowned Symposia Series published by Springer. The book was published in 2022.

IAG Scientific Assembly, Beijing, China

The Scientific Assembly of the IAG was held in Beijing, China from June 28 to July 2, 2021. The main local organizer was the Chinese

Society for Geodesy, Photogrammetry and Cartography (CSGPC) with more than 20 co-organizers in China. Due to the COVID-19 pandemic, the Assembly was organized as a hybrid conference with a possibility for the Chinese participants' physical meeting in Beijing. The theme of the Assembly was "Geodesy for a Sustainable Earth".

The number of registered participants was 1269 which is a record in the history of IAG meetings, more than twice the previous record. Of these, 435 were students and early-career scientists which is about 1/3 of all participants. A total of 615 abstracts were submitted for the Assembly.

IAG offered the possibility to submit a full paper of the presentation in the IAG-renowned Symposia Series published by Springer. A total of 59 manuscripts were submitted and the book will be published in 2023.

Activities of Commissions, Inter-Commission Committees, and Services

The four IAG Commissions, Sub-Commissions, three Inter-Commission Committees, IAG Project, GGOS, and the twelve Services suffered from the COVID-19 pandemic but were by end of 2022 gradually returning to their normal activities. Several in-person, online or hybrid symposia, webinars or seminars were organized during the period. The IAG entities maintain their Webpages (accessible also via the IAG Homepage) where more details can be found, as well on the IAG Newsletter. Major IAG-sponsored meetings and symposia are listed above with the names of the responsible IAG entity.

IAG Services continued their activities almost normally during the period. Data repositories, analysis centres and products of Services have been continued without interruptions. Meetings, workshops and other activities were organized online.

Communication and Outreach Branch (COB)

The main activities of the COB included the publication of the monthly Newsletter, GIM International and the maintenance of the IAG Homepage (www.iag-aig.org). The IAG Newsletter is published monthly and a part of it is also in the Journal of Geodesy as an open-access paper.

Cooperation with other Organisations

IAG maintains close cooperation with several organisations outside IUGG: Advisory Board on the Law of the Sea (ABLOS), Group on Earth Observation (GEO), ICSU Commission on Space Research (COSPAR, Sub-commission B2 and PSD), International Astronomical Union (IAU, Commission A2), International Standards Organisation (ISO, TC211 Geographic Information / Geomatics), Subcommittee on Geodesy of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), related Global Geodetic Centre of Excellence, United Nations Offices for Outer Space Affairs (UNOOSA, with Space-based Information for Disaster Management and Emergency Response, UN-SPIDER, and International Committee on Global Navigation Satellite Systems, ICG).

Selected Meetings of IAG Components and IAG Sponsored Meetings in 2019-2022

- | | |
|---|---|
| <p>2019 03 14-20 24th Meeting of the European VLBI Group for Geodesy and Astronomy (EVGA) and 18th IVS Analysis Workshop; Las Palmas, Gran Canaria, Spain</p> <p>2019 04 15-17 IGS 2019 Analysis Workshop; Potsdam, Germany</p> <p>2019 05 05-09 10th IVS Technical Operations Workshop; Westford, MA, USA</p> <p>2019 05 15-17 4th Joint International Symposium on Deformation Monitoring (JISDM); Athens, Greece</p> <p>2019 05 22-24 EUREF 2019 Symposium; Tallinn, Estonia</p> <p>2019 07 08-19 27th IUGG General Assembly; Montreal, Canada</p> <p>2019 09 30-01 DORIS Analysis Working Group meeting; Paris, France</p> <p>2019 10 01 ILRS Analysis Standing Committee (ASC) meeting; Paris, France</p> <p>2019 10 01-04 5th IAG Symposium on Terrestrial Gravimetry: Static and Mobile Measurements (TG SMM 2019); Saint Petersburg, Russia</p> | <p>2019 10 02-04 GGOS/IERS Unified Analysis Workshop; Paris, France</p> <p>2019 10 10 BIPM Workshop on Advanced Time and Frequency Transfer; Sèvres, France</p> <p>2019 10 21-25 2019 ILRS Technical Workshop; Stuttgart, Germany</p> <p>2019 11 11-14 GGOS Days 2019; Rio de Janeiro, Brazil</p> <p>2019 11 11-14 SIRGAS Symposium 2019; Rio de Janeiro, Brazil</p> <p>2020 06 09 Kick-off meeting of the IAG SC 1.4/IAU/IERS joint working group on the "Consistent realization of TRF, CRF and EOP", 20 participants</p> <p>2020 11 03 IAG SC 1.3e/UN-GGIM-AP (Geodetic reference frame of the Asia-Pacific region), 86 participants, virtual meeting</p> <p>2021 06 23-26 Geodynamics and Earth Tides. Wuhan, China. IAG Subcommission 3.1 meeting</p> <p>2021 06 28-07 02IAG Scientific Assembly, Beijing, China. The hybrid meeting, in-person for Chinese and online for foreign participants. A total of 1269 participants.</p> <p>2022 03 22-25 IVS Training School, Helsinki, Finland. Online only; 120 participants, 20 teachers</p> <p>2022 03 28-04 0112th IVS General Meeting March 28-April 1, 2022, Helsinki Finland. Online only, 175 participants (a new record of IVS), 98 contributions</p> <p>2022 04 11-13 IGRF Workshop 2022, Leipzig, Germany (25 in-person, >60 online)</p> <p>2022 06 01-04 EUREF 2022 Symposium, June 1-4, 2022, Zagreb, Croatia (only online ~100 participants)</p> <p>2022 06 13-17 X. Hotine-Marussi Symposium on Mathematical Geodesy, Milan, Italy, 13-17 June 2022 (60 participants who contributed 80 papers, Proceedings to be published in the IAG Symposia series)</p> |
|---|---|

- 2022 06 27-07 01IGS Workshop "IGS 2022: Science from Earth to Space", Boulder CO, USA
- 2022 09 05-09 2nd International Symposium: Positioning and Applications, Potsdam, Germany (75 participants, of which 45 in-person; Proceedings to be published in the IAG Symposia series)
- 2022 09 12-16 Gravity, Geoid, and Height Systems 2022 (GGHS2022), Austin TX, USA (87 participants, 59 in-person, proceedings to be published in IAG Symposia series)
- 2022 10 17-21 REFAG 2022, Thessaloniki, Greece (100 participants from 22 countries; proceedings to be published in the IAG Symposia Series in 2023)
- 2022 10 22-25 Unified Analysis Workshop (UAW) Thessaloniki, Greece (62 participants, 49 on-site)
- 2022 10 31-11 02IDS Workshop 2022, Venice, Italy, In-person meeting with 23 presentations.
- 2022 11 07-11 22nd International Workshop on Laser Ranging, Guadalajara, Spain, (109 in-person participants and 63 online; from 20 countries)
- 2022 11 07-09 SIRGAS Symposium, Santiago de Chile, (90 participants in-person and 130 online)
- 2022 11 14-16 GGOS Days 2022, Munich Germany (33 in-person and 78 online)

Cooperation with other Organisations

IAG maintains close cooperation with several organisations outside IUGG: Advisory Board on the Law of the Sea (ABLOS, presently with IAG presidency), Group on Earth Observation (GEO), ICSU Commission on Space Research (COSPAR, Sub-commission B2 and PSD), International Astronomical Union (IAU, Commission A2, with IAG presidency), International Standards Organisation (ISO, TC211 Geographic Information / Geomatics), United Nations Initiative on Global Information Management (UN-GGIM), United Nations GGIM Geospatial Societies (UN-GGIM-GS), United Nations Offices for Outer Space Affairs (UNOOSA, with Space-based Information for Disaster Management and

Emergency Response, UN-SPIDER, and International Committee on Global Navigation Satellite Systems, ICG).

Individual IAG membership

By the end of 2022, there were 186 members, of which 24 were student members.

Publications

The IAG Newsletter was published monthly online and is accessible via the IAG website

Based on the agreement with Springer Verlag, IAG Symposia Series will be open access, and free of charge to the Symposia participants.

Vol. 148 International Symposium on Gravity, Geoid and Height Systems (2019). Proceedings Organized by IAG Commission 2 and the International Gravity Field Service, Thessaloniki, Greece, September 19-23, 2016

Vol. 149 International Symposium on Advancing Geodesy in a Changing World (2019). Proceedings of the IAG Scientific Assembly, Kobe, Japan, July 30 – August 4, 2017

Vol. 150 Fiducial Reference Measurements for Altimetry (2020). Proceedings of the International Review Workshop on Satellite Altimetry Cal/Val Activities and Applications

Vol. 151 IX Hotine-Marussi Symposium on Mathematical Geodesy (2021). Proceedings of the Symposium in Rome, June 18 – 22, 2018

The number of submissions to the Journal of Geodesy published by Springer remained well above 300, with about a 30% acceptance rate. The impact factor of the Journal is 4.8 (2021). The JoG is within the top ten geosciences-related journals.

The Geodesist's Handbook 2020 was published in the November 2020 issue of the Journal of Geodesy.

Awards

Levallois Medal was presented to Professor Christoph Reigber on the occasion of the 80th Anniversary and a Geoscientific Colloquium.

IAG Guy Bomford Prize was awarded to Michal Šprlák on the occasion of the IUGG General Assembly in Montreal, Canada.

Young Authors' Awards were awarded to Minghui Xu and Athina Peidou on the occasion of the IUGG General Assembly in Montreal, Canada.

Young Authors' Awards were awarded to Susanne Glaser and Khosro Ghobadi-Far on the occasion of the SA2021.

A total of 20 IAG Travel Awards were granted to young scientists in 2019 and 2022 for participating in and presenting research results at IAG-sponsored Symposia. There were no applications in 2020 and 2021.

Obituaries

Obituaries published in the IAG Newsletter:

Rodrigue Blais (1941-2019)
Ahmet Aksoy (1932-2020)
Erik Wilhelm Grafarend (1939-2020)
Dezső Nagy (1930-2020)
Richard Henry Rapp (1937-2020)
Günter Stangl (1952-2020)
Andrzej Borkowski (1959 - 2021)
Steve Kenyon (1957-2021)
Tadahiro Sato (1945-2021)
József Ádám (1950-2022)
Gerd Boedecker (1944-2022)
Bjørn Engen (1941-2022)
Juhani Kakkuri (1933-2022)
Helmut Moritz (1933-2022)
George Veis (1929-2022)

PLANNED FUTURE ACTIVITIES

The situation is returning to normal after almost three years of pandemic restrictions. IAG entities will have smaller working group meetings or seminars, but most of the 2023 activities will be connected to the IUGG General Assembly in Berlin, July 11-20. All administrative meetings will be organised during the GA, as well as the meeting of the IAG Council. GGOS and COB of IAG are planning the reorganisation of the outreach and web services to improve the visibility of IAG and its services. This will be one of the largest internal efforts during the next quadrennial period.

Cooperation in the Subcommittee on Geodesy of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) and the newly opened Global Geodetic Centre of Excellence. Emerging new techniques in geodesy, new needs and practices following this development, and improving the global geodetic infrastructure to meet new requirements are as well in the scope of coming years.

Markku Poutanen, IAG Secretary General

QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY

INTRODUCTION

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

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

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

Observations of present and past magnetic fields are an important basis for these studies.

ADMINISTRATION

In 2019, during the IUGG General Assembly, the Conference of Delegates elected a new Executive Committee (EC) for the quadrennium 2019-2023. The new leaders for the Divisions and Commissions and their Working Groups were appointed by the Executive Committee and confirmed by the Conference of Delegates. Important to note is that IAGA extended its executive committee, following a change of Statutes and By-Laws adopted in 2017, to newly contain a second vice president, a treasurer (formerly included in the secretary general tasks) and an early career representative. Overall the IAGA EC now has 12 members.

ACTIVITIES

Outstanding frontiers of research in geomagnetism and aeronomy in the period

2019-2022 have included a wide range of new results, in diverse domains of Association activities. The Swarm satellite mission launched by ESA in 2013, continues to offer an unprecedented opportunity to achieve an improved separation between the internal and external magnetic field sources, a detailed mapping of the large-scale lithospheric magnetic field, and multi-point monitoring of ionospheric and near-Earth magnetospheric variations and related aeronomic processes for space weather applications.

Assemblies

2019: The XXVIIth IUGG General Assembly

IAGA was well represented at the IUGG Assembly with contributions to 18 joint symposia and 22 additional IAGA sessions. Nearly 400 participants from 36 countries gave IAGA as their main affiliation. The IAGA contribution to the Union Lectures was given by Lisa Tauxe (USA), an excellent and well-received lecture entitled "Hunting the magnetic field". A highlight was the IAGA Ceremony, where the IAGA awards were presented (see 3) and Catherine Johnson, recipient of the Shen Kuo Medal gave an exciting lecture on planetary magnetism entitled "The Magnetic Field of Mars: Progress and Puzzles".

The meeting and the venue provided excellent opportunities for scientists to discuss different themes, over breaks, poster sessions, and the IAGA special dinner.

2021: The Joint IAGA-IASPEI Assembly

The Joint IAGA-IASPEI Scientific Assembly was planned to be held in August 2021 in Hyderabad, India. Due to the pandemic, the assembly was turned into a virtual meeting, organised as originally planned by the Indian National Academy (INSA) and the CSIR-NGRI with support from other Earth science institutes of the Department of Science & Technology, Gol, CSIR and the Ministry of Earth Sciences, Gol. Our Indian colleagues have done a tremendous job in working with a professional conference organizer to set up the fully virtual environment in less than a year. The virtual meeting attracted 828 participants, with over 500 from IAGA, and overall coming

from 56 countries. The program included 3 plenary talks, 8 joint sessions, 27 IAGA and 17 IASPEI symposia. It was preceded by the NGRI-CSIR Diamond Jubilee Symposium which celebrated the 60th anniversary of the institute with 8 invited lectures. Shen Kuo Medalist, Jay Johnson, gave a well-received lecture entitled “From microphysics to system science: approaches to understanding dynamics from the sun to Saturn” in the virtual award ceremony.

IAGA Awards & Honors

IAGA recognised the achievements of scientists at all stages of their careers at the Awards ceremonies at the IUGG General Assembly 2019 and the virtual Joint IAGA-IASPEI Assembly 2021. Note that the former IAGA Young Scientist Award was re-named into IAGA Early Career Award in 2020. Two new honorary IAGA members were selected and approved by the Conference of Delegates at the IUGG General Assembly in 2019.

Recipients of the Shen Kuo Award for Interdisciplinary Achievements

Catherine Johnson	Canada	2019	IAGA News 56
Jay Johnson	USA	2021	IAGA News 58

Recipients of the IAGA Long Service Medal

Martin Berg	Norway	2019	IAGA News 56
Nataliya Sergeeva	Russia	2021	IAGA News 58

Recipients of the IAGA Young Scientist / Early Career Award

Tomasz Gonet	UK	2019	IAGA News 56
Deepak Kumar Karan	India	2019	IAGA News 56
Evgenii A. Shirokov	Russia	2019	IAGA News 56
Anreevna Kseniia Tlatova	Russia	2019	IAGA News 56
Man Hua	China	2021	IAGA News 58

New IAGA Honorary Members

Archana Bhattacharyya	India	2019	IAGA News 56
Toshihiko Iyemori	Japan	2019	IAGA News 56

IAGA Schools

The 4th IAGA School

The 4th IAGA School was held from July 3 to 7, 2019, at the Station de biologie des Laurentides (SBL), ca. 80 km NW of Montreal, the location of the IUGG Assembly. 20 PhD students from 12 different countries, nominated by the IAGA Divisions and selected by the IAGA Executive Committee, participated in the School. Topics across all the disciplines of IAGA were covered by lectures given by experts in their fields. Students and lecturers stayed together in the same place, so that not only coffee breaks, but also meal times and evenings were used for lively scientific discussion. Both the students and the lecturers gave very positive feedback on the event.

The 5th IAGA School

The 5th IAGA School was planned for the week before the IAGA-IASPEI Joint Assembly in Hyderabad in 2021, but could not be held in its usual form due to the pandemic. The Chair of IAGA’s Interdivisional Commission on Education and Outreach successfully organised the 5th IAGA School as a virtual event with assistance from the Joint Assembly local organisers. It was held from August 16 to 20, 2021, and attended by 34 students from 16 countries. Seven international lecturers provided 10 lectures and computer practicals, covering a large range of IAGA scientific topics. To mimic as best as possible the usual personal interactions, the Gather software (<https://gather.town>) was used for a social event and during breaks, and for distribution of information and further interactions an instant messenger group was set up. This combination of virtual tools worked reasonably well and the participants mostly gave quite a positive feedback.

IAGA-IASPEI GIFT Workshop

The IAGA Interdivisional Commission on Education and Outreach (ICEO) has started to organize GIFT (Geosciences Information for Teachers) Workshops following an example of the European Geosciences Union (EGU). On the occasion of the IAGA-IASPEI Joint Assembly, the GIFT workshop planned for Hyderabad, India, had to be turned into fully virtual format. It was held August 19 – 21, 2021. 54 teachers from India, Nepal and one from Morocco were registered. Twelve

international experts delivered lectures covering Earth's history through space and time; climate forcing, feedback and responses; and a general session on Earth science, and had organized six virtual hands-on activities.

IAGA Sponsored Topical Meetings

Over the four-year period (2019-2022) IAGA sponsored 10 topical meetings covering large parts of the IAGA science. This is less than in previous periods, as many planned meetings and traditional workshops (e.g., 6 that would have received IAGA support in 2020) had to be cancelled due to the pandemic. The meetings were well distributed geographically to make them available to a larger number of scientists. The IAGA financial contributions were directed mainly at supporting scientists who otherwise wouldn't be able to attend.

Outreach

Social Media

An IAGA Social Media Working Group, founded in 2019 and consisting mainly of early career scientists, is very active in promoting IAGA and our scientific activities to a broad audience. They are active on Facebook (www.facebook.com/IAGAandAIGA/), twitter (www.twitter.com/IAGA_AIGA), Instagram (www.instagram.com/iaga_aiga/), and with a blog (<https://iaga-aiga.blogspot.com/>). Moreover, Katia Pinheiro created an outreach film describing the "Magnetic Mosaic" of the Earth through interviews with scientists, which was shortlisted into the top 3 films in the "Women in Geoscience" category and came 5th in the People's Choice award at the Earth Futures Festival (<https://www.earthfuturesfestival.com/the-films/v/magnetic-mosaic>).

Memorandum of Understanding with IAPS

In May 2021 IAGA has established a formal collaboration with the International Association of Physics Students, IAPS, an international, student-run educational association. The objective of the Memorandum of Understanding is to promote and strengthen collaboration between the two international associations, by, e.g. organizing common online seminars or workshops at conferences. Collaborative activities so far included, e.g., a talk by IAGA's 2015 Shen Kuo medalist Dan Baker at the 2021 PLANCKS (Physics league

across numerous countries for kick-ass students) event, and a virtual meeting event for physics students with IAGA experts related to the virtual Joint IAGA-IASPEI Scientific Assembly.

IAGA Publications

Annual IAGA newsletter

IAGA News 56 (2019) – 59 (2022), containing information about IAGA activities and the Executive Committee decisions have been distributed annually, and can be found on the IAGA website http://www.iugg.org/IAGA/iaga_pages/pubs_p_rods/public_relation.html.

The IAGA website contains a lot of additional information and is updated regularly: <http://www.iaga-aiga.org>

IAGA Book: Geomagnetism, Aeronomy and Space Weather

On the occasion of the IUGG centennial in 2019 IAGA published a book with Cambridge University Press providing a comprehensive overview of the IAGA fields of research. The volume, edited by IAGA Executive Committee members Miora Manda, Monika Korte, Andrew Yau and Eduard. Petrovsky and entitled "Geomagnetism, Aeronomy and Space Weather – A Journey from Earth's Core to the Sun" was published in November 2019 as part of a special publications series of the IUGG.

IAGA History

A special issue of the open access journal History of Geo- and Space Sciences (HGSS) on the history of IUGG and its associations was published on the occasion of the IUGG centennial in 2019. The IAGA contribution is authored by M. Manda and E. Petrovsky, entitled "IAGA: A major role in understanding our magnetic planet" (Hist. Geo Space. Sci., 10, 163–172, <https://doi.org/10.5194/hgss-10-163-2019>).

FUTURE ACTIVITIES

The main event in 2023 for IAGA will be the IUGG General Assembly in July. Preparations for a strong IAGA involvement, and for the preceding 6th IAGA School, are ongoing according to schedule. Katia Pinheiro and Shivangi Sharan, two IAGA mid and early career scientists, won an outreach grant from

XXVIII General Assembly of the International Union of Geodesy and Geophysics
Quadrennial Reports of the IUGG Associations and Union Commissions

IUGG in fall 2022 to produce outreach videos. They aim at producing a documentary and short movies connecting the science from all 8 IUGG associations through interviews mainly of early career researchers from many different countries, which should be presented at the IUGG General Assembly in Berlin in July 2023.

The number of in-person topical meetings is increasing again since 2022, and IAGA will be involved in organising and sponsoring topical meetings in 2023 and the following years.

Monika Korte, IAGA Secretary General

QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES

INTRODUCTION

IAHS promotes the study of all aspects of hydrology through discussion, comparison, and publication of research results and through the initiation of research that requires international cooperation. IAHS publishes the Hydrological Sciences Journal (HSJ), the Proceedings of IAHS (PIAHS, open access, successor of the Red Book Series), the Benchmark Paper series, and other specialised publications. IAHS maintains strong connections with the International Hydrological Programme of UNESCO and with the Hydrology and Water Resources Programme of the World Meteorological Organisation (WMO), and is partner of the UN Water coordination mechanism.

Aside country membership regulated at the IUGG level, IAHS gives the opportunity to individuals to register as “Individual members” for free. During the IAHS 2022 Scientific Assembly, IAHS accepted the 10,000th member. The total membership included 10,425 members end of 2022, of which 4,661 (44.7%) are in financially disadvantaged countries.

The following International Commissions, Working Groups and Initiative of IAHS conduct conferences, symposia, workshops, courses, and research cooperations:

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

- Early Career Committee transversal to the Commissions
- Working Group MOXXI on Measuring and Observing in the XXIst century
- Working Group CANDHY on Citizens AND Hydrology
- Working Group for Africa
- Working Group on History of hydrology
- Decadal Initiative Panta Rhei 2013-2022.

ADMINISTRATION

Elections were held during the 2019 General Assembly. Every elected person took position immediately except Presidents of the Association itself and of the 10 Commissions, who became Presidents elect for two years and then acting Presidents mid 2021. At the Association level, Berit Arheimer (Sweden) became President, after Günter Blöschl (Austria). Dan Rosbjerg has been elected honorary President; Paola di Passalacqua (Italy, USA), Salvatore Grimaldi (Italy) and Zongxue Xu (China) have been elected Vice Presidents; Christophe Cudennec (France) has been re-elected Secretary General; Kate Heal (United Kingdom) remained nominated treasurer. The officership of every commission is composed similarly to the association with one President, one President elect/Past President, three Vice Presidents, one secretary, one Early Career Scientist. All individuals can be found at iahs.info and in the IUGG Yearbooks.

IAHS Ltd based in England is the legal and finance entity of the International Association of Hydrological Sciences. It is chaired by Kate Heal, IAHS Treasurer. It employs 4 staff, coordinated by Claire Lupton, essentially for the Publication activity and general support to the Association, through an office which is hosted by UKCEH in Wallingford, England. The editorial and communication support were deeply changed with Frances Watkins' retirement and Sara Rafferty's departure, Lottie Rundall's, Kate Hill's and Tarryn Payne's recruitments.

The Early Career Scientists of the 10 International Commissions and the chair of the transversal Early Career Committee have been renewed in 2022 (the inaugural mandate has been extended because of the turbulences of the

Covid pandemic) based on a public call for candidates.

The IAHS-level officers and the Presidents of the 10 International Commissions form the IAHS Bureau. All other commission officers and chairs of working groups and initiatives are invited to all bureau meetings for sake of corporate intelligence and information sharing. Bureau meetings have been held in Montreal (Canada, 2019), then online during the Covid pandemic (twice in 2020 and in 2021), in Montpellier (France, 2022) and again online (2022) to keep on with a bi-yearly rhythm.

ACTIVITIES

Publications

IAHS publishes the Hydrological Sciences Journal - HSJ with Taylor & Francis; the online journal is made available free of charge to libraries and IAHS members in financially disadvantages countries. IAHS also publishes the proceedings of some IAHS and other symposia and workshops in the online, open access Proceedings of the IAHS (PIAHS) series with Copernicus. The online library of IAHS publications, available free to view at the IAHS website, was completed with the rescanning of volumes which were previously only available as digital images rather than text.

Attilio Castellarin (Italy) and Stacey Archfield (USA) remained Editor in chief and co-editor of Hydrological Sciences Journal – HSJ and have been joined by co-editors Aldo Fiori (Italy, 2019), Riddhi Singh (India, 2022) and Konstantinos Soulis (Greece, 2022). Christophe Cudennec remained Editor in chief of PIAHS. Performance indicators of HSJ have increased. Promotion by “features articles” continues, with details disseminated in press releases and via IAHS social media. Featured articles and Tison Award papers are made free to view. All papers in volumes more than two years old automatically become open access. Any other paper can be open access, on Author’s paying principle. Several Special issues have been accommodated in HSJ over the four years.

Conferences

In the frame of the IUGG 2019 General Assembly in Montreal (Canada), IAHS organized many Symposia and Workshops and co-convened several inter-association and

union events. WMO and UNESCO co-convened some of these symposia.

The Scientific Assembly (29 May-3 June 2022) was postponed from 2021 because of the Covid pandemic. It was a successful presential Assembly in Montpellier, France, co-organized with the local UNESCO Category 2 Center IciReWard and a consortium of local research laboratories. The postponing and pandemic-related uncertainties induced a heavy workload and risk taking by the Local Organizing Committee and the IAHS governance and secretariat. The number of 592 participants materialized the wish of the community to gather again after two years of turbulences. Though delegates from some countries had to cancel their participation because of national/employer travel restrictions; and visa denials have been reported. The attendance of delegates from Southern countries was high, facilitated by the orientation and networks of many researchers in Montpellier, to the IAHS worldwide coverage, and to the IAHS granting mechanism.

The IAHS 100 Anniversary was celebrated during the Assembly with a strong retrospective of the IAHS development, achievements, partnerships and central role in the history of hydrological sciences across events, publications and agenda-setting initiatives. This retrospective was supported by the display of 10 milestone posters (1 per decade) and keynote talks, and served as the basis for a corporate brainstorming across the week about actual and future epistemic, operational and associative challenges and priorities. A strategic plenary with keynote talks, roundtables and a round of pop-ups allowed to discuss many issues, while specific meetings focused on the consolidation of the IAHS ED&I policy, on the community values and challenges regarding Open Science, and on the capitalisation of the Panta Rhei decade. Commissions, working groups and HSJ editorial board had coordination meetings, the Early Career Committee and French teams organized workshops, WMO launched its call for research projects, UNESCO organised meetings about IHP flagship initiatives. A PIAHS Volume is under preparation as an outcome of the Assembly.

Because of the Covid-19 pandemic outbreak, all events 2020 and 2021 have been canceled,

postponed or reformatted, with much of managerial and eventually financial costs. In particular the ICWRS conference planned in July in Cairns, Australia was canceled; the ICCE conference in Bydgoszcz, Poland planned in June was postponed and partly replaced by an online event coordinated from Moscow, Russia; the ICSH conference on statistical hydrology (STAHY) planned in September in Valencia, Spain was rescheduled online in 2021. And the ICSW – UNESCO Friend conference on Great Rivers in Africa planned in 2020 in Cotonou, Benin was postponed in a hybrid mode with a high onsite presence end of 2021. IAHS co-convened sessions on Panta Rhei and UPH at the EGU Assembly and the AGU Fall Assembly were held virtually. In 2022, topical conferences and events have been organized by commissions, in particular STAHY2022 in Chia, Sardinia, Italy in September and ICCE International Symposium in Bydgoszcz, Poland in October; and IAHS supported Cryosphere 2022 in Reykjavik, Iceland in August.

Many efforts have been also dedicated to organize the IAHS programme and presence, as well as Joint events with sister Associations and UN partners (WMO, UNESCO), for the IUGG 2023 General Assembly in Berlin (Germany).

Supporting mechanisms

WMO, UNESCO, Taylor and Francis allocated funds to IAHS, and IAHS allocated proper funds to support delegates from countries in need to participate to the Assemblies. The SYSTA (Sivapalan Young Scientists Travel Awards) travel award scheme set up in 2018 has been implemented for the first time for the Montreal Assembly with full support (travel organized and bought by the IAHS secretariat, living forfait, registration, visa), and then implemented for Montpellier and Berlin Assemblies, and for topical conferences organized by IAHS commissions.

In the frame of a renewed Memorandum of Understanding, IAHS provides a financial support to Waternet, the Hydrological network for science and capacity development in Southern Africa to allocate travel grants to young scientists to attend the Waternet Annual assemblies.

IAHS coordinated the IAHS-UNESCO-WMO International Hydrology Prize, Dooge and

Volker Medals; and bestowed the Tison Award for young hydrologist every year. The Prize ceremonies were held during the 2019 Montreal assembly, then clustered during the Montpellier Assembly.

Initiatives

The Panta Rhei initiative developed its final years with coordinating teams operating over the 2019-2021 and 2021-2023 biennia, respectively chaired by Fuqiang Tian (China), and Heidi Kreibich (Germany). Stand alone and joint events, a special series of conferences in emerging and developing countries, the opinion paper series in HSJ, labelled articles in other Journals have been structuring the agenda-setting initiative. A synthesis book and an article are under finalization to close the decade.

The UPH – Unsolved Problems in Hydrology initiative launched in 2017 led to the publication of a community agenda-setting article in 2019 in HSJ which is well uptaken by the community.

Partnership with UN Agencies and ISC

The close cooperation of IAHS with UNESCO, WMO and the UN Water mechanism has been continued. We have especially contributed to the World Water Development Reports WDRR 2019-2022, the UN-Task Force on Water and Climate (and its Policy Brief); and attended the UNESCO IHP Intergovernmental Council and Bureau meetings (Paris, France and remote – also as IUGG liaison), the WMO Commissions, Council and Hydrological Coordination Panel (Geneva, Switzerland and remote – also as IUGG liaison), the WMO HydroHub Innovation committee meetings (Geneva Switzerland, and remote), UN Water meetings (Geneva, Switzerland; Paris, France and remote). We have also contributed to the WMO Capacity Development Panel, the WMO SYMET Conference on Education, the WMO research strategy, the GRDC steering committee, the UNESCO Recommendation on Open Science (in the ISC delegation).

We have also contributed to the preparation of the UN 2023 Water Conference in the frame of UN Water, of the related ISC Policy brief <https://council.science/publications/water-policy-brief/>, and of the UNESCO-led Science-based Assessment of Global Water which was

then presented at the Conference (with IAHS support expressed in the ad hoc side event).

FUTURE ACTIVITIES

The Bureau made decisions as follows:

- Develop a new Decade to follow up after Panta Rhei.
- Develop a Digital Water Globe.
- Renew the iahs.info website.
- Create the Falkenmark Award for best PhD, recognising outstanding contributions to hydrological understanding of water scarcity and water supply. Malin Falkenmark received the International Hydrology Prize in 1998, <https://iahs.info/About-IAHS/Competition--Events/International-Hydrology-Prize/International-Hydrology-Prize-Winners/MFalkenmark/>
- Create the Frances Watkins Memorial Award to recognize articles whose structure, presentation and language are deemed to be exemplary. The Award commemorates the enormous contribution

to the Journal made by Frances Watkins, who was its managing editor for some 27 years until her retirement and sudden death in 2022.

- Create a Working Group on Water History.
- Accept the bid (among 3) from Roorkee IIT, in partnership with NIH, to organize the 2025 IAHS Scientific Assembly in Roorkee, India, 5-10 October 2025.

In addition to the organisation of the IAHS part of the IUGG General Assembly, including elections, implementation of the latter decisions was initiated end of 2022 and will materialise in and beyond 2023, in particular with a hybrid process to design the 2023-2032 Science for Solutions Decade HELPING (Workshops in Cordoba, Spain in January and in Vienna, Austria in May; intermediate online consultations) to be launched in Berlin.

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

Christophe Cudennec, 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) that deals with all aspects of the gaseous envelope around the Earth and other planets. The main research work is carried out, coordinated and communicated through IAMAS's ten International Commissions (IC), which are in alphabetical order:

- International Commission on Atmospheric Chemistry and Global Pollution (ICACGP)
- International Commission on Atmospheric Electricity (ICAE)
- International Commission on Climate (ICCL)
- International Commission on Clouds and Precipitation (ICCP) including the Committee on Nucleation and Atmospheric Aerosols (CNAA)

- International Commission on Dynamical Meteorology (ICDM)
- International Commission on the Middle Atmosphere (ICMA)
- International Commission on Planetary Atmospheres and their Evolution (ICPAE)
- International Commission on Polar Meteorology (ICPM)
- International Ozone Commission (IOC)
- International Radiation Commission (IRC)

IAMAS and all the IAMAS commissions play a leading role in global coordination, communication and discussion of the latest research through organization of and participation in a wide range of scientific meetings that are open to all scientists.

ADMINISTRATION

For the term 2019-2023, the IAMAS Executive Committee consists of the following officers:

President	Joyce Penner	United States of America
Vice-Presidents	John Burrows	Germany
	Mary Scholes	South Africa
Immediate Past President	John Turner	United Kingdom
Secretary General	Steven Ackerman	United States of America
Deputy Secretary General		
Members at large	Lisa Alexander	Australia
	Keith Alverson	Japan
	Iracema Cavalcanti	Brazil
	Mu Mu	China
	Michiel van den Broeke	Netherlands
Commission presidents (ex officio)		
ICACGP	Melita Keywood	Australia
ICAE	Xiushu Qie	China
ICCL	Jianping Li	China
ICCP	Greg McFarquhar	United States of America
ICDM	Thomas Spengler	Norway
ICMA	Bernd Funke	Spain
ICPAE	Feng Tian	China
ICPM	Matthew Lazzara	United States of America
IO3C	Sophie Godin-Beekmann	France
IRC	Peter Pilewskie	United States of America

Dr. Jing Li of Peking University, China joined the IAMAS Bureau as the Chair of the IAMAS Early Career Committee. Dr. Li participated in Bureau meetings of the association and promotes the activities of IAMAS and its commissions amongst the next generation of atmospheric scientists. She also coordinated Early Career virtual meetings and seminars.

With the global impact of COVID-19, Bureau meetings were held on-line. Due to COVID-19, BACO-21 was postponed to in 2025.

A new website design was developed for IAMAS to modernize the look and support user needs and migrated to a secure web server. Newsletters are available on that site at <https://www.iamas.org/newsletters/>

A new email address was also set up (iamas.org@gmail.com).

ACTIVITIES

2019:

The 27th General Assembly of IUGG was held in Montréal, Quebec, Canada, from 8 July to 18 July 2019. The meeting was a great success with over 4,300 participants taking part, of which around 550 were associated with IAMAS. There were more than 5,300 presentations given in 202 symposia. IAMAS provided 22 scientific programs.

At that Assembly, IAMAS celebrated its 100th anniversary by holding a half day symposium that reflected on the remarkable advances that have taken place in the atmospheric sciences over that century, as well as current outstanding questions and future developments. The symposium consisted of keynote presentations by world-leading experts in various branches of the atmospheric sciences:

- The International Association of Meteorology and Atmospheric Science: One Hundred Years of Research Challenges and Accomplishments: J. Fleming
- Satellite remote sensing: Achievements, challenges, and future progress: B.J. Sohn
- The Changing Atmospheric Pollution and Chemistry, observed from Space in the Anthropocene: J.P. Burrows
- Climate Change: From Knowledge to Action: T. Stocker

- Atmospheres of planetary bodies other than the Earth: A. Coustenis
- Weather Prediction: Progress and Prospects: A. Brown

The IAMAS Early Career Scientist Medal was presented to Dr. Lei Bi, Department of Atmospheric Sciences School of Earth Sciences, Zhejiang University.

IUGG Honorary Membership (Fellowship) was conferred on:

- John Turner, the President of IAMAS,
- Teruyuki Nakajima, the Secretary-General of IAMAS,
- Athena Coustenis, the former President of IAMAS, and
- Hans Volkert, the former Secretary-General of IAMAS.

The 2019 Bureau and Executive Committee meetings were held during the 27th General Assembly. The Bureau and Executive Committees reviewed the IAMAS financial status and activities and discussed and approved a new strategic plan. The financial audit was discussed and approved. The IAMAS Executive Committee agreed that the term of the Secretary General should be four years, instead of eight years.

Planning began for the IAMAS-IACS-IAPSO (International Association of Cryospheric Sciences, IACS; the International Association for the Physical Sciences of the Oceans, IAPSO) joint assembly to be held in the city of Busan, Republic of Korea, during the period of 18-23 July 2021 (BACO-21); although as noted below this meeting went virtual.

A 100 Year History of IAMAS was written by Michael C. MacCracken and Hans Volkert and published in *History of Geo- and Space Sciences*, 2019. Available at: <https://www.iamas.org/wp-content/uploads/2020/08/IAMAS-100.pdf>

2020:

Due to the COVID-19 pandemic, all meetings of the IAMAS bureau were held virtually and several planned meetings were postponed, including:

- The IAMAS-sponsored Quadrennial International Radiation Symposium planned to be held in Thessaloniki,

Greece, from 6-10 July 2020 was postponed until from 4-8 July 2022.

- The IAMAS-sponsored International Conference on Clouds and Precipitation planned to be held in Pune, India, from 3-7 August 2020 was postponed to 2-6 August 2021.
- The International Global Atmospheric Chemistry Conference planned to be held in Manchester, UK, from 14-18 September 2020 was postponed to 13-17 September 2021.
- The IAMAS-sponsored International Ozone Commission Quadrennial Ozone Symposium QOS2020 planned to be held in Seoul, Rep. of Korea, from 4-10 October 2020 was postponed to 3-9 October 2021.

Congratulations to Prof. Joyce Penner, IAMAS President, who was the 2020 recipient of the American Meteorological Society's Syukuro Manabe Climate Research Award.

2021:

IAMAS-IACS-IAPSO planned to convene a joint assembly for summer 2021 in Busan, South Korea (BACO-21). With the cancellation of many face-to-face meetings due to COVID-19, BACO-21 was postponed, and we convened the Virtual Atmosphere-Cryosphere-Ocean seminar series (VACO-21), held 19-23 July 2021. The online seminar series of VACO-21 featured presentations by the Association early career award winners for 2021 and invited speakers on the broad topics of remote sensing, field observations, modelling and coupled process of change in the atmosphere, cryosphere, and oceans. The presentations were:

Monday 19 July, 15:00-17:00 UTC. Remote sensing of the atmosphere, ocean and cryosphere

- Pepijn Veefkind (Royal Netherlands Meteorological Institute): The impact of COVID-19 policy measures on air quality and climate: the view from space
- Paolo Cipollini (European Space Agency): Essential Climate Variables over oceans and ice: a view from space
- Byongjun Hwang (University of Huddersfield): Satellite observation of the

floe size distribution of Arctic sea ice: implications for sea ice models

Tuesday 20 July, 15:00-17:00 UTC. Field observations of the atmosphere, ocean and cryosphere

- Laura Stevens (University of Oxford): Stress coupling between Greenland supraglacial lakes during rapid drainage
- Markus Frey (British Antarctic Survey): Sea salt aerosol from blowing snow above sea ice – observations, modelling and atmospheric impacts
- Joellen Russell (University of Arizona): Designing the required Southern Ocean observing system for predicting climate change: robot floats, satellites and supercomputers

Wednesday 21 July, 15:00-17:00 UTC. IAMAS-IACS-IAPSO Early Career Scientist Awards

- Giulia Mazzotti (WSL Institute for Snow and Avalanche Research SLF): Forest snow modelling from tree to regional scales
- Marta Abalos (Universidad Complutense de Madrid): Human impacts on the stratospheric circulation
- Thomas Wahl (University of Central Florida): Bigger ships or less flooding? How tidal changes affect flooding along the U.S. coast
- Jessica Fitzsimmons (Texas A&M University): Micronutrient trace metal dynamics in the Arctic Ocean
- David Bigelow (Minerva Intelligence): The role of englacial hydrology in the filling and drainage of an ice-dammed lake

Wednesday 21 July, 17:00-17:30 UTC. Coupled changes and variability in the atmosphere, ocean and cryosphere.

- Elizabeth Barnes (Colorado State University): Machine learning and climate projections

Thursday 22 July, 12:00-13:30 UTC. Coupled changes and variability in the atmosphere, ocean and cryosphere.

- Ruzica Dacic (University of Wellington): How much does spatial variability of the sea ice surface (SSL/snow) influence sea ice thickness?

- Matthew England (University of New South Wales): Global ocean-atmosphere climate teleconnections

Friday 23 July, 15:00-17:00 UTC. *Modelling atmosphere, ocean and cryosphere interactions*

- Cécile Agosta (LSCE): Antarctic surface mass balance: local and large-scale drivers, present and future
- Jenny Mecking (National Oceanography Centre): Predicting the 2015 North Atlantic Cold Blob
- Doug Smith (Met Office): Robust but weak multi-model atmospheric response to future Arctic Sea ice loss

The IAMAS Early Career Scientist (ECS) monthly webinar series began in June 2021, with the first webinar held on 22 June 2021. Speakers are all ECS, mostly young faculty and postdocs. The topics of the webinars were organized according to the IAMAS commissions, and the IAMAS ECS representative from each commission took a turn hosting the webinar.

2022:

Planning for the IUGG General Assembly in Berlin, Germany during 11-20 July 2023 occurred throughout 2022. There are no plans for this 28th Assembly to include a virtual format.

We legally incorporated IAMAS in the US and acquired a not-for-profit status. Following that designation, a bank account was opened in the US to facilitate the distribution of IAMAS funds to our commissions in support of their approved scientific activities; the account in the US was opened in August 2022. Funds were then moved from the IAMAS bank account in Germany to the US. A transfer of funds from Germany to US was made in October 2022, in the amount of \$207,727.63. We express our appreciation to Hans Volkert and John Burrows for their long-term support of the IAMAS bank account in Germany.

IAMAS Publications in Advances in Atmospheric Sciences (AAS):

IAMAS has an MOU with AAS, a journal co-published by Springer and Science Press and hosted by the Institute of Atmospheric Physics, China. AAS has published the IAMAS related articles:

- Li, J., Jiang, Z., Dong, Y. *et al.* The IAMAS-CNC Early Career Scientists Nobel Prize Online Interpretation Workshop. *Adv. Atmos. Sci.* **39**, 1012–1015 (2022). <https://doi.org/10.1007/s00376-021-1455-6>.
- Lazzara, M.A., Orendorf, S.A., Norton, T.P. *et al.* The 13th and 14th Workshops on Antarctic Meteorology and Climate. *Adv. Atmos. Sci.* **37**, 423–430 (2020). <https://doi.org/10.1007/s00376-019-9215-6>.
- Tian, W., Huang, J., Zhang, J. *et al.* Role of Stratospheric Processes in Climate Change: Advances and Challenges. *Adv. Atmos. Sci.* (2023). <https://doi.org/10.1007/s00376-023-2341-1> (Part of the collection National Reports to the IUGG by Chinese National Committee for IAMAS).
- Lyu, W., Zheng, D., Zhang, Y. *et al.* A Review of Atmospheric Electricity Research in China from 2019 to 2022. *Adv. Atmos. Sci.* (2023). <https://doi.org/10.1007/s00376-023-2280-x> (Part of the collection National Report to the IUGG Centennial by Chinese National Committee IAMAS).
- Bromwich, David H., Matthew A. Lazzara, Arthur M. Cayette, Jordan G. Powers, Kirstin Werner, John J. Cassano, Steven R. Colwell, Scott Carpentier & Xun Zou. The 16th Workshop on Antarctic Meteorology and Climate and 6th Year of Polar Prediction in the Southern Hemisphere Meeting. *Adv. Atmos. Sci.*, **39**, 536–542 (2022).

Some Highlights from the IAMAS International Commissions

ICACGP (<http://www.icacgp.org/>)

iCACGP convened several sessions at the 27th IUGG Assembly in Montreal in July 2019. As the pandemic continued, iCACGP, like many other groups, modified activities to adapt to restrictions. The Paul J. Crutzen Award for Early Career Scientists 2022 was awarded to Dr Sarah S. Petters from Aarhus University, Denmark in recognition of her contribution to a better understanding of aerosol chemical composition, phase state and aerosol-water interactions. The award was presented at the

2022 iCACGP-IGAC Joint Conference in Manchester, UK.

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

The 17th ICAE meeting was held successfully in Tel-Aviv, Israel, 19-24 June 2022. The venue at Tel-Aviv University's Porter School for Environmental Science hosted 120 participants from 30 countries. After a series of procedures, Barcelona, Spain has been chosen as the venue for the 18th ICAE conference, which will be held in 2026. Newsletters are available at <https://www.iamas.org/icae/newsletter/>.

ICCL (<http://www.iccl-iamas.net/>)

The ICCL biennial meeting was held on 22 July 2021 as a virtual meeting. Prof. Ayako Abe-Ouch was awarded the Milutin Milankovitch Medal at EGU 2021.

ICCP (<http://www.iccp-iamas.org/>)

The ICCP has released a statement that summarizes the position of the ICCP Executive Committee on the role of clouds and precipitation on climate change (https://www.iamas.org/iccp/wp-content/uploads/sites/3/2022/01/Letter_Climate_fin.pdf). There were some meetings associated with the ICCP Conference. The International cloud modelling workshop (26-30 July 2021), held virtually, was attended by over 120 participants from around the world. The 21st International Conference on Nucleation and Atmospheric Aerosols (ICNAA), which has been delayed since 2021, will now occur 27-30 June 2023 at the Queensland University of Technology (QUT), Brisbane, Australia. ICCP hosted a short course on radar on 7 August 2021 that introduced the principles of Doppler and polarimetric radar and its application to observing cloud microphysical processes. The course was attended by nearly 160 participants from around the world.

ICDM (<https://www.iamas.org/icdm/>)

Formed in late 1967, ICDM celebrated its 50th Anniversary at the 2019 Montreal Assembly with a small reception, a memento, and dinner at a local restaurant. A new web page was developed and moved to the IAMAS sponsored website: <https://www.iamas.org/icdm/>.

ICMA (<https://www.iamas.org/icda/>)

ICMA was a co-sponsor of the 8th IAGA/ICMA/SCOSTEP Workshop

on “[Vertical Coupling in the Atmosphere-Ionosphere System](#),” a hybrid workshop conducted in Sopron, Hungary. The ICMA website was restructured and hosted at the IAMAS website as noted above. ICMA nominated the successful candidate Dr. Marta Abalos (Spain) for the IAMAS ECS Medal Award 2021.

IO3C (<http://www.io3c.org/>)

Due to the Covid-19 crisis, the Quadrennial Ozone Symposium QOS2020 was postponed to 3-9 October 2021 and held online. There were 341 registered participants from various countries around the world. September 16th was the International Day for the Preservation of the Ozone Layer, celebrating the 35th signing anniversary of the 1987 Montreal Protocol treaty on Substances that Deplete the Ozone Layer. The *2021 Dobson Award for Young Scientists* was awarded to William Bell, who sadly passed away in April 2022.

ICPAE (<https://www.iamas.org/icpae>)

ICPAE focused on increasing its membership. As a result of the pandemic, ICPAE did not organize meetings or workshops in 2020, but increased the number of active members by 70%. ICPAE launched a new website, hosted by IAMAS.

ICPM (<http://www.icpm-iamas.aq/>)

The 14th Workshop on Antarctic Meteorology and Climate was held on 25–28 Jun 2019 in Charleston, South Carolina, USA (<https://amrc.ssec.wisc.edu/meetings/meeting2019/>). The 15th and 16th Workshop on Antarctic Meteorology and Climate were held virtually due to the pandemic.

