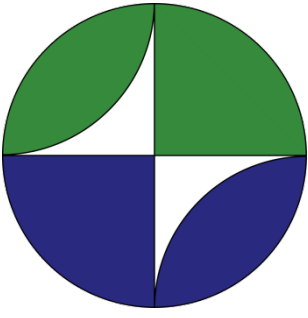


INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS  
UNION GEODESIQUE ET GEOPHYSIQUE INTERNATIONALE

# Annual Report 2023



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

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# TABLE OF CONTENTS

TABLE OF CONTENTS .....	1
INTRODUCTION.....	2
GENERAL INFORMATION .....	5
MESSAGE FROM THE PRESIDENT .....	10
MESSAGE FROM THE SECRETARY GENERAL .....	13
IUGG ACTIVITIES.....	15
ACTIVITIES OF THE UNION ASSOCIATIONS.....	50
International Association of Cryospheric Sciences (IACS).....	51
International Association of Geodesy (IAG).....	55
International Association of Geomagnetism and Aeronomy (IAGA) .....	60
International Association of Hydrological Sciences (IAHS).....	64
International Association of Meteorology and Atmospheric Sciences (IAMAS).....	68
International Association for the Physical Sciences of the Oceans (IAPSO).....	79
International Association of Seismology and Physics of the Earth’s Interior (IASPEI) .....	84
International Association of Volcanology and Chemistry of the Earth’s Interior (IAVCEI) .....	88
ACTIVITIES OF THE UNION COMMISSIONS.....	96
Union Commission on Climate and Environmental Change (CCEC).....	96
Union Commission on Mathematical Geophysics (CMG) .....	99
Union Commission on Geophysical Risk and Sustainability (GRC).....	102
Union Commission on the Study of the Earth’s Deep Interior (SEDI) .....	106
Union Commission on Planetary Sciences (UCPS).....	108
THE INTER-ASSOCIATION WORKING GROUP: Electro-magnetic Studies of Earthquakes and Volcanoes (EMSEV) .....	111
THE INTER-UNIONS COMMISSION: International Lithosphere Programme (ILP).....	115
IUGG FINANCIAL REPORT 2023 .....	119
ADDITIONAL UNION MATTERS.....	126
Awards and Honors .....	126
Obituaries .....	129
LIST OF ACRONYMS .....	133

# INTRODUCTION

Established in 1919, the International Union of Geodesy and Geophysics (IUGG) is an international, non-governmental, non-profit organization dedicated to advancing, promoting, and communicating knowledge of the Earth system, its space environment, and the dynamical processes causing change. Through its constituent associations, commissions, and services, IUGG convenes international assemblies and workshops, undertakes research, assembles observations, gains insights, coordinates activities, liaises with other scientific bodies, plays an advocacy role, contributes to education, and works to expand capabilities and participation worldwide. Data, information, and knowledge gained are made openly available for the benefit of society – to provide the information necessary for the discovery and responsible use of natural resources, sustainable management of the environment, reducing the impact of natural hazards, and to satisfy our need to understand the Earth’s natural environment and the consequences of human activities.

The IUGG is comprised of eight semi-autonomous International Associations, each responsible for a specific range of topics or themes within the overall scope of the Union activities. Each Association establishes commissions, divisions, services, working groups, or other entities. In addition, IUGG establishes Union Commissions and other activities to conduct inter-association science (see page 3).

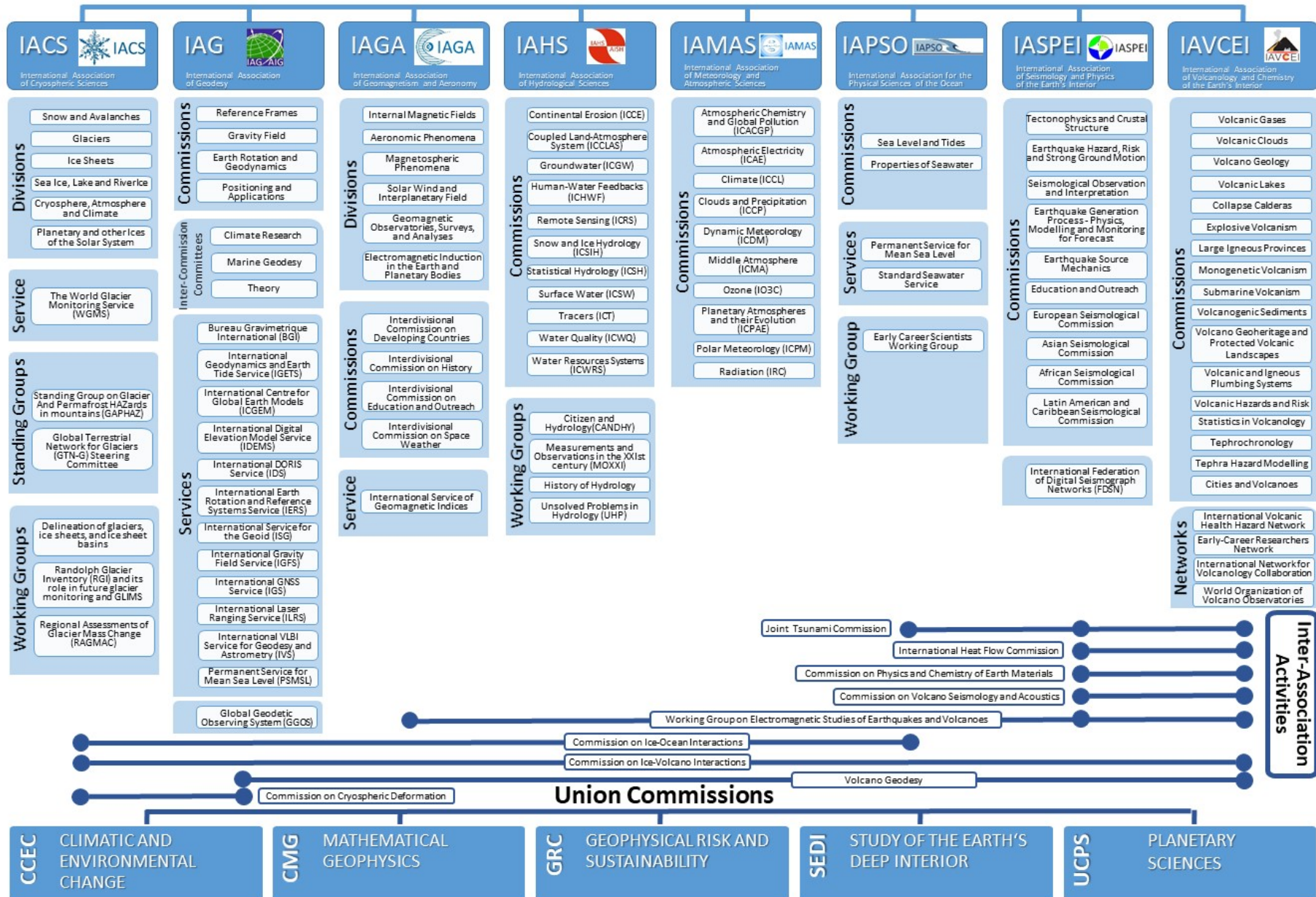
IUGG is one of over 40 scientific unions adhering to the International Science Council (ISC). ISC provides a global forum for scientists to exchange ideas and information and to develop standard methods and procedures for all fields of research. IUGG brings expertise on Earth studies from researchers in its International Associations and Commissions. As a member of ISC, IUGG strongly supports its policy of non-discrimination by affirming the rights and freedom of scientists throughout the world to engage in international scientific activity without limitation by such factors as citizenship, religion, creed, political stance, ethnic origin, race, color, language, age or gender.

IUGG has initiated and/or vigorously supported collaborative efforts that have led to highly productive world-wide interdisciplinary programs and projects. These programs have set a model for international and interdisciplinary cooperation in geosciences (see page 4).

The work of IUGG is related to that of many other scientific organizations. Some of these are inter-governmental such as those affiliated with the United Nations (UN); some are Interdisciplinary Bodies of ISC, and others are organizations of particular interest to specific Associations (see page 4).