IRC (<http://www.irc-iamas.org/>)

After two postponements due to the COVID-19 pandemic, the quadrennial International Radiation Symposium (IRS 2022) was held in Thessaloniki, Greece, from 4-8 July 2022. For many, IRS 2022 marked the first in-person event they had attended since the start of the pandemic in 2020.

FUTURE ACTIVITIES

IAMAS will be a full participant in the upcoming IUGG 2023 General Assembly in Berlin, Germany (<https://www.iugg2023berlin.org/>).

XXVIII General Assembly of the International Union of Geodesy and Geophysics
Quadrennial Reports of the IUGG Associations and Union Commissions

IAMAS Bureau meetings will be held on 12 and 14 July 2023.

The IAMAS Scientific Assembly in 2025 is planned to be held in Busan, South Korea in collaboration with IAPSO and IACS.

Steven A Ackerman, 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 the involvement of scientists and students from developing countries in oceanographic activities.

IAPSO maintains formal liaison with other scientific commissions and committees. These include the ISC's Scientific Committee on Oceanic Research (SCOR), and UNESCO's Intergovernmental Oceanographic Commission (IOC).

For more information see <https://iapso-ocean.org>.

ADMINISTRATION

The IAPSO Bureau was renewed in July 2019 during the IUGG General Assembly in Montreal. Two additional members were added in 2020 after an online election and one of them was replaced in 2021 (By Law n. 9-d). It comprises:

President: Trevor McDougall (Australia)
Past President: Denise Smythe-Wright, (UK)
Secretary General: Stefania Sparnocchia (Italy)
Treasurer: Ken Ridgway (Australia)

The Executive Committee comprises the Bureau members and

Vice-Presidents:

Agatha de Boer (Sweden)
Hans van Haren (Netherlands)

Members:

Edmo Campos (Brazil)
Juliet Hermes (South Africa)
Rick Lumpkin (USA, from Dec 2020 to Sep 2021)
Yukio Masumoto (Japan)
Jae-Hun Park (Republic of Korea)
Joellen Russell (USA, replace Rick Lumpkin from Oct 2021)

Alejandra Sanchez-Franks (UK, from Dec 2020)

Christa von Hillebrandt-Andrade (USA and Puerto Rico)

Peter Zavialov (Russia)

The IAPSO office is located at the Institute of Marine Science of the National Research Council of Italy, Trieste and day-to-day business is managed by Secretary General (SG), Stefania Sparnocchia. The SG is responsible for the IAPSO website and its continuous updating. The website was renewed during 2021-2022 and moved to the new address iapso-ocean.org. A page on the Facebook social network is also active with the aim of facilitating the spreading of information in the community (see <https://www.facebook.com/iapso.iugg.org>).

IAPSO finances are managed by the Australian-based Treasurer, Ken Ridgway.

IAPSO business meetings are conducted in person during Scientific Assemblies. Other business are managed by email and videoconference where appropriate.

Statutes 12, 13, 15, 16, 18, and 19 of the Association were modified at the General Business meeting in Montreal in 2019 to introduce electronic voting. Statute 8 and By-Law 9 were modified by electronic vote in 2020 to widen the membership of the IAPSO Executive Committee, by increasing the number of Members from six to eight. One of the eight members will be de facto an early career scientist, whose formal role will be to chair the IAPSO Early Career Scientists Working Group.

Following a meeting in Montreal in July 2019, IAPSO and IACS decided to set up a new Joint Commission on Ice-Ocean Interactions (JCIOI). Work has been done to establish it during 2020. The Commission was formally established in January 2021.

ACTIVITIES

Scientific Assemblies

- The **27th IUGG General Assembly** in Montreal, Canada, from 8-18 July, 2019. The Assembly attracted about 4,000 participants from 94 countries, 346 of them registered as IAPSO. The IAPSO scientific sessions were held from 9-14 July and included 11 IAPSO symposia (216 oral presentations and 94 posters) and 5 IAPSO-lead Association Joint symposia (111 oral presentations and 51 posters). IAPSO also co-sponsored 12 Joint symposia led by another Association (189 oral presentations and 104 posters).
- The **Virtual Atmosphere-Cryosphere-Ocean seminar series (VACO-21)** replaced the postponed joint assembly with IAMAS and IACS in Busan (South Korea). It consisted of a reduced number of invited speakers. The program was organized over 5 days from Monday 19 July to Friday 23 July 2021. Over the week, 187 individuals joined the audience. Recordings of the excellent presentations are available here: <https://www.youtube.com/channel/UCP3bCxu-NiGIIInmeoHgGxEQ/videos>. IAPSO contributed with the talks of 4 invited speakers.

Other meetings

IAPSO endorsed the following scientific meetings supported by IUGG:

- The **Workshop on Sea Level Data Archaeology**, held from 10 to 12 March 2020 in Paris, France. (http://legacy.ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=26751).
- The **Second World Conference on Meteotsunamis**, held from 18 to 20 May 2022 in Menorca, Spain. (<http://2cm-menorca.ime.cat/>).

IAPSO Awards

IAPSO delivers three prizes in the form of medals every two years.

The **Prince Albert I Medal** is an award offered by the Foundation Rainier III of Monaco to a most prominent scientist who has made

outstanding contributions to the enhancement and advancement of the physical and/or chemical sciences of the oceans. The award ceremony is held at an IAPSO Assembly, where the recipient delivers the Prince Albert I Medal Memorial Lecture. The first medal was presented in 2001. Two medals were awarded in this four-year period.

- Prof Corinne Le Quéré was awarded in 2019 for her fundamental contributions to our understanding of ocean biogeochemistry and global carbon cycling, and her work to quantify the ocean's role in the uptake of global carbon emissions.
- Prof Carl Wunsch was awarded in 2021 in recognition of his ground-breaking contributions to the development of modern physical oceanography.

The **Early Career Scientist Medal** honours Early Career Scientists for their outstanding research in the physical or chemical sciences of the oceans, and for their cooperation in international research. It is presented by the IAPSO President, at the biannual IAPSO Assembly, where the Awardee is expected to give a talk on a scientific topic. The first medal was presented in 2019. Four medals were awarded in this quadrennium.

- Dr Gerard McCa rthy is the recipient of the 2019 IAPSO Early Career Scientist medal in physical ocean science for his outstanding contribution to research on the Atlantic Meridional Overturning Circulation and its role in Earth's climate system.
- Dr Mar Benavides is the recipient of the 2019 IAPSO Early Career Scientist medal in chemical ocean science for her development of original strategies, integrating disciplines, to introduce a novel and comprehensive oceanographic approach to nitrogen cycling research.
- Dr Thomas Wahl is the recipient of the 2021 IAPSO Early Career Scientist medal in physical ocean science for his fundamental contributions to the research on changes in mean sea level, tides, storm surges, waves, and their interactions.
- Dr Jessica Fitzsimmons is the recipient of the 2021 IAPSO Early Career Scientist medal in chemical ocean science for her contributions to advances in the analysis,

distribution and cycling of trace elements in the oceans, particularly iron.

The **Eugene LaFond Medal** is awarded to an ocean scientist from a developing country making a presentation (poster or oral) in an IAPSO-sponsored or co-sponsored symposium at the IUGG or IAPSO assemblies. The first medal was presented in 2007, the most recent medal was awarded in 2019 to Phd student Mr. Balakrishnan Rohith from India for his oral presentation ‘Basin-wide sea level coherency in the tropical Indian Ocean driven by Madden-Julian Oscillation’ delivered within the IAPSO-IAG joint symposium ‘Monitoring Sea Level Changes by Satellite and In-Situ Measurements’ during the IUGG 2019 General Assembly.

The next medals will be delivered during the 2023 IUGG General Assembly in Berlin.

IAPSO Best Practice Study Groups

Starting from 2019 and every two years, IAPSO issues a call for two Best Practice Study Groups to support the community in solving problems in the conduct of oceanographic research. IAPSO provides each group with funding for the cost of one meeting. So far 4 study groups have been approved. Some of the activities were delayed by the covid pandemic which hindered the organization of the meeting. These are

- Best Practice Study Group on moored CTD measurements (2020-2021, extended to 2022)
- Best Practice Study Group to identify approaches to be recommended for seawater pH measurement (2020-2021, extended to 2022)
- Best Practice Study group on Tidal Analysis (2022-2023)
- Best Practice Study Group for the systematic evaluation of mapping methods in reconstructing ocean heat content and thermosteric sea level (2022-2023)

Working Groups, Commissions and Services

IAPSO is sponsoring/co-sponsoring Working Groups, Commissions and Services relevant to its prime goal of ‘promoting the study of scientific problems relating to the oceans and the interactions taking places at the sea floor, coastal, and atmospheric boundaries insofar as

such research is conducted by the use of mathematics, physics, and chemistry’. Information on Working Groups, Commissions and Services, including their reports, are maintained and updated on the IAPSO website (<https://iapso-ocean.org/activities/...>). Those active in the period of this report are:

IAPSO Early Career (EC) Scientist Working Group.

Chair: Alejandra Sanchez-Franks (United Kingdom). Vice-Chair: Malin Ödalen (Sweden). Website: <https://www.iapsoecs.org/>. The first IAPSO ECS networking event was held during the IUGG 2019 General Assembly. A second virtual interactive career event was organized during the VACO21 week. The event was recorded and made available on the IAPSO ECS website.

Joint Committee on the Properties of Seawater, JCS (with SCOR and IAPWS).

Chair: Rich Pawlowicz (Canada). Vice-Chairs: Rainer Feistel (Germany) and Steffen Seitz (Germany). Website: <http://www.teos-10.org/>. This is a permanent committee with limited membership responsible for maintaining and improving the recent seawater standard (TEOS-10). In particular, the development of new definitions and measurement procedures for seawater salinity, seawater pH and relative humidity of air, traceable to the SI and thus ensuring measurement comparability over climatological time scales of decades or centuries, are being pursued by this joint committee. A repository of knowledge and software for the scientific community is maintained in their website.

Commission on Mean Sea Level and Tides (CMSLT).

President: Gary T. Mitchum (USA). Website: <https://iapso-ocean.org/activities/commissions-and-committees.html>.

The Commission aims to support research into applications of sea level measurements. In addition to sponsoring meetings, the CMSLT is the body that the Permanent Service for Mean Sea Level formally reports to.

Joint Tsunami Commission (with IAPSO/IASPEI/IAVCEI).

Chair: Yuichiro Tanioka (Japan). Vice-Chairs: Maria Ana Baptista (Portugal), Diana Greenslade (Australia), Alexander Rabinovich (Russia). Secretary: Mohammad Heidarzadeh

(Iran/UK). IAPSO Representative: Efim Pelinovsky (Russia).

Website:

<https://tsunamicommission.ipma.pt/home/>.

It is an Inter-Association Commission responsible for international coordination of tsunami related meetings, research, and publications. Members of the Tsunami Commission actively participated in the organization of numerous tsunami sessions at AGU, EGU, AOGS, as well as regional and national workshops and conferences.

Joint Commission on Ice-Ocean Interactions (JCIOI, joint with IACS)

Chairs: Felicity McCormack (IAPSO) and Isabel Nias (IACS). Contact:

jcioicommittee@gmail.com

Website:

<https://sites.google.com/view/jcioi/home>.

The Commission was formally established in January 2021, to facilitate community efforts to fill critical knowledge gaps in ice-ocean interactions. Their first workshop was held online from 17-20 October 2022, drawing together researchers interested in the processes that govern ocean-driven melt of glaciers and ice sheets. The sessions were recorded, and are available via

<https://www.youtube.com/channel/UC-K08KQA86pNh5oLHNZU0Hw>.

Permanent Service for Mean Sea Level (PSMSL)

Hosted by Proudman Oceanographic Laboratory, Director: Lesley J. Rickards (UK). IAPSO Liaison: Philip L. Woodworth (UK).

Website: www.psmsl.org/.

The PSMSL is the internationally recognised global data bank for long-term sea level data and also provides a wider Service to the sea level community. The staff is continuously engaged in keeping the data bank updated with the most recent data. These are widely used in scientific work, climate projections of sea level change, and to support decision making on how to improve resilience and adapt to future changes.

IAPSO Standard Seawater Service, hosted by OSIL since 1989. Director: Richard Williams (UK).

Website: www.osil.co.uk.

The IAPSO Standard Sea-Water Service is the only internationally recognized standard for the calibration of salinity measurement devices. Under an agreement with IAPSO, OSIL produces and supplies ampoules of standard seawater to the oceanographic community.

SCOR Administration and collaboration

SCOR continues its activities in being the oversight and reporting body for many international marine biological bodies to the International Science Council, and in funding between 2 and 3 new Working Groups each year. These Working Groups are funded for three face-to-face meetings of up to 10 international researchers on topics which are in need of such international discussion and resolution. In the past four years the following three Working Groups have been established in the discipline areas of immediate relevance to IAPSO.

- Analysing ocean turbulence observations to quantify mixing (ATOMIX)
- Developing an Observing Air-Sea Interactions Strategy (OASIS)
- Coupling of ocean-ice-atmosphere processes: from sea-ice biogeochemistry to aerosols and Clouds (Clce2Clouds)

The October 2019 SCOR annual meeting in Japan was attended in person by IAPSO President Trevor McDougall. The subsequent annual meetings of 2020, 2021 and 2022 were attended virtually by him.

FUTURE ACTIVITIES

The following activities are scheduled for 2023 and beyond:

- Participation in the 28th IUGG General Assembly, July 11-20, 2023, at the CityCube in Berlin, Germany.
- Participation in the 2023 SCOR Annual Meeting in Guayaquil, Ecuador from 17 to 19 October 2023.
- Organization of the next Joint Assembly with IAMAS and IACS in Busan, Republic of Korea, in 2025.

Stefania Sparnocchia, IAPSO Secretary
General
Trevor McDougall, IAPSO President

QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR

INTRODUCTION

The International Association of Seismology and Physics of the Earth's Interior (IASPEI) is the leading international association promoting studies in seismology, earthquake processes, propagation of seismic waves, and structure and ongoing geodynamical processes within the Earth's interior. IASPEI achieves its goals primarily through scientific conferences organized by IASPEI and its Commissions, but also sponsors other international initiatives, fosters international cooperation, both in monitoring of seismic sources and research, and education activities, especially in countries that are working towards full scientific development.

During 2019 and 2021, most of the IASPEI efforts were directed towards the IUGG General Assembly in Montréal, Canada, and the 3rd Joint IAGA-IASPEI Scientific Assembly planned for Hyderabad, India, which could only be organized as a virtual Assembly due to the outbreak of the COVID-19 pandemic and the related world-wide restrictions on traveling.

During 2020 and 2022, most IASPEI efforts were directed towards the Assemblies of IASPEI's four Regional Commissions (Africa, Asia, Europe, Latin America and Caribbean). However, also due to the COVID-19 pandemic, almost all IASPEI activities planned for 2020 were cancelled or postponed. The European Seismological Commission managed to organize a virtual meeting in 2021 and all four Regional Commissions could reunite in-person or through hybrid meetings in 2022.

In addition, several scientific workshops were supported or sponsored by IASPEI and several ongoing projects continued.

ADMINISTRATION

ExeCom & Bureau meetings

The IASPEI Bureau and Executive Committee met several times in Montréal during the GA in July 2019 and twice virtually during the Scientific Assembly in Hyderabad in 2021.

In December 2022, the IASPEI Executive Committee met via video conference.

Several e-mails regarding important questions on financial support or business to be solved immediately were exchanged between the members of the Bureau and ExeCom throughout each year.

Information about the actual Members of the IASPEI Bureau and Executive Committee and Commission Chairs and National Correspondents can be found on the IASPEI website (<http://iaspei.org>).

Other matters

Website. The IASPEI website has the address <http://iaspei.org>. The website is managed by the International Seismological Centre, in Thatcham, UK.

Statutes. The IASPEI statutes and by-laws were not changed during the reporting period. The IASPEI Statutes and By-laws are available for download from the IASPEI website. IASPEI is registered as a Norwegian organisation (Norwegian Org. Number 916 047 495).

Newsletters. IASPEI Newsletters have been regularly sent as pdf-file attachments to more than 4000 e-mail addresses (status end of 2022). The Newsletters are also available for downloading from the IASPEI website. Five issues were distributed in 2019, three issues in 2020 and four issues in 2021 and 2022. In addition, six bulk e-mails were distributed with ad-hoc information.

ACTIVITIES

Scientific Assemblies, Workshops/Symposia etc.

During the years 2015 – 2018, IASPEI organized and (financially) supported the following Assemblies, Conferences, Workshops and Summer Schools. Some of them were in addition financially supported directly by IUGG.

2019

- 40th IASPEI General Assembly in Montréal, Canada. The 40th GA of IASPEI was held during the IUGG General Assembly in Montréal, Canada, from 8 to 18 July 2019. This IASPEI GA (<http://www.iaspei.org/assemblies->

[conferences](#)) had 494 officially registered IASPEI delegates. The scientific program included 26 IASPEI and 26 Inter-Association symposia with IASPEI participation.

- *Training Course „Seismology and Seismic Hazard Assessment 2019”*. The international training course “Seismology and Seismic Risk Assessment” was conducted at the German Geosciences Research Center GFZ (Potsdam, Germany), with 26 participants, from 12 August to 6 September 2019.
- *International Training Course on Ocean Bottom and Amphibian Experiment Seismological Data*. From 5 to 6 September 2019, the GFZ Potsdam hosted a two-day training course for young scientists on the use of seismological data on the seafloor and amphibian experiments. About 16 participants came from 6 different countries.

2020

Due to the outbreak of the COVID-19 pandemic all IASPEI related or supported Conferences, Workshops and Summer Schools planned for 2020 were cancelled or postponed to a later date.

2021

- *41st IASPEI Scientific Assembly and Third Joint Scientific Assembly of IAGA and IASPEI*. The 41st IASPEI Assembly (<http://www.iaspei.org/assemblies-conferences>) was held as virtual 3rd Joint Assembly with the International Association of Geomagnetism and Aeronomy (IAGA) in Hyderabad, India, from 21 to 27 August 2021. The conference had 828 registered participants from 53 different countries of which nearly 300 gave IASPEI as their primary Association. The scientific program consisted in total of 43 symposia (27 IAGA, 17 IASPEI and 8 Joint Symposia).
- *1st IASPEI Summer School for Early Career Research Scholars*. The IASPEI Commission on Education and Outreach organized a pre-Assembly Summer School in the week before the Joint IAGA-IASPEI Scientific Assembly, in which 13 instructors gave lessons for 30 students.

- *13th General Assembly of the Asian Seismological Commission (ASC)*. Due to the ongoing outbreak of the COVID-19 pandemic, the 13th ASC GA, which had been originally planned for 2020, was now held as part of the virtual IASPEI GA Assembly in Hyderabad, India, with 19 attendees.
- *37th General Assembly of the European Seismological Commission (ESC)*. The 37th General Assembly of the European Seismological Commission (ESC) was originally planned to be held on Corfu (Greece), in September 2020. Due to the COVID-19 pandemic, the Assembly was postponed and then held as a fully virtual conference with 596 attendees, from 19 to 24 September 2021.
- *Peter Bormann Young Seismologist Training Course*. ESC organized in the week before the 37th General Assembly the Peter Bormann Young Seismologist Training Course (YSTC) of 2021 as webinar titled “Seismology for Science and Society”.
- *AfSC Commemorated the World Tsunami Day*. On Friday, 5th November 2021, the African Seismological Commission (AfSC) organized a webinar, to commemorate the World Tsunami Awareness Day, broadcasted via the Commission's Facebook page. The webinar had a pretty good reach, the Facebook video having 1562 online viewings, with 149 engagements.
- *Workshop “Role of Early Warning Systems in Geo-Meteorological Hazards Risk Reduction”*. The IASPEI Commission on Education and Outreach in collaboration with a) the South Asia Alliance of Disaster Research Institutes (SAADRI), b) the National Science and Technology Center for Disaster Reduction (NCDR), Taiwan, c) the Multidisciplinary Centre for Geoinformatics, Delhi Technological University (DTU) and d) the National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt. of India, organised a Three-day Online International Workshop on the “Role of Early Warning Systems in Geo-Meteorological Hazards Risk Reduction”, which was held from 8 – 10 December, 2021.

2022

- *38th General Assembly of the European Seismological Commission (ESC)*. The 38th General Assembly of the European Seismological Commission (ESC) was held together with the 17th European Conference on Earthquake Engineering as 3rd Joint European Conference on Earthquake Engineering and Seismology (3ECEES) in Bucharest, Romania, from 4 to 9 September 2022. As originally planned, the Assembly was organized as an in-person meeting with about 800 participants from more than 60 countries.
- *Peter Bormann Young Seismologist Training Course*. During the week after its General Assembly, the ESC organized the Peter Bormann Young Seismologist Training Course (YSTC) of 2022 with the title “Intermediate-depth seismicity and strong ground motions with large displacement demands – Challenges and Insights in Seismology and Earthquake Engineering”, which was attended by 10 people.
- *4th General Assembly of the Latin American and Caribbean Seismological Commission (LACSC)*. The 4th General Assembly of the Latin American and Caribbean Seismological Commission (LACSC) was held as hybrid meeting in Quito (Ecuador), from 3 to 5 October 2022. The Assembly had 209 in-person participants from 28 different countries and 33 people participated on-line.
- Two pre-congress courses were given on the weekend before the start of the meeting. A 2-day course on SeisComp platform for beginners attended by 18 people and an afternoon course on the new developments of the "Shake Map" attended by about 30 people.
- *14th General Assembly of the Asian Seismological Commission (ASC); 3rd General Assembly of the African Seismological Commission (AfSC)*. The 3rd General Assembly of the African Seismological Commission (AfSC) and the 14th General Assembly of the Asian Seismological Commission (ASC) met together as *1st Joint ASC-AfSC Assembly* in a hybrid conference in Hurgada, Red Sea (Egypt), between 10 and 13 October

2022. The Assembly had about 180 participants (about 40 on-line) from 38 different countries. After the Assembly, the Organizing Committee convened a three-day long training course for early career seismologists that focused on the modern methods for nanoseismicity and infrasound monitoring and which was attended by 20 seismologists.

- *7th International Meeting on Heat Flow and the Thermal Structure of the Lithosphere (Čermák7)*. The “7th International Meeting on Heat Flow and the Thermal Structure of the Lithosphere” was held from 20 to 22 June 2022 in Potsdam, Germany, and hosted by the GFZ German Research Center for Geoscience under the auspices of the International Heat Flow Commission (IHFC) of the IASPEI/IUGG.
- *Electromagnetic Studies of Earthquakes and Volcanoes EMSEV22*. The EMSEV2022 was held at the National Central University in Taiwan, 22 – 24 August 2022. The meeting was initially scheduled for the summer of 2020 but was postponed for two years due to COVID-19.

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

In 2014, a rigorously updated and amended electronic second edition of the IASPEI New Manual of Seismological Observatory Practice, NMSOP-2, was completed and put online, thanks to the efforts of the late Peter Bormann. This version, as well as future ones, are professionally maintained, further developed and edited by the GFZ German Research Centre for Geosciences under a long-term commitment and the auspices of IASPEI and its Commission on Seismological Observation and Interpretation (CoSOI). All versions are freely available and downloadable from the website of the GFZ Library (<http://bib.telegrafenberg.de/publizieren/vertrieb/nmsop/>).

Scientific Programs, Projects, Publications

During the whole quadrennium, IASPEI continued to support the Inter-Association working group “Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV)” (<http://emsev-iugg.org/>), jointly organized

together with the International Associations of Geomagnetism and Aeronomy (IAGA) and Volcanology and Chemistry of the Earth's Interior (IAVCEI).

The IASPEI Working Group “Historical Seismology”, under the IASPEI Commission on Seismological Observation and Interpretation (CoSOI), planned and published a Focus Section themed “Past and Present of Historical Earthquake Data and Research” in the Seismological Research Letters (Volume 91, August 2020).

In 2021, the Asian Seismological Commission celebrated the 25th anniversary of its foundation with a special issue of the Journal of the Geological Society of India (Volume 97, December 2021).

Awards

The **IASPEI Medal** is awarded for distinguished contributions in seismology: for sustaining IASPEI goals and activities and for scientific merits in the field of seismology and physics of the Earth's interior. The Medal is awarded every 2nd year during the IASPEI Assemblies.

During the IASPEI General Assembly in Montréal, the 2019 IASPEI medal was awarded to **Brian L. N. KENNETT** (Australia).

During the virtual IASPEI Scientific Assembly in Hyderabad, the 2021 IASPEI medal was awarded to **Barbara ROMANOWICZ** (France/USA).

In 2016, the IASPEI Bureau established an **IASPEI Early Career Scientist Award**

program aimed at engaging excellent young researchers in the IASPEI community. Each of the four IASPEI Regional Commissions was asked to select one Early Career researcher (graduate student, postdoctoral research, pre-tenure faculty member) from their commission at each even-year Assembly of that Regional Commission.

The award was given by the ESC in 2021 to **Irina DALLO** (Switzerland) and in 2022 to **Luca LAUDI** (Malta), and by the AfSC in 2022 to **Olivier MUNGUIKO** (Congo DR).

Obituaries for prominent scientists were regularly published in the IASPEI Newsletters and on the IASPEI website (<http://www.iaspei.org/about/bios-obituaries>).

PLANNED FUTURE ACTIVITIES

- In 2023, the main focus will be on the 42nd General Assembly of the Association during the General Assembly of the IUGG in Berlin, Germany, in July 2023.
- In 2024, the IASPEI main activity will be again concentrated on the General Assemblies of the four regional commissions of IASPEI (AfSC, ASC, ESC, LACSC). Some preparation work will already be ongoing in 2023.
- In 2025, the 43rd Scientific Assembly of IASPEI is planned as 4th Joint Assembly together with IAGA, to be held in Lisbon, Portugal, in August 2025.

Johannes Schweitzer, IASPEI Secretary
General

QUADRENNIAL REPORT OF THE INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR

INTRODUCTION

IAVCEI, one of the eight Association members of IUGG, is the professional international focus for research in Volcanology and for efforts to mitigate volcanic disasters. IAVCEI scientists belong to 74 different countries. Their researches involve a great variety of disciplines of Earth Sciences, including igneous geochemistry and petrology, geochronology, seismology, geodesy, acoustics, ground and satellite remote sensing, HP-HT laboratory experiments, numerical modeling of the physics of magma genesis, storage and ascent from the mantle to the surface, as well as monitoring of active volcanoes worldwide, notably within Volcano Observatories.

ADMINISTRATION

The IAVCEI Executive Committee for the 2019-2023 term is composed of the following elected members:

President	Patrick Allard, France
Secretary General	Roberto Sulpizio, Italy
Vice-President	Masato Iguchi, Japan
Vice-President	Jan Lindsay, N. Zealand
Immediate Past President	Donald Bruce Dingwell, Germany
Officers	Fidel Costa, Singapore Eisuke Fujita, Japan Lizzette Rodriguez, Puerto Rico Jose Viramonte, Argentina Julia Eychenne (ECR), France

It also comprises Eugenio NICOTRA (Italy), webmaster/Communication leader, and Andy HARRIS (UK), Editor-in-Chief of our journal *Bulletin of Volcanology*.

ACTIVITIES

Like for other Associations, the meeting plans and activities of IAVCEI in 2019-2023 were strongly impacted by the Covid-19 pandemic over 2020-2021. In particular, two major meetings – the 11th Conference Cities on Volcanoes (COV11) in Crete and our Scientific Assembly in New Zealand - ought to be postponed and re-programmed twice. In 2023 the IAVCEI will thus face the unexpected situation of holding its General Assembly in Berlin (July) only 6 months after its Scientific

Assembly (January-February), rather than two years apart in normal time.

Nevertheless, since mid-2019 the current IAVCEI Executive board has achieved most of his initial objectives, promoting new steps ahead and a substantial growth of the Association, as detailed below.

The Executive board has worked through routine mailing exchanges, online Exec meetings (every 2 months, depending on priorities), and regular communication with members and external bodies via a new website combined with social media accounts, mailing and communiques, and the Newsletter "IAVCEI News" published 4 times a year. Communication activities have benefited from the contracted support of a private partnership (Guarant international, Praga).

Membership

Despite the COVID-19 pandemic, the IAVCEI membership could grow substantially since 2019, as shown by the Table below. By the end of 2022 the IAVCEI had 2239 members as a whole, which marks a 31% increase with respect to four years ago. Members with due-paid membership have increased by 38% compared to 2019. This highly positive trend reflects not only a renewed interest of previous members, but also the arrival of prevalently young new members, which make us very happy. Active members today include 706 Regular members, 132 Life members, 412 Young researchers and students (plus 42 post-COV11 free ones), and 5 Benefactor members. The 'Unpaid' figure is regularly checked by our secretariat to take account of retired/deceased

Memberships	2019	2020	2021	2022
Total	1705	2010	2142	2239
Paid	801	1046	732	1282
Unpaid	904	964	1410	957

members but also to re-motivate members. Our annual membership fee, whose amount depends on the professional status of each person, is a main income source for IAVCEI to organize and/or support meetings, workshops, Commissions' activities, travel grants, awards, etc. We appreciate that, by the end of 2022, the financial health of IAVCEI is very sane, as

detailed in the report by our SG Roberto Sulpizio.

Gender equity, diversity and inclusion

Improving gender equity and diversity within IAVCEI has been one key objective of the current Executive Committee. The results obtained since mid-2019 are quite encouraging: starting from a relative proportion of 60% male / 40% female in our overall membership, we are now closer to 54% male / 46% female. Especially, a reverse proportion (55.1% female vs. 44.9% male) characterizes our population of Young Researchers, which demonstrates the increasing involvement of young women in Volcanology, volcano Observatories and our international community.

Otherwise, perfect gender equality was promoted in the 2019-2023 IAVCEI sub-Committees for Awards and Elections, as well as among our awardees and nominations of Honorary Life members.

As regards geographical inclusion, IAVCEI members represent 74 different countries in all parts of the world. However, members originate predominantly from 23 countries (USA, UK, Italy, Japan, France, New Zealand, Mexico, Germany, Chile, Canada, Columbia, Australia, Spain, Singapore, Argentina, Switzerland, Iceland, Ecuador, Belgium, Peru, Philippines, Hungary, Russia and Greece, by decreasing order). Owing to their small size or/and low income, many other countries lack to be represented at the level expected from their importance in terms of volcanic activity and hazards. Hence, efforts were made by the IAVCEI to provide free membership to colleagues from these countries and also better include them in its instances. This is a long path, but advances were obtained through the activities of our INVOLC Network and, for instance, through joint IASPEI-IAVCEI support to the project entitled *Towards creating and launching the Network for African Volcanologists (NAV)* funded by the 2022-2023 IUGG Grants Program.

New website and Communication

- A new IAVCEI website (<https://www.iavceivolcano.org>), coupled with dedicated social media accounts (Twitter, Instagram and Facebook), was activated since June 2021 thanks to

combined efforts of our webmaster (E. Nicotra) and our private partner Guarant International. Various sub-domains were created, in particular for hosting the Commission's webpages - this ongoing process has already been completed for 14 Commissions and Networks - and the *Bulletin of Volcanology*.

- We created and activated in 2021 an IAVCEI Communication Team, led by our webmaster and including 3 young volunteer researchers from different countries.
- We created on our website an e-Volcano platform dedicated to specialists, teachers, students and the public, which allows to publish peer-reviewed video docs, with referenced DOI number, on all subjects and lessons in Volcanology. Three e-video projects were already approved and made accessible by early 2023.

Activation of IAVCEI webinar series

Travel restrictions imposed by the Covid-19 pandemic in 2020-2021 stimulated us to activate series of webinars, in particular special IAVCEI webinars on ongoing or/and recent volcanic eruptions of major interest to the international community. Four such webinars were held in 2021 (Etna, Iceland, Soufriere in St. Vincent, and Nyiragongo eruptions) and others are planned. These webinars, reserved to members, attracted a wide audience and promoted effective membership renewal or even new membership.

We also activated and sponsored new online webinars of our Early-Career Researchers network (since December 2021) and thematic webinars of our Commissions (since 2022).

Recordings of all webinars are posted on our website, in particular for those who were unable to attend.

Bulletin of Volcanology

Bulletin of Volcanology, the official journal of IAVCEI edited by Springer, is the most ancient journal in Volcanology (since 1922) and one of the most recognized in this research field.

The present Editor-in-Chief, Andy Harris, and its Editorial Assistant, Frances van Wyk de Vries, will close their service term in July 2023, after an additional 6-months extension upon request of the Executive Committee. They will

be substituted by Profs. Marie Edmonds (UK) and Richard Herd (UK) for the 2023-2027 term.

We deeply acknowledge the great job made by Andy and Fran, together with their team of Associated editors, in actively promoting the *Bulletin of Volcanology* over the past four years, as attested by the substantial increase of BV's impact factor under their leadership.

Year	Submissions	Publications	Impact Factor
2018	152	70	2.232
2019	150	81	2.032
2020	118	75	2.517
2021	153	88	2.906
2022 (07)	76	62	-

Meetings, Workshops and Courses

The Covid-19 pandemic forced the IAVCEI Executive Committee to reprogram several meetings. Online meetings became the only alternative in 2020-2021, while also revealing a useful new tool in future. In-person meetings could be reactivated since mid-2022 as travel restrictions were dropped off. We list below the meetings either directly organized or sponsored by the IAVCEI from mid-2019 to 2023.

2019 (since July)

- IAVCEI 2019 General Assembly, Montreal, Canada, July 8-18
- 4th Edition of the Volcanology Field Course in Colombia, August 24-31
- Annual Workshop of the IAVCEI-IASPEI Commission on “Volcano Seismology and Acoustics”, Tenerife, Canary islands, Spain, October 27-November 3
- 4th international Volcano Observatory Best Practices (VOBP) Workshop, Mexico City, November 18-23

2020

- 1st ALVO Congress on “Volcanology in the current Latin America context”, virtual, March 23 and 26
- International conference on “Strategies for the prevention and mitigation of volcanic risk in Peru”, organized by ALVO (Latin American Volcanology Association), virtual, Nov 4 and 6

2021

- International Workshop on “Volcano monitoring infrastructure on the ground and in space”, Global Volcano Monitoring Infrastructure Database, online, February 18–23
- First virtual Workshop of the IAVCEI Commission on Chemistry of Volcanic Gases (CCVG), May 24-26
- IAVCEI-EAG co-sessions on “Magmas and Volcanoes” at 2021 Goldschmidt Conference, Lyon, France, virtual, July 4-9
- 14th International AIV summer school, Lipari (Italy), August 28-September 4
- 9th Edition of postgraduate Course in Volcanology, Olot (Spain), October 18-31
- 2nd European Workshop of Volcano Observatories-Volcanic Ash Advisory Centers on “Volcano-Aviation”, virtual, November 8-10
- 2nd International Conference on “Volcanic Eruptions: Contributions of Research and Monitoring for Volcanic Risk Management », IGP, virtual, November 17–19

2022

- International Conference on “Mitigating Volcanic Risks in the Virunga Region”, Goma, R.D. Congo, on-site (250) and virtual (19), March 19-21
- 11th Conference Cities on Volcanoes (COV11), Heraklion, Crete (Greece), on-site (354) and virtual (240), June 12-17
- IAVCEI-EAG co-sessions on “Magmas and Volcanoes” at 2022 Goldschmidt Conference, Honolulu, Hawaii, hybrid, July 10-15
- 5th Alfred Rittmann Conference, AIV, Catania, Italy, on-site, September 29-October 1
- Symposium on “Submarine Volcanism”, IAVCEI Commission SV-Early Career Researchers, virtual, November 8-9
- 14th Field Workshop of IAVCEI Commission on Chemistry of Volcanic Gases (CCVG), Arequipa, Peru, on-site, November 6-16

2023

- IAVCEI Scientific Assembly, Rotorua, New Zealand, on site (894) and virtual (205), January 29-February 3

- International Workshop on “Genesis and dynamics of large active calderas: the case of Campi Flegrei and the Campanian Plain”, Naples, Italy, May 2–5
- La Palma International Workshop on “Reducing Volcanic Risks in Islands”, La Palma, Canary Islands, Spain, June 2–6
- IAVCEI General Assembly, 28th IUGG GA, Berlin, Germany, July 15-19
- 11th Workshop IAVCEI Commission on Crater Lakes, Sao Miguel, Azores, Portugal, August 28-September 5

IAVCEI Awards 2019-2023

The IAVCEI honors the most prominent scientists in Volcanology with different Awards and Medals. Two of these (*G. Walker Award* and *Wager Medal*) are given every two years to brilliant young (7 yr post-PhD) and relatively young (15 yr post-PhD) researchers, respectively. Three other awards (*Thorarinsson*, *Fisher* and *Krafft* Medals) are attributed every 4 years to outstanding senior scientists. In addition, since 2018 an Award for *Volcano Surveillance and Crisis Management* (VSCM) honors the personnel from volcano observatories and/or Institutions responsible of monitoring volcanoes that have made a remarkable contribution to the mitigation of volcanic hazards and volcanic risks. This latter award is given every 2 years during our Cities on Volcanoes (COV) Conferences.

The evaluation and ranking of submitted nominations to all these awards are made independently and confidentially by an Awards Committee of 6 scientists (3 male, 3 female) nominated for 4 years by the IAVCEI President.

The VSCM Award was first attributed to the CVGHM-Badan Geologi of Indonesia in 2018 (COV10, on-site). In 2020 it was attributed to the Instituto Geofisico-EPN of Peru (virtual ceremony) then, in 2022, to the Seismic Research Center of the University of the West Indies (COV11, on-site).

During our 2023 Scientific Assembly in New Zealand, the George Walker Award was attributed to Drs. *Emma Liu-Christopher* (UK) and *Andrea Bevilacqua* (Italy). Then, the Wager Medal was awarded to both Profs. *Suzanna Jenkins* (Singapore) and *Yves Moussallam* (USA). A second-run nomination to both Walker and Wager awards will occur during our GA in Berlin in July 2023.

Finally, nominations submitted for the 2023 Thorarinsson, Fisher and Krafft Medals are currently under evaluation by the IAVCEI Awards Committee.

IAVCEI Commissions and Networks

The thematic Commissions and Networks of IAVCEI - some of which are joint with other IUGG's Associations - constitute its driving force. During his 2019-2023 mandate, the current Executive Committee realized an overall survey of the activity of all Commissions, Networks and Working Groups. The objective was to evaluate their activity, facilitate their functioning, and try to reduce their number. This work has been conducted by the President and the two Vice-Presidents, and results were approved by the EC.

The following main decisions and results were reached:

- The four Liaison Committees, created in 2012 to improve horizontal connections between Commissions but revealed useless in practice, were disestablished.
- Instead, better communication between Commissions is now facilitated by:
 - A new email distribution list of Commission leaders kept up-to-date by Guarant (commissions@iavcei.eu)
 - More accurate and up-to-date information about Commission leadership and contact information on our IAVCEI website
 - A regular Commission Leaders workshop hosted by the IAVCEI Exec at our two major meetings (both SA and GA).
- One Commission (Volcano Geology) was disestablished, and the merging of 2 other Commissions is still under discussion.
- Guidelines for the Commissions' activity, management, reporting, creation or deactivation were updated.
- The IAVCEI website now includes the following forms:
 - The Commissions annual report template
 - Application form for proposing a new Commission
 - Application form for proposing a new Working group.

During its Scientific Assembly in Rotorua, the IAVCEI Exec hosted a workshop with Commission leaders. The meeting, managed by four members of the Executive Committee, was extremely successful, with 21 out of our 28 Commissions represented on site.

The updated list of Commissions and Networks is reported below. Today the IAVCEI hosts 18 purely IAVCEI Commissions, 7 Joint Commissions, and 3 Networks:

1) Purely IAVCEI Commissions

1. Chemistry of Volcanic Gases
2. Volcanic Lakes
3. Volcanic Clouds (ex-Remote Sensing)
4. Collapse Calderas
5. Explosive Volcanism
6. Monogenetic Volcanism
7. Submarine Volcanism
8. Volcanic and Igneous Plumbing Systems
9. Large Igneous Provinces
10. Volcano Geology
11. Volcanogenic Sediments
12. Tephrochronology
13. Tephra Hazard Modelling
14. Statistics in Volcanology
15. Volcanic Hazards and Risk
16. Cities and Volcanoes
17. International Volcanic Health Hazard Network (IVHHN)
18. Volcano Geoheritage and Protected Volcanic Landscapes

2) Networks

- a. Early-Career Researchers Network (ECR-Net)
- b. International Network for VOLcanology Collaboration (INVOLC)
- c. World Organization of Volcano Observatories (WOVO)

3) Joint Commissions

1. IAG/IAVCEI Commission on Volcano Geodesy
2. IASPEI/IAVCEI Commission on Volcano Seismology and Acoustics
3. IASPEI/IAVCEI/IAGA Commission Physics & Chemistry of Earth Materials
4. IAGA/IASPEI/IAVCEI Working Group on Electromagnetic Studies

of Earthquakes and Volcanoes (EMSEV)

5. IASPEI/IAVCEI International Heat Flow Commission
6. IAVCEI/IACS Commission on Volcano-Ice Interaction
7. IAPSO/IASPEI/IAVCEI Commission on Tsunamis

The World Organization of Volcano Observatories (WOVO)

Created in 1981, the World Organization of Volcano Observatories has developed under the IAVCEI umbrella as one Commission amongst others. Now, it is markedly different from other thematic Commissions in that its members are Volcano Observatories or/and Institutions responsible for volcano monitoring and eruption forecasting under in respective countries. It also includes the 9 Volcanic Ash Advisory Centers (VAACs) that provide alert information and simulation on volcanic ash clouds to the civil aviation.

In 2021 the Exec thus agreed to change the status of WOVO into a Network. Then, a project of restructuring the WOVO was launched in order to render it more operational and efficient in its functioning, communication and coordination for the benefit of worldwide Volcano Observatories. For this, a working group of 20 specialists was created to mind about proposals for this renewing/restructuring of the WOVO. A dedicated Survey on that perspective was sent to worldwide VOs in order to check their expectations and suggestions. Answers are now being analyzed and will serve for establishing proposals by the working group. This is a key project for the IAVCEI, whose achievement has been slowed down by the Covid pandemic but hopefully could be reached in a short term.

IAVCEI and the UN's Initiative on Global Early Warning Systems

Following informal discussions during COV11 in Crete (June 2022) then an official exchange with the Secretary-General of WMO, Prof. Petteri Taalas, the IAVCEI President obtained that the Association be involved into the UN's Initiative on Global Early Warning Systems, coordinated by WMO and developed within the Sendai Framework for Disaster Risk Reduction 2015-2030. The IAVCEI is actually interested

in participating into this UN's initiative through its specific competences in early warning systems devoted to the survey of volcano-atmosphere interactions and the mitigation of volcanic disasters. This framework offers IAVCEI a rare chance for very rapid investment in volcano-related early warning systems (*Tupper and Bear-Crozier, BV 2022*), as well as for enhancing the role of the WOVO – in course of rejuvenation – within global plans of early warning and mitigation of natural hazards.

On 4-5 February 2023, in Rotorua (NZ), both IAVCEI and WMO hold together the 8th IWVA International Workshop entitled “Managing and mitigating volcanic risks to aviation with an explosion of science!”. This workshop allowed to bring together research and operational experts and stakeholders from the volcanological, meteorological and aviation communities to highlight and discuss the worldwide progress that has been made over the past decade, in supporting the scientific and technological advancement (research-to-operations, science-for-services) of the International Civil Aviation Organization (ICAO) International Airways Volcano Watch (IAVW).”

IAVCEI-WMO liaison officer within IUGG:

Since 2011 Prof. Arnau Folch (Geosciences Barcelona, CSIC) was the IAVCEI liaison

officer with WMO within IUGG. He decided to step out at the term of his mandate (IUGG2023) and we thank him very much for this service to our community. Sara Barsotti, Coordinator for Volcanic Hazards in the Icelandic Meteorological Office (IMO), has accepted to candidate to take over the role. Her appointment will be proposed to the IUGG Council during IUGG2023.

Memorandum of Understanding 2019-2023

Over the past years the IAVCEI has signed new Memorandum of Understanding (MoUs) with different international and regional Associations:

- the *Geochemical Society*
- the *European Association of Geochemistry*
- the *International Association of Physics Students*
- the *Italian Association of Volcanology (IAV)*

Patrick Allard, IAVCEI President

QUADRENNIAL REPORTS OF THE UNION COMMISSIONS

QUADRENNIAL REPORT OF THE IUGG COMMISSION ON CLIMATE AND ENVIRONMENTAL CHANGE

INTRODUCTION

The Union Commission on Climatic and Environmental Change (CCEC) promotes the advancement of scientific understanding of climatic and environmental change; boosts research in reducing uncertainties in climate and environmental models, and defines criteria for collaborative transdisciplinary research on climate and environmental change, by providing an all-Union perspective on climatic and environmental change, and making available the knowledge and insights developed through scientific research to the benefit of society and planet Earth. The history and purpose of CCEC may be found on the CCEC web site at: www.ccec-iugg.org, or iugg.org/associations-commissions/commissions/cceg/.

ADMINISTRATION

Officers and members of the Commission were elected on 14 July 2019 during the Business Meeting held at the IUGG General Assembly in Montreal.

Executive Committee:

Chair: Jianping Li (China)

Vice-Chair: Keith Alverson (Canada/USA)

Secretary-Treasurer: Tonie Van Dam
(USA/Luxembourg)

Immediate Past Chair: Tom Beer
(Australia)

Commission Members:

Harry Bryden (IAPSO, UK)

Mark Cliverd (IAGA, UK)

Annette Eicker (IAG, Germany)

Domenico Giardini (IASPEI,
Switzerland)

Andrew Mackintosh (IACS, Australia)

Alberto Montanari (IAHS, USA)

Joyce Penner (IAMAS, USA)

Alan Robock (IAVCEI, USA)

Dan Rosbjerg (IAHS, Denmark)

ACTIVITIES

CCEC activities during the past quadrennium were: (1) At the IUGG General Assembly in Montreal CCEC organised and held a

successful Session U01 titled Achieving Sustainable Development: The Role for Earth Sciences. (2) held five business meetings. (3) successfully organized the 14th “General Circulation Model Simulations of the East Asian Climate (EAC)” workshop in City University of Hong Kong. (4) completed IUGG Union Commissions - Survey 2020. (5) prepared a proposal for International Year of Basic Sciences for Sustainable Development (IYBSSD Proposal). (6) contributed Evaluation of Applications to the IPCC Scholarship Programme Sixth Round of Awards (2021-2023). (7) reviewed the IPCC Sixth Assessment Report (AR6) in 2020. (8) interacted with representatives of other scientific unions and other IUGG scientific associations. (9) gave some Keynote Speeches and Invited Talks.

Union Session U01 Achieving Sustainable Development: The Role for Earth Sciences at the Montreal General Assembly

The CCEC coordinated successful the Union Session U01 “Achieving Sustainable Development: The Role for Earth Sciences” at the Montreal General Assembly, which was an all-day session held on 29 July 2019 with only invited speakers. Speakers from all IUGG associations and earth systems disciplines whose work is relevant to measuring progress towards, or helping to achieve, sustainable development goals participated.

Business meetings

The CCEC held five business meetings during the past quadrennium. This first one was held on 14 July 2019 and elected a new Executive as noted above.

In 2021 we organized three business Zoom meetings as follows: (1) On 24 February 2021. In attendance: Jianping Li, Keith Alverson, Tom Beer, and Tonie van Dam. We discussed future actions for the CCEC, a product for the International Year of Basic Sciences for Sustainable Development, and CCEC’s contribution at IUGG 2023 in Berlin. (2) On 8 April 2021. In attendance: Jianping Li, Keith Alverson, Tom Beer, and Tonie van Dam. The themes include a CCEC/authors meeting at

IUGG 2023 in Berlin, a draft proposal to IUGG for some funding for our book project “Geosciences for Sustainable Development”, connection with IOC of UNESCO on the international decade, and CCEC’s Qingdao meeting in 2022. (3) On 1 July 2021. In attendance: Keith Alverson, Annette Eicker, Alan Robock, Tom Beer, Jianping Li, Andrew Montanari, Domenico Giardini, Serhat Sensoy, Harry Bryden, and Tonie van Dam. The themes include reports on Activities in 2020 and 2021, reports on CCEC finances, what IUGG can do for those outside of the IUGG community, and CCEC Membership.

On 23 April 2022, we organized the 5th business Zoom meeting. In attendance: Jianping Li, Keith Alverson, Tom Beer. Absence: Tonie Van Dam. The themes include Website status and plans, discussion on CUP and Springer, IUGG congress session status and plans, IUGG elections (including but not limited to CCEC leadership), and CCEC International Year of Basis Sciences in Sustainable Development proposal.

Workshops

We successfully organized the 14th “General Circulation Model Simulations of the East Asian Climate (EAC)” workshop in City University of Hong Kong on 27-29 April, 2019. The theme of the workshop is East Asian Climate under Global Warming: Understanding and Projection. There are four sessions, Detection and Attribution, Climate Variability, High-Impact Weather and Extremes, and Predictability, Prediction and Projection. More than 100 participants attended the workshop.

IUGG Union Commissions - Survey 2020

The CCEC polled its members and contributed to the IUGG questionnaire regarding the effects of Covid-19.

A proposal for International Year of Basic Sciences for Sustainable Development (IYBSSD Proposal)

CCEC officers prepared a proposal to IUGG on Earth Sciences for Sustainable Development. The proposal was awarded 5k. As part of this proposal CCEC will co-organize a symposium (U01) at the Berlin IUGG General Assembly.

Evaluation of Applications to the IPCC Scholarship Programme Sixth Round of Awards (2021-2023)

As an expert reviewer, Jianping Li reviewed and graded the applications to the IPCC Scholarship Programme Sixth Round of Awards (2021-2023).

Expert Review of the IPCC Sixth Assessment Report (AR6) in 2020

As an expert reviewer, Jianping Li reviewed the Working Group I Contribution to the IPCC AR6, Climate Change 2021: The Physical Science Basis as well as the Working Group III Contribution to the IPCC AR6, Climate Change 2021: Mitigation of Climate Change.

Interactions

Session AS1.34/CL4.02.2, The global monsoons in current, future and palaeoclimates and their role in extreme weather and climate events at EGU 2019 Assembly, April 7-12, 2019, Vienna, Austria, was co-sponsored by CCEC.

The CCEC co-organized several symposia with IAMAS, IAHS and IACS during the IUGG General Assembly in Montreal in July 2019, including JM01 (IAMAS, IAHS, IACS) titled Adapting in the Anthropocene, JM03 (IAMAS, IAHS) titled Advances and Frontier Challenges in Global Monsoon Studies: Dynamics, Convection and Interactions with Hydrological and Land Surface Processes, and M20 (IAMAS) titled EL NIÑO/Southern Oscillation and its Regional and Global Impacts.

Session AS1.16: The global monsoons in current, future and palaeoclimates and their role in extreme weather and climate events at EGU 2020 Assembly, May 3-8, 2020, Vienna, Austria, virtual online conference, was co-sponsored by CCEC.

CCEC co-organized the 4th CCGG (Chinese Congress of Geodesy and Geophysics) Conference from 17-18 July 2021 in Qingdao, China.

Preparation for the IAMAS-IACS-IAPSO Joint Assembly 2021 (BACO-21) from 18th-23rd June 2021 in Busan, Korea. CCEC prepared two sessions (Plastic in the Ocean, Atmosphere and Cryosphere; and global monsoon and weather and climate extremes) for the

BACO21, but it had to be cancelled due to the Covid-19 pandemic situation.

Preparation for the 15th EAC (East Asian Climate) Workshop in State University of New York at Albany (ASRC), USA, 5-7 October, 2020, with theme on “East Asia and North America” under Global Climate Changes: Understanding and Projection”. But it had to be postponed due to the Covid-19 pandemic situation.

Session AS1.18: Monsoon systems in a changing climate: past, present and future at EGU 2022 Assembly, May23-27 2022, Vienna, Austria, onsite & online conference, was co-sponsored by CCEC.

On 19 December 2022, CCEC and CMG (The Commission on Mathematical Geophysics) co-organized a zoom meeting on the organization of IUGG U01 session. In attendance: Jianping Li, Ismail-Zadeh Alik, Keith Alverson, Llia Zaliapin. The themes include ranking the proposed speakers and selecting the first 9 of them, ranking the proposed panellists and selecting the first 3 of them, discussion on the topic of travel support and decision on the allocation of funds from CCEC and CMG to a joint pot to support invited people, and discussion on invitation of selected people.

Keynote Speeches and Invited Talks

- Keynote Presentation: Keith Alverson, Plastic in our Environment: A Global Challenge with Local Solutions, Global Environmental Action International Conference December 2020, Tokyo Japan Session: Integration of the Environment and Economy: Towards a Virtuous Cycle of Environment and Growth.
- Invited Presentation: Jianping Li, Tropical cyclones act to intensify El Niño, 2nd Fudan International Workshop on Atmospheric Science (2nd FIWAS), 110th Anniversary of Fudan University, May 18 2020, Virtual online conference.
- Invited Presentation: Jianping Li, Sea surface temperature interhemispheric dipole (SSTID) and its influence on climate, 2nd Shanghai Jiao Tong University Thinking Source Ocean Conference, June 21 2020, Virtual online conference.
- Invited Presentation: Jianping Li, Coupled Oceanic-Atmospheric Bridge and Pathways of Influence of the Northern Hemisphere

Mid-High Latitudes on East Asian Climate, 3rd International Workshop on the Human-Earth System Dynamics and Modelling, November 03 2020, Virtual online conference.

- Plenary Presentation: Tom Beer, Wildfires, Climate and Road Safety, 4th CCGG conference, 17-18 July 2021, Qingdao.
- Plenary Presentation: Tom Beer, Climate, Bushfires, Air Quality, Road Safety, 25th International Clean Air and Environment Conference (CASANZ2021), Virtual online conference, 18 May 2021.
- Keynote Presentation: Tom Beer, Climate, Bushfires, Road Safety, International Conference on Future Challenges and Sustainable Development Goals: Science to Policy Framework, New Delhi, India and online, 16 April 2021.
- Invited Talk, Jianping Li, Influence of the NAO on Wintertime Surface Air Temperature Over the East Asia: multidecadal variability and decadal prediction, 2022 International Conference on international Cooperation and Integration of Industry, Education, Research and Application for Future Ocean, November 27-28 2022, Qingdao, Virtual online conference.
- Invited Talk, Jianping Li, Climate Change, Carbon Neutrality and Blue Governance, OUC-UoP Joint Centre for Blue Governance Workshop, November 25 2022, Qingdao, Virtual online conference.
- Invited Talk, Jianping Li, Climate Change, Carbon Neutrality and Sustainable Development, International Year of Basic Sciences for Sustainable Development – International Forum for Climate and Environmental Changes and Sustainable Development, November 22-26, Beijing, Virtual online conference.
- Invited Talk, Jianping Li, Influence of the NAO on wintertime surface air temperature over the East Asia: multidecadal variability and decadal prediction, China-Norway Marine University Consortium Alliance Annual Academic Conference 2022, November 14-16 2022, Qingdao, Virtual online conference.
- Invited Talk, Jianping Li, Influences of tropical cyclones over the western North Pacific on El Niño intensity and diversity, 4th Open Science Symposium on Western

Pacific Ocean Circulation and Climate, October 25-27 2022, Xiamen, Virtual online conference.

FUTURE ACTIVITIES

CCEC Chair Jianping Li will chair the next CCEC business meeting, assisted by vice-president Keith Alverson at the Berlin General Assembly. The meeting is tentatively planned to be held on July 13th with a light lunch provided. Scientists interested in taking on leadership positions in CCEC after the congress are encouraged to inform CCEC Chair Jianping Li, and will be invited to attend the business meeting in Berlin.

CCEC is co-convening the IUGG U01 session titled Geoscience and Mathematics for Sustainable Development together with CMG. We now have a list of 12 invited speakers who have all agreed to present. The list of speakers will be updated to the congress website shortly after the abstract submission deadline in February.

As an expert, Jianping Li was invited by IPCC to participate in the IPCC Workshop on the Use of Scenarios in AR6 and Subsequent Assessments which will take place at the UNESCAP Conference Centre in Bangkok, Thailand from 25 April to 27 April 2023.

QUADRENNIAL REPORT OF THE IUGG COMMISSION ON MATHEMATICAL GEOPHYSICS

SUMMARY

During the 2019-2023 quadrennium, the Commission has organized and convened an IUGG Union Symposium “*Mathematics of Planet Earth: The Science of Data*” at the 27th IUGG General Assembly in Montreal, Canada (2019); a joint ICTP-IUGG workshop “*Data Assimilation and Inverse Problems in Geophysical Sciences*” in Trieste, Italy (2021); and the 33rd IUGG Conference on Mathematical Geophysics “*Geophysics in the World of Modern Mathematics and Artificial Intelligence*” in Seoul, Republic of Korea (2022). The Commission led the publication of a Cambridge University Press Book “*Applications of Data Assimilation and Inverse Problems in the Earth Sciences*” that is scheduled to appear in June 2023. The Commission has established the *IUGG Vladimir Keilis-Borok Medal* to recognize middle career scientists who made important contributions to the field of mathematical geophysics, and awarded the inaugural medal in 2022. The Commission updated its webpage at the newly designed IUGG website.

ADMINISTRATION

Executive Committee Membership. The CMG Executive Committee has been appointed in 2019 and remained the same for the quadrennium. **Chair:** Alik Ismail-Zadeh (Germany; IUGG); **Vice-Chairs:** Ute Herzfeld (USA; IACS) and Malcolm Sambridge (Australia; IASPEI); **Secretary:** Ilya Zaliapin (USA; IAHS); **Past Chair:** Yehuda Ben-Zion (USA; IASPEI). **Executive Committee Members:** Roberto Carniel (Italy; IAVCEI), Enamundram Chandrasekhar (India; IAGA), William Dewar (USA; IAPSO), Alexander Fournier (France; IAGA), Salvatore Grimaldi (Italy; IAHS), Shin-Chan Han (Australia; IAG), Sang-Mook Lee (Korea; IUGG), Annick Pouquet (USA; IAMAS). **Advisory Committee:** Dick Peltier (Canada), Daniel Rothman (USA).

ACTIVITIES

IUGG 2019 Union Symposium “Mathematics of Planet Earth: The Science of Data”

The Commission organized and conveyed a Union Symposium “*Mathematics of Planet Earth: The Science of Data*” at the 2019 IUGG General Assembly in Montreal, Canada, July 8-18, 2019. The goal of symposium was to highlight the elemental role that mathematical and statistical ideas play in the geosciences and encourage further research answering fundamental questions about our planet and dynamic environment. The symposium showcases how different elements of Earth System science – including observations, data analysis, mathematical, physical, and computer modeling – facilitate a predictive understanding the Earth’s surface, interior, oceans and atmosphere. A particular focus was on the emergence of data science and the ways artificial intelligence and machine learning play in data-driven geophysical knowledge discovery. **Convener:** Ilya Zaliapin (CMG, USA); **Co-Conveners:** Yehuda Ben-Zion (CMG, USA), Malcolm Sambridge (IASPEI, Australia), Gordon Swaters (IAPSO, Canada), Shin-Chan Han (IAG, Australia); **Invited Speakers:** Felix Herrmann (Canada), Kenneth Golden (USA), Anya Reading (Australia), Simon Papalexiou (Canada), Michel Stein (USA), Jürgen Kusche (Germany, IAG).

Joint ICTP-IUGG workshop on Data Assimilation and Inverse Problems in Geophysical Sciences, 18 to 29 October 2021 (DASS2021)

CMG in cooperation with the Earth System Science Section of the Abdus Salam International Centre for Theoretical Physics (ICTP, Trieste, Italy) and the East African Institute for Fundamental Research (EAIFR, Kigali, Rwanda) organized the Joint ICTP-IUGG Workshop “*Data Assimilation and Inverse Problems in Geophysical Sciences*” hosted by ICTP in Trieste, Italy, virtually from 18 to 29 October 2021. Workshop participants received welcome addresses from *Kathryn Whaler*, IUGG President, and *Atish Dabholkar*, ICTP Director and Assistant Director General

of UNESCO. World leading scientists from Australia, Canada, Germany, Italy, Republic of Korea, Russia, Spain, Switzerland, and USA lectured at the workshop and discussed with participants the topics in relation to specific geophysical disciplines. 96 of 117 applications received were selected, and the applicants were invited to attend the workshop. Among them, 32% are female participants; 79% (12%) are participants from developing (least developed) countries, namely, from Africa and Middle East 33%, Asia 35%, Latin America 19%, and Oceania 3%. Maibys Sierra Lorenzi (Cuba; female), Maria Alejandra Vesga Ramirez (Argentina; female), and Hari Ram Thapa (Nepal, male) received the best workshop paper awards. The Workshop was supported in part by IUGG via grant to CMG and ICTP. The Workshop organizers: Alik Ismail-Zadeh (Germany), Ilya Zaliapin (USA), Omolulu Akin-Ojo (Rwanda), and Karim Aoudia (Italy). More information on the Workshop (scientific program, list of participants, lecture notes and videos) can be found at: <http://indico.ictp.it/event/9609>.

The 33rd IUGG Conference on Mathematical Geophysics, 20-24 June 2022 (CMG2022)

The 33rd IUGG Conference on Mathematical Geophysics (CMG2022) “*Geophysics in the World of Modern Mathematics and Artificial Intelligence*” was held at the Seoul National University, Republic of Korea, during 20-24 June 2022 in a hybrid format. The CMG2022 Program

(<http://www.cmg2022.org/index.php/scientific-program>) covered several important topics related to data sciences, AI, machine learning, geophysical fluid dynamics, mathematics for natural hazards and climate science, and geophysical inversions. Two keynote lectures were delivered by *Frederik J. Simons* of Princeton University and *Kwang-Yul Kim* of Seoul National University. A panel of eminent experts in geosciences, physics, and mathematics

(<http://www.cmg2022.org/index.php/panel-discussion>) raised awareness about the 2022 United Nations International Year of Basic Science for Sustainable Development in promoting basic sciences. Over five days, fourteen invited speakers from Czech Republic, France, Hungary, Oman, Russia, Rwanda, Saudi Arabia, Switzerland, UK, and USA

presented cutting-edge mathematical applications to geosciences. More than 140 people from 33 countries attended the conference. The conference was highlighted in local media (<http://www.theasian.asia/archives/120063>).

The Local Organizing Committee was chaired by Sang-Mook Lee. Conference site: <http://www.cmg2022.org>

The Cambridge University Press Book “Applications of Data Assimilation and Inverse Problems in the Earth Sciences”

A CMG book proposal has been accepted by the Cambridge University Press - IUGG Special Publication Series for an edited monograph “*Applications of Data Assimilation and Inverse Problems in the Earth Sciences*”. In 2022, the final book has been submitted to the Cambridge University Press and its release is expected in June 2023. Editors: Alik Ismail-Zadeh (Germany), Dylan Jones (Canada), Fabio Castelli (Italy), and Sabrina Sanchez (France). Editorial Advisory Board consists of the Members of the CMG Executive Committee. The book sets out basic principle of inverse problems and data assimilation and present applications of the data assimilation and inverse problems in all disciplines of IUGG. The principal goal of the proposed book is to highlight the importance of research in data assimilation for understanding dynamical processes of the Earth and its space environment and for predictability. The book summarizes relevant newest advances in the field of data assimilation and inverse problems related to different geophysical fields. As outcomes of data assimilation contribute to scientific understanding and prediction of natural hazard events, this interdisciplinary book provides a broader knowledge to those who are dealing with hazard assessment and subsequent risk mitigation/reduction. It also offers guidance on future research directions to experts and early career scientists including PhD candidates. More information can be found at the website of the Cambridge University Press: <https://www.cambridge.org/de/academic/subjects/earth-and-environmental-science/solid-earth-geophysics/applications-data-assimilation-and-inverse-problems-earth-sciences?format=HB>

The Vladimir Keilis-Borok Medal

The Vladimir Keilis-Borok Medal of the IUGG Commission on Mathematical Geophysics (CMG) was established by the IUGG Bureau in 2021 to recognize middle career scientists who made important contributions to the field of mathematical geophysics. The aim of the Medal is to honor the legacy of Keilis-Borok – a visionary science leader and organizer, prolific seismologist and mathematical geophysicist, the CMG founder, and former IUGG President – in promoting transformative scientific advancement and selfless leadership. More information on the Medal can be found at: <https://iugg.org/associations-commissions/commissions/cmg/>. As a response to the call for nominations, five nominations were received. The Medal Committee was comprised of Alik Ismail-Zadeh (Chair), Ute Herzfeld, Malcolm Sambridge, and Ilya Zaliapin. The inaugural Vladimir Keilis-Borok Medal was awarded in 2022 to Dr. *Frederik J. Simons* (Princeton University, USA) for his outstanding contributions to mathematical geophysics and development of cutting-edge mathematical methods in geoscience data analysis.

CMG webpage

The Commission revised and updated its webpage; see the webpage at the newly

designed IUGG website:
<https://iugg.org/associations-commissions/commissions/cmg/>

FUTURE ACTIVITIES

Union Symposium at the IUGG General Assembly 2023

The IUGG General Assembly (IUGG2023) will be held in Berlin from 11 to 20 July 2023. The CMG is working jointly with the IUGG Commission on Climatic and Environmental Changes (CCEC) to organize the Union Symposium "*Geoscience and Mathematics for Sustainable Development*". Potential speakers have been identified and contacted by the key conveners: Keith Alverson (CCEC) and Alik Ismail-Zadeh (CMG). Twelve experts agreed to contribute to the symposium. More information:

<https://www.iugg2023berlin.org/980-2>.

The 34th IUGG Conference on Mathematical Geophysics (CMG2024)

The Commission decided to hold the 34th IUGG Conference on Mathematical Geophysics on 3-7 June 2024 at the Indian Institute of Technology Bombay, Mumbai, India.

Alik Ismail-Zadeh (CMG Chair) and
Ilya Zaliapin (CMG Secretary)

QUADRENNIAL REPORT OF THE IUGG COMMISSION ON GEOPHYSICAL RISK AND SUSTAINABILITY

INTRODUCTION

The IUGG Commission on Geophysical Risk and Sustainability (IUGG GeoRisk Commission, or GRC) was established by the IUGG Bureau in August 2000. The GRC seeks to advance the role of science in the reduction of natural disasters through a better societal understanding of environmental natural hazards. Fully understanding the risk posed by natural hazards also requires an understanding their environmental and economic impacts. Areas of development include accurate early warning through the robust and effective flow of critical information to inform decision making by emergency managers, policy-makers, scientists and the general public via initiatives, meetings, workshops, and publications.

During the past eight years, the GRC worked to advance the 2015 IUGG Resolution #4 that addresses the challenges of tsunami disasters through the development of geodetic tsunami warning systems that promise affordable and effective disaster risk reduction to the developing nations of the Indo-Pacific and other coastal communities. The GRC also supported the IUGG in the observance of the Centennial Year by providing leadership in the development of two symposia for the Centennial celebrations by the American Geophysical Union and the IUGG. The GRC also represents the IUGG within the International Consortium on Landslides (ICL). During the past four years, the GRC worked closely with the IAG and significantly expanded its collaboration with several international institutions including the Group on Earth Observations.

In Memoriam:

Paula J. Dunbar the GRC Secretary/Treasurer passed away Wednesday morning, August 26, 2020.

David Jackson, a member of the GRC, passed away March 30, 2023.

Paula and David were strong supporters of the IUGG and they devoted their energies to disaster risk reduction. We will miss them supremely.

ADMINISTRATION

Executive Committee:

- Chair: John LaBrecque (IAG, USA)
Vice-Chairs: Vyacheslav Gusiakov (IAPSO, Russia)
Chun-Chieh Wu (IAMAS, China, Academy of Sciences in Taipei)
Secretary: Yekaterina Kontar (IACS, IAHS, USA; since 2021 Secretary/Treasurer)
Treasurer: Linda Rowan (IAG, USA; until 2021)
Past Chair: Joan Marti (IAVCEI, Spain)

Association Representatives:

- Mohsen Ghafory-Ashtiany (IASPEI, Iran),
- Michael Krautblatter (IACS, Germany)
- Christa von Hillebrandt-Andrade (IAPSO, Puerto Rico)

Members in Active Advisory Capacity:

- Tom Beer (IAMAS, Australia),
- Harsh Gupta (IASPEI, India)
- Alik Ismail-Zadeh (IASPEI, Germany/Russia)
- Vladimir Kossobokov (IASPEI, Russia)
- Gordon McBean (IAMAS, Canada)
- Ramesh P. Singh (IASPEI, USA)
- Stephen McNutt (IASPEI, USA)
- Ester Szein (NAS, USA)

Business meetings

1. July 16, 2019: Election of Executive Committee Hybrid meeting Montreal
2. January 14, 2020: Discussion of GRC tasking
3. January 22, 2021: Discuss AGU-IUGG Centennial Symposia White Paper
4. August 11, 2021: Discuss GRC sponsored symposium for 2023 IUGG General Assembly.
5. June 29-30, 2022: Discussion of GRC Commission responsiveness to Association Goals following a request by President-Elect Chris Rizos. Recordings of these meetings were forwarded to the Union secretariat.

1. June 29: Recording at: [June 29, 2022 meeting](#)
2. June 30, 2022 Recording at: [June 30, 2022 meeting](#)
6. [February 28, 2023](#) to Present: Monthly GTEWS_Oceania organizational meetings in support of the GRC GTEWS_Oceania Initiative.
 1. February 28, 2023
<https://www.dropbox.com/s/wcibezix6tu19b7/>
 2. April 11, 2023
<https://www.dropbox.com/s/0l3qe1u9zcm4r1/>
 3. May 9, 2023:
<https://www.dropbox.com/s/kvrjf3vnet8c4wp/>
 4. June 13, 2023:
<https://www.dropbox.com/s/tx3s2wx2ob4gdf4/>

ACTIVITIES

The GRC developed collaborations with the International Consortium on Landslides (ICL), the Group on Earth Observations (GEO), the Global Geodetic Observing System (GGOS), International Consortium on Landslides (ICL), and the International Science Council-GeoUnions Standing Committee on Disaster Risk Reduction (ISC-CDRR).

The AGU-IUGG Centennial Symposia on Disaster Science: The GRC represented the IUGG in the development of two symposia on Disaster Science. The first symposium was held during the 2018 AGU fall meeting. The second symposium was held during the 2019 IUGG General Assembly. The GRC membership devoted many long hours in the assembly of these two symposia in collaboration with our AGU and US National Committee colleagues. Many thanks to all who attended and presented during these symposia. The reports of these symposia can be viewed by clicking on the following links:

- [AGU 2018 Centennial Symposium Report](#)
- [IUGG 2019 Montreal General Assembly Symposium Report](#)
- [AGU 2019 Fall Centennial Report](#)

Support for Kyoto Commitment on Landslides 2020: The IUGG President Kathy Whaler declared support for the [Kyoto Landslide Commitment 2020](#) during launching

ceremonies on November 5, 2020. GRC vice-chair Vyacheslav Gusiakov presented the keynote address during the [World Landslide Forum-5 \(WLF-5\)](#) sponsored by the ICL. Dr. Gusiakov's presentation, [December 11, 2018 landslide and 90-m icy tsunami in the Bureya water reservoir](#), presented on [World Tsunami Awareness Day](#) and published within the ICL proceedings of the WLF-5.

GNSS Tsunami Early Warning System Project: The principal project of the GRC was the support of the 2015 IUGG General Assembly [Resolution #4](#) for the implementation of GNSS Tsunami Early Warning Systems for the Indo-Pacific. The GRC and the IAG's Global Geodetic Observing System worked in close collaboration including the development of the GGOS [GNSS Augmentation for Tsunami Early Warning \(GATEW\) working group](#) that now includes 18 institutions from 12 nations with substantial experience and roles in the development of geodetic applications to disaster risk reduction. The GRC and the GGOS collaborated with the Association of Pacific Rim Universities (APRU), and NASA as sponsors of the GTEWS 2017 workshop to explore the feasibility and utility of GTEWS. The [GTEWS 2017 workshop report](#) was published by UNDRR in 2020 as a contributing paper to its Global Assessment Report of 2019. The workshop report reviews the scientific and programmatic developments of GTEWS, and makes specific recommendations for the development of an Indo-Pacific GTEWS.

The IGS, GRC and the GGOS/Geohazards FA worked with GEO to develop the Geodesy for Sendai framework to foster collaborations for the application of geodesy to goals of the Sendai Framework of the UNDRR. [Geodesy for Sendai](#) was codified in the [GEO Work Programme](#) of 2020-2022 and 2023 to 2025. within the [Geodesy for Sendai Framework](#). The GRC was granted \$10K by the IUGG to support the organization of a GTEWS Coordinating Committee as recommended by the GTEWS 2017 workshop.

The implementation of GTEWS continued as recommended by the IUGG Resolution #4 within the individual programs of Indian, Japanese, Chilean, and US agencies. Unfortunately, as noted by the GTEWS 2017 workshop report, a reticence persists among

several Indo-Pacific nations to engage in the sharing of real time GNSS essential for the realization operation of an Indo-Pacific GTEWS.

GTEWS for the Indo-Pacific will require significant international collaboration between institutions and agencies. In an attempt to solve this impasse, the GRC has worked to develop the GTEWS_Oceania in the hope that the Oceania region, home to numerous independent nations, could resolve in formula for data regional and perhaps global data analysis. The IGS published Stop 5 of the Tour de l'IGS that focussed upon GNSS Applications to the South Pacific Disaster Risk Reduction. Stop 5 included a report by the GRC/GGOS_Geohazards recommendation on the formulation of GTEWS_Oceania. The GTEWS_Oceania concept recognizes the need to develop a South Pacific real time GNSS network in support GTEWS as well as numerous other GNSS applications to environmental hazard risk reduction. The GRC

and the GATEW working group members as well as the IGC Geodesy4DRR task force are working with the member nations of the Oceania region in the formulation of GTEWS_Oceania GTEWS_Oceania Initiative is holding monthly meetings to resolve a development plan for the GTEWS network.

FUTURE ACTIVITIES

A draft Charter (Terms of Reference) is under review and implementation plans are being developed by a growing number of participating nations. The Oceania region has a significant number of GNSS receivers of varying quality and varying communications capability. Resources will be needed to upgrade these receiver stations and provide the regional broadband communications as well analysis systems. Discussions are underway to apply the \$10K IUGG/GRC grant as a matching grant to further develop resources for GTEWS_Oceania.

John LaBrecque, GRC Chair

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. 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, 2) the investigation of core magnetohydrodynamics at all time scales, both from a theoretical point of view and from an observational point of view, and of more general fluid rotational dynamics that can affect the core, 3) the investigation of mantle dynamics, both from a theoretical point of view and observational point of view, 4) the investigation of mechanical, electromagnetic, thermal and chemical interactions between the inner-core, core, mantle, crust and possibly surface fluid layers outer layers, with an aim to develop a global view of the Earth as a system of interacting regions, 5) the thermodynamics of the Earth and the investigation of its long-term thermal evolution.

Since 1987, SEDI has been a Union Commission 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 across multiple disciplines to generate the most coherent and consistent picture of the workings of the Earth's deep interior.

ADMINISTRATION

Over the time period of 2019-2022 SEDI has been chaired by Christine Thomas (WWU Münster, Germany), vice-chaired by Mathieu Dumberry (U. Alberta, Edmonton, Canada), with Michael Bergman (Simon's Rock College,

USA) acting as Secretary-General. SEDI membership remains at about 600, as recorded on the email list used to broadcast information related to SEDI activities, upcoming meetings, funding opportunities, and academic openings.

MAIN ACTIVITIES

IUGG 2019 General Assembly Montreal

At the IUGG 2019 Centennial meeting in Montreal, a union session (U05) on Discoveries in the Deep Earth as well as multidisciplinary session (JA01) linked between IAGA/IASPEI/IAG was organized and co-chaired by the SEDI officers and Carla Braitenberg (Italy, IAG), George Helffrich (Japan, IASPEI). The sessions went well with invited speakers Sanne Cottaar, Magali Billen, Jennifer Jackson, Roland Pail, Chris Finlay, Binod Sreenivasan and Quentin Williams covering all aspects of SEDI interests.

The poster session was co-organized by members of SEDI community in a joint symposium: Geophysical Constraints on the Earth's Core and Its Relation to the Mantle (co-organised by IAGA, IASPEI, IAG)

The SEDI Business Meeting was also held at IUGG 2019 as well. There Christine Thomas became Chair and Mathieu Dumberry (University of Alberta, Canada) became Vice-Chair and the future SEDI location was introduced (Taipei).

SEDI Meeting 2020

The meeting was to be held in Taipei, at the National Taiwan University at the Institute of Earth Sciences (Academia Sinica). The local organizing committee was comprised of Frederic Deschamp and Ban-Yuan Kuo (co-leads) along with Wen-Che Yu, Wen-Pin Hsieh and Kenny Vilella. This was supposed to be SEDI's first meeting held in Taipei.

However, due to the spread of the corona virus and subsequent travel restrictions, the LOC and the officers of SEDI decided to cancel the meeting scheduled for 2020. A shift to 2021 seemed difficult due to funding, possible travel restrictions into the next year as well as a large number of conferences being shifted to 2021. In

addition, an overlap with the CIDER meeting on deep Earth was to be avoided.

Instead a virtual, condensed meeting was held in October 2020, with a smaller number of research presentations and posters and without the long overview talks. We felt that the LOC did an excellent job setting up the virtual meeting and would like to thank them for their efforts!

There were several nice talks and a good number of posters, however, due to the time differences it was not easy to talk to other colleagues. Sadly, not all talks were uploaded in time. Also, the number of registered participants was smaller than for a normal SEDI meeting (note: there was no registration fee). Talks were made available on the meeting web site <https://sedi2020.earth.sinica.edu.tw/>

New web site for SEDI

The new site went online in 2020. While it is updated every few months, some content is still to be filled such as the job postings and SEDI related papers. Setting this part of the website to be handled easily (and remotely) up is a difficult task and the student that worked on it moved into a PhD, so time for setting up the postings are time consuming.

IAGA_IASPEI Meeting 2021 (online Hyderabad)

At the IAGA/IASPEI meeting in 2021, held online in Hyderabad, SEDI inspired sessions were organized. One of those was chaired by Chris Davies, Swarandeeep Sahoo, Kimberly Moore and Christine Thomas and was focused on core studies J1: Earth and planetary core structure and evolution from observations and modelling. The session went well with invited speakers were also from the SEDI members: R.v. Tent, J. O'Rourke and R. Yadav.

In the IASPEI part, the SEDI chair Christine Thomas together with Barbara Romanowicz, Stephane Rondenay and Sebastian Rost organized and chaired the session S13, Seismic structures in the mantle. Invited speakers were P. Kolinsky and L. Cobden.

In addition, plenary talks were given by SEDI chair Christine Thomas on seismic structures near the core-mantle boundary, connecting seismology on the mantle side with core studies, SEDI members Binod Sreenivasan on

the role of the core-mantle interaction in the geodynamo and Trond Torsvik on India: A journey in time and space.

There were other sessions with themes of SEDI organized and chaired by members of the SEDI community: e.g., D2 Planetary magnetic fields and geomagnetic secular variation, or 1.4 Earth's magnetic field and secular variation on all temporal and spatial scales. All sessions went well and the digital format was ok for the conference.

SEDI Meeting 2022

In 2022, the SEDI meeting was supposed to be held in Taipei, at the National Taiwan University at the Institute of Earth Sciences (Academia Sinica) after cancellation of the 2020 meeting in Taipei. The local organizing committee included Frederic Deschamps and Ban-Yuan Kuo (co-leads) along with Wen-Che Yu, Wen-Pin Hsieh, Kenny Vilella and Hsing-Wen (Samantha) Hsieh. However, due to the continuation of the Covid pandemic and the travel restrictions and quarantine requirements that were in place for Taiwan, we held the 2022 SEDI meeting at ETH Zürich with a very short preparation time. The organizing committee was the same as for Taipei and in addition included Jerome Noir and Karin Emmenegger of the ETH. The speakers and chairs were similar to those planned in 2020 but there were restrictions for flights from Japan and other Asian Countries (due to the war in Ukraine AND the pandemic), which reduced the presence of those scientists. The scientific program of the meeting is available at the web site <https://sedi2022.earth.sinica.edu.tw/>

The atmosphere during SEDI was marked by a happiness to meet with colleagues again after a long time of virtual conferences and many young scientists were present and benefitting from talking with each other and colleagues from different institutions. The organization, even though the ETH and Taipei team had only 4 months for preparation, was excellent and we believe people enjoyed the conference and the presentations. While many participants were present at ETH, there was also the possibility to follow talks online on the ETH platform or on Zoom.

Thoughts on Online meetings versus meetings in presence:

After the Covid Pandemic and therefore several conferences taking part online, we draw the following conclusions (our opinion): Online conferences have shown that it is possible to move conferences into the virtual space, reducing travel, and that the talks/posters are often very nice, but the fostering of collaborations, the feedback, especially for posters or streamed talks, are much reduced compared with a conference "in person". We feel that as a small conference SEDI fosters strong collaborations/interactions and is a good way for early career scientists to present their work, and a physical meeting is therefore the best form for SEDI meetings also in the future. Additionally, the time zones are problematic and while, when on a conference in another place, one can concentrate on the conference, a virtual conference does not allow this, since the teaching and admin duties at home continue. We therefore prefer physical meetings for the future.

FUTURE ACTIVITIES

At the IUGG 2023, SEDI officers are organizing a Union session (U3) on "Discoveries of deep interior of Earth and Planets" with 8 invited talks covering topics related to SEDI activities and several members of the SEDI community are organizing and convening further sessions at IUGG2023.

The next regular SEDI meeting is scheduled for 2024 and we are currently preparing a poll to SEDI member about the location on the US East Coast. Two SEDI members offered to organize the SEDI meeting: Peter Driscoll in Washington DC and Mike Bergman in Simon's Rock College, Great Barrington, MA.

Christine Thomas, Chair, SEDI
Mathieu Dumberry, Vice-Chair, SEDI
Michael Bergman, Secretary-General, SEDI

QUADRENNIAL REPORT OF THE IUGG COMMISSION ON PLANETARY SCIENCES

INTRODUCTION

The IUGG Union Commission on Planetary Sciences (UCPS) aims to promote and coordinate scientific (physical, chemical, and mathematical) studies of planets in the solar system and around other stars. UCPS intends to advance planetary science through advocacy of solar system and extrasolar exploration, seeking insights on the origin, formation and evolution of planets and systems, including a search for habitable worlds beyond Earth. The UCPS together with other IUGG associations will share knowledge through scientific research and comparative studies between planetary objects and the Earth in the fields of atmosphere, surface and interior science. Additional information about UCPS can be found at <http://202.127.29.4/geodesy/ucps>.

Objectives:

- To advance and foster the study of scientific problems in the planetary sciences;
- To promote and coordinate international cooperation in planetary science, and promote planetary science activities in developing countries;
- To facilitate, on an international basis, discussion and publication of the results of the studies, research and work indicated above;
- To contribute to coordinating activities for future space missions.

Executive Committee

- Shuanggen Jin (IAG, China) (Chair)
- Nader Haghighipour (University of Hawaii, USA) (Vice-Chair)
- Paul Hartogh (MPI, Germany) (Vice-Chair)
- Scot Rafkin (IAMAS, USA) (Secretary/Treasurer)

ACTIVITIES

- 8-18 July 2019, Shuanggen Jin received International Union of Geodesy and Geophysics (IUGG) Fellow during the 27th

IUGG General Assembly, Montreal, Canada.

- 14-16 November 2019, Shuanggen Jin was invited to attend International Conference on Geomatics in the Big Data Era & Digital Guangxi Summit, Guilin, China.
- 23 September-5 October 2019, Shuanggen Jin attended 2nd International Workshop on GNSS Ionosphere (IWGI2019) as Co-Chair and visited German Aerospace Center (DLR), Neustrelitz, Germany.
- 1st International Spatial Intelligence Application Innovation and Entrepreneurship Competition and High-level Forum, 26-27 December 2020, Nanjing, China.

In order to strengthen the exchange of the latest achievements in space intelligent applications, build a high-tech achievement industrial transformation platform, deepen international cooperation, promote scientific and technological innovation and cooperation with countries along the "Belt and Road", gather space intelligent industries, and create new momentum for economic development and transformation and upgrading, the 1st International Spatial Intelligence Application Innovation and Entrepreneurship Competition and High-level Forum was held on 26-27 December 2020, Nanjing, China.

Organizers and Sponsors:

- IUGG Union Commission on Planetary Sciences (UCPS)
- International Association of Planetary Sciences (IAPS)
- Nanjing University of Information Science and Technology
- Jiangsu Federation of Returned Overseas Chinese, China
- Nanjing Federation of Returned Overseas Chinese, China
- 3rd International Symposium on the Peaceful Use of Space Technology Health (IPSACE 2020) with one keynote, 17-19 November 2020, Beijing, China.

The 3rd symposium on the Peaceful Use of Space Technology – Health (IPSPACE 2020) was held on November 18 – 19, 2020 at three parallel main venues in the US, Europe, and China and 20 sub-venues around the world with an online and offline format, including an online exhibition, due to the impact of the COVID-19 pandemic. IPSPACE 2020 focuses on the application of space especially on pandemic monitoring, preparedness, prevention, and control. The event brings together world experts to explore civil and commercial use of space technology on human health, education, navigation, agriculture, environment protection, and finance. It aims to promote the peaceful use of space technology for the betterment of human being on earth. Prof. Shuanggen Jin was invited to give a keynote on BeiDou Navigation and Smart Health Applications. For more detailed information and to register, please visit the conference website at: <http://2020peacespace.csaspace.org.cn/8582?lang=en>

- 18-21 November 2021, Shuanggen Jin was co-organized and attended International Symposium on Peaceful Use of Space Technology with giving a keynote, Beijing, China.
- 17-19 October 2021, Shuanggen Jin was invited to attend China Engineering Forum on Deep-Space Exploration Science and Technology and gave an invited talk, Shenzhen, China.
- 26-28 September 2022, Shuanggen Jin co-organized and attended 3rd International Workshop on GNSS Ionosphere (IWGI2022) - Observations, Modelling and Applications as Co-Chair, Neustrelitz, Germany.

- 31 October 2022, Shuanggen Jin was elected as Fellow of African Academy of Sciences with receiving the certificate from President Fellex Dapare Dakora, Beijing, China.

FUTURE ACTIVITIES

- 2nd IUGG Symposium on Planetary Science (IUGG-PS 2024): New Observations and Advances in Solar System, 2024, Shanghai, China.
- Session: Science and Exploration of Mars and Venus at AOGS 20th Annual Meeting, 30 July - 4 August 2023, Singapore.

Conveners:

Prof Varun Sheel (Physical Research Laboratory, India)

Dr Takeshi Imamura (The University of Tokyo, Japan)

Prof Shuanggen Jin (Henan Polytechnic University, China)

Dr Yeon Joo Lee (Institute for Basic Science, Korea, South)

- Session: General Topics in Planetary Science at AOGS 20th Annual Meeting, 30 July - 4 August 2023, Singapore.

Conveners:

Dr Steven Vance (Jet Propulsion Laboratory, Caltech, USA)

Prof Shuanggen Jin (Henan Polytechnic University, China)

Dr Kyeong Ja Kim (Korea Inst. Geoscience & Mineral Resources, S. Korea)

Shuanggen Jin, UCPS Chair

QUADRENNIAL REPORT OF THE INTERNATIONAL LITHOSPHERE PROGRAM

INTRODUCTION

The International Lithosphere Program (ILP) is a joint project of IUGG and IUGS and receives additional funding from member countries (cf. financial report). ILP seeks to elucidate the nature, dynamics, origin and evolution of the lithosphere through international, multidisciplinary geoscience research projects in Task Forces (TF) and Regional Coordinating Committees (CC).

The major ILP themes are: I. Geoscience of global change, II. Contemporary dynamics and deep processes, III. Continental lithosphere, IV. Oceanic lithosphere.

All TF and CC are led by international teams and supported by ILP with 4,000 Euro per year over a period of 5 years. This “seed money” is used by the project leaders to raise additional funds and build strong interfaces with other projects (ICDP, SINOPROBE, TOPO-EUROPE, etc.).

ADMINISTRATION

ILP operates on the base of terms of reference and has an international Bureau. The Bureau meets regularly to monitor the progress and to select new projects in close consultation with the representatives of National Committees. The Bureau is chaired by the President with support from the Secretary General. ILP is supported by a science advisory board and its honorary members. The ILP Secretariat is complementarily located at Nanjing University, China. The 2022 ILP Bureau membership is as follows:

President H. Thybo, Turkey/Denmark
Secretary General M. Liu, USA
Executive Secretary Q. Wang, China
Representative of IUGG A. Rudloff,
Germany
Representative of IUGS J. Ludden, France
Chair Committee National Representatives A.
Tibaldi, Italy

The Advisory Board to ILP includes the following members:

Ö. Adiyaman Lopes, UNESCO, France
S. Dong, China
C. Ebinger, USA
D. Mueller, Australia

V. Ramos, Argentina
Atalay Ayele, Ethiopia
Kristine Asch, Germany

The Bureau is further supported by:

Past President S. Cloetingh, Netherlands
Honorary President A. Green, Switzerland
ILP Fellow J.F.W. Negendank, Germany

There have been major changes in the composition of bureau and advisory board during the last 4 years. ILP is indebted to GFZ-Potsdam and the former General Secretary, M. Scheck-Wenderoth, and former Executive Secretary, A. Rudloff, for their activities in running the ILP office for more than 10 years. The new office is located at Nanjing University, China. ILP also great appreciates the participation by H. Gupta from IUGG and Kristine Asch from IUGS in the bureau for the past four years.

Bureau meetings have been held each year during the EGU General assembly followed by the traditional business meeting where ILP activists meet and present activities of the Task Forces and Coordinating Committees.

ILP has established the Evgenii Burov medal for praiseworthy mid-career achievements; the medal has been awarded since 2018 to Dr. Francesca Funicello, Italy; Dr. Luc Lavier, USA; Dr. Clint Conrad, Norway; Dr. Thorsten Becker, USA; and Dr. Jun Korenaga, USA. The Flinn-Hart award to an outstanding young scientist for contributions to the solid earth sciences covered by ILP has been awarded to Pietro Sternai, Italy; Attila Balazs, Switzerland; and Alexander Koptev, Germany/France. The awards have been presented during the business meetings during which the awardees have given presentations on high-lights of their research.

ACTIVITIES

ILP successfully completed 10 projects by the end of 2020. Two new projects were initiated in 2019: 2019-TF1: Lithosphere Structure and Mineral Resources and 2019-CC2 Lithospheric Seismicity and Tectonics in the Himalaya. Following a general call, 10 new projects were initiated in 2021: 2021-TF2 - Deformation and magmatic processes from the lithosphere to the surface: integrated multidisciplinary approaches; 2021-TF3 - Global Lithospheric

Stress - The World Stress Map in 3D; 2021-TF4 - Continental Lithosphere: a Broad-scale Investigation (CoLiBrI); 2021-TF5 - Assessing the relationships between lithospheric processes and seafloor topography at oceanic hotspots and divergent margins (LithoMar); 2021-TF6 - Sedimentary Basins; 2021-TF7 - Bio-geodynamics of the lithosphere.; 2021-CC1 TOPO-EUROPE; 2021-CC3 Anatolian Tectonics (ANATEC); 2021-CC4 Global Geo Transects (GGT); and 2021-CC5 Lithosphere of East Antarctica. In 2021 one more project was approved: 2021-TF8 - Lithospheric Heat Flow – Global Data Assessment Project.

ILP now has 13 active projects, which is probably a historically high number and reflects the vivid global activity on lithosphere research. It is promising that one of the new task Forces is on oceanic lithosphere, which traditionally has seen less activity than other ILP topics.

ILP had a strong representation at the EGU, AGU and Goldschmidt Geochemical Conference meetings, where several symposia were co-sponsored by ILP and convened by members of the Task Forces and Coordinating Committees. A book is being planned with articles on the history and science of Task Forces/Coordinating Committees of ILP as a Special Publication of Geological Society London.

Scientific meetings, developments for the different TF and CC, selected publications:

The ILP TF and CC have been visible at the large international meetings (EGU AGU, IUGG congress in Montreal). A new series of lithosphere oriented biannual meetings, the DEEPxx series, has been initiated in China with close connection to ILP and with strong ILP activity during the meetings. Moreover, most TF and CC contributed to specific conferences within their thematic fields and held dedicated smaller international workshops. Details are given in the annual reports. The publication activity was significant for most teams and

most TF and CC produced Special Issues in peer-reviewed journals. The leaders of ILP, Task Forces and Coordinating Committees have been giving key note talks at major scientific events. The seed funding from ILP helped to initiate several collaborative projects such as the IUGG sponsored teaching programme in Bhutan, Nepal and India on earthquake alertness. For the highlights of the individual TFs and CCs we refer to the annual reports.

FUTURE ACTIVITIES

- Provide support to the new Task Forces/Coordinating Committees.
- Presence at the IUGG General assembly in Berlin 2023.
- Several sessions with TF and CC contributions at EGU-23 in Vienna and at AGU 2023 in San Francisco.
- Several workshops of individual task forces are planned.
- ILP Business meeting and meeting of the bureau during EGU annual meeting in Vienna, April 2023.
- Strategic discussion of the ILP's role in the scientific community.
- An ILP townhouse meeting and a dedicated ILP session at AGU 2023.
- Award the E. Burov medal and Flinn-Hart award with lectures at EGU 2023.
- Strengthen connection to industry through the most relevant projects.
- Expand the national membership, e.g., with dedicated approach to African countries and Australia.
- Seeking new support from national science foundations and industry.

Hans Thybo, ILP President

Part II

Statutes and By-Laws of the Union and the Associations

STATUTES AND BY-LAWS OF THE UNION

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

STATUTES

(Modified by the Council on 12 July 2023)

I. OBJECTIVES AND COMPOSITION OF THE UNION

1. The objectives of the International Union of Geodesy and Geophysics (IUGG) are:
 - a) to promote the study of all problems relating to the figure of the Earth, and the physics and chemistry of the Earth's interior, surface, fresh waters, cryosphere, oceans and atmosphere, along with relevant studies of other planets;
 - b) to initiate, facilitate and co-ordinate research into, and investigation of those problems of geodesy and geophysics which require international co-operation or which are of international interest;
 - c) to provide, on an international basis, for discussion and publication of the results of the researches indicated in Article 1.b);
 - d) to promote co-ordination worldwide of scientific activities in the disciplines of interest to the Union;
 - e) to assist with scientific advice the study of practical problems of a geodetic or geophysical character when such problems present an international aspect or when they require international co-operation of specialists or facilities;
 - f) to promote and co-ordinate the scientific activities of several Permanent Services whose objectives are, on an international basis, to facilitate the standardization of measurements or to collect, analyze and publish geodetic or geophysical data, taking into account the results of planetary studies.
2. To achieve its scientific aims, the Union consists of a number of International Associations, each of which deals with a discipline of geodesy or geophysics.
3. The Union adheres to the International Science Council.
4.
 - a) Any country in which independent activity in geodesy and geophysics has been developed may adhere to the Union, provided that it takes an adequate share in the maintenance of the Union.

That country shall be represented by a single body, known as the Adhering Body, which may be either its principal scientific Academy, or its National Research Council, or any other institution or association of institutions, whether non-governmental or governmental, representing the geodetic and geophysical activities of the adhering country. Only under extraordinary circumstances, the Council of IUGG (defined in Article 5 of these Statutes) may admit a suitably designated additional Adhering Body for a country, provided a corresponding Adhering Body of that country has already been admitted as a National Member of the International Science Council. In this case, each Adhering Body shall have a separate Council Delegate and shall be treated separately in questions of Voting and Finances.