# International Union of Geodesy and Geophysics (IUGG)

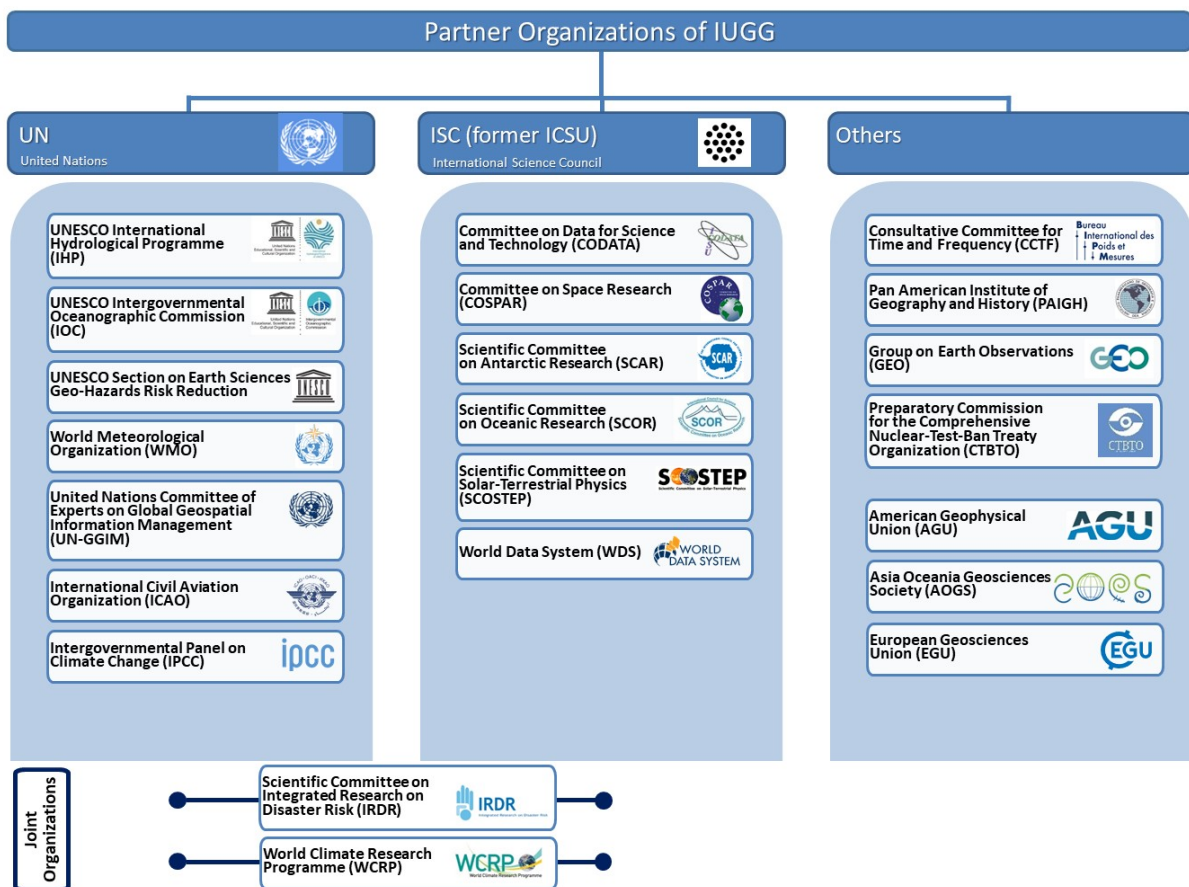
## Associations



## Programs and Projects initiated and/or supported by IUGG

Current	Past
<ul style="list-style-type: none"> <li>• <b>Global Geodetic Observing System (GGOS, an IAG program)</b></li> <li>• <b>Integrated Research on Disaster Risk (IRDR)</b></li> <li>• <b>International Lithosphere Program (ILP, a joint IUGS-IUGG activity)</b></li> <li>• <b>International Decade of Sciences for Sustainable Development (2024-2033)</b></li> <li>• <b>World Climate Research Programme (WCRP)</b></li> <li>• <b>World Data System (WDS)</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>International Year of Basic Sciences for Sustainable Development (IYBSSD, 2022/2023)</b></li> <li>• <b>International Year of Global Understanding (IYGU, 2016)</b></li> <li>• <b>Mathematics of Planet Earth (MPE, 2013)</b></li> <li>• <b>International Geosphere-Biosphere Programme (IGBP, 1987-2015)</b></li> <li>• <b>International Year of Deltas (IYD, 2013-2014)</b></li> <li>• <b>Extreme Natural Hazards and Societal Implications (ENHANS, 2010-2014)</b></li> <li>• <b>International Year of Planet Earth (IYPE, 2007-2010)</b></li> <li>• <b>Electronic Geophysical Year (eGY, 2007-2008)</b></li> <li>• <b>International Polar Year (IPY, 2007-2008)</b></li> <li>• <b>International Heliophysical Year (IHY, 2007-2008)</b></li> <li>• <b>International Decade for Natural Disaster Reduction (IDNDR, 1990-1999)</b></li> <li>• <b>Geodynamics Project (1972-1979)</b></li> <li>• <b>Global Atmospheric Research Program (1967-1980)</b></li> <li>• <b>International Hydrological Decade (1965-1974)</b></li> <li>• <b>Upper Mantle Project (1964-1970)</b></li> <li>• <b>International Geophysical Year (IGY, 1957-1958)</b></li> </ul>

*Programs and Projects initiated and/or supported by IUGG*



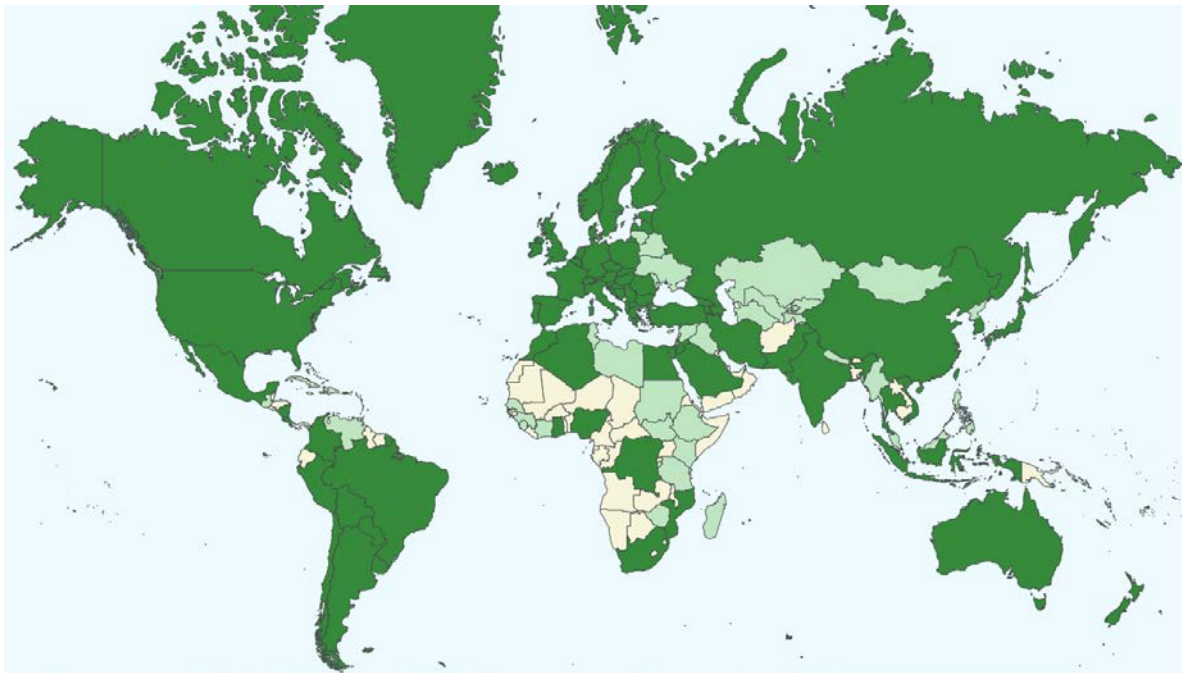
*Partner Organizations of IUGG*

# GENERAL INFORMATION

## MEMBERSHIP & FINANCE

By their very nature, geodetic and geophysical studies require a high degree of international co-operation. IUGG is critically dependent on the scientific and financial support of its member Adhering Bodies. The list of present and past IUGG Adhering Bodies is published in the IUGG Yearbook and posted on the website. Each Adhering Body establishes a National Committee for IUGG, and names Correspondents to each Association (as appropriate).

As of 31 December 2023, IUGG has 74 National Members including 59 countries in paying status. The paying members are placed in categories from 1 to 14 depending on their financial contribution to the Union (the membership dues rise with increasing category number). At present, the highest category used is category 11. The members pay dues according to a number of units assigned to their category (in category 1 the number of units is 1, and in category 11 the number is 35). According to a decision of the XXII IUGG General Assembly (Boulder, USA, 1995), the price of 1 unit is determined every year using an inflator index obtained from the Bureau of Labor Statistics, U.S. Department of Labor. In 2023, the price of 1 unit was US\$ 2,375. The 59 paying members represent a total of 278 units, which is equivalent to a total income of US\$ 660,250. The funds received as dues are the basis for IUGG's operations as a scientific union, although Union associations may have their own funds earned via book selling or donations. The funds are spent to support (i) international scientific programs, projects and services, (ii) general and scientific assemblies, symposia, workshops, and schools; (iii) travel of students, early career scientists, and scientists from developing countries to attend scientific meetings; (iv) scientific activities of Union Associations and Commissions, (v) the International Lithosphere Program, (vi) the International Science Council, and (vii) administration and management.



*Regional distribution of current (dark green) and former (light green) IUGG Member Countries (as of 31.12.2023)*

Several IUGG National Committees have published Annual and Quadrennial Reports on their activities over the last years. All reports are available [here](#). IUGG National Committees are invited to [submit](#) their annual/quadrennial reports at any time.

## STRUCTURE

Responsibility for directing the Union's affairs is vested in the IUGG Council by the Statutes and Bylaws. The IUGG Council consists of the Council Delegates, who are designated by the Adhering Body of their respective countries. The Council is convened at each quadrennial General Assembly but can make decisions by electronic voting in between General Assemblies. A Bureau, an Executive Committee and a Finance Committee administer IUGG affairs between Council meetings. The Executive Committee has the particular responsibility of overseeing the scientific programs of the Union. The IUGG Secretariat is located at the German Research Centre for Geosciences (GFZ) in Potsdam, Germany, and assists in the implementation of the decisions of the Bureau, Executive Committee and the Council.

### Associations

The Union brings together eight semi-autonomous Associations, each responsible for a specific range of topics or themes within the overall scope of the Union's activities and each with a sub-structure. The Associations convene their own assemblies and sponsor scientific symposia, often in partnership with one another. Within its own discipline each Association is responsible for determining its own program of investigations and for supporting the activities of its own component parts. All Earth scientists, worldwide, are eligible to participate in IUGG and Association activities, assemblies, workshops, and symposia, although only scientists from member countries with dues paid may serve as Association Presidents.

The eight International Associations are listed below, and short reports on their 2023 activities are included here. Additional information about each Association is given on their websites, which can be accessed from the IUGG [website](#).

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

### Union Commissions

Owing to the interactive nature of the subject fields addressed by the Union's Associations, a number of Union Commissions have been established that promote the study of particular interdisciplinary problems. In 2023, the following bodies were active:

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



## Inter-Unions Commission

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

## GENERAL ASSEMBLIES OF THE UNION

General Assemblies have been held since 1922 and, since 1963, at 4-year intervals. These assemblies provide an extraordinary opportunity for Earth scientists from around the world to gather and share expertise, research data, and results. Past IUGG General Assemblies are listed in the IUGG Yearbook and on the website. The most recent General Assembly was held in Berlin, Germany, 11-20 July 2023. The next IUGG General Assembly will take place in Incheon, Rep. of Korea, in summer 2027.

## OTHER SCIENTIFIC MEETINGS

Each Association organizes its own scientific assembly in the 4-year interval between Union General Assemblies in order to report scientific progress and conduct Association business. Associations sometimes meet jointly with the purpose of promoting interdisciplinary science. Topical and regional symposia and workshops are organized on other occasions by the Associations to provide opportunity for geodesists and geophysicists worldwide to discuss their respective methodologies, results and hypotheses and to plan collaborative research projects. The symposia, often held in less-visited, geophysically interesting locales, are intended to be attractive to the younger scientists from the developing countries of the world.

## IUGG OFFICERS FOR 2019-2023

### IUGG Bureau

President:	Kathryn Whaler	UK
President-Elect:	Chris Rizos	AUSTRALIA
Secretary General:	Alexander Rudloff	GERMANY
Treasurer:	Niels Andersen	DENMARK
Members:	Stephen McNutt	USA
	Eduard Petrovsky	CZECH REPUBLIC
	Yun Xia	CHINA
Executive Secretary: (a non-voting member of the Bureau)	Franz G. Kuglitsch	GERMANY

## IUGG Executive Committee

### IUGG Bureau Members

Immediate Past President:	Michael G. Sideris	CANADA
IACS President:	Regine Hock (2019-2021)	USA
	Liss M. Andreassen (2021-2023)	NORWAY
IAG President:	Zuheir Altamimi	FRANCE
IAGA President:	Mioara Manda	FRANCE
IABS President:	Günter Blöschl (2019-2021)	AUSTRIA
	Berit Arheimer (2021-2023)	SWEDEN
IAMAS President:	Joyce Penner	USA
IAPSO President:	Trevor McDougall	AUSTRALIA
IASPEI President:	Kenji Satake	JAPAN
IAVCEI President:	Patrick Allard	FRANCE

### IUGG Finance Committee

Chair:	Corina Risso	ARGENTINA
Members:	Priscilla Grew	USA
	Jan Krynski	POLAND

### Association Secretaries General

IACS Secretary General:	Richard Essery	UK
IAG Secretary General:	Markku Poutanen	FINLAND
IAGA Secretary General:	Monika Korte	GERMANY
IABS Secretary General:	Christophe Cudennec	FRANCE
IAMAS Secretary General:	Steven Ackerman	USA
IAPSO Secretary General:	Stefania Sparnocchia	ITALY
IASPEI Secretary General:	Johannes Schweitzer	NORWAY
IAVCEI Secretary General:	Roberto Sulpizio	ITALY

### Union Commission Officers

#### Union Commission on Climatic and Environmental Changes (CCEC)

Chair:	Jianping Li	CHINA
Secretary:	Tonie van Dam	LUXEMBOURG

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

Chair:	Alik Ismail-Zadeh	GERMANY/RUSSIA
Secretary:	Ilya Zaliapin	USA

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

Chair:	John LaBrecque	USA
Secretary:	Katia Kontar	USA

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

Chair:	Christine Thomas	GERMANY
Secretary:	Michael Bergman	USA

Union Commission on Planetary Sciences (UCPS)

Chair:	Shuanggen Jin	CHINA
Secretary:	Scot Rafkin	USA

**Inter-Unions Commission: International Lithosphere Program (ILP)**

President:	Hans Thybo	TURKEY/NORWAY
Secretary General:	Mian Liu	USA

## IUGG SECRETARIAT

The IUGG Secretariat is the informational centre of IUGG. It implements the organization plans, organizes the daily management of the Union, prepares business meetings, represents the Union at conferences, publishes documents (e.g., Newsletters, Yearbooks, Annual Reports) and helps National Members to be engaged in the Union's and its Associations activities.

Since the year 2013, the IUGG Secretariat is located at

Helmholtz Centre Potsdam  
GFZ German Research Centre for Geosciences  
Telegrafenberg, A17  
14473 Potsdam  
GERMANY

<i>Executive Secretary:</i>	Franz G. Kuglitsch	GERMANY
<i>Assistant:</i>	Katrin Gundrum	GERMANY
<i>Webmaster:</i>	Jan Schubert	GERMANY

# MESSAGE FROM THE PRESIDENT

Where to start? From the beginning. It was an occasion of immense pride and pleasure when I was officially named President of the International Union of Geodesy and Geophysics (IUGG) on 19 July 2023, at the Closing Ceremony of the IUGG General Assembly (11-20 July 2023; IUGG2023), in Berlin, Germany. I had been given the honour of the presidency for the next four years. Below are some remarks on activities, on initiatives, on issues, and on challenges, that the IUGG leadership was engaged with over the first 12 months following IUGG2023.



The IUGG leadership is a collective. Aside from the President, there is the Secretary General Alex Rudloff, the Executive Secretary Franz Kuglitsch, the Treasurer Niels Andersen, the President-Elect Mioara Manda, the Chair of the Finance Committee Jan Krynski, and the three elected Bureau Members Athena Coustenis, Andrew Mackintosh and Virendra Tiwari. This core leadership group is supported by many others, including the Immediate Past President Kathy Whaler, former Treasurer Aksel Hansen, and the presidents and secretary generals of the IUGG's eight Associations. I am indeed privileged to be able to interact with such a group of talented, experienced and motivated people. (It is worth noting that the Bureau in fact includes four members who were previously presidents of IUGG Associations, and who therefore bring to the Bureau considerable knowledge and expertise of many of the geosciences that the IUGG represents.)

Before reporting on recent IUGG activities and initiatives, I would like to summarise here a few of my initial thoughts on the IUGG, that I tried to articulate in my incoming presidential speech. The first was that the IUGG presidency was "handed over" to me by Kathy Whaler. Her four-year presidency was unusual, as it spanned the unsettling period of the COVID epidemic. The IUGG and its Associations and Union Commissions (UCs) continued to do fine work. Part of the reason was that we had continuity, something that we can rely on during the current quadrennial period. For example, I appreciate that the Secretary General Alex Rudloff and the Executive Secretary Franz Kuglitsch during the last IUGG quadrennial period are again serving us in these roles. Furthermore, the immediate thoughts of a new IUGG President are possibly the ones shared by many of the past presidents. That the President should use the IUGG's resources, expertise, networks and authority, to: (1) further the goals of the geosciences 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 & society.

Yet the environment in which internationally-focused organisations such as the IUGG operate is fluid, and fraught with many challenges. There are armed conflicts in many parts of the world that hinder global geoscience initiatives. Increasingly we are also seeing worrying implications of the "multi-polar world" that may constrain global geoscience cooperation, data/knowledge sharing, and even researcher exchanges. Finally, there is the Grand Challenges of climate change, environmental degradation, increasing severity and impact of (natural and anthropogenic) disasters, and the challenges of sustainable development and global equity. The IUGG cannot tackle these on its own – it must cooperate and coordinate with other international scientific, UN and inter-governmental bodies. This is one of the strategic challenges that the IUGG must address.

However, there are positive signs. We saw at IUGG2023 that the number of attendees had "bounced back" after COVID, and that the IUGG maintained (and even enhanced) the breadth and quality of the outputs of the IUGG community, the depth of engagement with international and national bodies, and the strength of its relationships with space agencies and other critical research infrastructure providers. The challenge is to improve the IUGG's visibility, increase its advocacy, act even more

strategically, and most of all ensure the Associations and UCs receive the support and encouragement to further their missions and goals.

Yet these sentiments are not new. They are, in many respects, the challenges faced by past IUGG presidents. The list is familiar: implement actions to improve UC-Association collaboration, attempt to have better engagement with Early Career Scientists (and the diverse researcher community), better communications with member states, improve liaison with affiliated/external organisations, and so forth. Can we make progress?

One important tool that the current IUGG leadership has is the need to develop a new Strategic Plan (SP) 2024-2031. It is not the document that is important, even the subsequent Implementation Plan. It is, I believe, the “process” that we follow. For the development of the SP 2024-2031 will necessitate the IUGG leadership group confronting many of these issues in a “strategic” manner. It may require new governance structures (such as new committees), new budget items, new communication and feedback channels, better articulation of what the IUGG does, the benefits that it brings, the value of its science and services, and more. For the first time the IUGG will not palm off the development of the SP 2024-2031 to a “Strategic Planning Committee”, but rather this will be a collective responsibility of the Bureau, chaired by the President-elect Mioara Manda. We have commenced this process.

The primary means of information sharing and discussion on all IUGG matters are the Bureau meetings. Since IUGG2023 the Bureau has met virtually on 17 October 2023, 5 December 2023, and 15 February 2024. It also met face-to-face on 17 April in Vienna (on the fringes of the 2024 EGU General Assembly). In all instances we dealt with urgent matters, discussed ongoing issues, and invariably returned to Strategic Planning. Other notable issues were the signing of the Memorandum of Understanding between the IUGG and the Abdus Salam International Centre for Theoretical Physics (ICTP) to continue the cooperation in geosciences education which started in 2011.

As IUGG president I accepted the invitation of the IUGG China to visit Beijing and Xi’an, 31 October to 6 November 2023. I had discussion with Professor Yuanxi Yang (President of the China National Committee of IUGG) and Professor Yamin Dang (Secretary General of the China National Committee of IUGG). I also had a long and fruitful discussion with the Director General, International Cooperation, the China Association of Science and Technology (China’s IUGG adhering body) on the topic of how Chinese researchers could increase their engagement with the IUGG and their interactions with the Associations and UCs.

I was able to record a short welcoming address for the opening of the 6<sup>th</sup> World Landslide Forum (<https://wlf6.org>), 14-17 November 2023, Florence, Italy.

The IUGG interacts with a range of external organisations and agencies. Chief amongst them is the International Science Council (ISC) of which the IUGG is one of the 44 Unions (or “Category 1 Members”). The ISC (<https://council.science>) has recently implemented a number of changes (incl. member voting rights), organised several online forums, and promoted UN’s Sustainable Development Goals (SDGs), collaboration between member countries and organisations, Freedom and Responsibility in Science, to mention a few. The IUGG is a member of a loose grouping of “GeoUnions” within the ISC. Several online meetings of representatives of the GeoUnions have been held, and it is fair to say that the most effective role that the GeoUnions can play is still not yet clear.

What of international initiatives in which the IUGG has aligned itself? 2023 was the “International Year of Basic Sciences for Sustainable Development” (IYBSSD), with the goal, as the rather unwieldy title states, to bring to the attention of governments and policy makers the crucial role that Science can play in addressing society’s most pressing challenges. On 15 December 2023, the IYBSSD was formally concluded with a celebration at CERN, Geneva. In August 2023, the United Nations General Assembly

proclaimed 2024 to 2033 as the "International Decade of Sciences for Sustainable Development (IDSSD)". The IUGG will support this decade.

The IUGG is also participating in regular online meetings of a new grouping of "Global Geoscience Societies". (The report of the IUGG Secretary General will provide more detail.)

Finally, I return to the theme of Strategic Thinking and Actions. For a SP to be more than dry words in a document there needs to be, at the very least, reflection on what the IUGG stands for, how it promotes itself, what its core mission and vision is, how it harnesses the talent of geoscience researchers for a greater good, how to manage communications with all stakeholders, how it networks and engages with diverse communities (of researchers, policy makers, and society at large), and the effectiveness of its administration and governance. We will explore these issues in the coming year, with the goal to make changes in IUGG structures, governance practices, engagement strategies and budgetary priorities that can maximise the benefits of the IUGG to its many stakeholders.

Chris Rizos

# MESSAGE FROM THE SECRETARY GENERAL

This year has been by far the most exciting and challenging year in my IUGG career. But first things first. It seems easiest to me to divide my report into three sections:



1) Before the IUGG 2023 General Assembly (GA) | The first months of 2023 were already clearly dominated by **preparations for the GA**, which was in July. Several meetings as a member of the Scientific Programme Committee (SPC) and as a guest in the Local Organising Committee (LOC) took place, details had to be checked and roles clarified between IUGG and its Secretariat towards the national community in Germany, the local organisers and the Professional Congress Organiser (PCO), known as C-IN. Of course, it was also about content - more on that later.

In March, the IUGG Executive Secretary Franz Kuglitsch and I were at UNESCO in Paris/France to mark the **50th anniversary** of the International Geosciences Programme (IGCP), a partner programme of our sister union IUGS | the International Union for Geological Sciences. A good opportunity for networking and visibility.

In April, the **second joint declaration** of the global geoscientific societies on **Earth Day** was published, another great success for their joint task force. The subsequent EGU meeting in Vienna/Austria then provided another excellent opportunity to promote the IUGG General Assembly in July. Another focus was on meetings with the ILP (International Lithosphere Programme) community and other global societies and unions.

At the end of June 2023, the Executive Secretary and I travelled to Edinburgh/United Kingdom to visit the IUGG President Kathy Whaler and, more importantly, to prepare all IUGG Business and Council meetings for the upcoming General Assembly.

2) During the **IUGG GA 2023, Berlin/Germany** | Even in my faded memories, I cannot find any other conference or meeting that was as exhausting. More than ten days of intense discussions and exchanges, interviews, openings, introductions, slideshows, last-minute changes, etc. In addition, there were several meetings, e.g., with the IUGG Council, the Executive Committee, the Bureau and with the Global Geoscience Societies. Now I finally know why the General Assembly is only held every four years!

As far as the programme is concerned, we have tried to develop new ideas. Together with a group of committed **Early Career Scientists (ECS)** representing the IUGG associations, two opportunities for meeting and exchange were planned and realised. The ECS representation throughout the meeting was - according to my observation - higher than ever before. We should endeavour to further expand this trend.

The newly developed and introduced **'Big Theme'** format, which I had the honour of moderating six times for an hour during the lunch breaks, was very well received and attracted a large audience. The great effort put into preparation and recruitment seems to have paid off:

- Open Science, changing practices in science?
- Reflection of the International Year of Basic Sciences for Sustainable Development (IYBSSD)
- Contribution to International Frameworks – Are we effective?
- Early Career Scientists – Needs, Wishes and Demands!