- b) A country in which activity in geodesy and geophysics has been developed but which cannot participate financially in the maintenance of the Union may become Associate. That country shall be represented by a single body, as specified in Article 4.a.
 - c) Hereafter, adhering countries will be referred to as Member Countries.
 - d) There shall be a category of adherence known as Affiliate Membership. Any multi-national or regional geodetic, geophysical or other geosciences organisation shall be eligible for Affiliate Membership. Affiliate Members shall have the same rights, duties and obligations as Associate Members.
 - e) There shall be a category of membership within IUGG known as Honorary Member conferred upon individuals awarded IUGG Fellowship by the IUGG Bureau. Honorary Members shall have no rights to attend meetings of Council or participate in Council business.
5. The General Assembly shall consist of three parts: i) a meeting of the duly accredited Delegates of the Member Countries and guests invited in accordance with the By-Laws (the Council Meeting); ii) business meetings of the Union; iii) an open scientific assembly.

The Council of the Union shall consist of the Delegates known as Council Delegates, designated by the Adhering Bodies of the Member Countries, one Council Delegate for each Adhering Body. Each Council Delegate shall be formally accredited by the Adhering Body in advance of each meeting of Council. Adhering Bodies in Associate status are not entitled to appoint a Council Delegate. Each Council Delegate, normally the President of the relevant IUGG National Committee, is expected to serve until the beginning of the first session of the subsequent Council meeting. However, an Adhering Body may replace its Council Delegate during the interval between successive Council meetings, and/or appoint an Alternate Delegate for a specific meeting.

The right of a Council Delegate to vote is subject to the relevant Adhering Body meeting its financial obligations to the Union.

II. ADMINISTRATION

6. Responsibility for the direction of the Union's affairs shall be vested in the Council of the Union. Decisions of the Council shall be reported to the General Assembly.
7. Between meetings of the Council, the direction of the affairs of the Union shall be vested in the Bureau and the Executive Committee, of which the respective responsibilities are hereafter defined.
8. The Bureau of the Union shall consist of the President, President-Elect, Secretary General, Treasurer and three additional Members, all of whom shall be elected by the Council. One of the three additional Members should be an early career scientist (being a researcher within 10 years, or equivalent full-time working, of receiving a PhD).
9. The Executive Committee shall consist of the Bureau, the Presidents of the International Associations, and the immediate Past President of the Union. The Secretaries of the Associations shall be invited to attend meetings of the Executive Committee of the Union in an advisory capacity.

The duties of the Bureau shall be to administer the affairs of the Union in accordance with these Statutes and By-Laws and the decisions of the Council.

The duties of the Executive Committee shall be to further the scientific objectives of the Associations through effective co-ordination and through the formulation of general policies to guide the scientific work of the Union.

The Executive Committee shall meet with the Council at sessions of the latter with voice but without vote.

10. Within the framework of the Statutes of the Union, the International Associations of the Union may make their own Statutes and By-Laws and control their administration and finance.

III. FINANCE

11. During the meeting of a General Assembly the Council shall elect a Finance Committee for the next period, consisting of three members drawn from the previous Finance Committee and accredited Council Delegates as specified by By-Law 10.

The Finance Committee shall meet with the Council at sessions of the latter, with voice but without vote.

12.

- a) There shall be fourteen categories of membership in the Union, numbered 1 to 14, plus special categories called A and AF.
- b) For categories 1 to 14, each Member Country shall pay annually the number of units of contribution assigned to the category in which it adheres. In each country the Adhering Body shall be responsible for the payment of the contribution. Any member country may additionally donate contributions for travel support of scientists from countries of Category A.
- c) Category A is composed of the Associates. They do not pay an annual contribution to the Union.
- d) Category AF is composed of the Affiliates. They do not pay an annual contribution to the Union.

13.

- a) A country which seeks to adhere to the Union must specify the category in which it proposes to adhere. Its application for admission may be refused if the category proposed is considered inadequate.
- b) An Associate may enter a paying category, or a paying Member Country may raise its category at any time provided the Council agrees. A paying Member Country may lower its category or become an Associate only with the consent of the Council of the Union.

14.

- a) The financial year shall be the calendar year.
- b) If at the end of any year a paying Member Country has not paid its subscription for that year, the benefits of membership in the Union will be denied to that Member Country until full payment has been made of that year's subscription and of any further subscriptions in arrears. Such Member Countries shall be deemed to be in Observer status.
- c) A Member Country in Observer status shall continue to accrue annual subscription obligations.
- d) If at the start of any year a paying Member Country has been in Observer status for four years, that Member Country shall be deemed to have withdrawn from membership unless the Secretary General has received a formal written request from the Member Country to be transferred to Associate membership (Category A).
- e) The Bureau of the Union is authorized to grant requests for transfer temporarily to Category A, until the next meeting of the Council, to Member Countries in Observer

status that provide evidence that efforts to pay all subscriptions in arrears are likely to be unsuccessful.

- f) A Member Country which has been denied a transfer to Category A by the Bureau may appeal at the next meeting of the Council.
 - g) Any Member Country in Observer status that is denied a transfer to Category A by Council shall cease to be a Member Country at the end of the Council meeting at which its request is considered.
 - h) Every Associate Membership shall be reviewed by the Bureau and the Finance Committee and the results communicated to Council at each General Assembly. Countries in Associate Membership will be asked to consider entering a paying category if it is deemed appropriate. If, following such a request, a Country does not enter a paying category, Council shall decide at its next meeting whether the Country can continue its membership in the Union.
15. In the event of the dissolution of any Association, its assets shall be ceded to the Union. In the event of the dissolution of the Union, its assets shall be ceded to the International Science Council.

IV. VOTING

16. Voting in Council is held (a) at meetings of the Council or (b) electronically. Electronic voting is voting using electronic systems (e.g., Internet, E-mail, Fax) and organized by the IUGG Secretariat. Electronic votes shall be open for one calendar month from the date of announcement. Electronic voting shall normally be suspended in the 6 months preceding a meeting of Council.

Associates have no voting rights.

- 17.
- a) On questions of scientific nature, or of administrative nature, or of a character partly administrative and partly scientific not involving matters of finance, voting shall be in Council by Member Countries, each Council Delegate having one vote, provided that the subscription of the Adhering Body has been paid up to the end of the calendar year preceding the voting.
 - b) On questions involving finance, voting shall be in Council by Member Countries with the provision that a voting country must have paid its subscriptions up to the end of the calendar year preceding voting in Council. The number of votes allotted to each Member Country shall be equal to the number of its category of membership.
18. Questions on admission of new Member Countries and new Affiliate Members and appeals against denial of transfer to Associate membership shall be decided by a two-thirds absolute majority vote of the Council Delegates meeting in Council or voting electronically, each Council Delegate having one vote.
19. A Council Delegate may represent only one Member Country. No member of the Bureau shall serve as a Council Delegate of a country. No Member of the Executive Committee shall vote with the Council unless under exceptional circumstances they are also the Council Delegate of a Member Country.

A paying Member Country which is not represented at a Council meeting may vote by correspondence on any specific question provided that the matter has been clearly defined on the final agenda distributed in advance to the Member Countries and that the discussion thereon has not produced any new considerations or changed its substance and provided that said vote has been received in writing by the President prior to the voting.

For the validity of the deliberations of the Council, at least one third of the Member Countries eligible to vote must be represented by their Council Delegates.

20. Before a vote in a Council meeting or an electronic vote, the President shall decide whether the matter under consideration is scientific, administrative or financial in character and whether the procedure of voting by correspondence applies.
21. Decisions of the Council shall be taken by a simple absolute majority except as otherwise specified in the present Statutes.

If a tie should occur in a Council vote, the decision shall rest with the President.

Simple or two-third absolute majorities are determined by the proportion of affirmative votes to the sum of votes (affirmative, negative, abstention), provided that the total number of delegates voting (affirmative, negative, abstention) is not less than one third of the total membership of the Union eligible to vote. Blank or invalid ballots and votes not cast by Delegates present at a Council meeting or by electronic voting are counted as abstentions.

V. GENERAL

22. These Statutes or any further modification to them shall come into force at the close of the Council meeting at which they are adopted, or in the case of electronic voting on the date at which they are adopted.
23. The Statutes of the Union may be modified only with the approval of two thirds of the Council Delegates present at a meeting or voting electronically.
24. Proposals for changes to any articles of the Statutes and By-Laws of the Union may be made by a Member Country, the IUGG Bureau, or the Statutes and By-Laws Committee.

The proposals must reach the Secretary General at least six months before the date of the meeting at which the changes are to be considered. The Secretary General shall notify all Member Countries of any proposed change at least four months before the announced date of the Council meeting.

If a proposal is submitted to Secretary General between Council meetings, the Bureau, in consultation with the Executive Committee, shall determine whether the proposal has merit to be placed for electronic voting by the Council. In the case of electronic voting, the Secretary General shall notify all Member Countries of any proposed change at least three months before the date of the vote.

25. Conduct of IUGG meetings, except as otherwise specified in the Statutes, shall be according to Robert's Rules of Order, Newly Revised. Details of the edition in current use shall be included in the reference document 'Guidelines on IUGG Administration' described in By-Law 13.
26. The official languages of the Union shall be English and French. In case of disparity between the texts, the English text shall be authoritative.

END OF STATUTES

BY-LAWS

(Modified by the Council on 12 July 2023)

I. COMPOSITION

1. The following are the constituent Associations of the Union:
The International Association of Cryospheric Sciences (IACS),
The International Association of Geodesy (IAG),
The International Association of Geomagnetism and Aeronomy (IAGA),
The International Association of Hydrological Sciences (IAHS),
The International Association of Meteorology and Atmospheric Sciences (IAMAS),
The International Association for the Physical Sciences of the Oceans (IAPSO),
The International Association of Seismology and Physics of the Earth's Interior (IASPEI),
The International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).
2. The IUGG Executive Committee may establish Union Commissions in order to examine scientific issues of mutual interest to at least four Associations. The Union may also, through the Executive Committee, sponsor jointly with other Unions or for special purposes, specific Programmes or Committees for the conduct of inter-disciplinary science. Such bodies may create subordinate bodies as necessary. In the same way, the Union may sponsor Permanent Services. The list of Union Commissions, Programmes, Committees and Permanent Services shall be reviewed by the Executive Committee at each General Assembly.

Scientists from all countries may attend scientific meetings of the Union and of the Associations. They may also act as observers in Commissions of the Union and in the Associations.
3. The President will normally represent the Union at the General Assemblies of the International Science Council but may be represented, if necessary, by the President-Elect or Secretary General.
4. Each Adhering Body shall form a Committee for Geodesy and Geophysics hereafter known as an IUGG National Committee, which normally consists of a President, Secretary General, and National Correspondents to Union Associations. The function of the National Committee is, under the direction of the Adhering Body, to provide for the participation of the Member Country in the Union's activities.

During the interval between General Assemblies, the Bureau of the Union may directly consult by correspondence the National Committee of each Member Country on any question of scientific character or on administrative matters not involving finance. On matters of finance and on admission of new Member Countries, the Bureau of the Union shall communicate with the Adhering Bodies of paying Members.

II. ADMINISTRATION

5. General Assemblies will normally be held once every four years at the call of the President of the Union. The interval of time between the closure of two successive General Assemblies shall be known as a "period".
6. Notice of the date and of the place of the meeting of the next General Assembly shall be sent by the Secretary General to the Member Countries at least nine months before the Assembly.

Proposals concerning the agenda for meetings of the Council may be presented by the Adhering Bodies or National Committees; they must be received by the Secretary General at

least six months before the meeting. Associates may make proposals of a scientific nature only. The Secretary General must place all proposals received on the final agenda for the Council meeting. This final agenda, with explanatory comments, shall be sent to all Member Countries at least four months prior to the meeting. An item which has not been thus placed on the agenda may be discussed at a meeting of the Council if a proposal to that effect is approved by a two-thirds absolute majority vote of the Council Delegates.

7. The Secretary General may send notice of the date and place of the next General Assembly to individuals or scientific organizations in countries not adhering to the Union, but where there is evidence of activity in Geodesy and Geophysics.

Scientists from these countries will be invited to participate in the scientific programme of the General Assembly, with the status of Guest.

The President of the Union may, on their own initiative or at the request of an Association or Member Country, invite representatives of scientific bodies to attend any General Assembly as Guests provided there is no financial obligation for the Union.

8. A plenary meeting of the participants in the General Assembly shall be held during each General Assembly for discussions of Union activities.
9. The Associations shall hold business meetings and scientific sessions at the General Assemblies of the Union.

The scientific meetings at a General Assembly should include joint sessions of two or more Associations for the discussion of interdisciplinary topics. The programme of the meetings and the selection of these interdisciplinary topics shall be decided by the Executive Committee of the Union, about two years before the time of the General Assembly, on the basis of recommendations made earlier by the Associations.

Provided that the Executive Committee is informed, an Association may also arrange meetings of its own in the interval between the General Assemblies, either singly to deal with topics of specific interest, or jointly with another Association or other Associations.

10.

- a) The President of the Union shall serve for one period.

The President-Elect shall be elected for one period and become President of the Union at the closure of the next General Assembly after her/his election.

The Secretary General shall be elected for one period and may be re-elected for not more than two additional consecutive periods.

The Treasurer shall be elected for one period and may be re-elected for not more than two additional consecutive periods.

The additional Members of the Bureau shall be elected for one period and may be re-elected for not more than one consecutive period.

The Members of the Finance Committee shall be elected for one period and may be re-elected for not more than one consecutive period.

- b) At least eighteen months before a General Assembly, the President shall appoint a Nominating Committee with the advice and approval of the Executive Committee. The Nominating Committee shall consist of a Chairman and three other members, not themselves members of the Executive Committee or of the Finance Committee.

The Nominating Committee, after soliciting nominations from the Adhering Bodies of the Member Countries, and from the officers of the Union and the Associations, shall propose one or two candidates for each position in the Bureau, seeking to achieve reasonable balance in their gender, experience, and geographical and disciplinary distribution. Candidates will be required to signify their acceptance of

nomination and to prepare a resumé outlining their position, research interests and activities related to the Union.

The officers of the Union and Associations and the National Committees shall be informed by the Nominating Committee of the list of nominations at least eight months before the General Assembly. They may make further nominations and/or recommendations to the Nominating Committee at least three months before the General Assembly. If new nominations for a given position are supported by at least three Presidents or equivalent officers of National Committees of Member Countries, and if they are accompanied by the written acceptance of possible nomination and resumé outlining the position, research interests and Union related activities of the candidates, they shall be added to the list initially established. The Nominating Committee shall send the final list of nominations to the officers of the Union and Associations and to the National Committees at the latest two months prior to the General Assembly.

Re-nominations, from those previously nominated for the Bureau may also be made over a period of 48 hours following the close of the first session of the Council meeting at the General Assembly. Such nominations must be submitted in written form to the Secretary General, supported by at least three members of the Council and accompanied by the same documentation as required with the original nominations. The Council Delegates shall be informed of these additional nominations, together with their resumé, at least 24 hours before the elections.

No one can be a candidate for more than one position in the election. Elections shall be by secret ballot.

- c) The Nominating Committee shall, after soliciting nominations from the Adhering Bodies of the Member Countries, and from the officers of the Union and the Associations, propose one or two candidates for each of the three positions on the Finance Committee: one position from among the current members of the Finance Committee and two positions from among the current accredited Council Delegates or the Council Delegates accredited to any previous General Assembly excluding the current members of the Finance Committee. If there is an insufficient number of candidates from the previous Finance Committee, then an additional member or members shall be elected from among the Council Delegates. No member of the Finance Committee may at the same time be a member of the Bureau or the executive body of the Union or of an Association or of a governing body of one of the Permanent Services or programmes supported by the Union. No member may serve for more than two consecutive periods on the Finance Committee.

The officers of the Union and Associations and the National Committees shall be informed by the Nominating Committee of the list of nominations at least three months before the General Assembly. The Council may add to the list of nominations for the Finance Committee during the General Assembly until three days prior to the elections.

Candidates will be required to signify their acceptance of nomination and to provide a resumé outlining their suitability for serving on the Finance Committee.

- d) No one may be at the same time a Member of the Bureau or of the Finance Committee and President or Secretary of an Association.
- e) Scientists from any country are eligible to hold positions within IUGG with the following exceptions: positions in the Bureau and the Finance Committee, and the positions of Presidents of the Associations, which can only be held by scientists from Member Countries whose subscription has been paid up to the end of the calendar year preceding their taking of office.

11. The Council is convened by the President of the Union, and shall meet at appropriate times during each Assembly.

The Council may be convened between two General Assemblies when a written request is made by at least a third of the paying Member Countries or by a simple majority of the members of the Executive Committee, with notice of the questions to be placed on the agenda of the meeting.

Council meetings shall be open to Council Delegates, the Executive Committee, and the Finance Committee. One person from each Associate Member may attend any Council meeting with voice but without the right to vote. The IUGG President may invite guests to make presentations at Council meetings. Other individuals may, with concurrence of the President, attend Council meetings as Listeners only, except that a simple majority of Council Delegates present may declare part of any meeting closed to Listeners.

The Council shall:

- a) decide upon the admission of new Member Countries and new Affiliate Members;
 - b) decide on an appeal against a decision by the Bureau to deny a transfer to Associate membership of a Member Country in Observer Status;
 - c) elect the members of the Bureau and of the Finance Committee;
 - d) receive reports from the Secretary General and the Treasurer of the Union and ratify the decisions or actions taken by the Bureau and the Executive Committee since the last Council meeting;
 - e) consider the budget submitted by the Treasurer and adopt the final budget;
 - f) determine the amount of the unit of contribution for the ensuing period (the unit cannot be changed at a General Assembly unless proposed on the agenda distributed four months in advance to the Member Countries);
 - g) review from time to time the categories of Member Countries; review the Associates at each General Assembly;
 - h) examine questions of general policy or administration in the business of the Union and appoint such Committees as may from time to time be deemed necessary for this purpose;
 - i) consider proposals for changes in the Statutes or By-Laws.
12. The Executive Committee is convened by the President of the Union. It shall meet at each General Assembly, and also at all sessions of the Council with voice but without vote. It will also meet normally at least once between General Assemblies, two years ahead of the next General Assembly, in order to prepare an outline of the interdisciplinary scientific agenda and of the timetables for the Union and for the Associations during the next General Assembly.

At a meeting of the Executive Committee, no member of the Bureau, or the immediate Past President of the Union, may be represented by any other person. The Presidents of the Associations, in case of hindrance, may be represented by a Vice-President or the Secretary of their Association. For the validity of the deliberations of the Executive Committee, at least half of its members must be present or represented.

Proposals concerning the agenda for meetings of the Executive Committee may be submitted by Members of the Committee; they must be received by the Secretary General at least six months before the meeting.

The final agenda shall be sent to the Members of the Executive Committee at least four months prior to the meeting. No question which has not been placed on the agenda may be

discussed at a meeting of the Committee unless a proposal to that effect has been approved by a two-thirds absolute majority vote of the Members present.

The Executive Committee shall:

- a) initiate actions, as required, to co-ordinate the common interest of the Associations, such as by meetings between the Secretary General and the Secretaries of the Associations;
 - b) guide the Treasurer regarding the financial needs of the Associations in achieving their objectives;
 - c) fill any vacancy which may occur between General Assemblies among the Members of the Bureau and the Finance Committee (when such appointments are later confirmed by the Council, the period of office will be considered to begin from the date of its confirmation by the Council);
 - d) make recommendations to the Council on matters of general policy of the Union.
13. The Bureau will normally meet once a year, at the call of the President of the Union. In a meeting, no Member of the Bureau may be represented by any other person. For the validity of the deliberations, four Members at least must be present.

Between the meetings of the Council, the Bureau shall initiate procedures to attain the general objectives of the Union; it shall manage the finances, and ensure the adequate administration of the Union, including maintenance of a reference document 'Guidelines on IUGG Administration'. It shall draw up the programmes for the meetings of the Council and of the Executive Committee.

14. Applications for membership of the Union and for transfer to Associate membership shall be referred to the Secretary General who shall report thereon to the Executive Committee, which shall decide on the scientific merits of each application. The Secretary General shall then forward the proposals through the appropriate channels to the Adhering Bodies representing the paying Member Countries; these bodies will vote electronically and the results of the ballot shall be communicated to them by the Bureau. Admission or transfer will be determined by a simple majority and is provisional until approved by Council. Simple majority is here determined by the proportion of affirmative votes to the sum of votes (affirmative, negative) provided that this sum is not less than one third of the total membership of the Union eligible to vote. Any case of refusal shall be referred to the Council.
15. The President of the Union shall:
- a) be the representative of the Union in its dealing with National or International Organisations or Institutions;
 - b) convene and preside over the General Assembly and over all meetings of the Council, Executive Committee and Bureau;
 - c) submit a report to the General Assembly on the scientific work of the Union during the current period.

The President-Elect shall:

- d) serve as presiding officer in the absence of the President;
 - e) succeed to the office of president if the President is incapable of remaining in office; and the Council shall elect a new President-Elect from the remaining Members of the Bureau based on the recommendation of the Executive Committee;
 - f) oversee the activities of the Union Commissions and Working Groups;
 - g) perform such other duties as may be assigned by the Bureau.
16. The Secretary General shall:

- a) serve as Secretary of the General Assembly, the Council, the Executive Committee and the Bureau; arrange for meetings of these bodies; prepare and distribute promptly the agenda and the minutes of all their meetings;
 - b) manage the affairs of the Union, informed by the document ‘Guidelines on IUGG Administration’, attend to correspondence, preserve the records;
 - c) circulate all information related to the Union;
 - d) prepare reports on the Union's activities; at least three months before the General Assembly, forward to all the Member Countries a report on the administration of the Union since the last General Assembly, and present a summary of this to the General Assembly itself;
 - e) maintain a register of distinguished scientists who have been honoured by the Union as Fellows of IUGG, collectively designated as the College of Fellows.
 - f) perform such other duties as may be assigned by the Bureau.
17. To assist the Secretary General and the Treasurer in the performance of their duties, the Bureau may appoint one Assistant Secretary General (Executive Secretary) and one Assistant Treasurer who shall be assigned specific tasks by the Secretary General and the Treasurer, respectively, with the approval of the Bureau. The Assistants may attend meetings of the administrative bodies of the Union in an advisory capacity. The Bureau may authorize employment of additional administrative and secretariat personnel as may be required to ensure orderly administration.

III. FINANCE

- 18.
- a) The Adhering Bodies to the Union shall pay annually the number of units of contributions assigned to the category in which they adhere, according to the following table

Category	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Units of Contribution	1	2	3	5	7	10	15	20	25	30	35	40	45	50

- b) Associates, in Category A, do not pay.
 - c) Affiliate members, in Category AF, do not pay.
19. The Finance Committee shall elect a Chair from among its members.

The Finance Committee shall meet, at the call of its Chair, and at least once during its term of office.

The Treasurer may be invited by the Chairman to attend a meeting of the Finance Committee. No Member may be represented by any other person at a meeting of the Committee.

The Finance Committee shall:

- a) advise the Council on all financial matters of the Union;
- b) receive and review the audits of the accounts;
- c) report to the Council;
- d) advise the Treasurer on preparation of the budget;
- e) advise the Treasurer, the Bureau, and the Executive Committee on financial matters, including raising funds to support Union and Association activities, and reviewing the category of membership of National Members.

The Chair of the Finance Committee will normally be invited to meetings of the Bureau or Executive Committee when financial matters are on the agenda.

20. The Treasurer of the Union shall be responsible for the financial administration of the Union informed by the document 'Guidelines on IUGG Administration' and directions issued by the Bureau.

The Treasurer shall:

- a) in consultation with the Executive Committee and the Finance Committee, prepare a preliminary budget to be sent to the Adhering Bodies at least three months prior to the Assembly together with comments of the Finance Committee, then update it at the General Assembly and submit the budget to the Council for approval;
- b) arrange for an annual audit of the books;
- c) collect the funds of the Union and disburse them in accordance with the approved budget and instructions of the Council and of the Bureau;
- d) maintain records of all financial transactions of the Union and submit annual financial reports thereon to the Bureau and the Finance Committee;
- e) submit such other reports to the Finance Committee and to the Council as may be requested;
- f) assemble, at the end of the calendar year preceding a General Assembly, a report on the complete accounts of the Union (including those of the Associations and of all Union activities) for the previous period, for presentation to the Bureau and to the Finance Committee at least three months prior to the General Assembly, and at the General Assembly to the Council. The report shall be accompanied by statements concerning each account administered by the Union, its Associations, and other financially assisted bodies. Each account shall be audited by a qualified accountant;
- g) prepare a summary report of the Finances of the Union (including those of the Associations and of all Union activities) and arrange for the distribution of copies thereof to the Member Countries not later than three months prior to the General Assembly.

The President, the Treasurer and the Assistant Treasurer have the authority to draw from any bank accounts of the Union, but only as directed by the Bureau.

21. Travelling expenses and per diem subsistence may be paid by the Treasurer in accordance with rates established by the Bureau.

The following conditions must be satisfied:

- a) the meeting must be for specific Union business;
- b) those concerned must represent the Union and not Adhering Bodies;
- c) those concerned must be unable to obtain adequate allowances from sources in their own country.

IV. AWARDS

22. Fellowship of the International Union of Geodesy and Geophysics is a tribute, awarded by the IUGG Bureau, to individuals who have made exceptional contributions to international cooperation in Geodesy or Geophysics and attained eminence in the field of Earth and space sciences.

The nomination and selection procedures and detailed criteria for IUGG Fellowship shall be determined by the IUGG Bureau and published in the document 'Guidelines on IUGG Administration'.

V. CHANGES TO THE BY-LAWS

23. The Council has the power to adopt By-Laws within the framework of the Statutes of the Union. These By-Laws may be modified by a simple majority of votes cast at a Council meeting or by electronic voting. These By-Laws, or any further modification of them shall come into force at the close of the Council meeting at which they are adopted or, in the case of electronic voting, at the date on which they are adopted.

END OF STATUTES AND BY-LAWS

STATUTES AND BY-LAWS OF THE ASSOCIATIONS

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF CRYOSPHERIC SCIENCES

Statutes of the International Association of Cryospheric Sciences

(Adopted July 2007, XXIV IUGG General Assembly, Perugia, Italy; revised July 2019, XXVII IUGG General Assembly, Montreal, Canada)

Denomination

The International Association of Cryospheric Sciences, hereinafter called "IACS", formed in 2007 is a constituent association of the International Union of Geodesy and Geophysics (hereinafter called "IUGG"), and is autonomous in its governance structure and processes, as defined below and without contradictions to the Statutes and By-Laws of IUGG.

Statute 1; Objectives of IACS

- 1 a. to promote studies of the cryosphere of Earth and other bodies of the Solar System and related physical processes
- 1 b. to encourage research on cryospheric sciences through collaboration and co-operation among individuals, institutions, and research programmes, both nationally and internationally
- 1 c. to provide opportunities for international discussion and collaboration on cryospheric sciences and research;
- 1 d. to promote education and public awareness about the cryosphere;
- 1 e. to facilitate the standardisation of measurements and the collection of cryospheric data and the analysis, archiving and publication of such data;
- 1 f. to promote the scientific activities of any permanent service which may fall under IACS responsibility and scientific supervision.
- 1 g. to promote and support diversity, inclusion and equality within the field of cryospheric science, within IACS as well as among its membership including but not limited to career stage, gender, racial and ethnic identities, and geographic origin.

Statute 2; Membership of IACS

- 2.1 There are three categories of membership in IACS: National Members, Individual Members, Honorary members
- 2.1 a. A National Member is a country admitted to IUGG and is represented by the IUGG Adhering Body of that nation. Each National Member may appoint at least one Correspondent to IACS.
- 2.1 b. Anyone engaging in scientific research on the cryosphere or otherwise contributing to the objectives of IACS may become an Individual Member.
- 2.1 c. Honorary membership is conferred upon an individual for outstanding service to IACS according to Statute 3.11.

Statute 3; Structure of IACS

- 3.1. IACS shall consist of a Bureau and other component bodies as specified in the By-laws of IACS.
- 3.2 Plenary Administrative Session
- 3.2 a. The work of IACS shall be directed by a Plenary Administrative Session which shall be convened at least once during each General Assembly of IACS, and attended by the Accredited Delegates appointed by National Members, and by Individual Members. One-third of the Accredited Delegates that are eligible to vote are required to validate a decision. Delegates not present may forward a vote on any specific question as described in Statute 3.4.
- 3.2 b. A Plenary Administrative Session may be convened at a Scientific Assembly of IACS between General Assemblies at the request of the President, and must be convened at the request of not less than one-third of

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IUGG Adhering Bodies eligible to vote. Such a request has to reach the Secretary General at least four months prior to the Scientific Assembly.

3.3. The work of IACS consists of matters that are scientific, administrative, and financial in character. Prior to a Plenary Administrative Session the President shall decide the character of each agenda item and whether the procedure of voting by correspondence applies.

3.3 a. On matters of scientific purpose, all Accredited Delegates and IACS Individual Members have a single vote but no person can have more than one vote.

3.3 b. On matters of administration, including election of officers, only Accredited Delegates from IUGG Adhering Bodies in regular IUGG member status (dues paid) may vote; each delegate has one vote and may represent only one Adhering Body.

3.3 c. On matters of finance, only Accredited Delegates from IUGG Adhering Bodies in regular IUGG member status (dues paid) may vote; each delegate has the number of votes corresponding to the Category of IUGG membership of the Adhering Body and may represent only one Adhering Body.

3.4. An IUGG Adhering Body eligible to vote that is not represented by a Delegate at a Plenary Administrative Session may vote by correspondence, including post, fax, or electronic mail, on any voting matter provided that:

- the matter has been clearly defined in the final agenda distributed in advance to the members in accordance with the By-laws,
- the substance of the matter has not been changed, and
- the vote has been received by the Secretary General prior to the meeting.

3.5. Decisions on any voting matter, except for the modification of the Statutes, shall be determined by a simple majority of the votes cast. Simple majority shall be determined by the proportion of affirmative votes to the sum of the affirmative and negative votes, including correspondence votes, and excluding abstentions. If a tie should occur, the decision shall rest with the President.

3.6. The Plenary Administrative Session has the power to adopt and modify By-laws that include specification of the scientific components of IACS (Divisions).

3.7. Electronic voting (e-voting) may be required in between Plenary Administrative Sessions on matters that are scientific, administrative, or financial in character. The matters must be communicated to the IACS Correspondents that are appointed by the IUGG Adhering Body National Committees and in case of scientific matters also to IACS Individual Members at least one month in advance of the voting date. IACS Correspondents from Adhering Bodies in regular IUGG member status (dues paid) are eligible to vote. Individual IACS Members may vote only on issues of scientific matter. The same number of votes per person applies as specified in Statute 3.3. The President nominates one Vice-President or the Secretary General to organize and oversee the ballot. The same quorum applies as for Sessions held at Assemblies.

3.8. The Bureau.

3.8 a. The Bureau shall consist of a President, the President-elect or immediate Past-President, three Vice-Presidents, the Secretary General, and the Heads of the Divisions. The immediate Past-President will remain a Bureau Member during the period between the end of his/her office of President and the election of a new President-Elect. In order to maintain continuity, the terms of office of the President, the President-Elect and the immediate Past-President are staggered. Thus, the four-year term of the President is split, with the first two years in office having the immediate Past-President on the Bureau and with the last two years having the President-Elect on the Bureau. The President-elect will become President at the IACS Scientific Assembly approximately mid-period between IUGG General Assemblies.

3.8 b. Except for the incumbent President, all members of the Bureau shall be elected by the Plenary Administrative Session during the General Assembly of IACS in accordance with the Statutes and By-laws.

3.8 c. In the event of any vacancy occurring in the membership of the Bureau, a person will be appointed to fill the vacancy by the remaining members of the Bureau until the next election. The eligibility for election of a person so appointed shall not be affected by such an appointment. If the vacancy is that of the President, the President-elect shall assume the office of President. If there is no President-Elect, then the Bureau shall appoint one of the three Vice-Presidents to act as President.

3.8 d. No elected officer of the IACS Bureau may hold more than one position within the Bureau at the same time.

3.10 The Bureau may establish Standing Groups and Working Groups with specified terms of reference.

3.11 The Bureau may nominate persons to the Plenary Administrative Sessions for recognition as “Honorary Members of IACS.”

3.12 IACS may create joint bodies with other IUGG Associations and other intergovernmental and non-governmental international scientific organizations such as the International Science Council (ISC) and organizations affiliated with the United Nations, to deal with topics of mutual interest, and may appoint appropriate representatives to these organizations.

Statute 4; Assemblies of IACS

4.1 A General Assembly of IACS shall normally be held in conjunction with each General Assembly of IUGG.

4.2 The interval between the end of one General Assembly and the end of the next one is, for the purposes of the Statutes, termed one Period.

4.3 A Scientific Assembly of IACS may be held between General Assemblies of IACS.

4.4 Notice of the date and place of a General Assembly or a Scientific Assembly shall be sent by the Secretary General to the IACS Correspondents at least nine months prior to that Assembly.

4.5 Between Assemblies, responsibility for the direction of IACS shall rest with the Bureau, which shall administer the affairs of the IACS in accordance with these Statutes and By-laws and the decisions of the prior Plenary Administrative Session.

Statute 5; Dissolution of IACS

If IACS should be dissolved, its financial assets will revert to IUGG to be used for the continuation of scientific and educational activities.

Statute 6; Languages

The present Statutes have been prepared in the official languages of IUGG. The English text shall take precedence if there is a question of interpretation.

Statute 7; Adoption and Modification of the Statutes

7.1 The Statutes of IACS must be approved by the IUGG Council at a General Assembly of IUGG, and shall come into force at the close of the Council Meeting at that General Assembly.

7.2 A member of the IACS Bureau, an IACS Correspondent or a Delegate to the IACS Plenary Administrative Session from an IUGG Adhering Body may propose a change to these Statutes. Any such proposal must reach the Secretary General of IACS at least six months prior to the announced date of the IUGG General Assembly at which it is to be considered. The Secretary General shall notify all IACS Correspondents and Accredited Delegates of any proposed change at least two months prior to the announced date of the General Assembly.

7.3. For adoption, modifications must be agreed by at least a two-thirds' majority of the votes cast by Accredited Delegates at a Plenary Administrative Session held during a General Assembly, and further approved by the Council of the IUGG. A two-thirds majority shall be determined by the proportion of affirmative votes to the sum of the affirmative and negative votes, including correspondence votes, and excluding abstentions.

7.4 Modifications to these Statutes shall come into force at the close of the General Assembly at which they were adopted.

By-laws of the International Association of Cryospheric Sciences (IACS)

By-law 1: Divisions

The scientific components of IACS shall be separated into Divisions as follows:

Snow and Avalanches
Glaciers
Ice sheets
Sea Ice, Lake and River Ice
Cryosphere, Atmosphere and Climate
Planetary and other Ices of the Solar System

- The role of Divisions shall be to further the scientific objectives of IACS through co-ordination of appropriate scientific research, promotion and administration of IACS Working Groups, organization of scientific meetings, and promotion of the exchange of information and data.
- Each Division shall be responsible for its role, structure, and mode of operation.
- Each Division shall be represented on the IACS Bureau by a Division Head.
- The role and effectiveness of each Division shall be reviewed periodically by the Bureau.

By-law 2: IACS Administration

2.1 The Bureau shall meet at least twice at each IACS General Assembly, and must meet at least once more between such Assemblies.

2.2 The Bureau shall meet at the call of the President, who will set the agenda in consultation with the Secretary General.

2.3 The Bureau can meet in person, or via teleconference. All participating Bureau Members have equal voting rights.

2.4 The quorum for an IACS Bureau Meeting shall be a majority of the Bureau Members but must include: at least three of the President; President-Elect or Past-President; the Secretary General; and one of the Vice-presidents.

2.5 The President may invite representatives of scientific bodies or individuals to attend a Bureau Meeting in an advisory capacity.

2.6 Electronic voting (e-voting) may be required in between Bureau Meetings. E-voting is a two-stage process: a discussion phase where Bureau Members openly discuss the issue, followed by a voting phase that is secret. The Secretary General or, in case of conflict of interest, either the President or the President-Elect or Past-President, counts the votes. The same quorum applies as for Bureau Meetings (see By-law 2.4). The discussion period and voting time should be kept as short as possible (approximately one week each).

2.7 The President, the Secretary-General, and either the President-Elect or the immediate Past-President shall meet at the call of the President, in person, or via teleconference. As a subset of the full Bureau, they will handle the day-to-day IACS administration and perform tasks delegated by the Bureau.

By-law 3: Officers

3.1 President

3.1 a. The President shall be elected for one Period, and may not be re-elected to the same office. In accordance with Statute 3.8a, the term of office begins approximately mid-period between IUGG General Assemblies, usually at the time of an IACS Scientific Assembly.

3.1 b. The duties of the President are

- (i) to represent IACS in the IUGG Executive Committee and at other meetings, conferences, or functions where formal representation is requested or desirable;
- (ii) to convene Plenary Administrative Sessions and meetings of the Bureau and to preside over these meetings;
- (iii) to prepare and distribute the agenda of Bureau Meetings to Bureau Members in consultation with the Secretary General;
- (iv) to submit a report on the work of IACS to Plenary Administrative Sessions;
- (v) to appoint the Chair of Standing and Working Groups established according to Statute 3.10;

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(vi) to appoint, on behalf of the Bureau, persons who maintain liaison between the Bureau and other scientific bodies and programmes according to specified terms of reference.

3.1 c. If the President is temporarily not available, the President-Elect shall act on behalf of the President in accordance with the Statutes and By-laws. If there is no President-Elect, then the Bureau shall appoint one of the Vice-Presidents, who shall be from a country represented by an IUGG Adhering Body in regular IUGG member status (dues paid), to act on behalf of the President in accordance with the IUGG Statutes and By-laws.

3.2 Vice-Presidents

3.2 a. The Vice-Presidents shall be elected for one period and may be re-elected for not more than one period which may or may not be consecutive.

3.2 b. The duties of the Vice-Presidents are:

- (i) to represent the interests of cryospheric scientists at-large;
- (ii) to advise the Bureau on IACS activities;
- (iii) to assist the President in furthering the objectives of IACS within IUGG and the International Scientific Community;
- (iv) to assist the President and Secretary General in administering IACS.

3.3 Secretary General

3.3 a. The Secretary General shall be elected for one period and may be re-elected for not more than two additional periods which may or may not be consecutive.

3.3 b. The duties of the Secretary General are

- (i) to assist the Bureau in the management of the administrative and scientific affairs of IACS, to attend to correspondence, and to maintain and preserve the records of IACS;
- (ii) to arrange meetings of the Bureau, to assist the President in the preparation of the agenda for Bureau Meetings, and to prepare and distribute the minutes of these meetings;
- (iii) to organize Assemblies according to the instructions of the Bureau, to prepare and arrange publication of the program of each Assembly,
- (iv) to request and receive the names of Accredited Delegates for each Plenary Administrative Session; to prepare and distribute the agenda; to prepare ballots and arrange for counting of votes; and to prepare and distribute the minutes of each Session;
- (v) to receive and take charge of the funds allocated by IUGG to IACS, or as may be received from any other source; to disburse such funds in accordance with the decisions of Plenary Administrative Sessions or with the instructions of the Bureau; to keep account of all receipts and disbursements and to submit such account, audited by a qualified accountant, for approval by the Bureau and submission to the Plenary Administrative Session;
- (vi) to maintain lists of IACS Members for purposes of communication, including IUGG, and Correspondents;
- (vii) to publish an internal IACS bulletin (such as IACS News) containing information of general interest to IACS;
- (viii) to perform such other duties as may be assigned by the President or the Bureau.

3.3 c. The Bureau may, at its discretion, appoint an Assistant Secretary General.

3.4 Heads of Divisions

3.4 a. The Heads of Divisions shall serve for one period but may be re-elected for two more periods which may or may not be consecutive.

3.4 b. The duties of the Heads of Divisions are:

- (i) to promote the interests of their respective divisions through participation in symposia, conferences, workshops and other activities, which receive the approbation of the Bureau;
- (ii) to oversee the activities of Working Groups within a Head's Division and serve as liaison between the Working Group and the Bureau;

(iii) to assist the Bureau in furthering the objectives of IACS in accordance with the Statutes and By-laws.

3.4 c. The Bureau may, upon request from the Head of a Division and at its discretion, appoint a Deputy Head of Division. The Division Head can temporarily delegate the right to vote on Bureau matters to the Deputy. No Division can have more than one vote.

3.5 No person who has served on the Bureau for four Periods shall be eligible for further election to any position on the IACS Bureau.

By-law 4: Nominations and Election of the Bureau

4.1 The Bureau shall establish a Nomination Panel consisting of a Chair and not less than two other members at least ten months before a General Assembly of IACS. The Panel will receive and consider suggestions and shall prepare a list of candidates for each office, seeking to achieve reasonable balance with respect to gender, career

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stage, cryospheric field, and geographical distribution. Members of the Bureau may not be appointed to the Nominating Panel.

4.2 At least nine months before an IACS General Assembly, the Secretary General shall solicit nominations for officers that must be received by the Chair of the Nomination Panel not later than six months before the IACS General Assembly. Nominees for the position of President-Elect, but not for the other positions, must be from countries represented by IUGG Adhering Bodies in regular IUGG member status (dues paid).

4.3 Each nomination for office must include a résumé of the candidate's qualifications relevant to the office for which the candidate is nominated. A signed statement of the candidate's willingness to stand for office must also be provided. The nomination shall not be considered without submission of the résumé and consent statement.

4.4 A person may be a candidate for more than one office, but once elected for one position cannot be elected for another for the same Period according to Statute 3.8d.

4.5 The list of candidates shall normally contain more than one name for each office. The Chair of the Nomination panel shall distribute the list to the accredited delegates to the Plenary Administrative Session at least three months before an IACS General Assembly. The list submitted for voting shall contain both the candidates proposed by the Nomination Panel and the names of all other nominees submitted.

4.6 Voting for the election of Bureau Officers by the Accredited Delegates shall be by secret ballot. The President shall select two electoral officers from among the participants at the Plenary Administrative Session to oversee and compile the votes. The electoral officers shall not be members of the Bureau or members of the Nominating Committee nor candidates for the election.

4.7 Candidates who obtain a simple majority of votes shall be elected. If no candidate receives a majority of votes for a specific office, the two candidates receiving the most votes shall be named and a second vote shall be held. In the case of a tie in the second round the current President shall decide.

By-law 5: Plenary Administrative Sessions

5.1 Attendance

5.1 a. Plenary Administrative Sessions shall be open to all scientific participants at IACS Assemblies and to the general public.

5.1 b. Participants who are either Accredited Delegates or IACS Individual Members have voice on any issue. Any other session attendee has voice only on scientific issues.

5.1 c. An Accredited Delegate may designate another participant from that country to be his or her representative at all or part of a Plenary Administrative Session provided that the Secretary General is informed in writing prior to the Plenary Administrative Session at which the designated representative is to act.

5.1 d. The President may, on his or her initiative or at the request of an Accredited Delegate, invite individuals such as representatives of relevant scientific bodies to attend a Plenary Administrative Session in an advisory capacity.

5.2 Agendas

5.2 a. A provisional agenda for a Plenary Administrative Session shall be prepared by the Secretary General and circulated to IACS Accredited Delegates and Correspondents at least two months prior to the opening of an Assembly.

5.2 b. The provisional agenda shall include all items submitted by IACS Accredited Delegates for discussion at the Plenary Administrative Session, together with questions placed on the provisional agenda by the Bureau. Additional agenda items, for which notice has not thus been given, may only be discussed with the consent of the voting members of the Plenary Administrative Session.

By-law 6: Modifications to the By-laws

The By-laws may be modified by a simple majority of votes cast at a Plenary Administrative Session.

Glossary: IACS Statutes and By-laws

Accredited Delegate:	the Delegate appointed to attend a Plenary Administrative Session of an IACS Assembly by an IUGG Adhering Body. The Accredited Delegate may, but does not need to be, the National Correspondent. An Accredited Delegate may vote on all IACS scientific matters and on IACS administrative and financial matters if the IUGG dues of the Adhering Body are paid.
Adhering Body:	As defined in IUGG Statute 4a, a single body in any country that represents the geodetic and geophysical activities of that country. Under extraordinary circumstances, there may be more than one Adhering Body for a country. Each Adhering Body forms a Committee for Geodesy and Geophysics hereafter known as an IUGG National Committee (IUGG By-law 4).
Assembly:	a General Assembly or a Scientific Assembly of IACS.
(The) Bureau:	the officers elected by a Plenary Administrative Session at an Assembly of IACS.
(The) By-laws:	the By-laws of IACS.
Correspondent:	the person named by an IUGG Adhering Body National Committee to serve as a liaison between the National Committee and IACS.
Divisions:	The primary scientific components of IACS, named in By-law 1.
IACS:	the International Association of Cryospheric Sciences.
(IACS) Individual Member:	a person registered with IACS as an individual member.
IUGG:	the International Union of Geodesy and Geophysics.
National Members (of IACS):	A country admitted to IUGG as voting or non-voting member as defined in Statute 2.1 a.
Nominating Panel:	the committee appointed by the Bureau to solicit candidates and provide nominations for the election of Bureau officers to the Plenary Administrative Assembly.
General Assembly (of IACS):	an Assembly of IACS held in conjunction with a General Assembly of IUGG (i.e., every 4 years). Consistent with IUGG General Assemblies it consists of three parts: (1) a Plenary Administrative Session, (ii) business meetings of IACS, and (iii) an open scientific assembly.
Period:	the interval between the end of one General Assembly of IACS and the end of the next General Assembly of IACS.
Plenary Administrative Session:	a formal meeting of Accredited Delegates, and IACS Individual Members. It is open to the public.
Scientific Assembly (of IACS):	an Assembly of IACS held between General Assemblies.
(The) Statutes:	the Statutes of IACS.

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF GEODESY

(Adopted by the IAG Council at the XXVIII IUGG General Assembly in Berlin, Germany, July 2023)

Statutes of the International Association of Geodesy

11. Definition of Terms

- (a) Geodesy is the discipline that deals with the measurement and representation (geometry, physics, and temporal variations) of the Earth and other celestial bodies.
- (b) IUGG is an acronym for the International Union of Geodesy and Geophysics.
- (c) IAG or Association is an acronym for the International Association of Geodesy.
- (d) Adhering Body and Council have the same meaning as in the Statutes of the IUGG.
- (e) IAG General Assembly refers to an assembly for scientific and/or administrative purposes of:
 - (i) scientists from geodesy and other Earth science disciplines;
 - (ii) the Council Delegates (or Alternative Delegates) appointed by the Adhering Bodies; and
 - (iii) Individual members as defined by Statute 6(b).
- (f) IAG Scientific Assembly means an assembly for primarily scientific purposes and therefore it does not normally require the presence of the delegates appointed by the Adhering Bodies.
- (g) Council Delegate means the person appointed by the Adhering Body to be a member of the Council for one period (see 1(h)). Adhering Bodies may appoint an Alternative Delegate to an IAG Council meeting if the Council Delegate cannot attend the meeting.
- (h) Period means the interval of time between the closures of two successive IAG General Assemblies.

2. International Association of Geodesy

- (a) The International Association of Geodesy (IAG):
 - (i) is a constituent Association of the IUGG; and
 - (ii) is subject to the Statutes and Bylaws of the IUGG.
- (b) In the event of the dissolution of the IAG, its assets shall be ceded to the IUGG.

3. Mission

The Mission of the Association is the advancement of geodesy. The IAG implements its mission by furthering geodetic theory through research and teaching, by collecting, analyzing, modelling and interpreting observational data, by stimulating technological development, by promoting refined observations, observing systems and satellite missions, and by providing a consistent representation of the figure, rotation, and gravity field of the Earth and other celestial bodies of the solar system.

4. Objectives

The IAG shall pursue the following objectives to achieve its mission:

- (a) Study, at the highest possible level of accuracy, all geodetic problems related to Earth observation and global change, including:
 - (i) Definition, establishment, and maintenance of global and regional reference systems for interdisciplinary use.
 - (ii) Rotation of the Earth and other celestial bodies of the solar system.
 - (iii) Positioning and deformation.
 - (iv) Gravity field.
 - (v) Ocean, ice and sea level.
 - (vi) Atmosphere and hydrosphere.