- Where do we stand on EDI = Equality, Diversity, Inclusion?
- Strengthening the North-South Dialogue! What are the Needs and Challenges?

These topical issues were discussed with guests in groups of varying sizes between one and nine participants from all over the world. After an introduction and intense exchange on the stage questions and comments were invited from the plenary. One challenge will now be to take follow-up measures and achieve the desired goals.

One of my personal highlights was of course **my re-election** with 100% of the votes cast. I am grateful for the trust placed in me and will endeavour to combine my experience from my first term of office with new impetus, in particular to make IUGG more diverse, younger and truly international. I will also focus on intensifying co-operation with other international unions and societies.



*Photo credits: Jan Pauls (left), Frank Woelfling (right)*

3) After IUGG 2023 | The first weeks and months were spent recovering - and of course on summer holidays.

In November, I was invited to represent IUGG at the **6th World Landslide Forum** in Florence/ITALY. On a wide-ranging panel, we discussed the challenges posed to society by mass movements and landslides in the wake of climate change. The humanitarian and financial consequences are drastic in some cases.

In December, I travelled to CERN in Geneva/SWITZERLAND for the **closing event** of the International Year of Basic Sciences for Sustainable Development (IYBSSD) 2022-2023. [The programme](#) gave a great impression of the various activities and their impact and also looked ahead to the coming decade. The IUGG has been a partner of the IYBSSD from the very beginning.

Just before the end, I would like to thank all **my colleagues** on the IUGG Bureau **who left after the elections** at the GA in July: first and foremost, our President Kathy Whaler. It was a great pleasure to work with her and I think we achieved a lot. Stephen McNutt, Eduard Petrovsky, and Yun Xia also left the Bureau, and Corinna Risso left the Finance Committee. My thanks also go to the **remaining members**, such as Chris Rizos, now President, and Niels Andersen, our re-elected Treasurer. And I **welcome the new Bureau members**: Mioara Manda, Andrew Mackintosh, Athena Coustenis and Virendra Tiwari. Finally, I would again like to thank my team in the **Secretariat**: Katrin and especially Franz! We always endeavour to serve the Union, its Associations and its Commissions and provide an excellent service. Of course, I would also like to thank the GFZ - my employer - for hosting and supporting the IUGG Secretariat, as well as the German Research Foundation (DFG).

Alexander Rudloff



# IUGG ACTIVITIES

## IUGG SECRETARIAT

The [IUGG Secretariat](#) is located at the German Research Centre for Geosciences in Potsdam (GFZ). The Secretariat is managed by the IUGG Secretary General Alexander Rudloff and the IUGG Executive Secretary Franz Kuglitsch, and supported by Katrin Gundrum. The Secretariat is responsible for implementing the day-to-day operations of IUGG; this includes (i) maintenance of daily correspondence and communication with IUGG National Committees, Adhering Organizations, Union Associations, Executive and Financial Committees, Union Commissions, Committees, Partner Organizations, and others; (ii) maintenance of IUGG electronic databases and technical documents; (iii) supervision of the IUGG webmaster and preparation of updates for the IUGG website and social media in timely fashion; (iv) development of IUGG Yearbooks and Annual Reports; (v) negotiations with companies for production of IUGG-related publications, medals, pins etc.; (vi) publication of the IUGG E-Journal (monthly issues); (vii) assistance in technical screening of IUGG grant applications, medal and awards nominations; (viii) preparation work for IUGG General Assemblies, Council, Executive Committee, and Bureau Meetings; and some other activities.

The IUGG Secretariat is co-sponsored by the **GFZ** and the **German Research Foundation (DFG)**. IUGG thanks the GFZ and DFG for the financial support of the Secretariat.

**IUGG Yearbook.** The Secretariat maintains the data related to the IUGG and its Association and produce annually a Yearbook which is available [here](#). By the decision of the IUGG Bureau only the current Yearbook should be linked to the IUGG website.

**IUGG website and social media.** The [IUGG website](#) maintained and regularly updated by the IUGG webmaster Jan Schubert. To learn more about IUGG and to keep individuals updated on Union's activities, the IUGG Secretariat maintains social media accounts on Facebook, Flickr, Twitter, and YouTube.

**IUGG Electronic Journal.** The [E-Journal](#), an informal newsletter, was published and distributed monthly keeping IUGG Member National Committees informed about the activities of IUGG, its Associations and Commissions, and the actions of the IUGG Secretariat. Also, the journal publishes feature articles, news from the International Science Council (ISC), news and reports related to IUGG scientific programs and co-sponsored scientific meetings, and a calendar of scientific meetings.

**IUGG Exhibition Booth.** To promote the IUGG General Assembly 2023 ([IUGG2023](#)), IUGG had an exhibition booth at the EGU General Assembly 2022 in Vienna, Austria, at the AGU Fall Meeting 2022 in Chicago, USA, and at the EGU General Assembly 2023 in Vienna, Austria.

## IUGG GENERAL ASSEMBLY 2023

The 28<sup>th</sup> IUGG General Assembly (IUGG2023), which was held from 11 to 20 July 2023 in Berlin, Germany, was a big success. The IUGG Executive Committee thanks the Local Organising Committee, the Scientific Program Committee, the main organiser and host German Research Centre for Geosciences (GFZ) and its co-organisers: 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 organiser company C-IN, and

all others for making the 28<sup>th</sup> General Assembly, with a record of about 5,000 participants, an outstanding success in the beautiful city of Berlin.

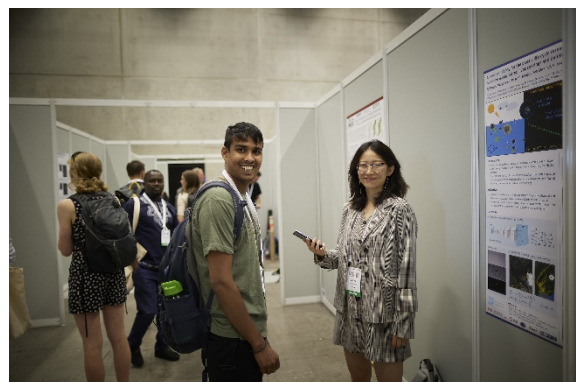
IUGG2023 consisted of three important parts: (i) an open Scientific Assembly, (ii) a meeting of the duly accredited Delegates of the IUGG Member Countries and guests invited in accordance with the By-Laws (referred to as the Council Meeting); and (iii) business meetings of the IUGG, its Associations, and their scientific bodies.

The Scientific Program of the General Assembly consisted of 640 sessions with 3,109 oral and 1,330 poster presentations in total. The program was completed by 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](#).

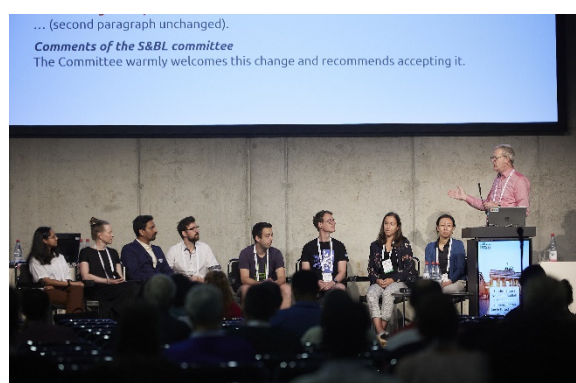
The Comptes Rendus of IUGG2023 are available [here](#).



*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*



*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*

Photos: IUGG2023

### **Council Meeting**

The Council Meeting was held in Berlin, Germany, from 12 to 18 July 2023. At three sessions of the meeting, the Council delegates, representing 39 Member countries, discussed various topics and approved/ratified the following decisions:

*(i) Admission of Latvia as a Regular Member Country and Paraguay as an Associate Member Country*

*(ii) Election of IUGG Bureau and Finance Committee Members for 2023-2027*

- **President:** Chris Rizos (Australia)
- **President-Elect:** Mioara Manda (France)
- **Secretary General:** Alexander Rudloff (Germany)
- **Treasurer:** Niels Andersen (Denmark)
- **Members at large:** Athena Coustenis (France), Andrew Mackintosh (Australia), Virendra Tiwari (India)
- **Finance Committee:** Archana Bhattacharyya (India), Priscilla Grew (USA), Jan Krynski (Poland).  
Jan Krynski was selected as the Committee's Chair

*(iii) Approval of the IUGG Budget for 2024-2027*

The activities of IUGG are based on payment of membership dues plus other direct and indirect contributions. IUGG has 74 member countries, 59 of them are regular members paying dues. The annual amount of dues is about \$650K (the budget is in US\$; K means thousands). Expected balance on 1 January 2024 is ~\$900K. Income in the period of 2024-2027 is estimated to be \$2,762K, making ~\$3,662K in total. Planned expenditures is \$3,055K, and hence an expected balance on 31 December 2027 would be ~\$607K. Half of the paid dues goes to Union Associations (\$1,298K), the remaining part to the Union Grants program and support of scientific meetings (\$300K), travel grants for the next general assembly (\$200K), Science and Education Program (\$320K), Union activities (\$156K), International Science Council (\$128K), and administration (\$621K).

*(iv) Selection of Incheon (Rep. of Korea) as the venue for the 29th IUGG General Assembly in 2027*

*(v) Appointment of IUGG Liaison Officers to International and Intergovernmental Organisations for 2023-2027*

<b>Name of the Organization</b>	<b>Name of the Liaison Officer (country)</b>
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)	Simon WING (USA) Christopher KOTSAKIS (GREECE)
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)

*(vi) Approval of six resolutions*

### **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 28<sup>th</sup> 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 28<sup>th</sup> General Assembly an outstanding success in the beautiful city of Berlin.

## GEOSCIENCE CONNECTIONS



IUGG produced a broad variety of science movies ‘Geoscience Connections’ related to the disciplines of its eight International Associations, namely cryospheric sciences, geodesy, geomagnetism, hydrology, meteorology, oceanography, seismology, and volcanology. We aim to inspire a new generation of scientists by screening the work of talented young and senior scientists. We assure gender equality and diversity by interviewing 29 researchers from 16

countries. The shootings were done in the Czech Republic, France, and Germany, between October 2022 and July 2023. The movies are available on the [IUGG YouTube channel](#).

## ASSOCIATION SCIENTIFIC ASSEMBLY 2023

### *IAVCEI Scientific Assembly 2023*

Owing to travel restrictions due to the COVID-19 pandemic, the IAVCEI Scientific Assembly which was planned to be organised in 2021 in Rotorua, New Zealand, had to be postponed twice. Finally, it was held from 29 January to 3 February 2023. Despite a tropical cyclone from 27 to 29 January which caused the closure of Auckland airport and flight cancellations for numerous expected attendees, the assembly was a great success. Fortunately, many attendees had reached New Zealand well in advance in order to participate in pre-conference field excursions on active volcanic systems of the northern island. The assembly was attended by 1,080 people (860 on site, 220 online). 1,258 abstracts were received for a 4 day programme of oral session, poster sessions, and plenary lectures. Early Career Scientists presentations comprised 60% of the presentations.