- (vii) Time and frequency transfer.
- (b) Support the maintenance of geodetic reference systems and frames for continuous, long-term observations and archival of results.
- (c) Provide observational and processed data, standards, methodologies, and models in a form that ensures the broadest possible range of research and application.
- (d) Stimulate development and take advantage of emerging space and other technologies to increase the resolution and accuracy of geodetic data and products in order to advance geodetic and interdisciplinary research.
- (e) Initiate, coordinate, and promote international cooperation and knowledge exchange through symposia, workshops, summer schools, training courses, publications, and other means of communication.
- (f) Foster the development of geodetic activities and infrastructure in all regions of the world, taking into consideration the specific situation of developing countries.
- (g) Collaborate with the international science and engineering community in supporting the application of geodetic theory and techniques and the interpretation of results.
- (h) Cooperate with national and international agencies in establishing research goals, missions, and projects.

5. Structure and Administration

- (a) The Association's structure shall comprise a small number of components: Commissions, Inter-commission Committees (ICCs), Services, the Global Geodetic Observing System (GGOS), and the Communication and Outreach Branch (COB).
- (b) Subcomponents, such as IAG Projects, Sub-commissions, Commission Projects, and Study and Working Groups, may be established as provided for in the Bylaws.
- (c) The administration of the IAG is carried out by the IAG General Assembly, the IAG Council, the IAG Bureau and the IAG Executive Committee. The COB is the office responsible for the promotional activities of the IAG and for communication with its members.

6. Membership

The membership of the IAG shall comprise:

- (a) Adhering Bodies; and
- (b) Individual members in accordance with the Bylaws.

7. IAG Council

- (a) The IAG Council is responsible for governance, strategic policy and direction.
- (b) The membership of the IAG Council consists of Delegates appointed by the Adhering Bodies.
- (c) Each Adhering Body may appoint one Delegate subject to the conditions in (d) and (e) below.
- (d) A Delegate may only represent one Adhering Body.
- (e) The IAG President, Vice President and Secretary General may not serve as Delegates.

8. IAG Bureau

- (a) The Bureau of the Association consists of the IAG President, the Vice President and the Secretary General.
- (b) The duties of the IAG Bureau shall be to administer the affairs of the Association in accordance with these Statutes and Bylaws and with the decisions of the IAG Council and the IAG Executive Committee.

9. IAG President

- (a) The IAG President shall be elected by the IAG Council.
- (b) The IAG President shall provide general leadership for the Association.

- (c) The IAG President presides over the meetings of the IAG General Assembly, the IAG Scientific Assembly, the IAG Council, the IAG Executive Committee, and the IAG Bureau. In the IAG Council meetings the President has no vote, except in the case of a tie as provided in 14(g).
- (d) The IAG President, on completion of their term of office of one period, shall serve for the next period in the position of Immediate Past President.

10. IAG Vice President

- (a) The IAG Vice President shall be elected by the IAG Council.
- (b) The IAG Vice President shall perform such tasks as may be assigned by the IAG President, the IAG Executive Committee or the IAG Council.
- (c) The IAG Vice President assumes the functions, duties and powers of the President when the latter is absent or otherwise unable to assume office.

11. IAG Secretary General

- (a) The IAG Secretary General shall be elected by the IAG Council.
- (b) The IAG Secretary General shall serve as secretary of the IAG General Assembly, the IAG Scientific Assembly, the IAG Council, the IAG Executive Committee, and the IAG Bureau and arrange for meetings of these bodies in accordance with the Bylaws.
- (c) The IAG Secretary General, on completion of their term of office, shall serve for the next period in the position of Immediate Past Secretary General.

12. IAG Executive Committee

- (a) The IAG Executive Committee shall consist of the following voting members: each member of the IAG Bureau, the immediate Past President, the immediate Past Secretary General, the Presidents of the Commissions, the Presidents of the Inter-commission Committees, the President of GGOS, the President of the COB, three representatives of the Services, and two Members-at-Large.
- (b) The Chairs of the IAG Projects and the Assistant Secretaries shall attend any meeting of the IAG Executive Committee, with voice but without vote. The Past Presidents and past Secretaries General may attend any meeting of the IAG Executive Committee, with voice but without vote (except for the immediate Past President and the immediate Past Secretary General, who do have a vote in accordance with Statute 12(a) for one 4-year period).
- (c) The election of IAG Executive Committee members shall be in accordance with the Bylaws.
- (d) The responsibilities of the IAG Executive Committee shall be to further the objectives of the Association through effective coordination and through the formulation of general policies.
- (e) Decisions of the Executive Committee shall be taken by a simple majority. If a tie should occur in an Executive Committee vote, the IAG President shall cast the decisive vote.

13. Council Meetings

- (a) The IAG Council shall meet at the time of an IAG General Assembly.
- (b) The IAG Council may hold extraordinary meetings, either in person or electronically, at times other than an IAG General Assembly. Such meetings must be proposed by the IAG Executive Committee
- (c) The members of the IAG Executive Committee may attend meetings of the IAG Council, with voice but without vote, except for those who are also Delegates.

14. Voting in the Council

Voting in the IAG Council shall follow the following rules:

- (a) An Adhering Body which is not represented at an IAG Council meeting may vote electronically or by correspondence on any specific question, provided that the matter has been clearly defined on the final agenda distributed in advance, and that the discussion thereon has not produced any significant new

considerations or change in its substance, and that the said vote has been received by the IAG President prior to the voting. In such a case the vote will be cast in accordance with 14(d)).

- (b) Quorum in IAG Council meetings is achieved when the number of Council Delegates (or Alternative Delegates) in attendance is at least one third of the delegates from countries eligible to vote.
- (c) On questions not involving matters of finance, each delegate from an Adhering Body, with its IUGG subscriptions paid up to the end of the calendar year preceding the voting, shall have one vote.
- (d) On questions involving finance, each delegate from an Adhering Body, which has paid its IUGG subscriptions up to the end of the calendar year preceding the voting, shall have the right to vote. The number of votes allotted to each delegate of an Adhering Body shall then be in accordance with its category of membership, as defined by the IUGG.
- (e) Prior to any vote in an IAG Council meeting, the IAG President shall decide whether or not the matter under consideration is financial in character and whether the procedure of voting by correspondence applies.
- (f) The IAG Council may also deliberate and decide matters at other times by electronic voting, email ballot and/or correspondence, provided that the issues have been communicated to IAG Council members at least one month in advance of the voting date.
- (g) Decisions of the IAG Council shall be taken by a simple majority, except as otherwise specified in these Statutes. If a tie should occur in an IAG Council vote, the IAG President shall cast the decisive vote. This procedure also applies if the vote is taken electronically. Simple and two-thirds majorities are determined by the proportion of affirmative votes to the sum of all votes (affirmative, negative and abstention). Blank and invalid ballots and votes not cast by delegates present are counted as abstentions.
- (h) Elections for all members of the IAG Executive Committee shall be by electronic voting. For each post, the winner must receive an outright majority (number of votes being greater than the total combined votes of the other candidates). If there are three or more candidates for a position and no candidate has an outright majority after the first voting round, then the top two ranked candidates will be retained and a second round of votes conducted to elect the winner. Ties will be broken by a coin toss, drawing of lots, or equivalent random selection.
- (i) Except as otherwise provided in the Statutes or Bylaws, meetings of the IAG Council, as well as those of other IAG administrative bodies, shall be conducted according to the edition of Robert's Rules of Order currently recommended by the IUGG.

15. Decisions of the Council

- (a) Decisions of the IAG Council shall be reported to the individual membership in a meeting at the IAG General Assembly.
- (b) If the majority of those present at this meeting disagrees with the decisions of the IAG Council, the IAG Council shall reconsider the question, and make a decision, which shall be final.

16. Changes to Statutes and Bylaws

Changes in the Statutes and Bylaws shall be made as follows:

- (a) If deemed necessary, the Association may review the Statutes and Bylaws in each period, to ensure an up-to-date structure of its scientific and administrative organization. A Review Committee, known as the Cassinis Committee, will be appointed by the IAG Executive Committee to achieve this goal. Proposals for a substantive change of any article of these Statutes and Bylaws must reach the Secretary General at least two months before the announced date of the IAG Council meeting at which it is to be considered. The Secretary General shall notify all Adhering Bodies of any proposed changes at least one month before the announced date of the IAG Council meeting.
- (b) The Statutes may not be modified except by a two-thirds majority of votes cast at an IAG Council meeting, and changes shall come into force at the close of that meeting.
- (c) The IAG Council shall have the power to adopt Bylaws within the framework of the Statutes.
- (d) The Bylaws may be modified by a simple majority of votes cast at an IAG Council meeting, and changes shall come into force at the close of the meeting.

By-Laws of the International Association of Geodesy

21. Definition of Terms

- (a) **Commissions** represent major fields of activity in accordance with the IAG Statutes.
- (b) **Inter-commission Committees (ICCs)** shall be responsible for well-defined, important and permanent tasks involving all Commissions.
- (c) **Services** collect and analyze observations to generate products relevant to geodesy and other sciences and applications.
- (d) The **Global Geodetic Observing System (GGOS)** works with the other IAG components in advancing our understanding of the dynamic Earth system by quantifying our planet's changes in space and time.
- (e) **IAG Projects** are flagship long-term projects of broad scope and of significant interest for the entire field of geodesy.
- (f) The **Communication and Outreach Branch (COB)** provides the Association with communication, educational/public information and outreach links to the membership, to other scientific Associations and to the world as a whole.
- (g) **Association subcomponent or subcomponents** are long-term or short-term structures created by the IAG or one or more of its components.
- (h) **Long-term subcomponents** comprise IAG Projects (broad in scope and of high interest for the entire field of geodesy), Sub-commissions and Commission Projects which are expected to operate for several periods.
- (i) **Short-term subcomponents** refer to Study Groups and Working Groups which are established for a maximum term of one period.
- (j) **Steering Committee** means a group of elected or appointed IAG officers who oversee the work of Commissions, Inter-commission Committees (see 17), IAG Projects (see 16), and the Communication and Outreach Branch (see 18).
- (k) **Period** means the interval of time between the closures of two successive IAG General Assemblies.

2. Responsibilities of Association Components

- (a) The scientific work of the IAG is performed by Commissions, Inter-commission Committees, IAG Projects, Services and GGOS.
- (b) The responsibilities of the IAG Components are determined by the IAG Council on the recommendation of the IAG Executive Committee.
- (c) Components are expected to interact with each other where their activities are inter-related.
- (d) Each Component may set up subcomponents and is responsible for the activities of those subcomponents.

3. General Responsibilities of Component Presidents or Chairs, and Steering Committees

- (a) Each Component shall have a President or Chair who will lead a Steering Committee.
- (b) The Component's President or Chair is responsible for the scientific development within the Component's field of interest. The Component's President or Chair shall:
 - (i) coordinate the work of the subcomponents;
 - (ii) keep the officers of the Component as well as the IAG Bureau and IAG Executive Committee informed of the Component's activities on an annual basis;
 - (iii) collect reports of the subcomponents two months before each IAG General and Scientific Assembly for publication in the "Travaux de l'Association Internationale de Géodésie";
 - (iv) receive suggestions for new subcomponents, and suggestions for continuation of existing ones; and

- (v) recommend changes to subcomponents to the IAG Executive Committee for approval.
- (c) The Component's Steering Committee is expected to meet at least once per year and at least once during each IAG General Assembly.
- (d) The Component's Steering Committee shall review at one of its meetings (usually the IAG General Assembly, or the IAG Scientific Assembly):
 - (i) the activities of the subcomponents over the past period;
 - (ii) the structure of the subcomponents; and
 - (iii) the programs for the forthcoming period for those subcomponents that will be recommended for continuation.
- (e) The Component's Steering Committee shall inform the Secretary General about all relevant issues.
- (f) The Component's Steering Committee may organize scientific and organizational meetings and workshops provided that they are readily distinguished as being of a more limited scope than IAG Scientific Symposia or IAG Sponsored Symposia as described in Bylaws 28 and 29.

4. Commission Responsibilities

Commissions shall promote the advancement of science, technology and international cooperation in their field. They establish the necessary links with sister disciplines and with the relevant Services. Commissions shall represent the Association in all scientific domains related to their field of geodesy.

5. Commission Steering Committee

- (a) The Commission Steering Committee shall be established at each IAG General Assembly, following the election of the Association officers.
- (b) The Steering Committee shall have the following voting members:
 - (i) Commission President.
 - (ii) Commission Vice President.
 - (iii) Chairs of the Sub-commissions and Commission Projects.
 - (iv) Up to three representatives of the Services relevant to the work of the Commission.
 - (v) Up to two Members-at-Large to balance geographical and member country representation.
- (c) The Steering Committee may also have non-voting members who represent organizations external to the IAG, as appropriate.

6. Appointment of Commission Officers

- (a) The Commission President shall be elected by the IAG Council for one period without reappointment, except where exceptional circumstances justify reappointment.
- (b) The Commission Vice President shall be appointed by the IAG Executive Committee for one period without reappointment, except where exceptional circumstances justify reappointment.
- (c) Chairs of the Sub-commissions and Commission Projects shall be nominated by the Commission President and Vice President within two months following the General Assembly.
- (d) The representatives of the Services shall be appointed by the Commission President and Vice President upon proposal of the Services.
- (e) The representatives of the external organizations shall be appointed by the Commission President and Vice President upon proposal of the external organizations.
- (f) The Members-at-Large shall be nominated by the Commission President and Vice President within two months following the IAG General Assembly.
- (g) The appointments of Members-at-Large and Chairs of Sub-commissions and Commission Projects take effect on approval of the nominations by the IAG Executive Committee.

7. Tasks of Commission Steering Committee

The Commission Steering Committee is subject to the general responsibilities of component Steering Committees in Bylaw 3(c), 3(d), 3(e), and 3(f). In particular, its tasks are to:

- (a) Review the Commission's field of interests and objectives.
- (b) Liaise with the other IAG Commissions, the Inter-commission Committees, and with similar organizations outside the IAG, as appropriate.
- (c) Foster active participation of early career geodesists and geodesists from under-represented countries.
- (d) Coordinate and review the work of its components and report at the time of the Scientific Assembly to the IAG Executive Committee on the progress and performance of the components.
- (e) Encourage and organize Commission and interdisciplinary symposia and/or sessions at major geodesy related international meetings.
- (f) Maintain a Commission website and email service.
- (g) As requested, nominate editors for the Journal of Geodesy.

8. Current Commissions

On the approval of these Bylaws, there shall be four Commissions with areas of scientific responsibility as outlined below:

(1) Commission 1: Reference Frames

- (a) Establishment, maintenance, improvement of the geodetic reference frames.
- (b) Advanced terrestrial and space geodetic techniques for the above purposes.
- (c) International collaboration for the definition and deployment of networks of terrestrially-based space geodetic observatories.
- (d) Theory and coordination of astrometric observation for reference frame purposes.
- (e) Collaboration with space geodesy/reference frame related international services, agencies and organizations.

(2) Commission 2: Gravity Field

- (a) Terrestrial, marine, and airborne gravimetry.
- (b) Satellite gravity and altimetry observations.
- (c) Gravity field modelling.
- (d) Time-variable gravity field.
- (e) Geoid determination and height systems.
- (f) Satellite orbit modelling and determination.

(3) Commission 3: Earth Rotation and Geodynamics

- (a) Earth orientation (UT1 and LOD, polar motion, precession-nutation).
- (b) Earth tides and tidal loading.
- (c) Crustal deformation, seismo-geodesy, volcano-geodesy and seafloor-geodesy.
- (d) Earth's response to non-tidal surface loading (including glacial isostatic adjustment).
- (e) Sea level changes over various timescales.

(4) Commission 4: Positioning and Applications

- (a) Terrestrial and satellite-based positioning systems development, including sensor and information fusion.
- (b) Navigation and guidance of platforms.
- (c) Interferometric laser and radar applications.

- (d) Applications of geodetic positioning using geodetic networks, including monitoring of deformations.
- (e) Applications of geodesy to engineering.
- (f) Atmospheric investigations using space geodetic techniques.

9. Commission Subcomponents and Joint Subcomponents

- (a) Commission subcomponents are Sub-commissions, Commission Projects, Study Groups, and Working Groups, which all belong to one Commission.
- (b) If more than one component is involved in a subcomponent, the term “joint subcomponent” will be used, e.g. Joint Sub-commission, Joint Commission Project, Joint Study Group, Joint Working Group.

10. Sub-commissions and Joint Sub-commissions

- (a) A Sub-commission may be set up for topics where the Commission plays a leading or coordinating role.
- (b) Where a topic relates to the scientific responsibilities of more than one IAG component, a Joint Sub-commission shall be established under the lead of one Commission.
- (c) A Sub-commission is expected to be established for several periods.
- (d) Sub-commissions are established and terminated by the IAG Executive Committee upon recommendation from the Commission President.
- (e) A proposal to the IAG Executive Committee for a Joint Sub-commission requires the recommendation of the Presidents of all contributing components.

11. Commission Projects and Joint Projects

- (a) A Commission Project may be established when a new scientific method or a new technique is being developed, or when it seems appropriate to apply an existing technique to a specific geographic area where international collaboration is required.
- (b) Where a topic for a Commission Project relates to the scientific responsibilities of more than one Commission, or a Commission and a Service, a Joint Commission Project shall be established under the lead of one Commission.
- (c) A Commission Project is established for one period and may be extended for another period subject to a positive review.
- (d) Commission Projects are established, extended and terminated by the IAG Executive Committee upon recommendation from the Commission President.
- (e) A proposal to the IAG Executive Committee for a Joint Commission Project requires the recommendation of the Presidents of all contributing components.

12. Inter-commission Committees (ICCs)

- (a) Inter-commission Committees shall be responsible for well-defined, important and permanent tasks involving all Commissions.
- (b) Each ICC shall have a Steering Committee, which shall include the following members:
 - (i) President appointed by the IAG Executive Committee.
 - (ii) Vice President appointed by the IAG Executive Committee on the recommendation of the President.
 - (iii) One representative appointed by each Commission.
- (c) The Terms of Reference for each ICC shall be developed by a planning group appointed by the IAG Executive Committee, for approval by the Executive Committee.
- (d) ICCs will be established for at least two periods and shall be reviewed by the IAG Executive Committee every eight years.
- (e) ICCs shall report to the IAG Executive Committee.

- (f) The President of an ICC shall hold office for one period, but is eligible to be re-elected for one further period.

12.1 Inter-commission Committee for Climate Research (ICCC)

The mission of the ICCC is to interact and collaborate with other IAG components, in particular the Commissions and GGOS, in order to further the objectives of the ICCC:

- (i) to be the international focal point of geodesy for climate research;
- (ii) to encourage and initiate activities to intensify the interaction between geodesy and climate science; and
- (iii) to monitor research developments related to the use of geodetic data for climate research.

12.2 Inter-Commission Committee on Marine Geodesy (ICCM)

The ICCM mission is to collaborate and interoperate with the IAG Commissions and GGOS to realize the objectives of ICCM:

- (i) to close the gaps between theory and applications in marine geodesy;
- (ii) to connect the seafloor geodetic network component to the ITRF;
- (iii) to develop multi-marine geodetic observations; and
- (iv) to establish international conventions for marine geodetic data processing and standards.

12.3 The Inter-commission Committee on Theory (ICCT)

The mission of the ICCT is to interact and collaborate with other IAG components, in particular the Commissions and GGOS, in order to further the objectives of the ICCT:

- (i) to be the international focal point of theoretical geodesy;
- (ii) to encourage and initiate activities to further geodetic theory in all branches of geodesy; and
- (iii) to monitor research developments in geodetic modelling.

13. IAG Services

- (a) IAG Services (see Bylaw 14) generate products, using their own observations and/or observations of other services, relevant for geodesy and for other sciences and applications. Accuracy and robustness of products, quality control, timeliness, and state-of-the-art quality are the essential aspects of the Services.
- (b) Each IAG Service shall define its Terms of Reference as appropriate to accomplish its mission and shall submit the Terms of Reference to the IAG Executive Committee for approval.
- (c) Each IAG Service shall have an IAG representative, appointed by the IAG Executive Committee, as a voting member of its directing or governing board.
- (d) IAG Services are linked to at least one of the Commissions and may be also linked to other scientific organizations, such as the ISC World Data System (WDS) or the International Astronomical Union (IAU).
- (e) IAG Services should collaborate on a scientific basis with the Commissions, establish Joint Commission Projects and Joint Study Groups and help compile the Commissions' list of themes for Study Groups.
- (f) Three representatives shall be elected in accordance with Bylaw 39 to the IAG Executive Committee to serve the interests of all Services.
- (g) On any matter relating to the products of a Service, the Service shall represent the IAG.

14. Current IAG Services

There are twelve IAG Services at the time of adoption of these Bylaws:

- (a) International Gravimetric Bureau (BGI)
- (b) International Centre for Global Earth Models (ICGEM)

- (c) International Digital Elevation Models Service (IDEMS)
- (d) International DORIS Service (IDS)
- (e) International Earth Rotation and Reference Systems Service (IERS)
- (f) International Geodynamics and Earth Tides Service (IGETS)
- (g) International Gravity Field Service (IGFS)
- (h) International GNSS Service (IGS)
- (i) International Laser Ranging Service (ILRS)
- (j) International Service for the Geoid (ISG)
- (k) International VLBI Service for Geodesy and Astrometry (IVS)
- (l) Permanent Service for Mean Sea Level (PSMSL)

15. The Global Geodetic Observing System (GGOS)

- (a) GGOS is IAG's observing system to monitor the geodetic and global geodynamic properties of the Earth as a system.
- (b) The **Global Geodetic Observing System (GGOS)** works with all IAG components, such as the Services, the Commissions, the Inter-Commission Committees and the Projects, to provide unique, mutually consistent, and easily accessible geodetic products (including the geodetic reference frames and gravity field models) and relevant geodetic constants for science and society. In addition, GGOS undertakes activities directed at improving the geodetic infrastructure that underpins the geodetic products. Further, GGOS works in concert with the Commissions, the ICCs and the Projects concerning new developments, and keeps other IAG components informed of the work of GGOS.
- (c) GGOS operates under its own Terms of Reference, defined by the GGOS Governing Board and approved by the IAG Executive Committee. The GGOS procedures for the nomination and election of its Officers are specified in its Terms of Reference.
- (d) The GGOS President is elected by the IAG Executive Committee from a slate of candidates nominated by the GGOS Governing Board and the IAG Executive Committee. The President is appointed for one period, which may be renewed once.

16. The Communication and Outreach Branch (COB)

- (a) The function of the Communication and Outreach Branch (COB) is to provide the Association with communication, educational/public information and outreach links to the membership, to other scientific organizations and to the world as a whole.
- (b) The responsibilities of the COB shall include the following:
 - (i) Promote the recognition and usefulness of geodesy in general and the IAG in particular.
 - (ii) Publications (such as newsletters) and social media platforms.
 - (iii) Membership development.
 - (iv) General information service and outreach.
- (c) The COB shall also assist the IAG Secretary General in the following tasks as required:
 - (i) Maintenance of the IAG website.
 - (ii) Setting up Association schools.
 - (iii) Organizing meetings and conferences.
- (d) The IAG Executive Committee establishes the COB on a long-term basis by issuing a Call for Participation. The responding organization(s) and the IAG Executive Committee shall then negotiate the Terms of Reference and other conditions.
- (e) The President of the COB shall be elected by the IAG Council after consideration of a COB proposal.

- (f) Major decisions related to the operations of the COB shall be made by a Steering Committee consisting of the following voting members:
 - (i) COB President.
 - (ii) IAG Secretary General.
 - (iii) Editor-in-Chief of the Journal of Geodesy.
 - (iv) Editor-in-Chief of the IAG Symposia Series.
 - (v) Up to five other members appointed by the IAG Executive Committee on the recommendation of the President of the COB.

17. IAG Projects

- (a) IAG Projects are flagship long-term projects of broad scope and of significant interest for the entire field of geodesy.
- (b) The establishment of an IAG Project shall be carried out by a planning group appointed by the IAG Executive Committee.
- (c) The Project Steering Committee shall have the following voting members:
 - (i) The Project Chair appointed by the IAG Executive Committee.
 - (ii) One member from each Commission appointed by each Commission's Steering Committee.
 - (iii) Two Members-at-Large proposed by the members of the Project Steering Committee identified in clause (i) and (ii) above and approved by the IAG Executive Committee.
 - (iv) Chairs of the IAG Project Working Groups (if any).
 - (v) Representatives of other IAG components, as appropriate.
- (d) IAG Project subcomponents are known as Working Groups.

18. Study Groups, Working Groups, Joint Study Groups and Joint Working Groups

- (a) A Study Group or Working Group may be established at any time to address clearly defined well-focused scientific topics of limited scope within the field of the Component. A Study Group is dealing with more theoretical issues and a Working Group with more practical realizations.
- (b) Where a topic for a Study Group or Working Group relates to the scientific responsibilities of more than one Component, a Joint Study Group or a Joint Working Group shall be established.
- (c) A Study Group or Working Group is established for a maximum of one period.
- (d) Study Groups and Working Groups, including the position of the group Chair, are established and terminated by the IAG Executive Committee upon recommendation of the Component President.
- (e) A proposal to the IAG Executive Committee for a Joint Study Group or Joint Working Group requires the recommendation of the Presidents of all contributing components.
- (f) The Chair of a Study Group or Working Group is responsible for initiating and directing its work and appointing its members.
- (g) Study Group and Working Group membership should be balanced so as to reflect international cooperation in its subject.
- (h) A Study Group or Working Group may have at most 20 full members and an unlimited number of correspondent members.
- (i) The Chair of each Study Group or Working Group shall issue a brief description of the work to be performed and a list of members, to be published in the Geodesist's Handbook after each IAG General Assembly.
- (j) The Chair of each Study Group or Working Group shall report annually to its members and the Commission Steering Committee, on results achieved and outstanding problems.

19. IAG Publications

- (a) The IAG publications include the Journal of Geodesy, the IAG Symposia Series, the Geodesist's Handbook, the "Travaux de l'Association Internationale de Géodésie," the IAG Newsletter, and IAG Special Publications.
- (b) The Association's journal is the Journal of Geodesy, hereinafter referred to as the Journal. The Journal is published monthly through an agreement between the Association and a publishing company, or by other arrangement approved by the IAG Executive Committee. The terms of any agreement for publication of the Journal shall be negotiated by the President of the Communications and Outreach Branch and ratified by the IAG Executive Committee.
- (c) The Journal publishes peer-reviewed papers, covering the whole range of geodesy.
- (d) After each IAG General Assembly, a special issue of the Journal shall be published under the name of "The Geodesist's Handbook". This issue provides the actual information on the Association, including the reports of the IAG President and Secretary General presented at the previous IAG General Assembly, the resolutions taken at that assembly, and the Association structure listing all components and subcomponents for the running period, rules for the IAG Fund, IAG Awards and for the conduct of scientific meetings as well as relevant scientific information.
- (e) The IAG Symposia Series publishes peer-reviewed papers related to presentations made at IAG Symposia and/or IAG Sponsored Symposia, provided that sufficient number of papers are submitted and accepted for publication.
- (f) After each IAG General Assembly, a collection of the reports by the Association components shall be published in the "Travaux de l'Association Internationale de Géodésie". This publication is supplied free of charge to the officers of the Association and to the adhering body of each member country.
- (g) At every IAG General Assembly each member country is encouraged to submit a National Report on geodetic work done since the previous General Assembly to be placed on the IAG website.
- (h) The IAG Newsletter is under the editorial responsibility of the Communication and Outreach Branch. It should be published on the IAG website and distributed to members electronically.

20. Editor-in-Chief and Editorial Board

- (a) There shall be one Editor-in-Chief for the Journal of Geodesy, hereinafter referred to as the Journal Editor. An Assistant Editor-in-Chief may assist the Journal Editor. The Journal Editor shall be advised and assisted by an Editorial Board. To ensure broad expertise, each of the Commissions may nominate up to three members of the Editorial Board.
- (b) The Journal Editor shall be responsible for the scientific content of the Journal. The Journal Editor or the Assistant Editor-in-Chief shall make the final decision on whether a refereed scientific manuscript is accepted for publication. The Journal Editor shall keep the IAG Executive Committee informed of the activities and status of operations of the Journal.
- (c) Nine months before each IAG General Assembly, the IAG Secretary General shall establish a search committee for the Journal Editor and the Assistant Editor for the next period. The search committee will include at least the IAG Secretary General and one member of the Editorial Board. In case that the Journal Editor is not eligible to be re-elected for one further period, he/she will also be a member of the search committee. Three months before the IAG General assembly, the search committee will select the candidate Journal Editor and the candidate Assistant Editor for the next period.
- (d) Three months before each IAG General Assembly, the Journal Editor, in consultation with the IAG Bureau, shall recommend a preliminary list of candidates for the new Editorial Board. This list shall be published on the IAG website at least two months in advance of the IAG General Assembly to solicit additional nominations for the Editorial Board from the IAG Components, Members, Fellows, Honorary Offices, and Council.
- (e) At the IAG General Assembly, the current Editorial Board in consultation with the candidate Journal Editor and the candidate Assistant Editor shall select the members of the new Editorial Board from those recommended. After taking office, the IAG Executive Committee shall approve the new Journal Editor, the new Assistant Editor, and the Editorial Board for the next period.

- (f) The Journal Editor, the Assistant Editor, and the members of the Editorial Board shall each hold office for one period, but are eligible to be re-elected for one further period.
- (g) There shall be one Editor-in-Chief for the IAG Symposia Series, hereinafter referred to as the Series Editor. He/she is appointed by the IAG Executive Committee for one period. An assistant Editor-in-Chief may also be appointed.
- (h) The Series Editor shall be responsible for the scientific content of the IAG Symposia Series. On the recommendation of the volume editor(s), the Series Editor shall make the final decision on whether a refereed scientific manuscript is accepted for publication. The Series Editor shall keep the IAG Executive Committee informed of the activities and status of the IAG Symposia Series.
- (i) Each volume of the IAG Symposia Series may have additional Volume Editors.

21. IAG Individual Membership

- (a) Individuals engaged in geodesy, can become individual members of the IAG on application and payment of the membership fee.
- (b) Applications for individual membership are submitted to the IAG Secretary General.
- (c) The decision on the membership application shall be made by the IAG Bureau.
- (d) Benefits of membership include:
 - (i) Reduction in the individual subscription rate to the Journal of Geodesy.
 - (ii) The right to participate in the IAG election process both as a nominator and a nominee.
 - (iii) Upon application, correspondent membership in a Sub-commission or Study Group of choice.
 - (iv) Reduction in the registration fee for IAG meetings as set under Bylaws 25(i), 26(d) and 27(c).
- (e) The membership fee per annum is set by the IAG Executive Committee.
- (f) In individual cases, the Secretary General may consider a discount or full remission of membership fees on application by the member.
- (g) Where a member provides a donation in excess of the membership fee, the excess shall be assigned to the IAG Fund.
- (h) Membership is terminated if the membership fee is not paid or if an application for discount or full remission has not been received one year after the fee was due.

22. Honorary Officers, Fellows

- (a) The IAG Executive Committee may appoint a merited past IAG President as Honorary President or a merited IAG Secretary General as Honorary Secretary General.
- (b) The IAG Executive Committee may appoint past officers of the IAG as Fellows.

23. IAG Fund

The IAG Executive Committee may establish an IAG Fund for supporting specific IAG activities as defined in the IAG Fund Rules, published in the Geodesist's Handbook. The Fund is under the direct responsibility of the President. The Fund's resources are administered by the Secretary General.

24. IAG Awards

The IAG Executive Committee may establish Awards for outstanding contributions to geodesy and distinguished service to the IAG. The rules for the awards are to be published in "The Geodesist's Handbook".

25. Administration of the IAG General Assemblies

- (a) The IAG General Assembly will be held at the same time and at the same place as the International Union of Geodesy and Geophysics (IUGG) General Assembly.
- (b) Before any IAG General Assembly, the IAG Bureau shall prepare detailed agendas for the IAG Council meetings, IAG Executive Committee meetings, and the opening and closing sessions.
- (c) The IAG Executive Committee shall prepare the agenda for the scientific program. Joint Symposia covering topics of interest to two or more IUGG Associations may be arranged.
- (d) The agendas developed according to (b) and (c) above are sent to the member countries and to all officers of the Association so as to reach them at least two months prior to the IAG General Assembly. In principle, only matters on the agenda may be considered during the sessions, unless a decision to do otherwise is passed by a two-thirds majority of the IAG Council.
- (e) At each IAG General Assembly, the IAG President shall present a report on the scientific work of the Association during their tenure. The IAG Secretary General shall present a report on the administrative work and on the finances of the Association for the same period. The President and Secretary General should include in their reports proposals for work to be undertaken during the coming period, within the limits of expected resources. These reports shall be published in "The Geodesist's Handbook".
- (f) At each IAG General Assembly, the work of each Commission, each Inter-commission Committee, each Service, the Global Geodetic Observing System, the Communication and Outreach Branch, and each IAG Project shall be reported on by its President or Chair. IAG Representatives to other scientific bodies shall report to the IAG Executive Committee.

26. Scientific Meetings

- (a) Scientific meetings of the IAG are:
 - (i) the Scientific Symposia held during an IAG General Assembly;
 - (ii) Scientific Assemblies, including IAG Scientific Symposia; and
 - (iii) IAG Sponsored Symposia.
- (b) The IAG Newsletter shall include a calendar of IAG Symposia and other scientific meetings organized or sponsored by the IAG or its components.
- (c) The IAG Executive Committee shall appoint an IAG Scientific Meeting Representative for each of the scientific meetings other than the General Assembly and the Scientific Assembly to be governed by these Bylaws. The representative is obliged to remind the organizers to adhere to the Bylaws for scientific meetings and to report back to the IAG Executive Committee.
- (d) A reduced registration fee shall be offered for individual members in accordance with Bylaw 21(d) (iv).

27. IAG Scientific Assemblies

- (a) IAG Scientific Assemblies are held in between two IAG General Assemblies and shall consist of a group of component meetings and/or a group of scientific symposia, held at the same time and place.
- (b) A reduced registration fee shall be offered for individual members in accordance with Bylaw 21(d)(iv).

28. IAG Scientific Symposia

- (a) Scientific symposia take place at the IAG General Assembly and the IAG Scientific Assembly. In general, they shall be organized by IAG components and subcomponents, and be led by their respective Presidents or Chairs.
- (b) The study of some questions may require joint meetings of several components under a Chair, appointed by the IAG Executive Committee. A committee consisting of the component Chairs shall decide on the agenda and on the inclusion of scientific presentations.
- (c) At each IUGG General Assembly, Joint Scientific Symposia covering topics of interest to two or more Associations within the IUGG and/or other international scientific organizations may be convened. Though the IAG may be asked to act as convener or co-convener, these symposia shall follow the rules

established by the IUGG. The IAG may participate also in joint symposia at any other time outside of the IAG General Assembly and governed by the same procedures.

- (d) The planning of a scientific symposium shall be subject to the usual approval procedure provided by “The Geodesist's Handbook”.

29. IAG Sponsored Symposia

- (a) The IAG may sponsor a symposium covering broad parts of geodesy and having large attendance at any suitable time outside the IAG General Assemblies or IAG Scientific Assemblies, and shall call it an IAG Sponsored Symposium, provided the following conditions are fulfilled:
- (i) One or more IAG components or subcomponents, or at least two Study Groups, shall sponsor it.
 - (ii) Host organization of the symposium shall accept an IAG representative in the Scientific Organizing Committee (SOC) appointed by the IAG Executive Committee.
 - (iii) The symposium shall be open to all bona-fide scientists in accordance with the International Science Council (ISC) rules.
- (b) The SOC appointed under Bylaw 29(a)(ii) shall be responsible for the quality of science of the symposium being at a high level. A Local Organizing Committee (LOC) shall be responsible for the organization and logistics.
- (c) Applications for approval of an IAG Symposium should be submitted to the Secretary General at least one year before the intended date of the meeting.

30. International Cooperation

- (a) The IAG may participate in joint bodies of the IUGG and other scientific organizations, especially those belonging to the ISC.
- (b) The IAG shall initiate international cooperation in scientific work of international and interdisciplinary character. This includes the adequate participation in international programs and projects and the representation at scientific congresses, symposia, etc., of organizations with related activities.
- (c) Representatives to international programs and projects shall be appointed by the IAG Executive Committee and shall inform the IAG Executive Committee on the activities, on a biannual basis. The representatives shall also prepare a report for presentation at the IAG General Assembly.
- (d) The IAG Components shall have close cooperation with inter-governmental organizations responsible for services and scientific products of particular interest to the Association (e.g. BIPM, ISO, UNOOSA/ ICG, UN-GGIM).

31. Responsibilities of the IAG Council

- (a) In addition to any other functions, powers and duties provided in other Statutes and Bylaws, the IAG Council shall:
- (i) Examine questions of general scientific policy or administration, and propose actions deemed necessary.
 - (ii) Elect the voting members of the IAG Executive Committee, with the exception of the GGOS President (Bylaw 15(d)) and the ICC Presidents, (Bylaw 17(b(i))).
 - (iii) Receive reports from the Secretary General and consider for approval the decisions or actions taken by the IAG Bureau and the IAG Executive Committee since the last IAG Council meeting.
 - (iv) Establish and dissolve IAG components.
 - (v) Appoint the three members of the ad hoc (audit) committee created for examining the finances of the IAG, consider its recommendations and adopt the final budget.
 - (vi) Consider proposals for changes in the IAG Statutes and Bylaws.
 - (vii) Decide on the venue of the next IAG Scientific Assembly.
 - (viii) Approve the establishment of Inter-commission Committees and IAG Projects.

- (b) IAG Council meetings shall be convened by the IAG President, and shall meet at least once during each IAG General Assembly. The IAG Council may be convened at other times, normally coinciding with the IAG Scientific Assembly. If circumstances do not allow an in-person meeting of the Council, a virtual meeting is also possible.

32. Responsibilities of the IAG Executive Committee

- (a) In addition to any other functions, powers and duties provided in other Statutes and Bylaws, the IAG Executive Committee shall:
 - (i) Initiate actions and issue guidelines, as required, to guide the IAG towards the achievement of its scientific objectives.
 - (ii) Fill vacancies occurring between IAG General Assemblies, in accordance with the Statutes and Bylaws.
 - (iii) Approve the internal structure of IAG components.
 - (iv) Make recommendations to the IAG Council on matters of general policy of the IAG and on the implementation of its objectives.
 - (v) Appoint Honorary Officers and Fellows of the IAG, upon the recommendation of the IAG Bureau.
 - (vi) Appoint planning groups for Inter-commission Committees and IAG Projects.
 - (vii) Establish Inter-commission Committees and IAG Projects.
 - (viii) Appoint a Committee, known as the Cassinis Committee, for reviewing and updating the IAG Statutes and Bylaws when deemed necessary.
 - (ix) Confirm the Assistant Secretaries (if any) of the IAG.
 - (x) Confirm the links between Commissions and Services.
 - (xi) Approve the level of the membership fee.
 - (xii) Appoint the Vice President of each Commission, the President of GGOS, and the President of each ICC.
 - (xiii) Appoint representatives to external bodies.
- (b) IAG Executive Committee meetings shall be convened by the IAG President. It shall meet at IAG General Assemblies and its members are expected to attend the meetings of the IAG Council, with voice but without vote. It shall also meet normally at least once a year, especially one year before the IAG General Assembly, in order to prepare the scientific agenda and timetable of the next IAG General Assembly. IAG Executive Committee meetings can be held in person or virtually.
- (c) At a meeting of the IAG Executive Committee, no member may be represented by any other person, except by the corresponding Vice Presidents or Vice Chairs of the IAG components represented in the Executive Committee. In order that the deliberations of the IAG Executive Committee shall be valid, a quorum of at least half of its members must be present or represented.
- (d) The agenda for each meeting of the IAG Executive Committee shall be prepared by the IAG Bureau and sent to the members at least two months prior to the meeting.

33. Responsibilities of the IAG Bureau

- (a) In addition to any other functions, powers and duties provided in other Statutes and Bylaws, the IAG Bureau shall:
 - (i) Draw up the agenda of the meetings of the IAG Council and IAG Executive Committee and send these to the members at least two months prior to the meeting.
 - (ii) Ensure the adequate administration of the IAG.
 - (iii) Receive applications for individual memberships and accept individuals as members of the IAG.
 - (iv) Recommend Honorary Officers and Fellows to the IAG Executive Committee.
- (b) The IAG Bureau shall normally meet before each meeting of the IAG Executive Committee.

34. Responsibilities of the President

In addition to any other functions, powers and duties provided in other IAG Statutes and Bylaws, the IAG President shall:

- (a) Provide general leadership for the IAG in all matters.
- (b) Convene and preside over the IAG General Assembly and over all meetings of the IAG Council, IAG Executive Committee and IAG Bureau.
- (c) Represent the IAG in IUGG meetings and forums.
- (c) Represent the IAG in its dealing with national or international organizations or institutions.
- (d) Submit a report to the IAG General Assembly on the scientific work of the IAG during their tenure.

35. Responsibilities of the Vice President

In addition to any other functions, powers and duties provided in other IAG Statutes and Bylaws, the IAG Vice President shall act on behalf of the IAG President whenever the IAG President is not present or is unable to perform any of the President's duties, and shall perform such tasks as may be assigned by the IAG President, the IAG Executive Committee or the IAG Council.

36. Responsibilities of the Secretary General

In addition to any other functions, powers and duties provided in other IAG Statutes and Bylaws, the IAG Secretary General shall:

- (a) Serve as secretary of the IAG General Assembly, the IAG Scientific Assembly, the IAG Council, the IAG Executive Committee and the IAG Bureau; and arrange for meetings of these bodies, distribute promptly the agenda and prepare and distribute the minutes of all their meetings.
- (b) Act as Director of the IAG Office.
- (c) Manage the affairs of the IAG, including finances as per Bylaw 42(b), attend to correspondence, and preserve the records of the IAG.
- (d) Circulate all appropriate information related to the IAG.
- (e) Prepare the reports of the IAG's activities.
- (f) Coordinate with the COB.
- (g) Perform such other duties as may be assigned by the IAG Bureau.
- (h) The function of the Secretary General is unpaid and only expenses incurred in connection with the functions and duties may be reimbursed.

37. Assistant Secretaries

- (a) The IAG Secretary General may be assisted by one or more Assistant Secretaries.
- (b) The position(s) of Assistant Secretary is unpaid and only expenses incurred in connection with the functions and duties may be reimbursed.

38. IAG Office

To assist the IAG Secretary General, the IAG establishes the IAG Office in the country in which the Secretary General resides. The IAG Executive Committee negotiates logistical and financial support with the host country or institution.

39. Procedure for Nomination and Election of IAG Officers

- (a) Elections shall take place by electronic voting before each IAG General Assembly and should be completed at least two months before the assembly.
- (b) The IAG President, after taking advice from the IAG Executive Committee, shall appoint a Nominating Committee consisting of a Chair and three other members.

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- (c) The Nominating Committee, after taking advice from the Council Delegates, the Officers, Fellows, and Individual members of the IAG, shall normally propose at least two candidates for each position to be filled by election of the IAG Council. Candidates shall be asked to signify their acceptance of nomination and to prepare a short resume, outlining their position, research interests and activities relating to the IAG.
- (d) The Council Delegates, Officers, Fellows and Individual members of the IAG shall be informed of these nominations at least four months before the IAG General Assembly.
- (e) During the following month further nominations can be submitted by the Council Delegates. Such additional nominations shall be in writing, shall be supported by at least two Council Delegates, and shall be submitted with resumes to the Chair of the Nominating Committee.
- (f) Nominations shall be checked against the eligibility criteria in Bylaw 40 by the Nominating Committee. Ineligible nominations will not be accepted and the members of the IAG Council who supported the nomination will be advised of the reason for its rejection.
- (g) Delegates shall be informed of these further eligible nominations and resumes and of their supporters.
- (h) The Chair of the Nominating Committee shall write to all Services asking them for nominations from each Service for the Service representatives on the IAG Executive Committee. The Nominating Committee shall recommend a minimum of two nominees for each of the Services' three positions, considering appropriate scientific and geographic distribution. The procedure for seeking additional nominations in subclause (e) above does not apply to these positions.
- (i) If candidates have been nominated for more than one position, they will be asked prior to the election to make a decision for which position they will allow their name to stand.
- (j) Elections shall be by electronic ballot. The winner must receive an outright majority (number of votes being greater than the total combined votes of the other candidates). If there are three or more candidates for a position and no candidate has an outright majority, then the top two ranked candidates will be retained and a second round of votes conducted to elect the winner. Ties will be broken by the IAG President's vote.
- (k) The Members-at-Large shall be elected in a subsequent round after the other members of the IAG Executive Committee have been elected, in order to fulfil the condition of geographical, gender and organizational balance (see Statute 12a).

40. Eligibility & Terms of Office

- (a) No person may hold more than one of the following offices at the same time: IAG President, Vice President, Secretary General, IAG immediate Past President, President of a Commission, President of an Inter-commission Committee, Chair of a Service, President of GGOS, President of the COB, Executive Committee Member-at-Large, or Chair of an IAG Project.
- (b) A member of the IUGG Bureau or of the IUGG Finance Committee may not occupy the post of President, Vice President or Secretary General of the IAG.
- (c) The IAG President is elected for one period and may not be immediately re-elected to the same office.
- (d) The Vice President is elected for one period and may not be re-elected to the same office.
- (e) The Secretary General is elected for one period initially. He/she may be re-elected for up to two additional periods.

41. Extraordinary Vacancies

- (a) Should the position of IAG President become vacant during the period between two IAG General Assemblies, their duties and responsibilities devolve to the Vice President until the closure of the next IAG General Assembly.
- (b) Should the post of Secretary General become vacant, the IAG President shall arrange without delay for the IAG Executive Committee to propose a replacement and for the IAG Council to appoint a new Secretary General so as to ensure the continuity of the work of the IAG Office. This appointment has effect until the closure of the next IAG General Assembly and shall not be counted in the restriction of eligibility for re-election of the Secretary General under Bylaw 40(e).

42. Finances

- (a) The Finances of the IAG derive from the following sources:
 - (i) Contributions of IUGG Adhering Bodies of which a portion, determined by the IUGG Council on recommendation of its Finance Committee, is paid to the IAG by the IUGG Treasurer.
 - (ii) Sale of publications.
 - (iii) IAG Fund collected from individual contributions for specific purposes.
 - (iv) Membership fees.
 - (v) A portion of the registration fee charged at IAG symposia.
 - (vi) Other sources, e.g. grants, interests, and funds remaining after a symposium.
- (b) The Secretary General is responsible to the IAG Bureau and to the IAG Council for managing the funds in accordance with the Statutes and Bylaws. The Secretary General alone shall be responsible for the day-to-day financial operations of the IAG.
- (c) At each IAG General Assembly the budget proposal for the next period shall be presented by the Secretary General and submitted for approval to the IAG Council. The budget as approved by the IAG Council shall be implemented by the Secretary General.
- (d) During each IAG General Assembly, the IAG Council shall examine all expenditures during the preceding period to ensure that they were in accordance with the approved budget. This examination shall be carried out by an ad hoc (audit) committee appointed by the IAG Council; see also Bylaw 31(a)(v).
- (e) In addition, the accounts shall be audited and shall then be reported to the IUGG Treasurer, as prescribed in Article 20 of the IUGG Bylaws.

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY

(Revised July 2023, IUGG General Assembly in Berlin, Germany)

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GLOSSARY OF TERMS

Terms are defined formally in the Statutes; this glossary is included for convenience only and does not provide the formal definition of terms.

Assembly: a General Assembly, an extraordinary Assembly, or a Scientific Assembly of IAGA.

(The) Association: IAGA.

(The) By-Laws: the By-Laws of IAGA.

Chief Delegate: the Delegate appointed by an IAGA National Body for the purpose of casting that country's vote(s) on administrative and financial matters and who has communicated his or her accreditation to the Secretary-General.

Component Bodies of IAGA: the Divisions and Interdivisional Bodies of IAGA.

Conference of Delegates: a formal meeting of Delegates and Chief Delegates of Member Countries, open to the public.