*Closing ceremony of the IAVCEI Scientific Assembly, Rotorua, New Zealand, 3 February 2023  
(photo: G. Leonard, GNS)*

The assembly started with a traditional Maori celebration. Besides scientific sessions, the assembly included several workshops, the awards ceremony (George Walker Award and Wager Medal, nominations of Honorary Life Members), and an evening projection of the Netflix documentary “*The Volcano: Rescue from Whakaari*” on the nearby 2019 Whakaari/White Island eruption catastrophe, where 22 people died and 25 people were severely injured. Mid-conference field excursions were cancelled due to meteorological conditions, but post-conference visits to several volcanoes took place.

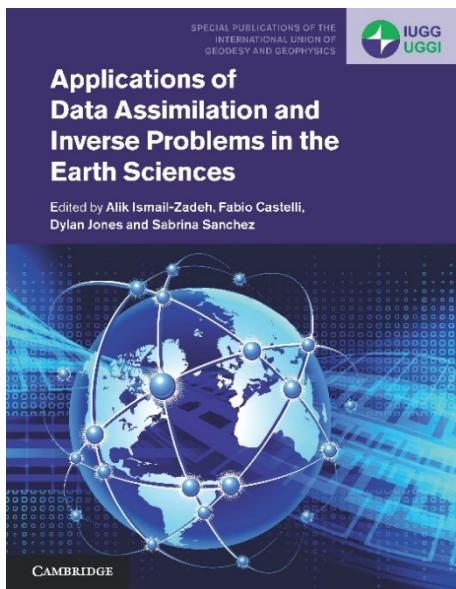
Many participants expressed their great pleasure to meet again in person for the first time after the COVID-19 pandemic and appreciated both the overall scientific level and the friendly atmosphere of

the assembly. The IAVCEI Executive Committee further acknowledges the New Zealand colleagues of the Local Organising Committee for the efficient organisation and the great success of the conference.

Patrick Allard, IAVCEI President  
Roberto Sulpizio, IAVCEI Secretary General

## IUGG SPECIAL PUBLICATIONS SERIES

[Special Publications of the IUGG](#) are a series of books co-published by the IUGG and Cambridge University Press (CUP). Volumes in the series present major scientific developments and achievements derived from programs, assemblies, and symposia run by the Union, and provide researchers and graduate students with authoritative insights into state-of-the-art research across the Earth Sciences. The new book [Applications of Data Assimilation and Inverse Problems in the Earth Sciences](#) provides a comprehensive reference on data assimilation and inverse problems, as well as their applications across a broad range of geophysical and geodetic disciplines.



With contributions from world leading researchers, this book covers basic knowledge about geophysical inversions and data assimilation and discusses a range of important research issues and applications in atmospheric and cryospheric sciences, hydrology, geochronology, geodesy, geodynamics, geomagnetism, gravity, near-Earth electron radiation, seismology, and volcanology. Highlighting the importance of research in data assimilation for understanding dynamical processes of the Earth and its space environment and for predictability, it summarises relevant new advances in data assimilation and inverse problems related to different geophysical fields. Covering both theory and practical applications, it is an ideal reference for researchers and graduate students within the geosciences who are interested in inverse problems, data assimilation, predictability, and numerical methods.

The book is co-authored and edited by Alik Ismail-Zadeh (Germany), Dylan Jones (Canada), Fabio Castelli (Italy), and Sabrina Sanchez (France). This is a contribution of the IUGG Commission on Mathematical Geophysics (CMG). More information on the content of the book and its authors can be found at the CUP's [webpage](#).

Alik Ismail-Zadeh, book editor and CMG chair

## ASSOCIATION JOURNALS

The IUGG, through some of its Associations, regularly publishes a number of peer-reviewed journals covering various topics of Earth and space sciences. All the journals are either full or hybrid open-access. Here, we would like to introduce you to the major journals of our Associations.

## **International Association of Geodesy (IAG)**

The [Journal of Geodesy](#) is an international journal concerned with the study of scientific problems of geodesy and related interdisciplinary sciences. It presents peer-reviewed papers on theoretical or modeling studies, and on results of experiments and interpretations. In addition to original research papers, the journal includes commissioned review papers on topical subjects, occasional short notes on topics with broad significance to the readership, and special issues arising from e. g. scientific symposia or workshops. The journal covers the whole range of geodetic science and reports on theoretical and applied studies in research areas such as positioning; reference frame; geodetic networks; modeling and quality control; space geodesy; remote sensing; gravity fields, and geodynamics. The Journal of Geodesy is published by Springer. Five year impact factor: 4.9 (2022).



- A journal of the IAG
- An international journal examining scientific problems of geodesy and related interdisciplinary sciences
- Covers the entire range of geodetic science
- Presents peer-reviewed papers on theoretical or modeling studies, and on results of experiments and interpretations
- Reports on theoretical and applied studies in research areas such as positioning; reference frame; geodetic networks and more
- 97% of authors who answered a survey reported that they would definitely publish or probably publish in the journal again

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

The [Hydrological Sciences Journal](#) is the official Journal of IAHS and provides a forum for original papers and for the exchange of information and views on significant developments in hydrology worldwide. The Hydrological Sciences Journal is published by Taylor & Francis. Five year impact factor: 3.7 (2022).



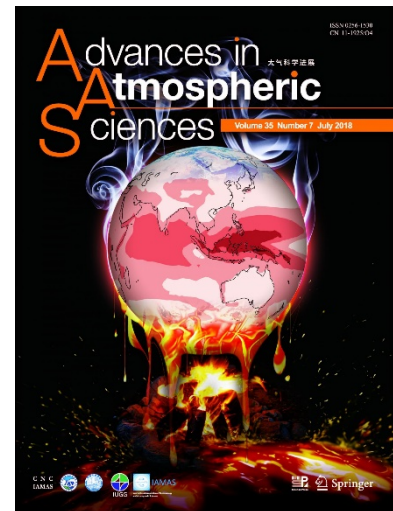
The scope of the journal includes:

- The hydrological cycle
- Surface water, groundwater, snow and ice, in all their physical, chemical and biological processes, their interrelationships, and their relationships to geographical factors, atmospheric processes and climate, and Earth processes including erosion and sedimentation
- Hydrological extremes and their impact
- Measurement, mathematical representation and computational aspects of hydrological processes
- Hydrological aspects of the use and management of water resources and their change under the influence of human activity
- Water resources systems, including the planning, engineering, management and economic aspects of applied hydrology

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

[Advances in Atmospheric Sciences](#), launched in 1984, aims to rapidly publish the latest achievements and developments on the dynamics, physics and chemistry of the Earth's atmosphere and ocean. It also aims to rapidly publish potentially high influential papers on the atmospheres of other planets and on earth system dynamics in which the atmosphere and/or ocean are involved.

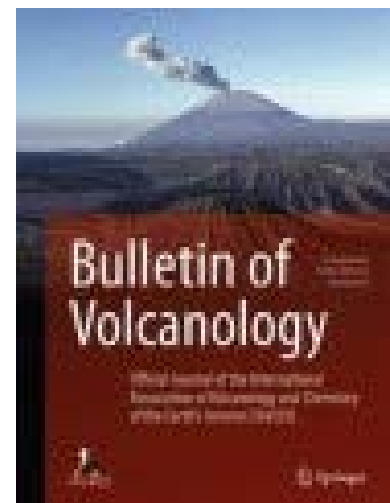
Papers cover the subject areas including but not limited to atmospheric and oceanic theories, modelling and observations; weather and general circulation systems, numerical weather prediction, climate dynamics; satellite meteorology, remote sensing, air chemistry and the boundary layer, clouds and precipitation; earth system dynamics, particularly on interactions of the atmosphere and ocean with the biosphere, the cryosphere, and the anthroposphere. The journal encourages studies seeking universal and generalized laws from local and specific phenomena.



Advances in Atmospheric Sciences is sponsored by the Chinese Committee for IAMAS, the Institute of Atmospheric Physics at Chinese Academy of Sciences and Chinese Meteorological Society. It is the associated journal of IAMAS. Five year impact factor: 4.7 (2022).

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

The [Bulletin of Volcanology](#) was founded in 1922, as Bulletin Volcanologique, and is the official journal of the IAVCEI. The Bulletin of Volcanology publishes papers on volcanoes, their products, their eruptive behaviour, and their hazards. Papers aimed at understanding the deeper structure of volcanoes, and the evolution of magmatic systems using geochemical, petrological, and geophysical techniques are also published. Material is published in four sections: Review Articles; Research Articles; Short Scientific Communications; and a Forum that provides for discussion of controversial issues and for comment and reply on previously published Articles and Communications. The Bulletin of Volcanology is published by Springer. Five year impact factor: 2.9 (2022).



## **IUGG GRANTS PROGRAM 2022-2023**

IUGG continued its Grants Program for 2022-2023, which complements the Union program of funding symposia and workshops organised or co-sponsored by Union Associations and Union Commissions. Key priority areas are defined for the Grants Program in line with IUGG overall scientific strategies:

- Creation of new knowledge in Earth and space sciences
- Dissemination of knowledge, data and information on geophysics and geodesy
- Geoscience for sustainable development
- Geoscience and policy interface
- Geoscience education and outreach in developing countries

For 2022-2023, IUGG awarded grants to the following projects:

- **Implementing IUGG 2015 Resolution #4: Organization of the GNSS Tsunami Early Warning (GTEWS) Consortium** (a joint project between GRC, IAG, IAGA, IAPSO, IASPEI, and IAVCEI);
- **Kyoto Landslide Commitment 2020** (a joint project between GRC, IAGA, IASPEI, and IAVCEI);
- **2nd IAG Commission 4 Symposium “Positioning and Applications”** (a joint project between IAG and IAGA); and
- **Discovering Patascoy, An Unknown Holocene Volcano** (a joint project between IAVCEI and IASPEI).

In July 2022, the IUGG decided to issue the IUGG Grants Program 2022-2023 (Special Call) which is dedicated to the International Year of Basic Sciences for Sustainable Development (IYBSSD2022). The program aims to support projects which address international cooperation in Earth and Space Sciences and that highlight the importance of basic science for sustainable development.

The IUGG awarded grants to the following projects:

- **Geosciences for Sustainable Development** (a joint project between CCEC and IAPSO)
- **2023 Glacial Isostatic Adjustment (GIA) Training School** (a joint project between IACS and IASPEI)
- **Workshop for SAR in Geodesy** (a joint project between IAG and IASPEI)
- **Sixth Meeting of ITU/WMO/UNEP Focus Group on AI for Natural Disaster Management** (a joint project between IAMAS and IAG)
- **Heat Flow Summer School & Workshop** (a joint project between IAPSO, IASPEI, and IAVCEI)
- **Towards creating and launching the Network for African Volcanologists (NAV)** (a joint project between IASPEI and IAVCEI)
- **Celebrating the 80th anniversary of Parícutin volcano (Michoacán, Mexico): Preserving our heritage and preparing for future eruptions; February 19-24, 2023** (a joint project between IAVCEI and IASPEI)
- **Improving earthquake preparedness through geoscience education in the Himalayas** (a joint project between SEDI, IASPEI, and ILP)

## Kyoto Landslide Commitment 2020

The International Consortium of Landslides (ICL), IUGG, and other global stakeholders established the Kyoto Landslide Commitment 2020 for Global Promotion of Understanding and Reducing Landslide Disaster Risk ([KLC2020](#)) in 2020, and decided to launch the open access book series ‘Progress in Landslide Research and Technology (P-LRT)’ as a core activity of KLC2020 at the Fifth World Landslide Forum, which was held from 2 to 6 November 2021 in Kyoto, Japan.