Delegate: a scientist from a Member Country who is registered for an IAGA Assembly as a *bona-fide* scientific participant, or someone who has the agreement of the Secretary-General in consultation with the IAGA Executive Committee to attend and vote as a Delegate at a Conference of Delegates.

Early career Scientist - a scientist satisfying the following criterion by 31 December of the year when an Assembly is held: be an undergraduate or postgraduate (Masters/PhD) student or have received her/his highest degree qualification (e.g., BSc, MSc, PhD) within the last ten years, or equivalent full-time working.

Executive Committee: the committee elected by a Conference of Delegates to be responsible for IAGA affairs between Conferences of Delegates.

Extraordinary Assembly: an Assembly of IAGA called by the President in accordance with *By-Law 5*.

Finance Committee: the committee appointed by the Executive Committee to examine the accounts and report to a Conference of Delegates.

General Assembly (of IAGA): a General Assembly of IAGA normally held in conjunction with a General Assembly of IUGG (i.e., every 4 years).

Honorary Member of IAGA: a person who has been voted the status of honorary member of the Association in recognition of outstanding contributions to the work of IAGA.

IAGA: the International Association of Geomagnetism and Aeronomy.

IAGA National Body: the body in a Member Country that is established by the body that adheres to IUGG to represent that country in IAGA activities.

ICSU: the International Council for Science (previously called the International Council of Scientific Unions).

IUGG: the International Union of Geodesy and Geophysics.

Member Country: a country that adheres to IUGG and may, therefore, participate in IAGA activities.

Paying Member Countries of IUGG, as defined in the IUGG statutes, are Member Countries of IAGA.

Nominating Committee: the committee appointed by the Executive Committee to provide to a conference of Delegates nominations for the Executive Committee (Chief Delegates may also make nominations).

Officers (of IAGA): members of the Executive Committee and chairs of Divisions and Interdivisional Bodies

Period: The interval between the end of one ordinary General Assembly and the end of the next one.

Scientific Assembly (of IAGA): an Assembly of IAGA normally held between General Assemblies.

(The) Statutes: the Statutes of IAGA.

STATUTES OF IAGA

I. OBJECTIVES, STRUCTURE, AND MEMBERSHIP OF THE ASSOCIATION

Statute 1. Objectives of IAGA

The objectives of the International Association of Geomagnetism and Aeronomy (henceforth IAGA) are:

- (a) (a) to promote studies of the geomagnetism and aeronomy of the Earth and other bodies of the solar system and of the interplanetary medium and its interaction with these bodies ;
- (b) (b) to promote and encourage research in the above subjects by individual countries, institutions or persons and to facilitate international co-ordination of such research;
- (c) (c) to provide an opportunity on an international basis for presentation, discussion and publication of the results of the research indicated above;
- (d) (d) to promote appropriate standardisations of observational programmes, data acquisition systems, data analysis, modelling, and publications;
- (e) (e) to promote understanding and appreciation of geomagnetism and aeronomy by the general public through, but not limited to, public lectures, media events, media publication packages, etc.

Statute 2. Establishment of Component Bodies

To achieve its objectives, IAGA may establish Component Bodies both within the Association and jointly with other Associations of the International Union of Geodesy and Geophysics (IUGG), components of other Bodies of the International Council for Science (ICSU) or other internationally recognised scientific bodies.

Statute 3. A Member Country of IAGA

Fully accredited Member Countries of IUGG, as defined in *IUGG Statute 4*, are Member Countries of IAGA. Countries in Observer status or having Associate Membership of IUGG, as defined in *IUGG Statute 4*, have the same status in IAGA as in IUGG.

Statute 4. An IAGA National Body

Each Member Country shall be represented by a single body, henceforth referred to as the IAGA National Body, established in that country by the body that adheres to IUGG.

II. ADMINISTRATION

Statute 5. Assemblies of IAGA

- 5.1 A General Assembly of IAGA shall normally be held in conjunction with each General Assembly of IUGG.
- 5.2 A Scientific Assembly of IAGA shall be held between General Assemblies of IAGA, in accordance with *IUGG By-Law 9*.

- 5.3 An extraordinary General Assembly or an extraordinary Scientific Assembly of IAGA may be convened by the President in accordance with *By-Law 5*.

Statute 6. Delegates and Conferences of Delegates

- 6.1 The work of the Association shall be directed by Conferences of Delegates held at Assemblies of IAGA.
- 6.2 A Delegate is a scientist from a Member Country who is registered for an Assembly as a *bona-fide* scientific participant, or someone who has the agreement of the Secretary-General in consultation with the IAGA Executive Committee to attend and vote as a Delegate at a Conference of Delegates.
- 6.3 Among the Delegates from each Member Country, one shall be identified by the respective IAGA National Body as Chief Delegate for the purpose of casting that country's votes on administrative and financial matters as stipulated in *Statutes 12, 13 and 14*. A Chief Delegate may be represented in voting matters by another Delegate appointed in accordance with the By-Laws.
- 6.4 A Delegate may represent only one Member Country. A member of the Executive Committee (see *Statute 7*) may not be a Chief Delegate, except when that member is the only person in attendance from the country in question.
- 6.5 A Conference of Delegates shall be convened at least once during each Assembly of IAGA.

Statute 7. The Executive Committee

- 7.1 Responsibility for the direction of IAGA affairs between Conferences of Delegates shall rest with an Executive Committee of the Association, elected at a Conference of Delegates.
- 7.2 Decisions of the Executive Committee must be reported to a Conference of Delegates. Any decision or recommendation failing to receive simple majority support from a Conference of Delegates shall be referred to the Executive Committee for further study.
- 7.3 The duties of the Executive Committee shall be to administer the affairs of the Association in accordance with these Statutes and By-Laws and the decisions of a Conference of Delegates.
- 7.4 The Executive Committee may appoint appropriate leaders and IAGA representatives to Joint Bodies established with other IUGG Associations, components of other ICSU Bodies, or other internationally recognised scientific bodies.
- 7.5 In its dealings with non-IUGG Bodies, the Executive Committee shall not commit the name of IUGG, or act on behalf of IUGG, unless prior approval has been secured from either the President or the Secretary-General of the IUGG, acting on behalf of the IUGG Executive Committee.
- 7.6 The Executive Committee shall meet at least twice at each Assembly, and must meet at least once more between Assemblies. Any such meeting between Assemblies can be conducted electronically, via audio and/or video links.

Statute 8. Membership of the Executive Committee

- 8.1 The Executive Committee shall be Chaired by the President of IAGA and shall consist of the President, two Vice-Presidents, the Secretary General, the Treasurer, the Early Career Scientist representative, and six additional Members. Two members of the Executive Committee shall come from developing countries. All members of the Executive Committee shall be elected by a Conference of Delegates as an administrative matter with voting as stipulated in *Statutes 13 and 14*.
- 8.2 8.2 The President shall be elected for one Period, and may not be re-elected to the same office.
- 8.3 The retiring President (ex-officio) shall be entitled to attend Executive Committee meetings and participate in Committee business, but shall not vote or draw on IAGA funds to attend such

meetings.

- 8.4 The two Vice-Presidents shall be elected for one Period, and may not be re-elected to the same office.
- 8.5 The Secretary General shall be elected for two periods and may be re-elected in extraordinary circumstances for up to two successive further periods.
- 8.6 The Treasurer shall be elected for two periods and may be re-elected in extraordinary circumstances for up to two successive further periods.
- 8.7 The Early Career Scientist Representative shall be elected for one Period, and may not be re-elected to the same office.
- 8.8 No person, other than the Secretary General and the Treasurer may serve in the same position for more than two Periods. A person who has already served for the maximum allowed number of Periods is not eligible for a lower position.
- 8.9 The election of the Executive Committee shall normally take place at a Conference of Delegates held at a General Assembly, with the exception of that of the Secretary-General and the Treasurer who shall normally be elected at a Conference of Delegates held at a Scientific Assembly.
- 8.10 In the event of any vacancy occurring in the membership of the Executive Committee during a Period, the Executive Committee shall appoint a person to fill the vacancy until the next election. The eligibility for election of a person so appointed shall not be affected by such an appointment. If the vacancy is that of the Presidency, one of the Vice-Presidents shall act as President

8.8 8.10 Statute 9. Duties of Component Bodies

- 9.1 The duties of the Component Bodies within IAGA (see *Statute 2*) shall be to further the scientific objectives of IAGA through:
 - (a) co-ordination of appropriate scientific research;
 - (b) (b) organisation of scientific meetings and business meetings on the matter
 - (c) promotion of the exchange of information and data; and
 - (d) provision of advice to the Executive Committee on the formulation of policies to guide the scientific work of the Association.
- 9.2 The duties of the Component Bodies established jointly with other Associations of IUGG, other ICSU Bodies or other internationally recognised scientific bodies (see *Statute 2*) shall be to deal with and co-ordinate those scientific programmes and/or meetings that cover topics of mutual interest, to promote the exchange of information, data and products derived from them, to undertake and promote educational and outreach activities, and to formulate policies and provide advice on topics of mutual interest.

III. FINANCE

Statute 10. Adoption of the budget

The Treasurer shall prepare a budget estimate of receipts and expenditures for each half-Period and present this budget before the Executive Committee and a Conference of Delegates at the time of an Assembly. On receiving the approval of both the Executive Committee and a Conference of Delegates, the Treasurer shall proceed with the disbursement of funds in accordance with that approved budget.

Statute 11. Finance Committee

- 11.1 A Finance Committee shall be appointed by the Executive Committee within six months after the opening of each General Assembly and shall normally serve for one Period.
- 11.2 No serving Executive Committee Member may be a member of the Finance Committee.
- 11.3 The Finance Committee shall examine the accounts and report the results of their examination for approval to the Executive Committee and to a Conference of Delegates at the time of an Assembly

IV. VOTING

Statute 12. Categories of Voting Matters

- 12.1 Prior to a vote by a conference of Delegates, the President, on the advice of the Secretary General, shall decide whether the matter under consideration is scientific, administrative, or financial.
- 12.2 Matters that are partly scientific and partly administrative and do not involve matters of finance shall be classified as administrative matters.
- 12.3 The President's ruling may be challenged only by the Chief Delegate of a Member Country. In the event of a challenge, the President's ruling can be changed in accordance with a vote passed at the Conference of Delegates by a two-thirds majority of those entitled to vote.

Statute 13. Voting Rules

- 13.1 When a vote is taken on a scientific matter, each Delegate present at a conference of Delegates shall have one vote.
- 13.2 When a vote is taken on an administrative matter, voting shall be by fully accredited Member Countries, each fully accredited Member Country having one vote cast by its Chief Delegate, or that person's representative appointed in accordance with the By-Laws.
- 13.3 When a vote is taken on a financial matter, voting shall be by fully accredited Member Countries, each fully accredited Member Country having a number of votes equal to the number of its category of membership in IUGG. Such votes shall be cast by the Chief Delegate of each fully accredited Member Country, or that person's representative.

Statute 14. Voting at Conferences of Delegates

- 14.1 Decisions taken by a vote at a Conference of Delegates shall be valid only if at least half of the Chief Delegates of fully accredited Member Countries attending the Assembly are present or represented in accordance with the By-Laws.
- 14.2 Decisions of a Conference of Delegates shall be taken by a simple majority of the votes cast, except as otherwise specified in the Statutes. If a tie should occur, the decision shall rest with the President.

V. GENERAL

Statute 15. Modification of the Statutes

- 15.1 Modifications to these Statutes shall normally come into force at the close first General Assembly following the Assembly at which the modifications are adopted. Where a modification of the Statutes is approved at a General Assembly the changes shall normally come into force at the end of that same General Assembly.
- 15.2 These Statutes may only be modified with the approval of at least a two-thirds majority of Chief Delegates of fully accredited Member Countries present at a Conference of Delegates held during an Assembly, in accordance with *Statutes 6, 13, and 14*.
- 15.3 Only the IAGA National Body of a Member Country may propose a change to these Statutes. Any such proposal must reach the Secretary General at least six weeks prior to the announced date of the Assembly at which it is to be considered. The Secretary General shall notify all IAGA National Bodies of any proposed change at least four weeks prior to the announced date of the Assembly.

Statute 16. Modification of the By-Laws

A Conference of Delegates shall have the power to adopt By-Laws within the framework of the Statutes of the Association. These By-Laws may be adopted or modified by a simple majority vote of Chief Delegates of fully accredited Member Countries present at an Assembly, in accordance with *Statutes 6, 13, and 14*. Any modification of the By-Laws shall normally come into force at the close of the first General Assembly following the Assembly at which they are approved. Where a modification of the By-Laws is approved at a General Assembly the changes shall normally come into force at the end of that same General Assembly.

Statute 17. Languages

The present Statutes have been prepared in the official languages of the IUGG. The English text shall take precedence if there is a question of interpretation.

BY-LAWS OF IAGA

I. COMPOSITION

By-Law 1. Component Bodies of IAGA

The Component Bodies of IAGA shall be called Divisions and Interdivisional Bodies as follows:

- Division I: Internal Magnetic Fields
- Division II: Aeronomic Phenomena
- Division III: Magnetospheric Phenomena
- Division IV: Solar Wind and Interplanetary Magnetic Field
- Division V: Observatories, Instruments, Surveys, and Analyses
- Division VI: Electromagnetic Induction in the Earth and Planetary Bodies
- Interdivisional Commission: History
- Interdivisional Commission: Developing Countries
- Interdivisional Commission: Education and Outreach
- Interdivisional Commission: Space Weather

By-Law 2. Role and Structure of a Component Body

- 2.1 Each Division or Interdivisional Body shall propose to the Executive Committee its own role, structure, and mode of operation, which must be approved by the Executive Committee.
- 2.2 The role and the effectiveness of each Division and Interdivisional Body shall be reviewed by the Executive Committee at each General Assembly.

By-Law 3. Appointment of Leaders of Component Bodies

- 3.1 The names of candidates to fill the positions of leaders of each Division and Interdivisional Bodies shall be proposed by the President, representing the wishes of the Executive Committee, at the Conference of Delegates during a General Assembly. Alternates may be proposed by a Chief Delegate (or his/her representative appointed in accordance with *By-Law 9*) of a fully accredited Member Country, and, if seconded by another Chief Delegate (or his/her representative), then voting occurs of all Chief Delegates (or their representatives) at the Conference of Delegates.
- 3.2 In order that their appointments shall become effective, Division and Interdivisional Body leaders must express in writing or electronically to the President their willingness to serve. For leaders proposed by the President, this must be prior to the Conference of Delegates; for alternates approved at the Conference of Delegates, this must be no later than four weeks after the Conference of Delegates.
- 3.3 If no structure exists within subdivisions for appointment of leaders of such subdivisions, then the leaders of the relevant Divisions and Interdivisional Bodies may appoint, for each Period, Reporters, Working Group leaders, and the leaders of other possible subdivisions.
- 3.4 While it is recognized that the prime criteria for the appointment of leaders should be the scientific and administrative competence of the candidates, the Executive Committee and Division and Interdivisional Body leaders shall ensure that, wherever possible, these appointments achieve a diversified geographical and gender representation.

By-Law 4. Honorary Membership of IAGA

- 4.1 A person who has given outstanding service to IAGA may be elected by a Conference of Delegates as an “Honorary Member of IAGA”. Proposals for Honorary Members must reach the Secretary General no later than 31st December of the year before an Assembly. The Executive Committee shall select persons for this category and shall present their names to a Conference of Delegates for approval.
- 4.2 The names of Honorary Members of IAGA shall be listed in publications where the structure of IAGA is shown.

II. ADMINISTRATION

By-Law 5. Extraordinary Assemblies

- 5.1 The President may at any time, with the approval of the Executive Committee, call an Extraordinary Assembly.
- 5.2 The President must call an Extraordinary Assembly at the request of not less than one-third of the number of IAGA Member Countries.
- 5.3 Such an Extraordinary Assembly must be held no later than nine months after the request.
- 5.4 An Extraordinary Assembly shall have the same powers and be subject to the same rules as a General Assembly.

By-Law 6. Notice of an Assembly

Notice of the date and place of a General Assembly or a Scientific Assembly shall be announced on the IAGA web site and through electronic distribution to the IAGA emailing list maintained by the Secretary General.

By-Law 7. The Agenda for a Conference of Delegates

- 7.1 A provisional agenda for a Conference of Delegates shall be prepared by the Secretary General and sent electronically to IAGA National Bodies at least four weeks prior to the opening of an Assembly.
- 7.2 The provisional agenda shall include all items submitted by IAGA National Bodies for discussion at the Conference of Delegates, together with questions placed on the provisional agenda by the Executive Committee. Additional agenda items, for which notice has not thus been given, may only be discussed with the consent of the Conference of Delegates by simple majority of all Delegates present.

By-Law 8. Attendance at a Conference of Delegates

- 8.1 A Conferences of Delegates shall be open to the public. Any non-delegate shall be heard in a discussion provided that person has the consent of the President to speak on the matter.
- 8.2 The President may, on his or her own initiative or at the request of a National Body, invite representatives of scientific bodies or individuals to attend a Conference of Delegates in an advisory capacity.

By-Law 9. Representation on behalf of a Chief Delegate

A Chief Delegate of a Member Country may designate another Delegate from that country to be his or her representative at all or part of a Conference of Delegates. If the Chief Delegate is unable to do this, the accredited Delegates from that Member Country may designate one of their members to represent the Chief Delegate. In either case, the Secretary General shall be informed of the designation electronically prior to the Conference of Delegates at which the representative of the Chief Delegate is to act.

By-Law 10. Nominations and Election of the Executive Committee

- 10.1 At least six months prior to the opening of a General Assembly, the President, in consultation with the Executive Committee, shall appoint a Nominating Committee consisting of a Chair and four members. Members of the Executive Committee may not be appointed to the Nominating Committee.
- 10.2 The Nominating Committee shall nominate at least one candidate for each position on the Executive Committee and notify the Secretary General so that these nominations are circulated to all IAGA National Bodies at least six weeks prior to the election. Those nominated must have advised the Nominating Committee in writing or electronically beforehand of their willingness to serve.
- 10.3 The IAGA National Body of any Member Country may make other nominations in writing to the Chair of the Nominating Committee at least four weeks prior to the election. To qualify for candidacy, each individual nomination must be supported by at least three Member Countries and must be accompanied by the written or electronic agreement of the nominee to stand. The combined list of candidates must be made publicly viewable and distributed electronically at least one day prior to the election.
- 10.4 The composition of the Executive Committee should reflect diversified geographical and scientific disciplinary representation, and favour short rather than long intervals of service in order to increase opportunities for new members to serve. At least two members of the Executive Committee should come from developing countries.
- 10.5 Members of the Executive Committee shall be elected by secret ballot. The President shall select two scrutineers for the election from among the Delegates present. The scrutineers shall not be members of the Executive Committee nor of the Nominating Committee nor candidates for the election.
- 10.6 Only scientists from Member Countries of IUGG (as defined in *IUGG Statute 4*) are eligible to hold elected positions in IAGA.

By-Law 11. Meetings of the Executive Committee

- 11.1 Executive Committee meetings shall be convened by the President, or by one of the Vice-Presidents when the President is not available. At a meeting of the Executive Committee, whether a physical or virtual meeting, no member can be represented by another person. Decisions of the Executive Committee shall be valid only if at least half plus one of its members are present. All decisions of the Executive Committee shall be taken by simple majority of the total number of voting members present. In the case of a tie, the decision shall rest with the President.
- 11.2 When the importance and urgency of a decision warrant it, a vote by electronic correspondence may be organized by the Secretary General at the request of the President. Voting rules stipulated in these Statutes and By-Laws shall apply.

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- 11.3 The President may, on his or her own initiative or at the request of another member of the Executive Committee or of an IAGA National Body, invite representatives of scientific bodies or individuals to attend an Executive Committee meeting in an advisory capacity.
- 11.4 Proposals concerning the agenda for meetings of the Executive Committee may be submitted by members of that Committee, by Division or Interdivisional Body leaders, or by IAGA National Bodies; they must be notified to the Secretary General at least two weeks prior to the meeting. The final agenda, after its approval by the President, shall be distributed to the members of the Executive Committee at least one week prior to the meeting.

By-Law 12. Duties of the Executive Committee

In addition to the duties specified in *Statutes 7 and 8* and *By-Laws 2, 3, 4, 5, 7, 10, and 11*, and subject to directives of a Conference of Delegates, the Executive Committee shall have the power to:

- (a) act as the organizing committee for all IAGA Assemblies, Symposia, and Meetings, or delegate such responsibility to other persons by making the necessary appointments;
- (b) entrust to special commissions or to particular individuals the preparation of reports on subjects within the province of the Association;
- (c) invite or appoint persons or institutions belonging to countries that are not members of the Association to be local correspondents to the Association.

By-Law 13. Duties of the President

The duties of the President of IAGA are:

- (a) to promote geomagnetism and aeronomy within scientific communities and also to the public;
- (b) to represent IAGA in the IUGG Executive Committee;
- (c) to represent IAGA in its dealings with IAGA National Bodies, other IUGG Associations, other ICSU Bodies, and other international scientific bodies;
- (d) to represent or to appoint a person to represent IAGA at meetings, conferences, or functions where formal representation is requested or desirable;
- (e) to convene Conferences of Delegates and meetings of the Executive Committee and to preside over these meetings;
- (f) to submit a report on the scientific work of the Association to a Conference of Delegates at each Assembly.

By-Law 14. Representation on behalf of the President

If the President is not available, one of the Vice-Presidents, delegated by the President, shall preside at a Conferences of Delegates or an Executive Committee meeting, and the Vice-President or the Secretary General shall represent the President at an IUGG Executive Committee Meeting in accordance with IUGG By-Laws. The President may designate one of the Vice-Presidents, the Secretary General or any other EC member to act on his or her behalf in any other function, meeting, or conference in which formal representation of IAGA is requested or desirable.

By-Law 15. Duties of the Secretary General

The duties of the Secretary General are:

- (a) to serve as secretary of IAGA, to organize Assemblies according to the instructions of

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the Executive Committee, to arrange meetings of the Executive Committee, and to prepare and distribute promptly the agenda and minutes of Conferences of Delegates and meetings of the Executive Committee;

- (b) to manage the administrative and scientific affairs of the Association, to attend to correspondence, and to maintain and preserve the records of the Association;
- (c) to inform members of the Executive Committee during the interval between its meetings about any important matter concerning the Association;
- (d) to advise the President during the meetings of the IUGG Executive Committee;
- (e) to prepare and arrange publication of the Programme of each Assembly, and a report on the outcomes;
- (f) to publish an internal Association bulletin (such as IAGA News) containing information of general interest to the Association;
- (g) to prepare for each Assembly the list of Chief Delegates;
- (h) to ensure that the website of the Association is maintained;
- (i) to perform such other duties as may be assigned by the President or by the Executive Committee.

By-Law 16. Duties of the Treasurer

The duties of the Treasurer are:

- (a) to receive and take charge of such funds as may be allocated by IUGG to the Association, or as may be received from any other source;
- (b) to disburse such funds in accordance with the decisions of Conferences of Delegates or with the instructions of the Executive Committee;
- (c) to keep account of all receipts and disbursements and to submit such account, audited by a qualified accountant (before each General Assembly), for examination by the Finance Committee appointed according to *Statute 11*;

III. FINANCE

By-Law 17. Allocation of Funds

In the estimation of expenditures by the Treasurer and approval thereof by the Executive Committee, as mentioned in *Statute 10*, provision may be made to allocate the expected funds to:

- operation of the Secretariat of the Association;
- administrative arrangements in preparation for Assemblies and Executive Committee meetings;
- publication and distribution electronically of IAGA News or special publications;
- assistance for the President to attend IUGG Committee meetings and for IAGA officers to attend functions as the representative of IAGA when such officers have expressed in writing or electronically that they are unable to obtain the necessary support from other sources;
- assistance for officers of IAGA, to attend official administrative meetings or IAGA-sponsored scientific meetings when participation by such persons is judged by the Executive Committee to be essential for the success of the meeting and those persons

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have expressed in writing or electronically that they are unable to obtain the necessary support from other sources;

- minor administrative expenses requested by leaders of Divisions, Joint Bodies, and Interdivisional Bodies who have expressed in writing or electronically that they are unable to obtain the necessary support from other sources,
- any item not mentioned above for which support will contribute to achieving the objectives of the Association.

STATUTES AND BYE-LAWS OF THE INTERNATIONAL ASSOCIATION OF HYDROLOGICAL SCIENCES

(changes adopted 12 July 2023, XXVIII IUGG General Assembly, Berlin, Germany)

Statutes

DEFINITION

1. The International Association of Hydrological Sciences (forthwith the Association) is a constituent body of the International Union of Geodesy and Geophysics (IUGG). The Association is subject to those Articles of the Statutes and Bye-laws of the Union that apply to associations and also to these Statutes.

OBJECTIVES AND ACTIVITIES OF THE ASSOCIATION

2. The objectives of the Association are as follows:
 - 2.1. To promote the study of Hydrology as an aspect of the earth sciences and of water resources;
 - to study the hydrological cycle on the Earth and the waters of the continents; the surface and groundwaters, snow and ice, including their physical, chemical and biological processes, their relation to climate and to other physical and geographical factors as well as the interrelations between them;
 - to study erosion and sedimentation and their relation to the hydrological cycle;
 - to examine the hydrological aspects of the use and management of water resources, their change and their interactions with human activities;
 - to provide a firm scientific basis for the optimal utilization of water resources systems, including the transfer of knowledge on planning, engineering, management and economic aspects of applied hydrology.
 - 2.2. To provide for discussion, comparison, and publication of research results.
 - 2.3. To initiate, facilitate, and coordinate research into, and investigation of, those hydrological problems which require international cooperation.
3. All hydrologists of the world are entitled to participate in the work of the Association. Equality, diversity and inclusion are particularly encouraged.
4. The Association performs its activities in the framework of the International Science Council (ISC) and IUGG, in cooperation with the United Nations and its specialized agencies and through direct contacts with other international organizations. Any country adhering to the IUGG also adheres to the Association.

BODIES OF THE ASSOCIATION

5. The Association shall comprise: the Plenary Session, The Plenary Administrative Session, the Bureau of the Association, the Scientific Commissions, the Panels and Working Groups, the Early Career Scientists Committee, the International Association of Hydrological Sciences Limited, and Individual Members. The Association shall maintain contact with the several adhering countries through their National Representatives or National Committees (often subcommittees or sections of the IUGG National Committees) and Regional Committees.

Scientific Commissions: Units of the Association having defined scientific responsibilities in specific hydrological fields or subjects. Divisions are corresponding units of the Scientific Commissions.

Panels and Working Groups: Ad hoc units to report on specific problems, either scientific or administrative.

National Committees: National Committees of IAHS are administrative bodies for maintaining contacts with the Association. They may include representatives to the Scientific Commissions of IAHS.

National Representatives: Each member country of IUGG shall appoint a National IAHS Representative who is responsible for maintaining contact with the Association, taking part in the work of the National Committee of IAHS, if one such is established.

Regional Committees: Regional Committees are administrative bodies which examine subjects of particular concern within specific regions.

Early Career Scientists Committee (ECSC): The ECSC consists of one member for IAHS and one member for each scientific commission. Its role is to foster the cooperation and work of Early Career Scientists.

The International Association of Hydrological Sciences Limited (IAHS Ltd.): This is a Charity registered with the Charity Commission for England and Wales having as part of its Articles of Association objects which are identical to those of this Association and coming within the framework of ISC and IUGG.

Individual Members: Even though membership of IAHS is by country, individuals may request to be registered for so-called individual membership. To qualify for such membership an individual must work in one or more fields of hydrology and endeavour to participate in IAHS activities. The individual members are not permitted to vote on administrative matters.

PLENARY SESSION

6. A Plenary Session of the Association shall be convened in accordance with the Bye-laws of the Union. At least one Plenary Session of the Association shall be held during a General Assembly of the IUGG and during a Scientific Assembly of the Association. Each adhering country may be represented by one or more delegates to the Plenary Session.
 - 6.1. The Plenary Session has final authority on questions of a scientific character.
 - 6.2. The Plenary Session shall consider the state of hydrological sciences, the trends in their development, and questions relating to the organization of symposia on important programmes, taking into consideration the appropriate programmes of other international organizations.
 - 6.3. Each participant present at the Plenary Session shall have one vote on scientific matters.

PLENARY ADMINISTRATIVE SESSION AND ELECTION OF OFFICERS

7. The final authority of the Association in all matters of administration and finance shall be vested in the Plenary Administrative Session of the Association.
 - 7.1. The Plenary Administrative Session shall consist of the President, the President-Elect or immediate Past-President, the Vice-Presidents, the Secretary General, the Treasurer, the Editor(s), the President or other designee of each Scientific Commission in existence at the time, the Chair of IAHS Limited and one voting delegate from each adhering country, appointed by that country to vote in the Plenary Administrative Session.

A quorum shall consist of the President (or Vice-President acting as President), the Secretary General, or his/her deputy, and voting delegates from at least 10 countries.
 - 7.2. Voting in the Plenary Administrative Session shall be by countries, each country having one vote, with the provision that it has voting rights in IUGG at that time. This voting may be in person, by mail or other electronic means but if the vote has been by mail or other electronic means then the country cannot vote in person at the Plenary Administrative Session again on the same matter. Only those officers of the Association and its Scientific Commissions who are also voting delegates of their countries may vote.
 - 7.3. The Plenary Administrative Session shall elect the President-Elect of the Association, three Vice-Presidents, the Secretary General and the Officers of the Scientific Commissions.

All hydrologists of the world participating in the work of the Association are entitled to stand as candidates for these positions, with the exception of the candidate for the President-Elect of the Association who shall be a citizen or resident of a country adhering to the Union.

The election shall be held during the IUGG General Assembly and/or electronically before the start of the Plenary Administrative Session, in accordance with Articles 7.1 and 7.2, and the Bye-laws.
 - 7.4. The period of office for all Association officers except the President, shall be the interval between elections at two successive IUGG General Assemblies. The President-Elect shall become President, and the President shall become immediate Past-President, two years after the elections at the IUGG General Assembly. If a Scientific Assembly is held during the second year after the elections, the President-Elect shall become President at the beginning of the Scientific Assembly. The term of immediate Past-President shall be from the time the new President takes office to the next election

of a President-Elect.

The President and Vice-Presidents may not be elected to two successive terms of the same office. The Secretary General shall be eligible for re-election, but not for more than two additional terms.

The President-Elect shall assume the office of President if this office becomes vacant. If there is no President-Elect the Bureau shall appoint one of the Vice-Presidents to be President.

If the office of the Secretary General becomes vacant between IUGG General Assemblies, acting officers shall be appointed by the President to serve the remainder part of the term.

- 7.5. The Plenary Administrative Session has the power to form and discontinue Scientific Commissions. Their terms of reference shall be included in the Bye-laws of the Association.

The office of President-Elect, Vice-Presidents and the Secretary of each Scientific Commission shall be established under the same terms as outlined in Articles 7.3. The Presidents of the Scientific Commissions may not be re-elected to two successive terms of the same office. The Vice-Presidents and the Secretary shall be eligible for re-election but for not more than one additional term. The Scientific Commissions have the power to fill vacancies that may occur between elections.

- 7.6. The Plenary Administrative Session has the power to form and discontinue Regional Committees, which may be formed on the initiative of several National Committees or National Representatives. Their Officers shall be elected by those National Committees, or National Representatives. Regional Committees shall examine hydrological subjects of particular concern to a specific region, and may conduct regional meetings on such subjects.

Each Regional Committee may propose a set of regulations for its organization and governance for approval by the Plenary Administrative Session of the Association.

- 7.7. The Plenary Administrative Session may elect an Honorary President.

The Honorary President may participate as a non-voting member in any Association meeting, including those of the Bureau, and may be requested by the Bureau to undertake specific tasks in support of the Objectives of the Association.

- 7.8. In questions involving finance, voting in the Plenary Administrative Session shall be as in Article 7.2, except that upon the request of two voting delegates, the number of votes for each country shall be one greater than the number of its category of membership in the Union as defined in the Statutes of the Union.

- 7.9. An adhering country not represented at a Plenary Administrative Session may forward its vote on any pertinent item on the agenda, including elections of Association officers, by mail or other electronic means.

- 7.10. Voting by mail or other electronic means between Plenary Administrative Sessions of the Association can be authorized by the Bureau.

THE BUREAU AND APPOINTMENT OF TREASURER AND EDITOR(S)

8. The Bureau of the Association shall consist of the President, the President-Elect or immediate Past-President, three Vice-Presidents, the Secretary General, the Treasurer, the Editor and Presidents of the Scientific Commissions in existence at the time, and the Chair of the International Association of Hydrological Sciences Limited. The immediate Past-President shall remain a Bureau member during the period between the end of his/her office and the election of a new President-Elect. The President shall convene the Bureau at least every other year to guide the affairs of the Association.

At any time there shall be in the Bureau either a President and President-Elect or a President and a Past-President.

- 8.1. The Treasurer shall be appointed by the Bureau, and shall be eligible for re-appointment without limit. The Editor(s) shall be appointed by the Bureau, and shall be eligible for re-appointment without limit.

TASKS OF THE PRESIDENT, SECRETARY GENERAL, TREASURER AND EDITOR(S)

9. The President shall be the executive officer of the Association and shall direct its affairs in accordance with the decisions of the Plenary Session of the Association. The President shall be assisted by the Vice-Presidents.
10. The Secretary General, in consultation with the President, shall manage the business of the Association, conduct the correspondence, preserve the official documents and administrative records. The Bureau may authorize the Secretary General to employ administrative and secretarial personnel to assist him/her in the performance of his/her duties to the Association. The Secretary General shall also take any action necessary to ensure that the Objectives of the Association are fulfilled in a manner which complies with the relevant Law governing administration, taxation, Contract and Tort or their equivalent in any country where the Association is operational including the appointment of a person or corporation if required to protect and represent the Association in any such matters and he/she shall be indemnified by the Association in respect of the costs of any such action.
11. The Treasurer, or acting Treasurer, shall collect the funds of the Association and disburse them in accordance with the decisions of the Plenary Session of the Association and the Bureau. He/she shall make previews of the budget of the Association, maintain records of all financial transactions and submit annual reports thereon to the Bureau as required by the Statutes and Bye-laws of IUGG.
 - 11.1. The funds of the Association shall be invested in accounts of the Association. They shall be at the disposal of the Treasurer and the Secretary General as may be deemed necessary and as specified in Article 11, but provisions shall be made to enable the President to transfer the funds or part of them to an acting Treasurer appointed according to Article 8.2.
12. The Editor(s) shall prepare for publication original papers, reviews and other material in the journals of the Association, in a form in accordance with the decisions of the Plenary Session and the Bureau.

COMMISSIONS

13. The following provisions shall govern Scientific Commissions that are created under Article 7.4.
 - 13.1. The Scientific Commissions shall keep abreast of their fields of hydrology and determine the trends in research on the most urgent problems of hydrology that are of common interest to many countries. The Scientific Commissions shall study the questions voted by their Plenary Session.
 - 13.2. The Scientific Commissions shall participate actively in the preparation of symposia on appropriate scientific problems.
 - 13.3. The Scientific Commissions shall be styled "International Commission on ...".
 - 13.4. The National Committee (or National Representative) for IAHS of each adhering country may designate one representative on each Scientific Commission and on each Regional Committee with which it desires to affiliate. Such representatives may vote on all administrative and scientific matters before the Scientific Commission or Regional Committee and may correspond directly with the Officers of a Commission or such Committee on all matters of concern to that Commission or such Committee. All participants present at a meeting of a Commission or such Committee may vote on scientific matters.
 - 13.5. While the regulations for all scientific commissions should be as similar as possible, each Scientific Commission may propose a set of regulations for its organization and governance for approval by the Plenary Administrative Session of the Association.
 - 13.6. The Scientific Commissions may establish Divisions and ad hoc working groups to report on specific problems.

PANELS, WORKING GROUPS AND RAPPORTEURS

14. The Plenary Session or the Bureau may create panels or working groups and appoint rapporteurs to undertake either:
 - a) ad hoc scientific programmes; or
 - b) activities of a pro tempore regional nature; or
 - c) specific administrative or organizational tasks.

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The Chair and members of all such groups shall be appointed by the President, to whom they shall report. Such groups shall exist only during the term between two successive IUGG General Assemblies.

EARLY CAREER SCIENTISTS COMMITTEE (ECSC)

One member of the ECSC is appointed by the President of the Association. This member shall be the chair of the ECSC. The other members, one for each Commission, are appointed by the presidents of the respective Commissions. The members of the ECSC serve for a term of two years, and reappointment is possible once.

IAHS LIMITED

- 15.1. The International Association of Hydrological Sciences Limited shall deal with those matters set out in its Articles of Association (a copy of which shall be held by the Secretary General) and is a Charity registered with the Charity Commission for England and Wales. Membership of the Limited Company is restricted to Individual Members of the Association. The Limited Company will manage the financial accounts, office, contracts and the publishing programme on behalf of the Association.
- 15.2. The International Association of Hydrological Sciences Limited shall have as its Board the Secretary General, the President and Treasurer of the Association and those persons appointed by the President. The Chair of the Limited Company will report to the President.
- 15.3. For the purpose of continuity of administration of the Limited Company, the President shall have absolute discretion regarding the appointment of the Chair and the Board in accordance with article 15.2.

AMENDMENTS OF STATUTES AND BYE-LAWS

16. Within the framework of these Statutes, the Plenary Administrative Session of the Association shall have the power to adopt or amend Bye-laws by a simple majority.
17. Proposals by adhering countries for a change of any Article of the Statutes must reach the Secretary General at least six months before the date of the meeting at which they are considered by the Plenary Administrative Session of the Association. The Secretary General shall notify all adhering countries of any proposed changes at least four months before the named date.
18. The Articles of these Statutes may be changed only by a majority of two-thirds of the votes cast at a meeting of the Plenary Administrative Session of the Association by voting members who are present or who vote by mail or other electronic means, provided that the total number of favourable votes is not less than one-half the number of the members of the Plenary Administrative Session of the Association eligible to vote.

Bye-Laws

COMMISSIONS

1. The following Scientific Commissions have been established in accord with Articles 7.5 and 13 of the Statutes:
 - International Commission on Surface Water;
 - International Commission on Groundwater;
 - International Commission on Continental Erosion;
 - International Commission on Snow and Ice Hydrology;
 - International Commission on Water Quality;
 - International Commission on Water Resources Systems;
 - International Commission on Remote Sensing;
 - International Commission on the Coupled Land-Atmosphere System;
 - International Commission on Tracers;
 - International Commission on Statistical Hydrology;
 - International Commission on Human-Water Feedbacks.

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The Commissions shall follow the Regulations of the Scientific Commissions. Commission-specific modifications of these regulations are subject to approval by the Plenary Administrative Session of the Association and shall become part of the By-laws.

All Commissions will be concerned with natural processes, the interactions of these processes with human activities or with processes, technologies and applications.

Whenever Scientific Commissions are referred to in the By-laws, it implies "International Commissions".

2. The several Scientific Commissions shall prepare scientific reviews of the state of research in their respective fields of hydrology, noting achievements and trends, with particular emphasis on significant problems for attack. The reports should be submitted in English.

The report shall reach the Secretary General at least four months before the Plenary Session of the Association, for distribution among the officers of the Association including those of the several Scientific Commissions and among the National Committees, and for publication in the reports of the Plenary Session of the Association. The President of the Association shall introduce these reviews in his/her address to the Plenary Session of the Association, together with his/her recommendations as to the course of research.

3. The Scientific Commissions shall meet at the IUGG General Assemblies and Scientific Assemblies of the Association unless authorized otherwise by the Bureau. A Scientific Commission may also schedule other meetings under the regulations it adopts according to Statutes Article 13.
4. Each Scientific Commission shall show on its stationery or other formal documents its identification with the International Association of Hydrological Sciences.

NOMINATIONS AND VOTING FOR OFFICE

5. The Bureau shall establish a Nomination Panel of not less than three members at least 10 months before an IUGG General Assembly to receive and consider suggestions and prepare nominations for the following Association officers: President-Elect, the three Vice-Presidents and the Secretary General.

At least nine months before an IUGG General Assembly the Secretary General shall inform all National Committees via the National Representatives of the membership of the Nomination Panel, asking them to send their nominations to its Chair not later than six months before the General Assembly in order to be considered by the Panel. In addition, there should be an open call for nominations from any IAHS member. On the basis of available nominations from the National Committees via the National Representatives, the IAHS members, and the IAHS Bureau, the Panel shall prepare a list of recommended candidates, seeking to promote equality, diversity and inclusion. The Panel may also choose to recommend all nominated candidates.

Each nomination for office must include a résumé of the candidate's qualifications relevant to the office for which the candidate is nominated. A signed statement of the candidate's willingness to stand for office must also be provided. The nomination shall not be considered without submission of the résumé and consent form. A person may be a candidate for more than one office except the candidate for President-Elect who may not be a candidate for any other office of the Association. No one may hold more than one office at the same time.

The list submitted for voting shall contain all nominated candidates and mention the recommendation of the Nomination Panel.

The voting on the list shall be in person by the Plenary Administrative Session of the Association, mail or other electronic means according to Articles 7.2 and 7.3 of the Statutes.

6. Each of the Scientific Commissions shall establish a Nomination Group of not less than three members at least 10 months before an IUGG General Assembly to prepare nominations of Commission officers. It can be the same Nomination Panel as for the Association Officers (Article 5). At least nine months before an IUGG General Assembly the Secretary General shall inform all National Committees via the National Representatives of the membership of these groups, asking them to send nominations to the Chair of the Nomination Panel not later than six months before the General Assembly. In addition, there should be an open call for nominations from any IAHS member. The Chair of the Panel shall furnish each Nomination Group with the names of candidates appropriate to each Scientific Commission. On the basis of available nominations from the National Committees via the National Representatives, IAHS members, and respective Scientific Commissions, each Nomination Group shall then prepare a list of candidates for Scientific Commission officers. The preparation of the list shall be done in consultation with the Panel Chair.

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The nominations for Commission officers shall follow the same procedure as that for the Association officers (Article 5) except that the nominee for President-Elect may be a candidate for more than one office.

The voting on this list shall be by the Plenary Administrative Session of the Association, mail or other electronic means according to Articles 7.2 and 7.3 of the Statutes. The results shall be given to the Chair of the Nomination Panel who shall draw up a list of Scientific Commission Officers to be announced at a Plenary Session of the Association in Administrative Session.

- 6.1 The list of candidates for Association and Commission Officers shall normally contain more than one name for each office. The Chair of the Nomination Panel shall distribute the list to the National Committees at least three months before an IUGG General Assembly.

The list submitted for voting shall include both the candidates recommended by the Panel and the names of all the other nominees submitted.

- 6.2 Voting on the list of candidates for both Association and Scientific Commission officers shall be done by secret ballot.

To be elected, each candidate must obtain a simple majority of votes. For those offices not filled in the first round of voting, a second round shall be held on the two highest ranking candidates of the first round.

In the case of a draw in the second round, the President shall decide.

NATIONAL COMMITTEES

7. The National Committees or the National Representatives shall disseminate information on the Association within their countries and shall solicit papers for symposia or for publication in the Hydrological Sciences Journal.
8. National Committees shall be invited to present their views on hydrological and water resources research and on matters relating to the management of the Association to the Bureau and the Plenary Sessions, as a contribution to the discussion on future activities of the Association.
9. Where the National Committee for IAHS has not appointed or designated a person or persons to cast its vote as specified by the Statutes in the Plenary Session or at a meeting of a Scientific Commission or other committee, the delegates present are invited to select one of their number for this purpose.
10. The Association should encourage the formation of National Committees for hydrology in all countries that adhere to the Union. Where such National Committees do not exist, de facto or de jure delegates who have attended General Assemblies and symposia of IAHS are invited to petition the National Committee for IUGG to form a national group for discussion of questions before IAHS or its Scientific Commissions or to designate delegations to a General Assembly.
11. National Committees shall designate a delegate to the Plenary Sessions of the Association and each of the Scientific Commissions. The names of such delegates should be given to the Secretary of the pertinent body at least one day in advance of any Administrative Session.

AGENDA, SYMPOSIA AND PUBLICATIONS

12. The Bureau of the Association shall organize the agenda for the Plenary Sessions of the Association.
13. Suggestions for the agenda of the Plenary Session of the Association must reach the Secretary General at least three months before the date of the meeting. However, a question which has not been placed on the agenda may be discussed if a proposal to that effect be approved by two-thirds of the votes of the delegates to the Plenary Session.
14. A Scientific Assembly may be held once during the four-year period between the General Assemblies of IUGG.
15. Symposia for which the Association has primary responsibility (referred to as IAHS symposia in this By-law) should meet the following conditions and be accepted by the Bureau:
 - (i) a subject having an important role in the development of hydrology;
 - (ii) proposed by a National Committee or by officers of the Association or of its Scientific Commissions;
 - (iii) a member country expressing readiness to serve as host and presenting evidence of adequate support.

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- 15.1 IAHS symposia (with subject outline) should be announced by the Secretary General not later than 18 months before the date of the symposium.
 - 15.2 IAHS symposia are organized jointly with a relevant organization of the host country and may be supported by or organized in collaboration with other international organizations. Preference shall be given to those symposia where there is evidence of adequate national support.
 - 15.3 IAHS makes an umbrella contract with a professional Conference Organiser, who may be responsible for the administration of the IAHS symposia, the registration, the abstract handling and publication of (extended) abstracts in the Proceedings of IAHS (PIAHS).
 - 15.4 The Association may support or take partial responsibility in symposia of other international organizations according to arrangements formulated through exchange of correspondence and approved by the Bureau.
16. The Editor(s) is/are authorized to arrange for the publication of (a) periodic Journal(s) to provide a line of communication with the world hydrological community.

GENERAL

17. The President may invite representatives of the UN specialized agencies or other observers, advisors or consultants to attend Plenary Sessions or meetings of the Bureau, with voice but without vote.
 18. The Secretary General shall publish the current Statutes and Bye-laws of the Association.
 19. The Secretary General keeps a list of hydrologists who are willing and qualified to participate actively in the work of the Association. These hydrologists are designated as Individual Members of IAHS.
- The Secretary General will notify the Secretaries of the Scientific Commissions of the Individual Members interested in their respective Commission.

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF METEOROLOGY AND ATMOSPHERIC SCIENCES

(Revised August 2019)

PREAMBLE

The International Association of Meteorology and Atmospheric Sciences is one of the constituent associations of the International Union of Geodesy and Geophysics, and carries out its activities subject to those of its Statutes and By-Laws that apply to associations. Both the International Association of Meteorology and Atmospheric Sciences and the International Union of Geodesy and Geophysics operate within the framework of the International Council Science (ISC) and the policies and principles it upholds guiding the conduct of international scientific activities.

STATUTES

Statute I - Objectives of the Association

1. The objectives of the International Association of Meteorology and Atmospheric Sciences (IAMAS), hereafter the Association, are:

- 1.1. To promote study of the sciences of the atmospheres of the Earth and other celestial bodies, and of the interactions of the Earth's atmosphere with society and with other components of the Earth system.
- 1.2. To initiate, encourage, facilitate, and coordinate international cooperation in scientific research.
- 1.3. To stimulate discussion, presentation and publication of scientific results.
- 1.4. To facilitate the education, development, and participation of early career scientists and atmospheric scientists from countries with low per-capita GDP (hereafter referred to as resource-limited countries) in international scientific assemblies and conferences.
- 1.5. To recognize leading scientific accomplishments and scientists.
- 1.6. To promote communication about the atmospheric sciences within and across the international scientific community.
- 1.7. To convey the collective views of the atmospheric science community to other organizations.
- 1.8. To promote public education and awareness of the role and importance of the atmosphere and atmospheric sciences.

In pursuit of all of its activities, the aim of the Association is to further the advancement of atmospheric sciences in a strictly non-partisan and non-profit manner.

Statute II - Membership in the Association

2. Membership in the Association is of three forms: (1) National Members, (2) Individual Members, and Affiliate Members.

2.1. National (or Adhering) Members of the Association are the Member Countries of the International Union of Geodesy and Geophysics (IUGG), hereafter referred to as the Union. All countries that adhere to the Union are National (Adhering) Members of the Association and are qualified to appoint delegates to the Association's General Assemblies.

2.1.1. Consistent with the Statutes of the Union, a nation's Adhering Body may be either its principal scientific Academy, its National Research Council, or any other institution or

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association of institutions, whether non-governmental or governmental, that can represent the geodetic and geophysical activities of the adhering country.

- 2.1.2. Both Adhering (or Member) Countries of the Union and Countries in Associate status with the Union (i.e., countries not participating financially with the Union) are qualified to appoint delegates to the General Assemblies (see Statute IV) of the Association. However, consistent with Union, National Members in Associate status with the Union have restricted rights of participation in some of the Association's activities (e.g., see Statute XI, Article 26.1, and By-Law I, Paragraph 2).
 - 2.1.3. National Members of the Association may participate in the governance and activities of the Association through a number of mechanisms, including directly through their National Committee for the Union, through a National Committee (or Sub-Committee) for the Association, or by appointing a National Delegate to (or National Correspondent with) the Association.
 - 2.1.4. The general duties and responsibilities of the National Members include: selection of a Delegate to represent their nation at General Assemblies of the Association; participation in the nomination and election of capable and effective officers of the Association; oversight and promotion of the interests and success of the Association; approval of the financing of the Association; and, along with the officers and members of the Association and its Commissions, promotion of the advancement of meteorology and atmospheric sciences in their country and throughout the world.
 - 2.1.5. National Members have the opportunity and responsibility to present proposals to host General and Scientific Assemblies and other meetings associated with the Association and its Commissions.
 - 2.1.6. The Secretary General (see Statute IX) shall be the primary contact point with the Association's National Members, including communicating with them about the upcoming meetings and activities of the Association, and responding to their requests and queries.
- 2.2. Scientific Members of the Association are individual scientists with primary interests in meteorology and atmospheric sciences who are or have been an officer of the Association, a National Delegate attending a General Assembly of the Association, an officer or member of a Scientific Commission or other scientific entity sponsored by IAMAS, awarded honorary membership, or whose application to the Secretary General to be included as a Scientific Member of IAMAS has been approved by the Bureau of the Association.
- 2.2.1. Applications for admission as Scientific Members should include a brief summary of the applicant's education, scientific research, and publications in the field of atmospheric sciences and a statement indicating the interest in and efforts to promote the objectives of the Association. Approval should be granted based on an indication that the applicant is of the caliber of those who would be approved to present a paper at a Scientific Assembly of the Association.
 - 2.2.2. The Secretary General shall keep a listing of the Scientific Members of the Association. The initial list of members shall be created from the listing of past officers of the Association, of the officers and members of the Scientific Commissions, and National Delegates that have attended the General Assemblies of the Association.
 - 2.2.3. There is no fee for being a Scientific Member of the Association. Membership shall be for life unless a resignation from the Scientific Member is received or membership is revoked by a two-thirds vote of those present at a regular meeting of the Executive Committee or of all Executive Committee members if the vote is taken by electronic means.
 - 2.2.4. Scientific Members are able to participate in the Association through a number of mechanisms, including participation in the Scientific Assemblies (see Statute V), serving as officers of the Association (see Statute VI), serving as members and officers of the Scientific Commissions and Joint Scientific Committees, voting on resolutions of the Association

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dealing with scientific matters, submitting nominations for officers of the Association, and otherwise contributing to the objectives of the Association.

2.2.5. Scientific Members of the Association and activities in which they participate may be recognized by the Association for their contributions and accomplishments, as provided for in By-Law IV.

2.3. Affiliate Members are other scientific or professional organizations at the international, regional, or national level that are involved in study of the atmosphere, helping to educate the public about the atmosphere, or otherwise promoting the objectives of IAMAS, and that have been admitted to Affiliate membership by the General Assembly of the Association.

2.3.1. Affiliate Members are not permitted to vote on administrative or scientific matters coming before the Association, but may join with the Association in activities to promote the objectives of the Association and may be invited to make presentations before bodies of the Association, including the General Assembly.

Statute III - Time Schedule of the Association

3. The fundamental time interval for the Association is a 'period,' which is defined as the interval elapsing between the conclusion of the final Plenary Session of the Association at one Ordinary General Assembly (see Statute IV) and the conclusion of the final Plenary Session of the Association at the succeeding Ordinary General Assembly. This interval is generally four years.

Statute IV - General Assemblies of the Association

4. Representatives of the National Members of the Association will meet regularly to conduct the business of the Association in Ordinary General Assembly. The Association's Ordinary General Assembly will normally be at the time and place of the Ordinary General Assembly of the Union.

4.1. The General Assembly of the Association will be composed of Delegates appointed by the National Committees of the National Member countries (see Statute II). These appointments will be brought to the notice of the Bureau officially before the opening of the first Plenary Session of the General Assembly. The National Committees will designate the particular National Delegate who, in case of voting by countries, will hold the right to vote for their country. A quorum shall be considered present with the attendance, in person or by proxy, of at least three of the elected officers and Delegates from a minimum of at least 10% of the Member Countries of the Union (excluding members in Associate status).

4.2. The agenda of a Plenary Session of a General Assembly of the Association will be determined by the Bureau (see Statute VIII), which will have previously invited the National Committees of the IUGG Adhering Countries to submit proposed topics for consideration. This agenda will be communicated to the Committees at least four months before the opening of the General Assembly. Questions not contained in the agenda may be considered during the sessions only with the agreement of at least half of the countries represented, or of the Delegates present at the General Assembly, accordingly, as the question is administrative (including financial) or scientific.

4.3. The Bureau will have the responsibility for preparing the schedule of business for the General Assembly. In general, an opening Plenary Session will be held near the start of the General Assembly to cover business matters of the Association including: to hear the reports of the President and Secretary General, to consider for approval the decisions and actions of the officers and committees of the Association, to receive nominations for Officers and Members of the Executive Committee, to agree on appointment of appropriate committees to function during the General Assembly, to hear proposals from Delegates of Member Countries to host upcoming Scientific Assemblies (see Statute V), and to hear presentations of reports from at least some of the Scientific Commissions, as may be appropriate at the first plenary. A second plenary session will be held towards the close of the General Assembly, during which financial reports will be made, remaining reports of the Scientific Commissions will be heard, resolutions or recommendations will be decided (see By-Law V for the procedure for considering and approving resolutions), elections will be held, and other appropriate business conducted.

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- 4.4. The General Assembly is responsible for hearing a report from the Executive Committee on the status of the Scientific Commissions, and for, if necessary, amending and/or acting on any recommendations, including changes in the objectives and continuation, establishment, or termination of any of the Scientific Commissions. The General Assembly will also consider the establishment, continuation and termination of any Joint Scientific Committees that have been established.
 - 4.5. By vote of the National Delegates, the General Assembly may, at its discretion, propose, enact, modify, and/or amend By-Laws defining Association procedures. This responsibility includes consideration of any amendments or new By-Laws proposed or approved on an interim basis by the Executive Committee over the preceding period.
 - 4.6. At the General Assembly, both National Delegates and Individual Members that are present will have the right to vote on resolutions and issues of scientific interest. Voting is expected to be on the basis of each individual's scientific knowledge and understanding.
 - 4.7. In the election of Officers of the Association and on administration matters without financial implications, voting by National Delegates at the General Assembly will be by country and each country will have one vote, subject to the condition that the country will have paid its subscription to the Union up to the end of the year preceding the voting.
 - 4.8. On financial questions, and particularly with respect to the budget of the Association for the period from the January 1 following the General Assembly to the December 31 following the next General Assembly, voting at the General Assembly will be by country, provided that the country will have paid its subscription up to the end of the year preceding the voting. The number of votes assigned to each country will be one greater than the number of its category of membership in the Union. In case of doubt as to which class a question belongs, and in all cases of equality of votes on a question, the decision will rest with the President or Presiding Officer.
 - 4.9. In the event that a designated National Delegate from a country cannot be present for voting, the National Delegate from that nation may in writing designate a Delegate from another country to cast the vote(s) on behalf of the country of the aforementioned National Delegate. No designated Delegate may represent more than two countries in addition to their own.
 - 4.10. A National Member country not represented by a National Delegate may, by post or in a printable electronic form, forward its vote on any specific agenda question that has been distributed in advance. The postal or electronically provided ballot must be received by the Bureau in advance of the Plenary Session in which the voting takes place.
 - 4.11. The decision on all voting matters will be by simple majority of those Delegates or those countries present, including votes received by post or in a printable electronic form, counting for the purpose of determining a majority only those votes cast for or against a particular matter. In case of a tie vote, that of the President or Presiding Officer will decide.
 - 4.12. Except as indicated in the Statutes and By-Laws, conduct of IAMAS meetings shall be conducted according to Robert's Rules of Order, Newly Revised.
5. If the need should arise, the President of the Association, with the concurrence of the Executive Committee, may convene an Extraordinary General Assembly of the Association, during the interval between two Ordinary General Assemblies of the Union. Delegates to an Extraordinary General Assembly will have the same powers and be subject to the same rules as the Ordinary General Assemblies.
- 5.1. An Extraordinary General Assembly must also be convened by the President upon the request of at least half of the National Members.
 - 5.2. If the date and place of such an Extraordinary General Assembly have not been agreed upon during the preceding Extraordinary or Ordinary General Assembly, that will be determined by the Executive Committee of the Association and communicated to the National Member countries at least six months in advance. The date and time will at the same time be communicated to the bureaus of the Union and its constituent Associations.

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6. Ordinary and Extraordinary General Assemblies will be open to the public. All interested scientists may participate in the discussions, and may take the floor after being recognized by the President or Presiding Officer, whether those scientists be formally accredited Delegates or not, and whether they are from National Member countries or not. However, voting will be conducted according to the procedures outlined in Article 4 above.

Statute V - Scientific Assemblies of the Association

7. The Association may, upon decision taken at an Ordinary or Extraordinary General Assembly, organize and conduct Scientific Assemblies.

- 7.1. The Association will organize Scientific Assemblies in cooperation with other associations of the Union to coincide with the Ordinary General Assemblies of the Union and the Association.
- 7.2. The Association may organize and conduct Scientific Assemblies at times other than the General Assemblies of the Union. These Scientific Assemblies may be arranged by the Association alone, or they may be held jointly with other Associations of the Union, with other bodies of the ISC, or in cooperation with international organizations or research programmes.
- 7.3. Plans for such Scientific Assemblies will be communicated to the National and Scientific Members of the Association and to the bureaus of the Union and its constituent Associations at least six months in advance.
- 7.4. Proposals of National Members to host a Scientific Assembly will normally be made to the Executive Committee at least four years prior to the intended Assembly, where a proposal may receive preliminary approval. Formal approval to hold a Scientific Assembly separate from the Union's General Assembly would normally be at the Ordinary General Assembly prior to the Scientific Assembly.
- 7.5. Financial responsibility for Scientific Assemblies held separately from the Union General Assembly must be accepted by the proposing National Member Country. The host country has responsibility for preparing the budget for the Scientific Assembly, the solicitation of supporting funds, and for any shortfall or surplus resulting from the conduct of the Scientific Assembly. The host Country also has authority to set the registration fee for the Assembly (including provisions for reduced rates for students or other special categories), subject to approval of the Bureau and the addition of any IAMAS fee (e.g., head tax).
- 7.6. IAMAS will participate in overall support for the Assembly by contributing to the costs for travel, lodging, and/or registration for selected early career scientists and atmospheric scientists from resource-limited countries who have applied for support by the announced procedure to the Association. The Association may also advance funds to cover organizing and preparatory costs for the Scientific Assembly, with reimbursement made following the Scientific Assembly. In the event that the Scientific Assembly generates a surplus, any contribution to the Association (e.g., by rebating all or part of the contribution to the support for participation of qualifying scientists) will be used to augment support for qualifying scientists to participate in following Scientific Assemblies.
- 7.7. Preparation of the scientific programme is the responsibility of the Executive Committee, assisted by a representative of the host country (see Statute X).
- 7.8. The Association may set a fee (head tax) for participation of scientists at Scientific Assemblies. The funds collected are to be deposited in the general bank account of the Association and used in support of the conduct of the Assembly, including especially the enhancement of participation by scientists from resource-limited countries.

Statute VI – Officers of the Association

8. The Officers of the Association will include a President, two Vice-Presidents, a Secretary General, and five Members-at-Large. By the Statutes of the Union, the elected Officers of the Association must be from National Member countries (i.e., Adhering Countries that are up-to-date on their dues). Officers of the Association will be

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chosen, as far as is possible, on the basis of competence, experience, scientific specialty, gender, and geographical coverage. No elected officer of IAMAS may simultaneously serve as an officer of the Scientific Commissions.

- 8.1. The President will be elected at the final Plenary Session of each Ordinary General Assembly (see Statute IV). The term of office for the position of President will be for one period (see Statute III), and the individual serving will not be eligible for re-election.
 - 8.1.1. If the office of the President becomes vacant between two Ordinary General Assemblies, the senior Vice-President will become President. In the event that the two Vice-Presidents are equal in seniority (i.e., each having been elected for the first time at the same Ordinary General Assembly), the Executive Committee will decide which Vice-President will become President.
- 8.2. Two Vice-Presidents will be elected at the final Plenary Session of each Ordinary General Assembly. Their terms of office will be for one period. They will be eligible for immediate re-election, but only for one additional period.
 - 8.2.1. If one or both offices of the Vice President become vacant between two Ordinary General Assemblies, the Executive Committee may decide to elevate a Member-at-Large to the Office of Vice President.
- 8.3. The Secretary General, who also serves as the Treasurer, will be elected at the final Plenary Session of each Ordinary General Assembly for one period and may be re-elected for not more than one additional consecutive period.
 - 8.3.1. If the office of the Secretary General becomes vacant between two Ordinary General Assemblies, a Secretary General will be nominated by the President to occupy the office until the next Ordinary or Extra-ordinary General Assembly.
 - 8.3.2. At the conclusion of the service of a Secretary General, the Bureau may appoint the individual for a term of no more than nine months as a special Deputy Secretary General in order to assist the incoming Secretary General in completing the financial matters pertaining to: (a) the General and Scientific Assemblies at which the term of the Secretary General ended, (b) the full calendar year of the assemblies, and (c) transfer of the location of the Secretariat.
- 8.4. Five Members-at-Large, each from a different National Member country (see By-Law I for an interpretation of this provision), will also be elected as officers of the Association. Their term of office will be for two periods, with their terms of office staggered so that at least two positions are up for election at the final Plenary Session of each Ordinary General Assembly. Members-at-Large will not be eligible for immediate re-election.
 - 8.4.1. If a vacancy occurs among the Members-at-Large, a replacement will be chosen by the General Assembly in the course of the next appropriate Plenary Session, for a period which will expire at the time when the member Member-at-Large so replaced would have terminated his/her office.

Statute VII - Components of the Association

9. The internal organization of the Association shall consist of the following organs, each defined in succeeding Statutes:

- 9.1. The Bureau (see Statute VIII).
- 9.2. The Secretariat and Seat of the Association (see Statute IX).
- 9.3. The Executive Committee (see Statute X).
- 9.4. The Scientific Commissions (see Statute XI).
- 9.5. The Joint Scientific Committees (see Statute XII).

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10. All officers and members of the Bureau, the Secretariat, the Executive Committee, the Scientific Commissions, and the Joint Scientific Committees serve on a voluntary basis without receiving a salary or honorarium from the Association.

Statute VIII - The Bureau

11. The Bureau is chaired by the President, and also includes the two Vice-Presidents and the Secretary General. The Bureau of the Association will, on a continuing basis and as necessary, direct and coordinate all scientific and related activities of the Association in the interval between Ordinary General Assemblies. Critical responsibilities include:

- 11.1. Preparation of the agendas for General Assemblies of the Association, as indicated in Article 4.2.
- 11.2. Promoting understanding of meteorology and atmospheric sciences in accord with the objectives of the Association.
- 11.3. Promoting the development of the theme and the scientific programme of the Scientific Assemblies convened by the Association.
- 11.4. Encouraging the development of proposals for the convening of future Scientific Assemblies.
- 11.5. Promoting the recognition of leading scientists and leading scientific accomplishments within the scope of the Association's activities. Awards and other recognitions may be made pursuant to the procedures described in By-Law IV.
- 11.6. In the event of significant disagreements or of concerns about possible malfeasance in the conduct of the Association's affairs among members of the Bureau, the matters shall be referred to the Executive Committee, which shall have authority for determining appropriate actions, up to and including reassigning responsibilities for the financial and other actions of the Association and referral to the General Assembly of a recommendation for removal of any of the officers of the Association.

12. The President, with input from and, as necessary, assisted by the other members of the Bureau, has responsibility for the following:

- 12.1. Presiding at General Assemblies of the Association.
- 12.2. Serving as Chair of the Executive Committee.
- 12.3. Serving as the IAMAS representative on the Executive Committee of the Union.
- 12.4. With concurrence of the Executive Committee, appointing atmospheric scientists to serve as the scientific liaisons from IAMAS to Joint Scientific Committees and appropriate international scientific and governmental organizations. Normally those appointed will be members of the Executive Committee or the Scientific Commissions. Organizations to which IAMAS officers and Scientific Members currently make appointments are listed in By-Law VI.
- 12.5. Working with the Secretary General to expedite the activities and operations of the Association.

13. The Vice-Presidents of the Association, with input from and, as necessary, assisted by other officers of the Association and Scientific Commissions, have lead responsibility for:

- 13.1. The Vice Presidents, in priority senior to junior in terms of date of election, shall act in place of the President whenever the President is not present or is unable to perform the duties of the President.
- 13.2. The Vice Presidents, consistent with their capabilities and interests, shall carry out activities assigned to them by the President and the Bureau. Among those meriting their specific participation, as appropriate with other members of the Bureau, are:

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- 13.2.1. Development, organization, and implementation of education and outreach activities of the Association.
- 13.2.2. Monitoring and reporting to the Bureau on the activities of the Scientific Commissions and Joint Scientific Committees.
- 13.3.3. Annual or more frequent reviews of the finances of the Association.
- 13.3.4. Other activities as assigned by the President, Bureau, or Executive Committee.

Statute IX – Secretariat and Seat of the Organization

14. The Secretary General establishes the Secretariat and the legal seat of the Association, which shall normally coincide with the location of employment and/or residence of the Secretary General.

14.1. To the extent possible, support for the direct and indirect costs of the Secretary General and of the office for the Secretariat are expected to be covered by the hosting nation.

15. The Secretary General is responsible for expediting the current business of the Association in cooperation with the President of the Association. The Secretary General has primary responsibility for:

15.1. Management of the affairs of the Association, including responsibility for the official communications of the Association with the Union, with Members of the Association, and with other scientific bodies.

15.2. Management of the financial resources of the Association in accord with best practices for non-profit organizations. Management of the financial resources will be understood to include:

15.2.1. The right to open both checking and savings accounts in the name of the Association. Both the President and Secretary General shall have individual signing authority.

15.2.2. Subject to the Association's budget, the authority to accept and disperse funds in the conduct of the Association's business.

15.2.3. Based on decisions of the Association, the responsibility for awarding funding for expenses (but not salaries or other personal remuneration) to the Scientific Commissions and Joint Scientific Committees and monitoring their expenditures based on procedures recommended by the Secretary General and approved by the Executive Committee.

15.2.4. The costs of operating the office, including consumables, costs of publications, purchase and maintenance of office equipment, expenses of correspondence, postage and shipping, incidental expenses, and, with the approval of the Bureau, costs of necessary computational and office equipment and, with approval of the Executive Committee, rental for the office of the Secretariat if not provided by the host organization or nation. Borrowing, purchase, and disposal of Association equipment should be carried through for the benefit of the Association.

15.2.5. The responsibility for sustaining a Contingency Fund to be used to ensure the continuity of IAMAS through at least one period at a restricted funding level in the event of high-consequence financial contingencies that might arise and seriously impact the income of the Association. The amount to maintain shall be approved as a component of the draft budget, and the distribution of a contingency expenditure should be considered by the Executive Committee upon recommendation of the Bureau.

15.2.6. Responsibility for soliciting applications and making awards for travel, lodging, and/or registration to Scientific Assemblies of the Association to deserving early career scientists and atmospheric scientists from resource-limited countries.

15.2.7. To the extent not covered by their home countries or other organizations and within the limits of the approved budget, authority to cover the travel, lodging, meal, and communication expenses that are necessary for the President and the Secretary General to conduct the official business of the Association. Travel and lodging costs for other members of the Executive Committee may be paid provided that: (a) participation is in connection with meetings or other events on specific Association business; (b) when those concerned represent the Association and not National Member countries or other organizations; and (c) in special cases where those concerned cannot draw proper allocations from their own national sources

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and it is especially important for the Association to be represented. Such payments may cover traveling costs and a reasonable contribution to other expenses.

- 15.2.8. The responsibility to report on the income, expenses, and financial condition of the Association to the Ordinary General Assembly of the Association and the Union, comprising in particular, a statement of receipts, expenditures assets, and liabilities of the Association for the period from the first of the January prior to the preceding Ordinary General Assembly, to the thirty-first of the December prior to the current General Assembly (i.e., the financial year being from January 1 through December 31).
 - 15.2.9. Preparation of a draft budget (estimate of expected income and expenses) for the Association for the financial years up to that of the next Ordinary General Assembly.
 - 15.2.10. To seek approval of the Bureau and Members-at-Large for any expenditure that would lead to a significant exceedance (i.e., by more than 20% or \$5000, whichever is less) of the approved budget of the Association. On the initiative of any two of the members of the Bureau and the Members-at-Large, the decision may be appealed to the Executive Committee.
- 15.3. Administrative, financial, and logistical support of the General and Scientific Assemblies of the Association, including maintaining the roster of National, Scientific, and Affiliate Members of the Association, and acceptance of and action on letters of application to become Scientific and Affiliate Members of the Association.
 - 15.4. Administrative, financial and logistical support and arrangements for General and Scientific Assemblies, including fulfillment of the decisions of the Association at General Assemblies. In addition, the Secretary General, in support of the Executive Committee, shall coordinate organization of the scientific programme for the Scientific Assemblies (see Statute V).
 - 15.5. Administrative, financial, and logistical support, as necessary, for the Bureau, the Commissions, and the Joint Scientific Committees.
 - 15.6. Preparation, printing, and distribution of publications of the Association, including newsletters, reports and other documentation.
 - 15.7 Maintenance of the presence of the Association on the Web and other electronic media.
 - 15.8. Maintaining the financial and historical records of the Association.
 - 15.9. Undertaking other activities in support of the objectives of the Association as they may be assigned by the Bureau or Executive Committee and that are within the budget of the Association.
16. The Bureau together with the Members-at-Large may, at their discretion, appoint a Deputy Secretary General, who would be assigned specific functions of the Secretariat and also share duties with the Secretary General. The term of the appointment would be for the same interval as for the Secretary General. The Deputy Secretary General would report to the Secretary General and be an ex officio member of the Bureau. Normally the Deputy Secretary General will be from an area of science complementary to that of the Secretary General.
17. The Secretary General may, with the approval of the Bureau, appoint an Assistant Secretary General, normally resident in the same general geographical area as the Secretary General. The period of the appointment would be at the discretion of the Secretary General, but not to exceed the term of the Secretary General. The Assistant Secretary General would be expected to:
- 17.1. Become familiar with the routine operations of the Secretariat.
 - 17.2. Have signing authority (together with the President and Secretary General) for cheques on the Association bank account, only to be used on written instruction from the President or Secretary General.
 - 17.3. Assist the Secretary General as appropriate.

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Statute X – Executive Committee

18. The Executive Committee will be composed of the members of the Bureau, the five elected Members-at-Large, the Presidents of the Commissions, and the Past President of the Association.

18.1. The Executive Committee will be chaired by the President of the Association.

19. The President of a Commission may delegate to the Vice President or the Secretary of that Commission the right to participate in a meeting of the Executive Committee if the President cannot do so.

20. The Executive Committee will normally meet at General Assemblies. Meetings of the Executive Committee may also be convened by the Bureau in the interval between two General Assemblies (particularly at Scientific and Extraordinary Assemblies).

20.1. The Executive Committee is responsible for reviewing the objectives of the Scientific Commissions every four years, and making recommendations to the General Assembly for determination of adjustments and status of the Scientific Commissions.

20.2. The Executive Committee may develop, enact, and, without contravening specific changes of the General Assembly, amend or add to the By-Laws establishing procedures of the Association. New and modified By-Laws will come into effect immediately or as provided in their approval; they will also be explicitly considered by the National Members at the succeeding General Assembly.

20.3. The Executive Committee may appoint subcommittees to prepare materials for consideration by the full Executive Committee.

21. The Executive Committee will be consulted by the Bureau, by postal or electronic correspondence, on questions of importance, administrative or scientific, that arise between General Assemblies. With one week's notice by electronic means, meetings of the Executive Committee may be convened between assemblies by electronic means.

22. The Executive Committee has responsibility for appointing a Nominating Committee. The governing procedures for the Nominating Committee are presented in By-Law I.

23. With the organizing support and overall coordination of the Secretary General, the Executive Committee, working also with representatives of the host Country of the Scientific Assembly, is responsible for development of the scientific programme, including IAMAS symposia led by its Scientific Commissions and, as appropriate, joint symposia held with other Associations and Union symposia held in conjunction with General Assemblies of the Union.

24. All decisions of the Executive Committee will be taken by a simple majority vote of those voting. If the votes are equally divided, that of the President will decide.

Statute XI – Scientific Commissions

25. Scientific Commissions for the study of particular aspects of meteorology and atmospheric sciences may be constituted by the General Assembly. The list of approved Scientific Commissions and their scientific scope is maintained in By-Law II.

25.1 The scopes of the Scientific Commissions approved by the General Assembly will be reviewed every four years by the Executive Committee. Recommendations, as appropriate, for changes in the scope or status of a Scientific Commission will be presented at a Plenary Session of each Ordinary General Assembly, which will decide on the continuation of the research and works of each Scientific Commission or on its termination.

25.2 To better fulfill their scope and objectives, each Scientific Commission may formulate and approve their own set of Statutes and/or By-Laws and control their own administration and finances, all subject to the provisions provided in the Statutes, By-Laws, and positions of the Association, and as appropriate, of the Union and ISC. Review of proposed changes by the Bureau of the Association is encouraged.

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26. The members of the Scientific Commissions will be scientists with expertise in or closely related to the subject area of the Commission (i.e., Scientific Members of the Association).

26.1 The Scientific Commissions may elect new members by a simple majority vote of the members voting in the election. These members must be from IUGG (i.e., National Member) Adhering Countries. Members may also be appointed from IUGG non-Adhering Countries by the President of a Commission, after consultation with members of the Commission. Due regard should be paid to geographical representation in the composition of the Commissions. The terms of Commission members will normally be for two full periods. The results of membership elections and appointments will be promptly reported to the Secretary General, who will convey the results to the General Assembly.

27. Each Commission will elect a President and a Secretary from among their membership. A Vice President may also be elected if the Commission desires. Their terms of office will normally be for one four year term. They will be eligible for re-election for one additional term. Officers will be from National Member countries, except IUGG Associate Countries.

28. When a new Scientific Commission is constituted, the first President will be appointed by the Executive Committee. The Commission President will invite appropriate scientists to be on the Commission. These appointments will be voted upon by the Commission at its first meeting.

29. The Scientific Commissions should, in general, conduct their elections of officers and members at the times of the Ordinary General Assemblies of the Association. In this case these elections should be held prior to the final Plenary Session of the General Assembly so that the results, along with other business conducted by the Commissions, may be reported to the General Assembly. Alternatively, Commissions may decide to elect their officers at a Commission meeting/symposium that is independent of the Ordinary General Assembly, or by postal or electronic correspondence. The General Assembly will have the right to comment on the work of the Commissions, which the Commissions may wish to consider at subsequent business sessions.

30. The Scientific Commissions may meet, organize conferences, and have symposia when convened by their President outside the meetings of the General and Scientific Assemblies of the Association. Such activities may be arranged jointly between interested Commissions, or jointly with other appropriate bodies of the IUGG or ISC, or with other relevant organizations (e.g., the World Meteorological Organization).

31. A Scientific Commission may, at the discretion of its President and, as appropriate, in cooperation with other scientific bodies, appoint Sub-Commissions, Committees, Working Groups, Scientific Steering Committees or other similar panels to undertake planning and conduct of research activities or programmes designed to enhance scientific understanding of relevant aspects of meteorology and atmospheric and related sciences. The members of such sub-bodies need not be members of the Commission. They should be appointed by the President of the Commission, after due consultation with members of the Commission. Findings or recommendations of such sub-bodies must be approved by the parent Commission or an equivalent independent body or process before promulgation. In addition to reporting on their own activities, Commissions have an obligation to periodically report to the Association on the arrangements and findings from cooperative activities with other organizations.

32. All decisions of Commissions will be taken by a simple majority of votes of the members voting (individual votes). In case of equal votes for and against, that of the President will decide.

33. Each Scientific Commission should have an officer responsible for its financial affairs. The Association may make financial awards to Scientific Commissions in support of their activities and symposia. In accepting funds from the Association or any other source, the Scientific Commissions agree to provide financial statements to the Association no less often than every two years, at the direction of the Secretary General. In addition, the Scientific Commissions agree that, by vote of the Executive Committee, they will cooperate with the Secretary General or an individual or committee appointed by the Secretary General in review and examination of their finances.

33.1. In the event of the termination of a Scientific Commission, any assets and balances in its account(s) will be turned over to the Association.

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Statute XII – Joint Scientific Committees

34. Joint Scientific Committees (which also include entities that may be named Joint or Inter-Association Commissions or Working Groups, etc.) between the Association and other Associations on scientific questions of mutual interest may be constituted by the Associations concerned, acting directly in cooperation with the other Associations or through the Union. In the case of IAMAS, formal approval of Joint Scientific Committees or similarly named entities will be confirmed by a General Assembly, although approval in principle may be granted at an earlier date by the Executive Committee. The list of approved Joint Scientific Committees and their scientific scope is maintained in By-Law III.

34.1. With the concurrence of the Executive Committee, adjustments in the policies and rules governing the operation of Joint Scientific Committees may be made to ensure concurrence with the policies and rules of other organizations that are co-sponsoring the Joint Scientific Committee.

35. The members of Joint Scientific Committees will be expert scientists nominated by the respective Associations, each of which will normally nominate the same number of members.

36. The Joint Scientific Committees may propose new members whose nomination must be ratified by the respective Associations at the occasion of their General Assembly. The term of office of members will be for one period. They will be eligible for re-appointment.

37. Each Joint Scientific Committee will elect a President and Secretary who will not both have been appointed by the same Association, and whose term of office will be for one period. They will be eligible for re-election for one additional period.

38. The Joint Scientific Committees will formulate their programme of work and will organize their meetings, insofar as possible, during the course of the sessions of the General Assembly of the Union. The proceedings of the Joint Scientific Committees will be appended to the minutes of the Associations concerned.

38.1. The Joint Scientific Committees may meet when convened by their President outside the meetings of the General or Scientific Assemblies, on condition that the bureaus of the respective Associations are advised beforehand. They may meet at the same time as related Commissions or Joint Scientific Committees constituted by other Associations of the Union or by other Unions, in order to study and resolve together problems which interest more than one Association of the Union or more than one Union.

39. Requests from a Joint Scientific Committee for financial support must be presented and supported by the Associations concerned.

40. Every Joint Scientific Committee may refer in a consultative capacity to experts who are not members of the Joint Scientific Committee.

41. All decisions of Joint Scientific Committees will be taken by a simple majority of votes of the members present (individual votes). In case of equal votes for and against, that of the President will decide.

42. The IAMAS Executive Committee will review the continued participation of IAMAS in each Joint Scientific Committee at each Ordinary General Assembly.

Statute XIII – Financial Arrangements

43. The Secretary General is responsible for the financial operations of the Association (see Statute IX, Article 15.2).

43.1 The financial year of the Association is the calendar year, and the budget period is four calendar years.

44. At least two months prior to the General Assembly, the President shall appoint a Finance Committee consisting of up to three members, not more than one of which is on the Executive Committee and at least one of which will be a Delegate from a National Member country. Prior to the first Plenary Session of the upcoming General Assembly, the Finance Committee, with the cooperation of the Secretary General, shall examine the budget and

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the accounts for the years since the prior General Assembly (including a provisional estimate of income and expenditures for the current year). The Committee will also examine and offer comments on the draft financial summaries and the draft budget for the ensuing period that the Secretary General is called upon to prepare for consideration at the General Assembly. At the first plenary session General Assembly, the Finance Committee will offer its findings and recommendations. The General Assembly and/or the Finance Committee may request that further examination of the accounts be conducted and/or that the accounts be audited by a qualified accountant, with follow-up to be carried through by the Executive Committee.

45. The Association will draw its resources from several sources, including that part of the subscriptions of the National Member countries that is allotted to the Association by the Union. To this income may be added other receipts from, for example, the sale of publications, interest on bank accounts, contributions made by other interested organizations to support symposia or other meetings, and a share of the registration fees at Assemblies (e.g., head tax).

46. The income will be assigned in the first place for the payment of the expenses of the Secretariat, the maintenance of the Contingency Fund, and support for the conduct of scientific meetings, as enumerated in Article 15.2.

47. Upon application to the Secretariat and approval of the Bureau, the balance of receipts will be devoted primarily to grants to support the success of scientific symposia or special meetings. As far as possible, funds are expected to be used to contribute to the participation of early career scientists and atmospheric scientists from resource-limited countries who cannot obtain adequate travel allocations from other sources and who desire to come to General or Scientific Assemblies of the Association and/or its Scientific Commissions and Joint Scientific Committees. In general, it will be expected that such participants will obtain partial support from the Association's funds with the balance coming from national or other sources.

48. Unless provided for specifically by the General Assembly, Association resources are not to be used to fund honoraria for speakers at symposia and other events.

Statute XIV – Voting

49. Voting by the Executive Committee and by the National Delegates can be conducted at a meeting of these bodies or electronically. Electronic voting is voting using electronic systems (e.g., Internet, E-mail, Fax) and organized by the Secretary General. Electronic voting shall normally be suspended in the 6 months preceding a meeting of these bodies.

Statute XV – Dissolution of the Association

50. If the Association should be dissolved, its financial assets will fully revert to a non-profit association for the atmospheric sciences (e.g., a national meteorological society) or the appropriate national adhering body of the Union of the country where the current Secretary General resides. The receiving national association shall pass the financial assets on to the Union to be used exclusively for the continuation of scientific and educational activities, such as the organization of scientific meetings and symposia, the dissemination of scientific information, and the coordination of international research activities.

Statute XVI – Changes in the Statutes of the Association

51. Only National Member countries, members of the Executive Committee, including ex officio members, and officers of the Scientific Commissions may propose changes to any article in these Statutes and By-Laws. These changes must reach the Secretary General at least six months before the announced date of the General Assembly at which it is to be considered. The Secretary General will notify National Member countries and Executive Committee members of proposed changes at least four months before the General Assembly meeting. Adjustments to the proposed amendments may be announced at the General Assembly before the voting.

52. The Statutes and By-Laws can be modified by a two-thirds vote of the National Delegates present or represented by designation (see Article 4.9) or proxy (see Article 4.10) at a Plenary Session of the General Assembly. Such changes will come into effect at the close of the General Assembly at which they are approved.

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Statute XVII – Official Languages of the Association

53. The Association will observe the official languages recognized by the Union, namely English and French. Documents, reports, and abstracts of presentations may be submitted for presentation or publication in either of these languages.

54. For the interpretation of the Statutes, the English text shall be considered authoritative.

Record of Latest Amendment of the Statutes:

These Statutes, approved at the General Assembly in supersede those last amended by the IAMAS General Assembly in Perugia in July 2007 and Melbourne on 4 July 2011. This version of the IAMAS Statutes and By-Laws was compiled by a Statute Committee, chaired by the president of IAMAS, John Turner, between the IAMAS 2017 assembly in Cape Town and the regular General Assembly of IUGG 2019 in Montréal. The IUGG Statutes and By-Laws Committee found no conflict with the IUGG statutes in the drafted version. On 11 August 2019 the IAMAS General Assembly unanimously adopted the present version. After circulation by email to all national representatives it is now in force.

BY-LAWS

By-Law I – Governing Procedures of the Nominating Committee

1. The Executive Committee will appoint a Nominating Committee at the Scientific Assembly two years before a General Assembly. This committee will be responsible for nominating candidates for President, two Vice Presidents, elected members of the Executive Committee, and a Secretary General, when required. The Nominating Committee will consist of a chairperson (the Past-President, if available) and at least two other members plus the President as an ex-officio member, each of whom should be Individual Members of the Association.
2. The Nominating Committee will contact the adhering body of the National Member countries of the Association and the Executive Committee at least six months before the General Assembly and request nominations for the positions indicated above to reach them at least four months before the General Assembly. Individual Members of the Association will also be invited through a Web site posting that they may also submit nominations; any such nomination should be seconded by two additional Individual Members.
3. The Nominating Committee will consider nominees from National Member countries, from Commissions and from Individual Members and may also consider nominations from other sources. The Nominating Committee will prepare a list of nominations for consideration at the General Assembly, and may propose a single slate of candidates. The nominees must be from National Member countries, except Associate Countries (see paragraph 4 for interpretation of this provision). The slate of candidates for office will be communicated to National Member countries and the Executive Committee at least two months before the General Assembly.
4. Recognizing the internationalization of science and the intent of the Statutes to encourage widespread participation in the governance of the Association, this By-Law is included to provide guidelines for the interpretation of the first sentence of Statute 8.4, which states that “Five Members-at-Large, each from a different National Member country, will also be elected as officers of the Association” and Paragraph 3 of By-law I:
 - 4.1. The nation of affiliation of a scientist shall be defined as the nation where the scientist has been and is expected to be primarily based for the greatest number of years over the period from 5 years before the election to 5 years after the election, assuming that a scientist’s affiliation will remain the same unless a prior arrangement is in place.
 - 4.2. In the event that paragraph 4.1 leads to a scientist being affiliated with a nation that is not an Adhering Member of the IUGG in paying status, the basis for national affiliation may be determined by considering the years spent in a member nation where the scientist has held a formal appointment in the 20 years prior to the present appointment.
 - 4.3. In the event that a scientist’s primary affiliation is with an international organization or program office other than in the nation of the scientist’s citizenship or previous research position, the national affiliation may be either the nation where the position is or has been located or the nation of citizenship.
 - 4.4. To the extent possible, not more than two of the members-at-large shall be from the same continent, excluding any scientist primarily affiliated with an international organization.
 - 4.5. In considering the national affiliations of the President, Past President, Secretary General, two Vice-Presidents, and five Members-at-Large, the Nominating Committee should endeavor to ensure that at least four of the world’s continents are represented.
5. Any nominations for President or Secretary General should be accompanied by an indication of available resources for the operation of the respective offices.
6. At the first Plenary Session of the General Assembly the Nominating Committee will, if one is prepared, formally table its slate of candidates. Nominations from the floor for all positions except Secretary General can be made at that time. All nominations require the agreement of the individual to serve if elected. The election will take place during the final Plenary Session of the General Assembly.

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By-Law II -- Approved Scientific Commissions

1. The General Assembly approves Scientific Commissions to carry through the Objectives of the Association in specific scientific areas. As described in Statute XI, the continuation and scope of each of these Commissions is to be reviewed at each General Assembly.
2. The following Scientific Commissions have been either accepted (in the case that their formation predates formation of the Association) or established by the General Assembly:
 - 2.1. The International Radiation Commission (IRC). The scope of the IRC encompasses atmospheric radiation and related disciplines. The IRC was founded in 1896 and accepted into IAMAS in 1948.
 - 2.2. The International Ozone Commission (IOC). The scope of the IOC encompasses the amounts, characteristics and processes of ozone in the atmosphere. IOC was originally approved in 1948.
 - 2.3. The International Commission on Clouds and Precipitation (ICCP). The scientific scope of ICCP encompasses the characteristics and processes governing clouds and precipitation in the atmosphere. ICCP was originally approved in 1956.
 - 2.3.1. The Committee on Nucleation and Atmospheric Aerosols is a subcommittee of the ICCP formed in 1966 to bring together scientists covering the following subject areas: nucleation theory and experiment, tropospheric and stratospheric aerosols, cloud drop and ice nucleation, and aerosol-climate interactions.
 - 2.4. The International Commission on Atmospheric Chemistry and Global Pollution (ICACGP). The scientific scope of ICACGP encompasses the chemistry and composition of the atmosphere, especially aspects that contribute to solving the basic societal issues of water supply, food production and human/ecosystem health. ICACGP was originally approved in 1957 as the International Commission on Atmospheric Chemistry and Radioactivity, and renamed in 1971.
 - 2.5. The International Commission on Dynamical Meteorology (ICDM). The scope of the ICDM encompasses dynamical meteorology. ICDM was originally approved in 1967.
 - 2.6. The International Commission on Climate (ICCL). The scientific scope of ICCL encompasses the characteristics, fluctuations, and changes of climate on all time scales, covering the past, present and future. ICCL was originally approved in 1977.
 - 2.7. The International Commission on Planetary Atmospheres and their Evolution (ICPAE). The scope of ICPAE encompasses planetary, cometary and satellite atmospheres and their evolution (including the Earth, when considered as a member of the Solar System). The ICPAE was originally approved in 1977.
 - 2.8. The International Commission on the Middle Atmosphere (ICMA). The scientific scope of ICMA encompasses the middle atmosphere, defined loosely as stretching from the tropopause into the lower thermosphere. The ICMA was originally approved as the International Commission on Meteorology of the Upper in Atmosphere in 1979, and renamed in 1987.
 - 2.9. The International Commission on Atmospheric Electricity (ICAE). The scientific scope of ICAE encompasses electrical phenomena in the atmosphere. ICAE was originally approved in 1989.
 - 2.10. The International Commission on Polar Meteorology (ICPM). The scope of the ICPM encompasses the meteorology and climatology of the Arctic and Antarctic. The ICPM was originally approved in 1963.

By-Law III -- Approved Joint Scientific Committees

1. IAMAS approves Joint Scientific Committees to carry through the Objectives of IAMAS in cooperation with other Associations. As described in Statute XII, the continuation and scope of each of these Committees is to be reviewed at each General Assembly.

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2. Participation in the following Joint Scientific Committees (names of which can vary based on IUGG conventions) has been concurred in by the Executive Committee and, if so indicated, approved by the IAMAS General Assembly:

- 2.1. The Committee on Mathematical Geophysics (CMG). The CMG is formally an IUGG Union Commission. The aims of CMG are 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. CMG was formed as a Working Group in 1964 and reconstituted as the CMG in 1971.
- 2.2. The Union Commission on Geophysical Risk and Sustainability (GeoRisk). The scope of GeoRisk encompasses the interaction between hazards, their likelihood and their wider social consequences as a result of the vulnerability of societies. GeoRisk was formed by IUGG in 2000 and approved by IAMAS in 2003.
- 2.3. The Union Commission for Data and Information (UCDI). The scope of UCDI is to provide a focused and sustainable organizational structure that supports and strengthens IUGG science through integrated scientific information activities. UCDI was established by IUGG in 2008 with Executive Committee concurrence in 2009 (formal IAMAS General Assembly approval pending).

3. The President, with the approval of the Executive Committee, is responsible (as indicated in Statute 12.5) for appointment of members of Joint Scientific Committees who serve on behalf of IAMAS to represent its objectives.

By-Law IV -- Procedures for the Recognition of
Scientific Expertise and Accomplishments

1. The General Assembly has established the following types of recognition of individual scientists (i.e., Scientific Members) and scientific accomplishments. Implementation of these types of awards, including protocols and criteria, is assigned to the Executive Committee, upon recommendation by the Bureau:

- 1.1. Recognition of an individual scientist whose career has contributed to the advancement of international research in meteorology and atmospheric sciences through appointment as an honorary member, which will be recognized by a suitable memorial the Association.
- 1.2. Recognition of an individual scientist for significant scientific accomplishments over a career or prolonged research programme through a suitable memorial and passage of a resolution of the Association calling special attention to the accomplishment.
- 1.3. Recognition of one or more early career scientists at a Scientific Assembly through award of a certificate or other suitable reward.
- 1.4. Other awards or recognition as determined by the Executive Committee or General Assembly.

2. The Executive Committee may choose to implement this By-Law at its discretion, choosing to offer or not offer any of the recognitions at any of the General or Scientific Assemblies.

By-Law V -- Procedures for Proposing and Approving Resolutions

1. Resolutions expressing the views of IAMAS must be approved by the General Assembly. Between General Assemblies, the Executive Committee may express its views in the form of a resolution of that body.

2. Resolutions of IAMAS will normally be addressed to scientific bodies, to organizations responsible for the conduct and governing of scientific research, and/or to the public. Through the president, IAMAS may join with IUGG or other Associations in resolutions that reflect the views as expressed by the IAMAS General Assembly and/or Executive Committee.

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3. The content of resolutions must be in furtherance of the objectives of the Association and not for partisan purpose. The General Assembly or Executive Committee may amend or modify a draft of the resolution before considering it for final approval. When developing joint resolutions with other bodies, the President and/or Secretary General or their designees may revise draft resolutions in the interests of IAMAS.
4. For consideration at the final Plenary Session of a General Assembly of the Association, a draft of the resolution must be provided to the Secretary General in time for consideration by the IAMAS General Assembly by the close of its first Plenary Session.
5. The Secretary General is responsible for the official transmittal of resolutions of the Association to those to the entities to whom the resolution is addressed.
6. The Secretary General shall maintain a cumulative record of the resolutions of the Association and of the resolutions made in partnership with other Associations and the IUGG.

By-Law VI -- Liaison Appointments of the Association

1. As a constituent association of the Union, officers of the Association and its Scientific Commissions, upon nomination and approval of the Union, serve as the Union's liaison to and/or ex officio members of the following scientific organizations:
 - 1.1. Executive Committee of ISC's Scientific Committee on Oceanic Research (SCOR).
 - 1.2. The World Meteorological Organization (WMO).
 - 1.3. The Joint Scientific Committee of the World Climate Research Programme (WCRP).
2. Acting in partnership with other IUGG associations, IAMAS makes appointments to Joint Scientific Committees, Inter-Association Commissions, Union Commissions, and Working Groups. These presently include:
 - 2.1. The Committee on Mathematical Geophysics (CMG).
 - 2.2. The Union Commission on Geophysical Risk and Sustainability (GeoRisk).
 - 2.3. The Union Commission for Data and Information (UCDI).
3. In representing the interests of the Association in other international bodies, the Association may, in cooperation with the relevant Scientific Commission, make additional liaison appointments.

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION FOR THE PHYSICAL SCIENCES OF THE OCEANS

STATUTES

(Adopted October 1967, Berne, Switzerland, revised December 1979, Canberra, Australia, revised by mail ballot 1998, revised July 2007, Perugia, Italy, revised July 2019; Montréal, Canada, and revised by electronic vote, December 2020)

I. Objects, Composition and Membership of the Association

- 1) The International Association for the Physical Sciences of the Oceans (IAPSO) hereafter referred to as the Association is a constituent of the International Union of Geodesy and Geophysics hereafter referred to as the Union. The Association is subject to those articles of the Statutes and By-Laws of the Union which apply to Associations, and also to these Statutes.
- 2) The objects of the Association are:
 - (a) to promote the study of scientific problems relating to the ocean and interactions taking place at its boundaries, chiefly insofar as such study may be carried out by the aid of mathematics, physics and chemistry;
 - (b) to initiate, facilitate and coordinate research into and investigations of those problems of the ocean which require international cooperation;
 - (c) to provide for discussion, comparison and publications; and
 - (d) to organize Assemblies, which include symposia on the most interesting and up-to-date problems of physical and chemical oceanography.
- 3) Those Adhering Bodies that adhere to the Union are Members of the Association, and are hereafter referred to as "Members".

By resolution of an Association Assembly, other international organizations that are concerned with the study of physical sciences of the oceans may be admitted to Membership, with the status of guests.