The ICL Open Access Book Series ‘P-LRT’ was launched in 2022 with the founding issues of Volume 1, Issue 1 and Issue 2. Volume 2, Issue 1 and Issue 2 were published in December 2023. The themes of Vols 1 and 2 were diverse and ranged from early warning and real-time prediction to climate change, experimental and numerical analysis, landslide-induced tsunami, hazard mapping, resilience and sustainability, giant landslides on volcanic islands, cultural heritage, and socio-economic significance. All articles/issues can now be accessed and downloaded at: [Vol 1, Issue 1](#); [Vol 1, Issue 2](#); [Vol 2, Issue 1](#); and [Vol 2, Issue 2](#).



Four book covers of the ICL Open Access Book Series 'P-LRT' in 2022 and 2023

In order to contribute to KLC2020, ICL and the Global Promotion Committee of IPL and KLC2020 (GPC/IPL-KLC) including IUGG jointly organised the Sixth World Landslide Forum, in Florence, Italy, from 14 to 17 November 2023. The IUGG President Chris Rizos provided a [video message](#) for the opening ceremony and the IUGG Secretary General Alexander Rudloff participated in the High-Level Panel Discussion 'Review of KLC2020 and the way Forward' on 14 November 2023. The [Florence Declaration on Landslide Risk Reduction](#) was adopted in this High-Level Panel Discussion. The number of participants was 1,202, from 69 countries, and the number of oral presentations was 643. The Sixth World Landslide Forum programme covered [six themes](#) including (i) Kyoto Landslide Commitment for sustainable development, (ii) Remote sensing, monitoring and early warning, (iii) Testing, modeling and mitigation techniques, (iv) Mapping, hazard, risk assessment and management, (v) Climate change, extreme weather conditions, earthquakes and landslides, and (vi) Progress in landslide science and applications. All abstracts are available [here](#).

KLC2020 was supported by the IUGG Grants Program.

Kyoji Sassa, ICL Secretary General

### **2nd IAG Commission 4 Symposium "Positioning and Applications": Report**

The [2nd Symposium of IAG Commission 4 "Positioning and Applications"](#) took place at Wissenschaftsetage Potsdam, Germany, from 5 to 8 September 2022. On-site and online participation was possible. 74 participants were registered, of which 28 joined online. Among the registered were 14 students and six IAG members. 14 participants were female, 60 were male. The participants came from 20 countries: Algeria, Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Denmark, Finland, Germany, Greece, Iran, Italy, Poland, Saudi Arabia, South Africa, Spain, Switzerland, and the USA. The scientific programme included nine sessions. Five of these were arranged according to the IAG Commission 4 structure:

- Emerging Positioning Technologies and GNSS Augmentation
- Multi-frequency Multi-constellation GNSS
- Atmospheric Remote Sensing of the Troposphere
- GNSS Reflectometry
- GNSS Integrity and Quality Control

and two were dedicated to the special focus topics of the symposium:

- Atmospheric Remote Sensing of the Ionosphere
- IAG GGOS Focus Area Geodetic Space Weather Research

51 talks and seven posters were presented within these sessions. We accepted presentation slides and posters as part of the open access [Symposium Proceedings](#) at Zenodo. We also held opening and closing sessions, and a special session with a video presentation. Our delegates organised an IAG Sub-Commission 4.3 splinter meeting, a business meeting of IAG Commission 4, and a IAG/IAGA splinter meeting on the topic of “Space Weather Research”.



*On-site participants of the 2nd IAG Commission 4 Symposium “Positioning and Applications”*

Various scientific bodies took part in the organisation of this symposium. Besides IAG Commission 4, the IAG GGOS Focus Area “Geodetic Space Weather Research” and the Interdivisional Commission on Space Weather of IAGA, we had the Technical University of Berlin, K.N. Toosi University of Technology Tehran, the International GNSS Service (IGS) and the U.S. Institute of Navigation (ION) on board as organisers. Due to its multi-association character, we received IUGG funding for fostering participation of scientists from developing countries, students, and early-career female scientists, and we could partly reimburse invited speakers that allowed us to design the symposium programme according to the focus topic. The local organisation was undertaken by Robert Heinkelmann, Anja Böhmer and Harald Schuh (GFZ Potsdam, Department Geodesy).

Especially we would like to thank IUGG for their grant which helped make the symposium an inter-association success.

Robert Heinkelmann  
on behalf of the Local Organising Committee and IUGG Funding Organiser

### ***Discovering Patascoy, An Unknown Holocene Volcano: Report***

The meeting was held on the slopes of the Patascoy Mountain, located  $0.9442^{\circ}$  N,  $77.0725^{\circ}$  W, in Colombia. In order to reach Patascoy it was necessary to travel by boat for almost five hours. The meeting was split into two parts, one devoted to talks and discussions before travelling to Patascoy, and a second part held on its slopes, where it was necessary to condition the place and to build an auditorium in the middle of the jungle (see picture). The 29 meeting participants included scientists, students and community members from Italy, Peru, Ecuador, and Colombia.

The first part of the meeting was held on the shore of La Cocha Lake on 20 January, where several talks were given by some of the participants of the workshop, followed by discussions. The discussions allowed the participants to be introduced to and understand the physical environment they were to face and the little scientific knowledge that we have about Cerro Patascoy. On the next day, on the boat trip to Patascoy, a massive white pyroclastic fall deposit, identified the year before during a preliminary exploratory trip, on walls eroded by the river, was reached. We stopped near to it in order to collect samples which will later be used for chemical analysis and dating. On 22 January, we split



between a group who attempted to reach the top of the Cerro Patascoy, and a group who visited the El Silencio o El Trueno Lake. The first group departed in the early morning with the aim to reach the top of the mountain after about five hours of walking. During the journey they collected samples and confirmed that most of the little exposed deposits are actually granite. Unfortunately, a landslide affected the already difficult trail making it impossible to climb to the mountain. So, they were forced to return to the base camp. The second group departed in the morning reaching the El Trueno Lake, examining the morphology and landscape of the surroundings of the lake, identifying possible domes, and observing if the lake could be the result of a phreatic explosion.



*(a) basement of the building and (b) finished meeting room with participants of the workshop*

On 23 January the team split in groups to explore eroded scars left by the La Joya River and along the road built to connect the landing stage on the Guamuez River with the base camp, in order to collect samples and to do a first visual analysis of them. Late in the afternoon the whole group of participants met in the cabin built for meetings in order to discuss the outcomes of the expedition based on the visual analysis of the samples, the landscape and satellite images. The undergraduate students joined both the trip towards the top of the mountain and the lake, as well as the discussions, openly questioning the science behind the preliminary conclusions. At the end of the discussions, we shared the preliminary conclusions with the community of peasants and indigenous people using non-technical language, that is more accessible for them. The last day was for the return trip by boat.

The preliminary conclusions suggest that Patascoy is not an ancient, eroded caldera as most of the outcrop rocks are granites and there is no evidence of ignimbrite deposits in the region, at least for the last 20,000 years, and the structures are likely the result of tectonic stresses. The volcanic deposits found in the area are both pyroclastic fallout and flow deposits. In particular fallout deposit outcrops were found in two locations along the river (~5-6m) and along the trail to the base camp coming from the river (~9m). In the latter location, on the top of the fallout deposits, there are also deposits of a volcanoclastic flow (~2m). Several potential sources of these deposits were discussed during the workshop, including distal volcanoes like Soche at the border with Ecuador or El Estero volcano, but on the basis of the distance and variation of thickness among the outcrops and because the presence of a flow deposit on the most proximal found deposit, the conclusion was that the source has to be near the Patascoy slopes. This can be the Cocha del Trueno or the nearby El Alcalde hill, which looks like a potential dome. A better idea may be obtained after the analysis of the field data and the ongoing laboratory analyses. The expedition resulted in a challenge for the visiting vulcanologist who decided to continue studying the geology of those areas and volcanoes not previously studied by promoting international collaboration among the participants.

### ***Accomplishment of the goals***

Five of the six objectives of the expedition stated on the proposal were accomplished. The remaining one is the study of the impact of the eruptions on environmental services in the surrounding tropical rainy Amazon forest.

### ***Accomplishment of the expected results***

Two of the expected results stated in the proposal remain in progress, which are improvement of the understanding the impact of the volcanic eruptions on the ecological services, and to work on a paper to publish the outcomes. We learn that Patascoy could not have caldera-forming eruptions, but a granite-based formation. However, anecdotal references from the participant stakeholders and drawings from Alphose Stübel in 1869 show volcanic activity from a volcano in the sector. It is likely that the complex fault system closed and are responsible for the Patascoy formation. The caldera hypothesis is unlikely, thus there was no need to characterise it. During the session devoted to show the preliminary results to the stakeholders, they seemed to be happy with them, pointing out that “if Tayta Patascoy is not responsible for the volcanic deposits, it was his relatives”.

The project was supported through the IUGG Grants Program.

Gustavo Córdoba  
on behalf of all participants

### ***Workshop for SAR in Geodesy: Report***

The Workshop for Synthetic Aperture Radar (SAR) in Geodesy took place in Espoo, Finland from 13 to 14 March 2023. There were 130 participants in total, 42 were on-site in Espoo and some 40-50 online, depending slightly on the time of day. All on-site participants were from Europe, mostly from Nordic and Baltic countries, but among the online participants there were people from Africa, Asia, and Europe.

The workshop started on Monday after lunch with presentations about experiences and results from work done with active and passive SAR reflectors by German colleagues. After the coffee break a colleague from ESA presented their views on how the satellites and the SAR products are planned to evolve. There was also some discussion at the end of the day. The workshop dinner saw some lively discussions about the workshop topic, but was also valuable from the general networking point-of-view. Tuesday started with a presentation about TU Delft’s work on the topic and the workshop ended with discussion on where we are now, what we would like to do in the future and what kind of opportunities the SAR technique holds for geodesy. The workshop was very well received and timely, as SAR usage is growing.

More information about the workshop can be found [here](#).

The meeting was supported through the IUGG Grants Program.

Maaria Nordman  
on behalf of the Local Organising Committee

***Celebrating the 80th anniversary of Parícutin volcano (Michoacán, Mexico): Preserving our heritage and preparing for future eruptions; February 19-24, 2023: Report***

The international conference ‘Commemorating the 80<sup>th</sup> anniversary of Parícutin volcano: Preserving our heritage and preparing for future eruption’ took place at Morelia, Michoacán, México, from 19 to 24 February 2023, and was organised by the Universidad Nacional Autónoma de México (UNAM) and la Universidad Michoacana de San Nicolás de Hidalgo (UMSNH).



*Photograph of the conference participants, Morelia, 23 February 2023*

Parícutin is an iconic volcano that was born on 20 February 1943, in a cornfield in a remote part of the Michoacán State in México. Its eruption lasted nine years and provided insights into monogenetic volcanism that are still of considerable interest today. Nevertheless, this outstanding volcanic heritage is threatened and the preparedness for the next eruption is low.

To contribute to solving these issues, the conference included scientific sessions on: A) New research on monogenetic volcanism, B) Monogenetic volcanism, environment and society, and C) Precursors, monitoring and crisis management. More than 100 participants gathered from Mexico and 12 other countries, including 35 students which received support for their stay expenses. Distinguished researchers from Spain and Iceland, shared lessons of the recent eruptions in Reyjanes Peninsula and La Palma. The Dirección de Literatura (UNAM) and collaborators organised a contest of the best ‘birthday letter to Parícutin’, among other cultural activities that strongly enriched the event. Pre-, syn-, and post-conference fieldtrips allowed participants to discover the richness of monogenetic volcanic fields in Mexico.

We received overwhelmingly positive feedbacks from this event, and we wish to thank all participants and members of the staff. Check our photo gallery and watch keynote talks [here](#).

The conference was supported through the IUGG Grants Program.

Marie-Noëlle Guilbaud, UNAM, on behalf of the Organising Committee

## ***Improving earthquake preparedness through geoscience education in the Himalayas: Report***

Since 2017, we have been running a successful educational seismology programme in Nepal which stands on two main pillars, (i) the installation of low-cost seismometers in schools to span an operational seismic network, and (ii) the training of local teachers to teach about earthquake preparation and related topics including hands-on activities with seismic sensors.

In the proposal submitted to IUGG for funding from the IYBSSD grants round, we stated an aim to develop a new module, namely the Earthquake Evacuation Procedure Guide, to continue educational activities in Nepal, and to extend the initiative to neighboring countries. Below, we present major activities done with the support of the funding.

### Teachers' workshop

With the support of various institutions including IUGG, we have organised a two-day workshop for Nepali school teachers from 1 to 3 May 2023 in a centrally located city in Nepal, Pokhara. There were 49 teachers participating, of which most were science, computer science, and social science teachers, as well as several school principals. The workshop topics covered a broad spectrum of topics such as seismic hazard in Nepal, demonstration of a teaching tool for teachers: Sismobox, an earthquake evacuation procedure guide, earthquake location using school-seismometer recorded data, and an educational card game 'Beat the Quake'. The program was designed to offer a mixture of scientific talks, demonstrations, open question-and-answer sessions. All presentations were well received, and Nepali clarifications and translations have been ensured where necessary. What has clearly gone well beyond our expectations was the open Q&A session. All speakers sat in front of the audience, and we received literally any type of question about the Earth, Earth Sciences, earthquakes, and much more, leading to great discussions.

Five speakers, including Prof. Dr. György Hetényi (University of Lausanne, Switzerland), Ms. Sarah Houghton (St. Michael Steiner School, United Kingdom), Dr. Fabrice Jouffray (University Côte d'Azur, France), Dr. Lok Bijaya Adhikari (National Seismological Center, Kathmandu), and Dr. Shiba Subedi (Seismology at School in Nepal) shared the stage for presentations, practical demonstrations, and discussions.

*Group photo during the teacher workshop in Pokhara, Nepal, from 1 to 3 May 2023*

### Running educational activities in 2023

In 2023, we also conducted various educational activities in participating schools, such as special lectures on earthquake awareness, answering questions with demonstrations, monitoring the seismometer to keep it online 24/7, introducing an educational card game for students, etc. During our school visits, we took the opportunity to provide religious and scientific explanations for earthquakes in the Himalayas. This is crucial for local people, because most of them, especially in the countryside, believe that earthquakes are caused by God. This is also mentioned in various Hindu scripts, and it is difficult to convince older and poorly educated people of the scientific causes of the earthquake. We carefully explained the science of earthquakes to the public during our school visits.

### Earthquake evacuation procedure guide: preparation and test

As part of our Seismology at School programme in Nepal, we developed an earthquake preparedness module called the Earthquake Evacuation Procedure Guide (EEPG). Since there is no specific protocol to follow when an earthquake happens in Nepal, it would be very helpful to save lives in future earthquake occurrences. The main goal of this guide is to teach students in schools how to maximise their chances of saving their lives during earthquake shaking. The document includes information on what students can do to prepare for earthquakes, how to improve earthquake safety, the school's emergency plan, and a proposed earthquake education schedule. All action steps before, during, and after an earthquake are explained in detail in the guide, with an additional section for teachers.

Below are the main steps of the Earthquake Evacuation Protocol:

1. Secure space by identifying hazards and securing moveable items.
2. Plan to be safe by creating a school emergency plan and deciding how one will communicate.
3. Organise emergency supplies in convenient locations.
4. Prepare and organise important documents and strengthen the school building.
5. Good response during an earthquake: Where are you? Outside or inside?
6. Improve safety after earthquakes by evacuating, helping the injured, and preventing further injuries or damage.
7. There will be a need to restore daily life by reuniting with others, repairing damage, and rebuilding the community.

Shiba Subedi, Seismology at School in Nepal and György Hetényi, University of Lausanne

## IUGG STATEMENT

### *IUGG Supports Scientists at Risk*

IUGG notes with alarm and dismay the escalation of conflict and suffering in the Middle East since 7 October 2023. IUGG opposes any discrimination or harassment of individuals based on factors such as age, citizenship, disability, ethnic origin, gender identity, language, political or other opinion, religion, or sexual orientation. IUGG recalls the [International Science Council Declaration: Supporting at-risk, displaced and refugee scientists: A call to action](#) and urges universities, research centers, and scientific organisations to take every possible measure to prevent any incitement to worsen the situation by the exclusion of scientists who may be at risk based on the given conditions.

## COOPERATION WITH THE INTERNATIONAL SCIENCE COUNCIL (ISC)

### *ISC Mid-term Meeting Report*

I represented IUGG at the mid-term meeting of the International Science Council ([ISC](#)), held in Paris, France, from 11 to 13 May 2023, with theme 'Capitalizing on Synergies in Science'. The ISC was formed in 2018 by a merger of the international natural and social science



**International  
Science Council**

councils, and this was its first in-person meeting since its inception. The programme was put together with input from members as to where their priorities lie, and can be found [here](#). Several hundred delegates attended, and there was considerable lively discussion, during the formal meeting, in the breaks and at social events, as delegates welcomed the opportunity to network.

I had accepted an invitation to co-Chair 'Session 2: Membership Forum – The Evolution of Science in a Global Context', during which I gave a Union view of the context in which science systems evolve, and

the challenges we are facing now and in the future. Many of the challenges facing Unions were the same as those facing the ISC itself and were covered in the previous session on 'The Present and Future of the ISC', such as trust in science and scientists, the spread of misinformation, the impacts of the pandemic, conflicts, and artificial intelligence, the north-south divide, the need for inter- and trans-disciplinarity, open data and publishing, and freedom and responsibility in science. However, I did also mention the practical difficulties of maintaining observing networks, particularly in the global south, and the increasing dangers (including of theft, assault, kidnap and even death) to scientists and technicians who make the measurements and service the equipment. I pointed out that satellite data cannot replace these ground observations, and that it is essential that the data are made freely available in a timely fashion for all to use, and placed in recognised repositories.

The focus of ISC is shifting compared to those of the Science Councils from which it was formed, with the President, Peter Gluckman, keen for it to be the 'go-to' organisation for advice on policy and involvement in diplomacy. As such, it is increasing its involvement and forming closer links with the UN Headquarters and UN Agencies, and expanding its staffing levels. The President advised delegates that the organisations we represent should expect many invitations to nominate experts to help provide this advice – we have already successfully nominated IAHS Secretary General Christophe Cudennec to participate in the UN Water Conference in March 2023, for which he helped prepare a Policy Briefing. At the meeting, the [ISC Centre for Science Futures](#) was launched, to gather evidence on changes in science systems, and understand where this is taking us in the future.

Many parts of the programme led to discussions on the Sustainable Development Goals ([SDGs](#)), global warming, biodiversity loss, and hazards, disasters and risk, especially their unequal impacts on different societies and groups of people. In particular, it was pointed out that most SDG targets are not on track, with many metrics reflecting a worse situation than when the Agenda was launched in 2015.

Members of the ISC fall into several categories – International Unions such as IUGG, known as Category 1, and national bodies such as the National Academy of Sciences, known as Category 2, and other organisations such as the Scientific Committee on Antarctic Research. ISC has established a Working Group on Constitutional Revision, to guide a revision of the Statutes and Rules of Procedure, since the existing Statutes and Rules were a pragmatic solution to facilitate the merger that founded the ISC. The existing ISC Constitution affords different voting rights to the different categories, such that the combined votes of each of the Unions and National Bodies carry equal weight. Following discussions before the meeting, in a parallel session of Category 1 Members, and when Constitutional Revision was discussed in plenary sessions, it became clear that the Unions remain implacably opposed to any constitutional change that could erode their equal voting weight. The Unions also felt that changes risked reducing the voice of less rich national bodies, most of which are from the global south. A suggestion from the ISC President during the plenary sessions that national and regional Unions with international membership could also join ISC was also regarded as unwelcome, since many of them have far greater financial resources than the International Unions. After the meeting finished, available delegates from the Unions met and agreed to send a letter outlining our disquiet to the ISC Governing Board before it met the following week.

It was such a delight to have spontaneous informal interactions again – for example, I met the President of the International Association of Physics Students, Cyrus Walther, which now plans to participate in the Early Career Scientists' 'Big Theme' at the IUGG General Assembly 2023, and Kazuo Shiokawa, the President of SCOSTEP, who was concerned about the cessation of magnetometer station data sharing with Russia following the invasion of Ukraine, which may lead to a Resolution at the General Assembly.

Kathy Whaler, IUGG President

## ISC Annual Report 2022



The International Science Council's (ISC) 2022 Annual Report is now available [here](#). The report summarises all of the ISC's major activities in 2022, as well as those of its affiliated bodies, and includes the ISC's financial reporting for the year. Highlights include, among others, the signed agreements with the World Health Organization and the United Nations Environment Programme, the launch of the ISC Fellowship programme, and

the establishment of ISC regional presences in Latin America, and the Caribbean and the Asia-Pacific region.

2022 was a turbulent year for the world, and in times of crises, we are reminded of the importance of collaboration and the resilience of our networks – we are indeed stronger together.

## COOPERATION WITH INTERNATIONAL AND INTERGOVERNMENTAL ORGANIZATIONS

### Global Geoscience Societies

IUGG celebrated Earth Day on 22 April 2023 together with its partners and published the following statement.

The global geoscience community celebrates Earth Day by encouraging informed, practical action. As people around the globe seek to understand societal challenges, Earth, space and planetary scientists provide information and stimulate innovation that can contribute to meaningful solutions. Geoscience expertise contributes to infrastructure and energy systems improvement, efficient resource use at all scales, and other applications that foster sustainable development. Geoscientists contribute to ever-evolving scientific knowledge and techniques that can lead to robust environmental, economic, and social action. In this way, geoscientists are co-working collaboratively for a better, more equitable future.



The Early Career and Student Communities Survey has been put together by 13 geoscience societies, incl. IUGG, and is designed to help societies and unions to understand the career aspirations and challenges for students and early career professionals interested in Earth and Space Science.