II. Administration

- 4) The Authority of the Association shall be vested in the Members, and exercised collectively by their accredited delegates. The Association will hold a meeting of delegates at General Assemblies of the Union and at Association Assemblies occurring during interim periods between General Assemblies.
- 5) The Association shall convene scientific symposia and/or workshops and hold business meetings of the Members' delegates at the General Assemblies of the Union, to be held normally once every four years. The Association may recommend to the Executive Committee of the Union, at a General Assembly of the Union, arrangement of joint sessions of two or more Associations or of joint meetings of two or more Committees or Commissions for the discussion of topics of an interdisciplinary character. With the concurrence of the Executive Committee of the Union, the Association may arrange General Assemblies and other meetings of its own in the interval between the General Assemblies of the Union, either singly to deal with topics of specific interest, or jointly with another Association or other Associations.
 - (a) Meetings of Members' delegates are restricted to the delegates, members of the Association Executive Committee, and persons invited by the Association President when their attendance is deemed necessary to make reports or presentations to the delegates.
 - (b) Meetings of the Association Executive Committee are restricted to members of the Executive Committee and persons invited by the Association President when their attendance is deemed necessary to make reports or presentations to the Executive Committee.

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- 6) The President, the two Vice Presidents, the Secretary General, and the Treasurer of the Association shall be elected by delegates to the Association in accordance with Section III.
- 7) The Bureau of the Association shall consist of the President, Past President, the Secretary General and the Treasurer. Its duties shall be to conduct the affairs of the Association in accordance with the decisions of the foregoing meetings of the delegates. It shall prepare the Agenda for meetings of delegates. With the advice of the Association Executive Committee, it shall prepare the scientific program for Assemblies.
- 8) In accordance with Section III, the delegates from countries having Members shall elect eight persons who, together with the President, immediate Past President, Vice Presidents, Secretary General, and Treasurer, shall constitute the Executive Committee of the Association. One of the eight members will be de facto an early career scientist, whose formal role will be to chair the IAPSO Early Career Scientists Working Group.
- 9) The Executive Committee may establish Association Commissions, Working Groups or Services to address particular scientific areas of oceanography, and may abolish such Commissions, Working Groups and Services by a majority vote of the Executive Committee members. The Executive Committee may also approve Association participation in joint Commissions, Working Groups and Services with other Associations or scientific bodies, and may withdraw Association participation by a majority vote of the Association Executive Committee members.
- 10) A Nominations Committee of four persons from countries having Members will be appointed by the Executive Committee. The Nominations Committee will normally include the immediate Past President as its Chairperson. Its function will be to scrutinize nominations received for positions on the Executive Committee which become vacant, to seek additional nominations where appropriate, to ensure disciplinary and geographical distribution, and to prepare a final slate of candidates for election at the General Assembly.
- 11) The Executive Committee of the Association may establish medals and awards to recognize individuals for their accomplishments in advancing the knowledge of the physical and chemical sciences of the oceans.

III. Voting

- 12) Voting is held (a) at meetings during the Association Assembly or (b) electronically. Electronic voting is voting using electronic systems (e.g., Internet, E-mail, Fax) and organized by the IAPSO Secretary General. Electronic votes shall be open for one calendar month from the date of announcement. Electronic voting shall normally be suspended in the 6 months preceding an Association Assembly.
- 13) In questions of scientific nature, or of administrative nature, or of a character partly administrative and partly scientific not involving matters of finance, voting shall be by Members, each Member having one vote with the provision that its subscription shall have been paid up to the end of the year preceding the voting.
- 14) In questions involving finance, voting shall be by Member delegates, with the same provision as for administrative questions. The number of votes for each Member delegate shall be equal to the number of its category of membership to the Union.
- 15) Before a vote either during an Association Assembly, or through an electronic vote, the President shall decide whether the matter under consideration is scientific, administrative or financial in character and whether voting by correspondence is applicable.
- 16) A delegate shall represent only one Member. In the case of voting held during an Association Assembly, an adhering Member not represented by a delegate may submit by post its vote on any specific question of an agenda.
- 17) Guests will not vote.

IV. General

- 18) These Statutes shall be changed only by a majority of two thirds of the votes cast by delegates at an Association Assembly or electronically in accordance with Section III. Any modification to the Statutes shall

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come into force at the close of the Association Assembly at which they are adopted, or in the case of electronic voting on the date at which they are adopted.

- 19) The Association may make By-Laws which may be changed by a simple majority of the votes cast by delegates at an Association Assembly, or electronically in accordance with Section III. Any modification to the By-Laws shall come into force at the close of the Association Assembly at which they are adopted, or in the case of electronic voting on the date at which they are adopted.
- 20) This English text shall be the authoritative text of the Statutes of the Association.

BY-LAWS

(Adopted October 1967, Berne, Switzerland, modified December 1979, Canberra, Australia, modified August 1995, Honolulu, USA, modified 1998, and modified July 2007, XXIV IUGG General Assembly, Perugia, and modified by electronic vote, December 2020.)

I. Membership of the Association

- 1) It is recommended that each adhering Member shall form a National Sub-Committee for the Physical Sciences of the Oceans, to which correspondence may be addressed.
- 2) Each adhering Member and each international member may contribute to the Agenda of Association Assemblies.

II. Administration

- 3)
 - (a) The President and the Vice Presidents shall be elected for one four-year term. Their terms shall be the interval between the ends of two successive General Assemblies of the Union. A Vice President may be elected for one additional four-year term.
 - (b) The term of the immediate Past President shall run from the end of the General Assembly at which the new President is elected until the end of the next General Assembly.
 - (c) The Secretary General and the Treasurer shall be elected for two periods, and may be re-elected for the subsequent single period.
- 4) The President shall:
 - (a) provide general leadership for the Association in all matters;
 - (b) represent the Association on the Union Executive Committee;
 - (c) serve as chairperson of those meetings of Members' delegates and the Association Executive Committee held at Association Assemblies;
 - (d) represent the Association in communications with the International Association for Biological Oceanography (IABO) either directly or through scientific committees of the International Council for Science (ICSU);
 - (e) appoint qualified ocean scientists to serve as liaisons between the Association and other scientific organizations as appropriate; and
 - (f) prepare Association responses on inquiries of a scientific nature received from other organizations.
- 5) The Vice Presidents shall:
 - (a) perform such tasks as may be assigned by the President or the Association Executive Committee; and

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- (b) act as the President whenever the President is not present or is unable to perform any of the President's duties. The acting President shall perform such tasks as required by the President.
- 6) The Secretary General shall:
- (a) serve as Secretary of the Association Assemblies, the Member meetings, the Executive Committee and the Bureau; arrange for meetings of these Bodies; prepare and distribute promptly the agenda and the minutes of all their meetings;
 - (b) manage the affairs of the Association, attend to correspondence, preserve the records;
 - (c) maintain an Association web page on the World Wide Web, either as part of or linked to the Union web page. The web page shall include all general details of the Association; its activities; abstract books of Association Assemblies when available; and other information of use to Members and associated scientists;
 - (d) at least three months before the General Assembly of the Union, forward to all the Members a report on the administration of the Association since the last General Assembly, and present a summary of this to the delegates meeting at General Assembly itself; and
 - (e) perform such other duties as may be assigned by the Association Bureau.
- 7) The Treasurer of the Association shall be responsible for the financial administration of the Association in accordance with directions issued by the Association Bureau. The Treasurer shall:
- (a) prepare the yearly budget of the Association and distribute to the Association Bureau for approval;
 - (b) collect the funds of the Association and disburse them in accordance with the approved budget;
 - (c) maintain records of all the financial transactions of the Association and submit annual financial reports thereon to the Association Bureau and to the Treasurer of the Union;
 - (d) assemble, at the end of the calendar year preceding a General Assembly, the complete accounts of the Association for the past period for presentation to the Association Bureau and the Treasurer of the Union at least three months prior to the General Assembly and at the Member meeting at the Assembly; and
 - (e) pay traveling expenses and per diem subsistence to members of the Executive Committee attending Association Assemblies and meetings with Association support, where those concerned cannot draw proper allocations from their national sources (see By-Law 18).
- 8) Of the eight persons referred to in Article 8 of the Statutes, not more than four may be elected to an additional term.
- 9) The Executive Committee shall:
- (a) prepare for the Executive Committee of the Union recommendations concerning the arrangement, at a General Assembly of the Union, of scientific meetings to be confined to joint sessions of two or more Associations or of Joint meetings of two or more Committees or Commissions, for the discussion of topics of an interdisciplinary character;
 - (b) at its meetings during an Assembly, select the themes of Association symposia for the next Assembly, and recommend conveners for the symposia;
 - (c) seek for the concurrence of the Executive Committee of the Union for the arrangement of General Assemblies and other meetings of the Association in the intervals between the General Assemblies of the Union, either singly to deal with topics of specific interest, or jointly with another Association or other Associations;
 - (d) fill any vacancy which may occur among the officers of the Association between General Assemblies. Such appointments shall be subject to the subsequent approval of the next General

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Assembly. Tenure of office for part of a period shall not be counted as a period for the purpose of these By-Laws;

- (e) consider matters of general administration and finance, and report thereon to the General Assembly;
 - (f) make recommendations on matters of policy;
 - (g) frame the budget for the ensuing period and report to the General Assembly of the Association and to the Secretary General of the Union. The budget period of the Association coincides with the budget period of the Union;
 - (h) advise upon the distribution of funds; and
 - (i) consider proposals for changes in the Statutes and By-Laws, and report thereon to the General Assembly.
- 10) Officers designated by these By-Laws for special duties or for special committees may appoint substitutes in their stead. Notice of the intention to do so must be sent in writing to the President or Secretary General. No substitute shall represent more than one officer.
- 11) Decisions and actions of the Officers and Committees of the Association, taken during and between Association Assemblies, shall be reported to the delegates' business meeting at the Assembly.
- 12) Proposals for the Agenda of the meeting of delegates at General Assemblies of the Union and Association Assemblies shall reach the Secretary General six months before the meetings. The Secretary General shall send the Agenda to the Members and their accredited delegates, through the National Sub-Committees where such exist, at least four months before the meeting. No question not previously placed on the Agenda shall be discussed unless approved by two thirds of the votes of the Members represented at the Assembly.
- 13) Medals and Awards
- (a) The Executive Committee shall establish protocols for awarding medals or other awards established by the Association.
 - (b) The Prince Albert I Medal shall be awarded at each Association Assembly to a distinguished ocean scientist for career achievements in advancing the knowledge of the physical and/or chemical sciences of the oceans.
 - (c) The Eugene LaFond Medal will be awarded at Association Assemblies to a student or scientist from a developing country in recognition of the student's or scientist's presentation of an outstanding paper. Not more than one Medal will be awarded at any Assembly. The Executive Committee may decline to present the Medal at a particular Assembly.
- 14) Nominations Committee
- (a) The terms of members of the Nominations Committee referred to in Article 10 of the Statutes will expire at the end of the General Assembly following their appointment.
 - (b) A call for nominations for candidates for positions on the Executive Committee will be issued by the Secretary General of the Association at least six months prior to a General Assembly where an election is to take place.
 - (c) Nominations must be accompanied by a brief Curriculum Vitae, and will not be accepted later than three months prior to the General Assembly, except for additional candidates identified by the Nominations Committee in accordance with Article 10 of the Statutes.
 - (d) The Nominations Committee will prepare a slate of candidates one month prior to the General Assembly, and will confirm that the members of this slate are prepared to serve if elected.
 - (e) In the event of a vacancy occurring on the Executive Committee during its term of office as a result of the resignation or demise of a member, the Nominations Committee will assist the Executive Committee in finding a suitable replacement.

III. Finance

- 15) The President and Treasurer shall individually have power to sign documents on behalf of the Association.
- 16) All disbursements of Association funds shall be made by the Treasurer in consultation with the Association Bureau.
- 17) The Treasurer shall receive the allocation of funds from the Union, maintain financial accounts, obtain receipts for disbursement of funds and maintain financial records.
- 18) Traveling expenses may be paid by the Treasurer, but only
 - (a) in connection with meetings on specific Association or Union business; when the travelers represent the Association and not the Members or other organizations; and where those concerned cannot draw proper allocations from their national sources; and
 - (b) to cover the traveling costs of a person receiving an award from the Association.
 - (c) Such payments may cover traveling costs at economy rates and a reasonable contribution to other expenses when attending such meetings.

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR

(Adopted 1975, Grenoble, France, amended in July 2011, XXV IUGG General Assembly, Melbourne, Australia, in June 2015, XXVI IUGG General Assembly, Prague, Czech Republic, 2017 at the Scientific Assembly in Kobe, Japan, and July 2019, XXVII IUGG General Assembly, Montreal, Canada)

Statutes

I. Objectives of the Association

1. The International Association of Seismology and Physics of the Earth's Interior (IASPEI) is a non-governmental and non-profit organization with the purposes:
 - a. To facilitate research on theoretical, observational and applied seismology, such as the propagation of seismic waves, the discussion, design and adoption of standards for observatory practice and data storage, and generally all matters related to seismology.
 - b. To promote multidisciplinary research related to earthquake science, internal structure, properties and processes of the Earth.
 - c. To initiate and co-ordinate the conduct and communication of related research which depends on co-operation between different countries.
 - d. To organize and support international conferences and meetings focusing on the above-mentioned topics and to support, including financially if the budget allows, the participation in such meetings of young researchers and of scientists from developing countries.

II. Members of the Association

1. Each country having adhered to the International Union of Geodesy and Geophysics (IUGG) is a member.
2. Each scientist participating in IASPEI activities and in the Scientific Assemblies is an individual IASPEI member. Any member attending the General Assemblies or participating in other activities of the Association at least once in the past ten years is considered to be an active individual member.

III. National Committees

1. Each National Committee for the IUGG (or national organisation adhering to IUGG) where possible should nominate a section, or sub-committee, for Seismology and Physics of the Earth's Interior. The functions of this section or sub-committee are to facilitate and co-ordinate in their respective countries the study and practice of Seismology and Physics of the Earth's Interior, in accordance with the objects of the Association. Each National Committee and the Section or Sub-Committee shall be empowered to refer to the Association matters for discussion falling within the competence of the Association.
2. The National Committee (or adhering organization) names in each country a correspondent (hereafter National Correspondent), whose duty is to provide liaison between IASPEI and the Section in each country.
3. The National Committee, on the recommendation of the Section or Sub-Committee, nominates the delegate or delegates who shall represent it at the General Meeting of the Association. One of these delegates shall be designated as the principal delegate of the country and shall cast the vote of that country whenever a "national vote" is required (refer section VIII.2). If a National Committee does not formally appoint a delegate, the (older in age in case of two) National Correspondent(s) present at the General Meeting is the principal delegate.
4. Official communications sent by the International Association of Seismology and Physics of the Earth's Interior to an adhering country shall be addressed to that country's IASPEI National Correspondent or, in default, to its National Committee for the IUGG.

IV. Administration of the Association

1. The work of the Association shall be directed by the Association Plenary Meeting of the delegates of the Member countries of IUGG, and of the individual IASPEI members.
2. The Plenary Meeting of the Association shall elect the following: a President, a First and Second Vice-President, a Secretary General, a Treasurer and four additional persons. These, plus the immediate past President shall constitute the voting members of the Executive Committee of the Association.
3. A single person may, with the approval of the Executive Committee, be elected both Secretary General and Treasurer.
4. The President, the Vice-Presidents, the Secretary General and the Treasurer shall constitute the Bureau of the Association.
5. Elections shall be held at an Association Plenary Meeting held in conjunction with the quadrennial General Assembly of the IUGG. The President may not be re-elected to the same office, and no person may hold any one office for more than 12 consecutive years.
6. Should a vacancy occur among the elected offices, the Bureau shall fill the position provisionally by nomination, and an election shall be held for this office at the next General Meeting of the Association.
7. The transfer of duties takes place at the close of the Association Plenary Meeting at which the election occurs. The interval between successive elections (normally 4 years) is called a period.
8. The President, in consultation with the Executive Committee, may appoint individuals to committees as may be needed, and may approve the terms of reference of such committees.
9. Urgent matters arising in the interval between Association Assemblies shall be referred by the Bureau to the Executive Committee.
10. The Executive Committee may appoint an Associate Secretary who will be an ex-officio member of the Executive Committee, but without vote.
11. The Executive Committee may appoint an Association Webmaster who will be responsible for maintaining the website of the Association.

V. Secretariat

A Secretariat placed under the direction of the Secretary General shall conduct the correspondence, preserve the administrative archives, maintain a register of the National Correspondents, delegates and active membership, arrange the Association Assemblies and other meetings, and ensure the records of the Assemblies and Commission reports are preserved in an accessible web location.

VI. Budget and Finance

1. The financial resources of the Association are derived from: The allocation by the IUGG; The sales of publications, subscriptions, advertisements, etc.; A quota of the registration to the Association Assemblies; Grants; Contracts; Donations.
2. The Treasurer shall administer and disburse these resources under the direction of the Executive Committee. The administration of resources shall include the permanent delegation of authority to manage any bank accounts or investments held in the name of the Association.
3. The Treasurer shall alone retain responsibility toward the Association for all banking operations. As a precaution, however, the right to sign as an authorized agent for any account opened in the name of the Association shall be extended to at least one other Member of the Executive Committee.
4. The Treasurer shall provide annual financial reports as required by IUGG.
5. The Treasurer shall arrange for independent external audit of, and prepare and submit to the Association Plenary, the Accounts of Receipts and Expenditures for the preceding period, together with an estimated budget for the following financial year.
6. An audit committee, authorised by the Plenary Meeting shall examine the accounts prepared by the Treasurer and submitted to the Plenary Meeting for the preceding period, and give discharge to the Treasurer for those accounts.
7. In the event of the dissolution of the Association, its assets shall be ceded to the IUGG.

VII. General Meetings of the Association

1. Scientific Assemblies of the Association shall be held in conjunction with General Assemblies of the IUGG, and normally at least once between successive IUGG meetings. At least one Plenary Meeting of the Association shall be held at each Scientific Assembly.
2. In the intervals between the Scientific Assemblies the Association may, either separately or jointly with other Associations, hold or sponsor additional scientific meetings.
3. The Bureau of the Association, on the request of the majority of the members of the Executive Committee may conduct an extraordinary meeting of the National Correspondents using e-mail or web-based tools, in order to resolve an urgent question. National Correspondents shall have at least one week notice of any resolution that requires a national vote.
4. The agenda to be transacted at an Association Plenary Meeting held in conjunction with a Scientific Assembly is to be prepared by the Bureau and posted at least two working days before the Plenary Meeting.
5. The agenda may only be modified with the consent of the majority of the IASPEI members present at the Plenary Meeting.
6. The Executive Committee approves a Local Organising Committee for the Scientific Assemblies conducted between the General Assemblies of IUGG, on the basis of a proposal submitted by the approved hosting country.
7. The Scientific Programme for a Scientific Assembly is the responsibility of the Secretary General, who will approve symposia and appoint convenors, in consultation with the Executive Committee and the Commission chairs.
8. Registration and abstract submission to the Scientific Assembly are open to all members of the international scientific community.

VIII. Voting

1. In a Plenary Meeting of the Association, two types of resolution may be put to the meeting: A. Procedural, and B. Scientific
2. Elections of the President and Procedural resolutions shall be decided on the basis of one vote per country present at the Association Plenary. That vote is to be exercised by the principal delegate of each country (refer paragraph III.2) or his proxy and is referred to here as a "national vote". In any vote a delegate may represent only one country.
3. A country that is not represented at the Association Plenary Meeting may appoint a proxy, or forward its vote, by notifying the Secretary General in writing before the election.
4. Scientific resolutions and the election of the members of the Bureau and Executive Committee, apart from the President, shall be decided by a majority of the votes cast by all IASPEI members present at the Association Plenary.
5. The Resolutions Committee will decide which category any specific resolution falls into, before it is presented to the Association Plenary. If any principal national delegate objects to that classification, the delegate may request that a national vote be used to decide which category a specific resolution falls into, before the resolution is voted on.
6. When there is an equal division of votes, the President shall have a deciding vote.
7. The election of the President will be conducted by open ballot and requires the approval by the majority of the principal national delegates or their proxies present at the Plenary Meeting. If requested by one principal national delegate the election has to be conducted by written ballot.
8. The election of all other Association Offices and of the Executive Committee members will be conducted by open ballot and requires the approval by the majority of the IASPEI members present at the Plenary Meeting.

IX. Validity of Statutes

1. These statutes may be revised by a two-thirds majority vote of the member countries represented by principal national delegates at an Association Plenary Meeting.

2. The proposed revision must be posted at least one month in advance of the vote.
3. The English text shall be used exclusively in interpreting these statutes.

X. Commissions and Working Groups

1. The Association, on the recommendation of the Executive Committee, may establish Commissions to study scientific topics and to stimulate and coordinate research on specific topics or research related to a specific region.
2. The Association may also establish joint Commissions or Working Groups with other organizations.
3. Commission chairs (or co-chairs) will be nominated by the President.
4. Working Groups may be established or disbanded by the Commission chair, who will appoint the chair of the Working Group.
5. Commission and Working Group members will be invited to participate by the respective chair.
6. Commission or Working Group chairs shall not hold the same office for more than two periods.
7. Commission chairs will provide annual reports to the Secretary General (including reports on their Working Groups) prior to the Annual Bureau Meeting.
8. A Commission may be disbanded by decision of the Executive Committee if in the view of that Committee the Commission is no longer needed.

By-Laws

The following by-laws are established in order to provide for continuing guidance in conducting the affairs of the Association. The by-laws may be amended by majority decision of the Executive Committee.

XI. Definitions

In the context of the Statutes and By-laws, the term "posted" will be taken to indicate an e-mail sent to a prepared list of the Association National Correspondents and posted on the IASPEI web site. The term "mail" will be taken to include e-mail. The term "period" indicates the period between elections of the Association Officers, normally four years.

XII. Resolutions

- a. Before the General Assembly, the President shall appoint a Resolutions Committee consisting of one officer of the Association and two other persons.
- b. All resolutions to be presented at the Plenary Meeting of the Association must be transmitted in writing to the Resolutions Committee at least the day before the said meeting. It is the responsibility of the Resolutions Committee to word the resolutions consistently with the terminology of the Association and of the IUGG.

XIII. Nominations

1. At least two years before an election, the President shall appoint a Nominating Committee whose charge is to bring before the Plenary Meeting of the Association at the quadrennial General Assembly a slate of candidates for election to the Association Offices and the Executive Committee. The candidates for election shall be announced at least four days in advance of the Plenary Meeting.
2. The Nominating Committee should keep in mind the need for persons of executive ability, comprehensive scientific interests, and broad geographical representation and should consult, where possible, with former Presidents of the Association.
3. At the Plenary Meeting, additional nominations for each office may be made from the floor but they should reflect the same criteria that the Nominating Committee has to abide, in particular, the broad geographical representation.

XIV. Meetings of the Bureau and of the Executive Committee

1. The Bureau of the Association should meet at least every year. The Executive Committee should meet as often as necessary and at least once during each Association Assembly. If necessary and practicable, such meetings may be held using web-based communications, recognising that face-to-face meetings are preferable for most purposes.
2. The Association will normally cover Bureau travel expenses incurred for such meetings.
3. The president of each Regional Commission or their designee shall be invited to participate in Executive Committee meetings with consultative capacity without vote.

XV. Conduct of Meetings

Except if otherwise provided in the Statutes and By-laws, meetings shall be conducted according to Robert's Rules of Order.

STATUTES AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR

(Revised July 2011, XXV IUGG General Assembly, Melbourne, Australia, and June 2015, XXVI IUGG General Assembly, Prague, Czech Republic)

STATUTES

I. Objectives of IAVCEI

- a) To promote the study of volcanoes, volcanic processes and their deposits, past and present, and of the chemistry of the Earth's interior;
- b) To encourage, initiate, and coordinate research and to promote international cooperation in these studies;
- c) To arrange for the dissemination and discussion of research results and policy matters on volcanology at major conferences (IAVCEI General Assemblies, IAVCEI Scientific Assemblies, Cities on Volcanoes Conferences), and Research Commission Workshops and Field Workshops;
- d) To arrange for the publication of the results of scientific research on volcanology and on the chemistry of the Earth's interior through its dedicated journal, *Bulletin of Volcanology*, and book series;
- e) To encourage volcanologists to alert appropriate authorities to the importance of adequate surveillance of active and potentially active volcanoes and of volcanic risk assessment;
- f) To be the international reference body for advice on scientific policies relating to volcanic processes, hazards and risks;
- g) To provide guidelines to professional volcanologists on protocols and principles in the conduct of their work, and to help them understand their responsibilities, the expectations and consequences of their actions, in their countries of employment and service

II. Relationship of IAVCEI to IUGG

2. IAVCEI is a constituent association of the International Union of Geodesy and Geophysics (IUGG), but is autonomous in its governance structure and processes, as defined below.
3. IAVCEI will contribute to IUGG through the IUGG Bureau, Executive Committee and Council through nomination of office bearers for the Bureau, participation of its President, and by invitation, Secretary General, in IUGG Executive Committee meetings, and their attendance at IUGG Council meetings when invited, to contribute the views of IAVCEI and its members, to the business of IUGG.
4. IAVCEI will receive from IUGG an annual capitation fee, based on the number of IAVCEI delegates who register and attend IUGG General Assembly conferences as IAVCEI members.

III. Membership of IAVCEI

5. In accordance with the Principle of Freedom of Participation in Learned Societies (see Appendix), anyone who has interests in volcanology or geochemistry can become a member of IAVCEI, irrespective of country of origin, and participate in the governance of IAVCEI.
6. Those wishing to become members of IAVCEI must apply on-line for membership through the IAVCEI website, and must pay the annual fee to maintain membership.

IV. Administration of IAVCEI

7. IAVCEI will be managed by a democratically elected Executive Committee, that is elected every 4 years, immediately prior to the IAVCEI General Assembly.
8. The Executive Committee will consider business brought to it by members of the Committee, individual members of IAVCEI and the IUGG Bureau and Executive Committee.

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9. The IAVCEI Executive Committee will conduct its business progressively during its 4-year term through meetings of the Committee at IAVCEI Scientific and General Assemblies, and in the interim as e-business and video conferences.
10. The IAVCEI Executive Committee is empowered to make policy decisions on behalf of IAVCEI and its members, but major policy decisions should be ratified by members through an on-line plebiscite, or at meetings of members during IAVCEI General and Scientific Assemblies.
11. The Executive Committee of the Association shall consist of 11 members. Candidates for the following 9 positions are democratically nominated by, and elected by, IAVCEI members:
 - President
 - Secretary General
 - two Vice-Presidents
 - four Ordinary Committee Members
 - an Early Career Researcher, aged 35 or less at the time of nomination
12. In addition, the immediate past-President will be an ex-officio member of the Executive Committee for one term to provide continuity and offer advice to the new committee.
13. The Editor of Bulletin of Volcanology is invited to be a non-voting observer on the Executive Committee to provide insight from his/her dealings with IAVCEI members through the association's publication processes. She/he may also be nominated to become an elected member of the Executive Committee.
14. The President may only serve for one term as President.
15. The Secretary General is elected for two 4-year terms.
16. All other members of the Executive Committee are elected to serve for one term of 4 years in the first instance, but may serve one extra term if nominated and elected for a second term at the next election.
17. No more than two members from the same country can be elected to the Executive Committee during one 4-year term of office.
18. An Assistant Secretary may be appointed by the Secretary General to help with his/her duties, including the role of web-master for the IAVCEI website.
19. The Executive Committee shall have the power to fill any vacancy that arises on the Executive Committee during the interval between successive elections for the IAVCEI Executive Committee.
20. The Executive Committee shall have the power to appoint the Executive Editor of the Bulletin of Volcanology, as well as of other publications of the Association.
21. The Executive Committee shall have the power to create and disband Research Commissions and Task Groups of the Association.
22. Only members of IAVCEI can present papers at IAVCEI conferences, but scientists wanting to present papers at IAVCEI conferences can join IAVCEI at the time of registering for the conference. Distinguished invited keynote speakers may be exempted from this requirement.
23. Countries that are represented by individual members may apply to the IAVCEI Executive Committee to have a National Correspondent for IAVCEI to represent their national volcanological community.
24. National Correspondents are also appointed by the IUGG adhering scientific organisations in each IUGG financial member country, but it is recommended that appointments of such member country National Correspondents be done in consultation with the IAVCEI Executive Committee.
25. National Correspondents are required to act as conduits of information flow between IAVCEI and national volcanological communities, and may make representations on behalf of their national volcanological communities to the IAVCEI Executive Committee.

V. Nomination and Voting for the IAVCEI Executive Committee

26. Only individuals who are members of IAVCEI can be nominated for election to the IAVCEI Executive Committee.
27. Only members of IAVCEI can nominate another member for election to the IAVCEI Executive Committee.

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28. Candidates for election to the IAVCEI Executive Committee can be from any country, except candidates for the Presidency, who must come from IUGG member countries, according to IUGG Statutes.
29. Only members of IAVCEI can vote in the election for the IAVCEI Executive Committee.
30. Nominations for candidates for election to the IAVCEI Executive Committee, must be seconded by three other current individual members, each from countries other than that of the candidate.
31. The outgoing Executive Committee has the power to nominate candidates for particular positions on the Executive Committee, when only one, or no candidates are nominated by members.
32. Nominations must be called for and submitted to the Chairperson of the IAVCEI Nominating or Election Committee no later than six months before the General Assembly.
33. The voting process will be anonymous and conducted electronically through the IAVCEI web site and will be initiated by the Secretary General and President at least three months before, and must close no later than one month before, the IAVCEI General Assembly.
34. The Secretary General and Assistant Secretary are responsible for establishing a secure on-line voting site and process, that ensures that only IAVCEI members registered as members at a defined date can vote, and that members can only vote once.
35. A Nominating or Election Committee will be responsible for overseeing the voting process to ensure that it is undertaken in accord with the current IAVCEI statutes and by-laws.
36. The members of the Nominating Committee will be proposed by the President and endorsed by the Executive Committee no later than nine months before the IAVCEI General Assembly.
37. The Nominating Committee will consist of no less than five current individual members of IAVCEI, one of whom, usually the Past President bar one, will be nominated to be the Chairperson.
38. All nominations of candidates for election to the IAVCEI Executive Committee shall be considered by the Nominating or Election Committee, which will produce a shortlist of at least one, but no more than three candidates for each of the positions on the new Executive Committee, except for the 4 general committee positions, for which no more than 12 candidates should be proposed.
39. Not more than two candidates from the same country, can be proposed by the Nominating Committee as candidates for election to the Executive Committee as a whole.
40. The Nominating Committee is also responsible for scrutinising the results and reporting the results to the President and Secretary General within a month following the close of voting.
41. The candidate(s) with the largest number of votes for each position will be elected.
42. The President-elect must be endorsed by a majority of IAVCEI National Correspondents from IUGG member countries. A non-response from a National Correspondent will be taken to be an endorsement for the President-elect.
43. In case of a tie the Executive Committee at the time of the election will elect the candidate from among those with the same number of votes.
44. The Secretary General will communicate through the website to all IAVCEI members the results of the elections before the General Assembly, and the new officers of the Executive Committee will be officially appointed during the General Assembly.

VI. IAVCEI Awards

45. To honour outstanding achievements in research and contributions to volcanology and to IAVCEI, IAVCEI will make awards at the General Assembly and Scientific Assembly to the most suitable candidates who have been nominated.
46. The awards to be made are:
 - a) The *George Walker Award* is for an early career researcher within 7 years of being awarded the PhD degree at the time of nomination. This is awarded every 2 years at each General and Scientific Assembly. Detailed criteria are available on the IAVCEI website.

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- b) The *Wager Medal* is for a mid-career researcher within 15 years of being awarded the PhD degree at the time of nomination. This is awarded every 2 years at each General and Scientific Assembly. Detailed criteria are available on the IAVCEI website.
 - c) The *Thorarinsson Medal* is awarded to a senior researcher with an outstanding international research record. The medal is awarded only at the Scientific Assembly. Detailed criteria are available on the IAVCEI website.
- 47. Candidates for IAVCEI awards must be members of IAVCEI.
 - 48. Candidates for IAVCEI awards can only be nominated and supported by IAVCEI members.
 - 49. Nominations for all IAVCEI awards must be made in writing by one member, and supported with supporting letters by no more than 3 other members.
 - 50. The principal nominator and the 3 supporting members must be from different countries to ensure that all candidates have international profiles, and have contributed to volcanology at the international level.
 - 51. An Awards Sub-Committee will be established by the President 6 months before a General Assembly or Scientific Assembly. The President will be Chairperson of the Awards Committee and will invite at least 4 other members with significant international research profile and experience, representing different geographic regions around the world and ensuring gender balance, to join the committee. Each member of the Awards Committee will have an equal say in the outcome for each award.
 - 52. In addition, at each Scientific Assembly, the IAVCEI Executive Committee may decide on and award Honorary Life Membership to up to 3 members for their contributions and services to volcanology and IAVCEI over an extended period of time.

VII. Alteration and Interpretation of Statutes

- 53. These statutes shall be changed only by a majority of at least two thirds of votes by members in attendance at the General Assembly business meeting for members, or through an on-line plebiscite for members.
- 54. Any individual member may propose in writing an alteration, or alterations, to the Statutes, provided the proposal is supported by three other, current individual members in writing.
- 55. The Executive Committee may also propose changes to the Statutes.
- 56. The Executive Committee shall have the power to decide whether the proposal will be distributed to members to vote on through an on-line plebiscite or at a General Assembly.

BY-LAWS

I. National Volcanological Communities/Organisations, and National Correspondents

- 1. Individual countries are encouraged to establish national volcanological communities/organisations, with the following functions:
 - a) To foster volcanological research within their own country, and encourage membership of IAVCEI;
 - b) To nominate through their National Committee a National Correspondent who will act as the principal contact between IAVCEI and their national community and have the power to represent their country's views at IAVCEI General Assemblies;
 - c) To submit topics for discussion at the General Assemblies of the Association. Topics so submitted should be notified to the Secretary General of the Association at least three months before the General Assembly;
 - d) To facilitate and coordinate, as appropriate and necessary, the dissemination of IAVCEI NEWS, correspondence and other information relating to the affairs of IAVCEI.
- 2. National Correspondents of IUGG member countries are asked to endorse the IAVCEI President-elect at the General Assembly.

II. Duties of Officers of the Association

3. The function of the Executive Committee is to exercise general oversight of the affairs of the IAVCEI. It should meet during each General Assembly and Scientific Assembly, and when possible during other IAVCEI meetings. At other times the Executive Committee will conduct the affairs of the Association by email exchange among its members. Its duties include the following:
 - a) To consider proposals for changes to the Statutes and By-Laws
 - b) To fill committee vacancies arising between elections for the Executive Committee.
 - c) In the event of the President's position becoming vacant between General Assemblies, the Executive Committee shall appoint one of the Vice Presidents to act as President until the next General Assembly.
 - d) To assist in preparing the agenda and making arrangements for General Assemblies and other meetings
 - e) To appoint a Nominating Committee for the short-listing of candidates for election as new office bearers and the conduct of the election
 - f) To appoint the Executive Editor and Associate Editors of the Bulletin of Volcanology and other publications
 - g) To endorse Commissions and Working Groups proposed by the Vice-Presidents.
 - h) To consider applications for funding to the Executive Committee by Commissions, IAVCEI Conference organizing committees, individual members seeking support to attend conferences, and special purpose grants from affiliated organisations
 - i) To determine the membership fee structure and membership fees
 - j) To promote the interests of the Association.
4. The Executive Committee will also conduct the business of the Association between General Assemblies and take on the particular responsibility of pro-actively fostering the objectives and interests of the Association, the Commissions and Task Groups. The Executive Committee is responsible also for establishing Sub-committees to deal with specific aspects of the work of the Association.
5. The duties of the President are to
 - a) Preside at General Assemblies and Scientific Assemblies of the Association and, in consultation with the Secretary General, to regulate the business of the Association.
 - b) Sign documents on behalf of the Association.
 - c) Select and chair the Awards Committee.
 - d) To appoint Task Groups to address specific issues and to liaise and work with them to ensure the goals of the Task Group are achieved in a timely manner.
 - e) Be responsible for all protocol aspects related to the Association.
6. The duties of the Vice-Presidents are to
 - a) Preside at General Assemblies and Scientific Assemblies in the absence of the President.
 - b) Be prepared to become President should the presidency become vacant between elections.
 - c) Foster pro-actively the objectives and interests of the Association.
 - d) Manage the IAVCEI Commissions and Task Groups program, and have the responsibility for ensuring that all Commissions and Task Groups are active and functioning effectively.
7. The duties of the Secretary-General of the Association are:
 - a) To carry on all correspondence relating to the affairs of the Association;
 - b) To maintain and preserve the records of the Association;
 - c) To maintain a mailing list of members of the Association, and to receive and process membership applications;

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- d) To administer the funds of the Association, to prepare at the end of the calendar year preceding a General Assembly the accounts of the Association, and to arrange that they shall be properly audited
 - e) To prepare annual Financial and Activities reports for members and for IUGG
 - f) To ensure that the annual reports of the Association are published and distributed;
 - g) To prepare a budget for the ensuing four-year term.
 - h) In consultation with the President and members of the Executive Committee, to prepare the agenda and make arrangements for the next General Assembly, and
 - i) To cooperate with the other Associations of IUGG in arranging the scientific program for IUGG/IAVCEI General Assembly conferences, and with the local organising committee for the IAVCEI Scientific Assembly conferences.
8. The duties of the Assistant Secretary, in the case where one has been appointed, are to assist the Secretary-General in carrying out the duties of the Secretary General, especially in maintaining the membership register, email address list of members, and the Association website. The Assistant Secretary may be appointed Secretary-General in the event of that position becoming vacant between General Assemblies.
9. The duties of the webmaster, in case of one having been appointed, are to assist the Secretary-General in managing the website of the Association.
10. The Executive Editor of the Bulletin of Volcanology shall normally be appointed for no more than 6 years, and shall:
- a) Administer the process of receipt of manuscripts and their distribution to the Associate Editors for review and acceptance (or otherwise).
 - b) Be responsible for maintaining high standards of content and presentation of the Bulletin of Volcanology.
 - c) Be empowered to sign documents on behalf of the Association that are pertinent to the Bulletin of Volcanology.
 - d) Appoint Associate Editors, with the approval of the Executive Committee; AEs will normally serve for periods not exceeding four years.

III. Commissions, Working Groups, Task Groups, and other committees

11. The Executive Committee, on the advice of the Vice Presidents, may establish any Research Commission devoted to the international promotion of research in any speciality of volcanology and chemistry of the Earth's interior.
12. Commissions are usually initiated by submission of an application to the Vice-Presidents and Executive Committee by a group of members with common, but well-defined research interests, which can be presented an important research theme. Commissions may also be initiated by the Executive Committee to fill a need or gap in the research activities of IAVCEI, by contacting groups of members to encourage them to form a Commission.
13. Each Commission will have one or more leaders.
14. At least one leader should be an early career researcher.
15. The leaders will present proposals for the objectives, program, and membership of the Commission for approval by the Executive Committee.
16. Leaders normally will serve for periods not exceeding four years.
17. Leaders are expected to solicit interest and participation from IAVCEI members who may be interested in the research theme(s) of the Commission, and build up a contact list of such members.
18. Leaders should regularly provide information to and solicit suggestions from their network of members on proposed activities, and make arrangements to organize Commission activities.
19. Every Commission is *required* to propose and organize at least one symposium research theme for *every*

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IAVCEI General Assembly and Scientific Assembly.

20. The convenors of every Commission hosted symposium must include at least one Early Career scientist.
21. Commissions are also encouraged to organize workshops and field workshops affiliated with the major IAVCEI conferences, or outside of these, or jointly with other commissions within IAVCEI, or with Commissions from other IUGG Associations, which have related research interests.
22. Commissions may propose the formation of Working Groups to explore research interests that represent a sub-theme of related research theme to that of the Commission.
23. Working Groups should also submit an application to the Vice-Presidents, with the endorsement of the Commission leaders, with a specified life-span and clearly enunciating the goals of the Working Group.
24. At the end of the term of the Working Group it is expected to submit a report to the Vice Presidents, summarizing the outcomes.
25. At the end of the term of a Working Group, it may be terminated, or if the members of the Working Group feel there is continuing momentum, then the Working Group may submit an application to become a Commission.
26. All Commissions and Working Groups are required to submit a brief one to two page report of activities annually to the Vice-Presidents.
27. The President in consultation with the Executive Committee may establish Task Groups devoted to the short-term completion of specific scientific tasks, at the end of which term, a report(s) will be submitted to the President and the Executive Committee.
28. The President in consultation with the Executive Committee may also establish small committees devoted to the completion of specific administrative tasks.
29. These will include the Awards Committee whose responsibility, under the chairmanship of the President, is to prepare recommendations for the IAVCEI Awards at the time of the Association's General Assemblies or Scientific Assemblies, and the Election Nominating Committee, which will oversee the election process.

IV. Alteration and Interpretation of By-Laws

30. These By-Laws shall be changed only by a majority of at least two thirds of votes by members in attendance at the General Assembly business meeting for members, or through an on-line plebiscite for members.
31. Any individual member may propose in writing, alteration, or alterations, to Statutes and By-Laws, provided the proposal is seconded (in writing) by three other current individual members.
32. The Executive Committee may also propose changes to the By-Laws.
33. The Executive Committee shall have the power to decide whether the proposal will be distributed to members to vote on through an on-line plebiscite, or at a General Assembly.

APPENDIX

Principle of Freedom of Participation in Learned Societies

IAVCEI adheres to the Principle of Freedom of Participation in Learned Societies for all scientists:

- a) All scientists should be able to apply for, and be accepted for, individual membership of scientific learned societies or associations, and should be able to participate freely irrespective of age, cultural background, race, religion, political or scientific views, disability, gender, gender orientation, country of origin, country of residence, or financial status of those countries in the learned society or association.

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- b) All scientists who become individual members of scientific learned societies or associations should be able to participate in the activities of such societies or associations, including attendance at conferences and other activities, voting on matters that are brought to the membership, nominating others for committee positions, being nominated for committee positions and serving in those capacities if voted in by the membership.
- c) Membership of a learned society or association may only be rejected or cancelled if the candidate or member has been guilty of (i) professional malpractice, (ii) discrimination against others on the grounds of age, cultural background, race, religion, political or scientific views, disability, gender, gender orientation, country of origin, country of residence, or financial status of those countries in the learned society or association, or (iii) bringing the society or association into disrepute by unfairly maligning it.
- d) Disagreeing with the policies of the association or society in good faith is not deemed to malign the learned society or association, but represents the democratic right of any member of an enlightened learned society or association to state their views.

Part III

Assembly Statistics: Facts and Figures

ASSEMBLY REGISTRATION BY COUNTRY

IUGG 2023 Berlin

Country	Delegates
Afghanistan	1
Albania	1
Algeria	10
Argentina	15
Armenia	1
Australia	86
Austria	48
Azerbaijan	1
Bangladesh	2
Belgium	43
Benin	3
Botswana	2
Brazil	60
Bulgaria	3
Cameroon	5
Canada	95
Chile	27
China	711
China-Taipei	50
Colombia	8
Congo, Rep.	1
Congo, D.R.	1
Costa Rica	1
Côte D'ivoire	1
Croatia	19
Czech Republic	66
Denmark	26
Djibouti	1
Ecuador	4
Egypt	7
Estonia	6
Ethiopia	3
Finland	44
France	203
French Polynesia	1
Germany	986
Ghana	7

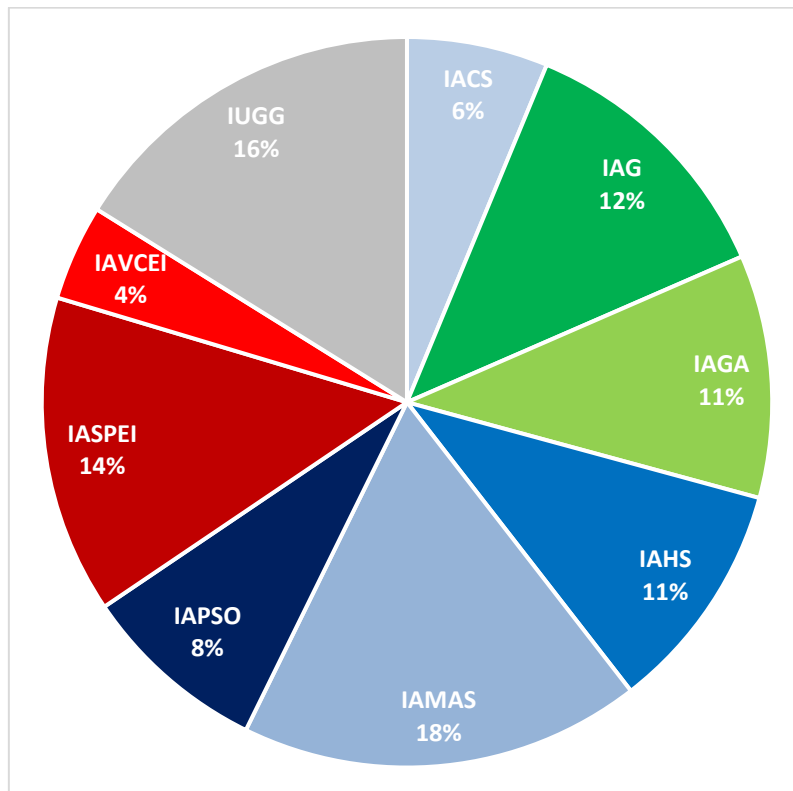
Country	Delegates
Greece	37
Hong Kong	14
Hungary	22
Iceland	4
India	197
Indonesia	24
Iran	25
Iraq	1
Ireland	12
Israel	21
Italy	281
Japan	284
Jordan	3
Kenya	2
Korea, DPR	1
Korea, Rep.	112
Latvia	6
Lebanon	1
Libya	1
Lithuania	1
Luxembourg	4
Madagascar	2
Malaysia	2
Mali	1
Malta	3
Mexico	29
Mongolia	2
Morocco	3
Namibia	1
Nepal	5
Netherlands	59
New Zealand	32
Nigeria	18
Norway	72
Pakistan	12
Panama	1
Philippines	2

Country	Delegates
Poland	75
Portugal	16
Qatar	1
Romania	31
Russia	32
Saudi Arabia	7
Senegal	2
Serbia	1
Singapore	2
Slovakia	8
Slovenia	1
South Africa	40
Spain	105
Sudan	1
Sweden	53
Switzerland	164
Syrian Arab Republic	2
Tajikistan	1
Tanzania	1
Thailand	7
Trinidad and Tobago	1
Tunisia	3
Turkey	35
Uganda	6
Ukraine	3
United Arab Emirates	8
United Kingdom	249
US Minor Outlying Island	2
Uruguay	2
USA	480
Uzbekistan	2
Virgin Islands (British)	1
Zimbabwe	2
<i>unknown</i>	8
TOTAL	5198

ASSEMBLY REGISTRATION BY ASSOCIATION

IUGG 2023 Berlin

Association	Number of Registered Delegates
IACS	325
IAG	635
IAGA	559
IAHS	534
IAMAS	924
IAPSO	430
IASPEI	732
IAVCEI	220
IUGG	839
Total	5198



*Name of the association and percentual value from total of 5198 delegates

PHOTO GALLERY

The following photos were taken during the XXVII IUGG General Assembly, Berlin, Germany, 10-20 July 2023 (© Jan Pauls).



Opening Ceremony and Reception



Exhibition Area and Poster Sessions



Early Career Scientists Social Event and Panel Discussion



Valérie Masson-Delmotte, IUGG Gold Medalist



Rakiya A. Babamaaji, IUGG Union Lecturer

XXVIII General Assembly of the International Union of Geodesy and Geophysics
Photos



Ricarda Winkelmann, IACS Union Lecturer



Geoffrey Blewitt, IAG Union Lecturer



Max Moorkamp, IAGA Union Lecturer



Luz Adriana Cuartas, IAHS Union Lecturer



Ravi Ravishankara, IAMAS Union Lecturer



Martin Visbeck, IAPSO Union Lecturer



Philippe Lognonné, IASPEI Union Lecturer



Robin Matoza, IAVCEI Union Lecturer

IUGG BERLIN 2023



THE 28TH GENERAL ASSEMBLY
OF THE INTERNATIONAL UNION
OF GEODESY AND GEOPHYSICS



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