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### ***EGU General Assembly 2023 Report***



The IUGG President, Secretary General and Executive Secretary were at the EGU General Assembly 2023 in Vienna, Austria, from 23 to 28 April 2023. The Executive Secretary, together with colleagues from [C-IN](#) (the professional conference organiser of the IUGG General Assembly 2023) and Federal Institute for Geosciences and Natural Resources ([BGR](#); the Adhering Body of Germany to IUGG) organised an exhibition stand to promote IUGG and its upcoming General Assembly. The President and Secretary General attended a meeting of the 'Global Geosciences Societies', an informal group that aims to meet whenever one of the members has an in-person meeting. The main agenda items were Hybrid Meetings: Lessons Learned; Open Science including publishing; Equality, Diversity and Inclusion topics; and Strategy and Policy: societal challenge areas (e.g., climate change, sustainable development). One of the main activities of the group is a set of Task Teams addressing areas of mutual concern, through which we have, for instance, issued two Earth Day statements and are about to launch an early career researchers' survey. The President and Secretary General were invited to the President's Reception, and the President and Executive Secretary attended an American Geophysical Union Leadership Dinner. Our flagship programme with the International Union of Geological Sciences ([IUGS](#)), the International Lithosphere Programme ([ILP](#)), held its annual Business Meeting, which the President and Secretary General attended.

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### ***International Decade of Sciences for Sustainable Development (2024-2033)***

An [International Decade of Sciences for Sustainable Development](#) (2024-2033) has been proclaimed by the United Nations General Assembly on Friday, 25 August 2023, by consensus. The resolution has been proposed by Argentina, Cuba, Equatorial Guinea, Guatemala, Honduras, Hungary, Serbia, South Africa, Spain and Vietnam.

Congratulations to Michel Spiro, Luc Allemmand, and all supporters. As a Founding Union, IUGG has co-organised the International Year of Basic Sciences for Sustainable Development ([IYBSSD](#)), which was the precursor of this decade, from its beginning.



## IYBSSD – Closing Ceremony

The Closing Ceremony of the International Year of Basic Sciences for Sustainable Development ([IYBSSD](#)) took place on 15 December 2023 in the new Science Gateway building at CERN in Geneva, Switzerland. The ceremony showcased the rich portfolio of a year filled with insightful discussions, ground-breaking research, and significant advancements in the field of basic sciences. It reflected on the achievements made towards the implementation of the Sustainable Development Goals (SDGs) and looked ahead to future challenges and opportunities in the realm of sustainable development and scientific innovation, now that an [International Decade of Sciences for Sustainable Development](#) (2024-2033) has been declared.



IUGG, as a founding partner of the IYBSSD, was represented by its Secretary General.

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## UNESCO – 50th Anniversary of the International Geoscience Programme

The International Geoscience Programme ([IGCP](#)) was founded in 1972 by UNESCO and the International Union of Geological Sciences ([IUGS](#)). This UNESCO flagship programme actively contributes to society and to the implementation of the United Nations Sustainable Development Goals. The IGCP presently involves more than 5,000 geoscientists from 94 countries. In 2022, it delivered 60 projects, of which 41% involved women and 50% involved early-career scientists. The UNESCO Earth Sciences and GeoParks Section organised a conference “[Healing the Earth: UNESCO and Earth Sciences – Past, Present and Future](#)” held at the UNESCO Headquarters in Paris, France, on 16 March 2023. Participants were welcomed by Mr. Xing Qu, UNESCO Deputy Director-General and Acting Assistant Director-General for Natural Sciences; HE Dr. Mohamed Nabil, Minister of Higher Education and Research of the Republic of Djibouti; Dr. John Ludden, IUGS President; and Mr. Kristof Vandenberghe, Chief of Earth Sciences and GeoParks Section of UNESCO.



*Participants of the conference (photo: UNESCO ESGS)*

The conference showcased IGCP’s achievements; discussed new IGCP and GeoParks projects; and assessed the impact and current status of the programme. The role of UNESCO and IUGS in international earth science cooperation were reviewed, and the challenges our society is facing today were addressed. Also, attention was given to the efforts of the programme to promote collaboration of geoscientists from less affluent countries and to engage them in research with geoscientists from the developed world. A panel chaired by Dr. Iain Stewart, UNESCO Chair on Geoscience and Society,

discussed how geoscience expertise could tackle current and future threats to human and planetary wellbeing. Ms. Lisa Reborá, Senior Vice President of Emerging & Future Business at Equinor, Dr. Rokhaya Samba Diene, General Manager of the National Geological Survey of Senegal, and Dr. Geertje Schuitema, Associate Professor at University College Dublin joined the discussion as panelists. Several points were highlighted during the discussion involving the conference participants: a transformation from conventional to renewable energy resources; how to strengthen the IGCP including its financing; and how to involve industry, governmental agencies, and international organisations in cooperation with the IGCP. The IUGG Secretary General, Dr. Alexander Rudloff, IUGG Executive Secretary, Dr. Franz Kuglitsch, and the IUGG Liaison Officer to the UNESCO Earth Sciences and GeoParks Section, Dr. Alik Ismail-Zadeh, attended the conference.

Alik Ismail-Zadeh, IUGG Liaison Officer to the UNESCO Earth Sciences and GeoParks Section

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### WCRP – Open Science Conference 2023

More than 1400 delegates of the World Climate Research Programme 2023 Open Science Conference (WCRP2023) met in Kigali from 23 to 27 October 2023, representing scientists from diverse research communities worldwide as well as practitioners, planners and politicians, to discuss urgently needed solutions to climate change and the evolution of inclusive international climate science.



This once-in-a-decade event was truly hybrid with around 700 delegates participating onsite at the Conference Center and an equal number joining virtually from all around the world. The Conference was instrumental in reaching audiences from the Global South: 32% of the delegates were from Africa and 26% from other regions of the Global South. At the same time the event had a clear eye to the future, attracting many early career scientists.

The WCRP2023 was held in Africa in recognition of the disparities in the drivers and consequences of climate change around the world; persistent inequities in the global scientific community that undermine and disadvantage the knowledge contribution from communities in resource-poor nations; and a collective commitment to address both. As other regions of the Global South, African countries face disproportionate burdens and impacts, risks arising from climate change-related, severe weather events and patterns, including prolonged droughts, heatwaves, devastating floods and landslides, disastrous tropical cyclones, and wild/forest fires.

#### Conference Output:

- Kigali Declaration
- Concept Papers published in *Frontiers in Climate*

WCRP thanks IUGG for its financial support to cover the registration fees of 13 early-career scientists from Africa.

Michael Sparrow, Head of the WCRP Secretariat

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## 6th World Landslide Forum

The IUGG President gave a pre-recorded [welcome address](#) while the IUGG Secretary General Alexander Rudloff was present at the opening ceremony and participating in a high-level panel discussion of the 6th World Landslide Forum (WLF) in Florence, Italy, on 14 November 2023.

IUGG was one of the early signatory parties of the KLC2020, the Kyoto Landslide Commitment in 2020. The renewed and expanded [Florence Declaration 2023](#) aims to further reduce disaster risks from landslides worldwide.

The 6<sup>th</sup> World Landslide Forum, organised by the University of Florence and its partners, attracted more than 1,100 participants from all over the world. More than 850 scientific contributions were submitted.



*Alexander Rudloff, IUGG Secretary General with John Ludden, IUGS President, and Veronica Tofani, WLF6 SG on 14 November 2023 in Florence, Italy (left), Panel and Signatory Parties (right); Source: WLF6*

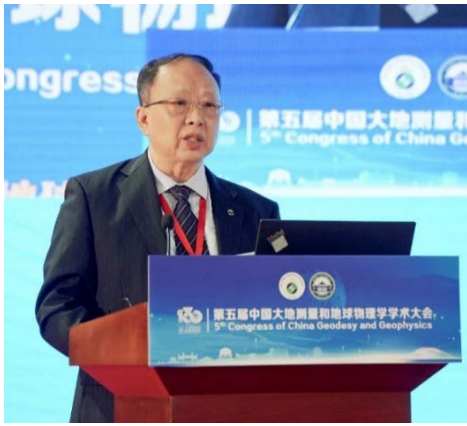
## IUGG MEMBER COUNTRIES

### ***IUGG CHINA – 5th Congress of China Geodesy and Geophysics***

From 21 to 23 April 2023, the 5th Congress of China Geodesy and Geophysics (CCGG) was successfully held in Wuhan, China. The 5th CCGG was sponsored by the Chinese National Committee for International Union of Geodesy and Geophysics (CNC-IUGG) and organised by Wuhan University.



*Participants of the 5th CCGG in Wuhan, China*



*Jun Xia, President of CNC-IUGG and IUGG Bureau Member, giving his welcome speech*

The theme of the 5th CCGG was ‘Earth System Sciences and Large River Sustainable Development’. 16 academicians from the Chinese Academy of Sciences and the Chinese Academy of Engineering, together with more than 3,900 scientists and students from over 300 universities, research institutions and other organisations gathered in Wuhan to exchange their scientific achievements, ideas and visions.

Kathryn Whaler, IUGG President, and Jun Xia, President of CNC-IUGG and IUGG Bureau Member, delivered welcome speeches at the opening ceremony. Chris Rizos, IUGG President-Elect, delivered a pre-recorded keynote speech. Five other keynote presentations were delivered by eminent scientists from China and abroad. The 5th CCGG Excellent Student Paper Award was presented to 10 students at the Opening Ceremony.

46 scientific sessions were organised, and over 800 oral and 500 poster presentations were selected following a peer-review process. Topics covered cryospheric science, geomagnetism and aeronomy, geodesy, hydrology, meteorology and atmospheric science, physical oceanography, seismology, volcanology, and interdisciplinary studies, which reflected the latest achievements and progress in Earth Sciences of China over the past two years.

Jun Xia, President of CNC-IUGG and IUGG Bureau Member (2019-2023)

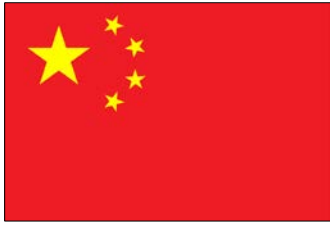
### ***IUGG CHINA – IUGG President visits China Association of Science & Technology***

The IUGG President, Chris Rizos, visited China and took the opportunity on 2 November 2023, to meet with colleagues at the China Association of Science & Technology (CAST). CAST is the organisation that is responsible for the management of many of China’s professional and scientific associations, including the payment of subscriptions to international bodies such as the IUGG.

At the invitation of Professors Dang Yamin and Yang Yuanxi, Secretary General and President, respectively, of the IUGG National Committee for China, the IUGG President met with Dr. Luo Hui, Director General, Department of International Cooperation, CAST. Discussions ranged over topics that included the recent IUGG General Assembly, the overall contributions made by Chinese geoscientists and institutions, how to increase the number of Chinese researchers in IUGG leadership positions, and strategies for expanded Chinese international engagement in the geosciences.

*Chris Rizos, IUGG President, with Luo Hui, Director General, Dept of International Cooperation CAST, on 2 November 2023 in Beijing, China*

### ***IUGG CHINA – Quadrennial Report 2019-2023 of the National Committee***



This national report was prepared by the Chinese National Committee for IUGG, on the occasion of the 28th IUGG General Assembly which was held in Berlin, Germany, 11 to 20 July 2023.

The report consists of seven parts, which presents the research activities and progress achieved in cryospheric sciences, geodesy, geomagnetism and aeronomy, meteorology and atmospheric sciences, physical ocean sciences, seismology and Earth's interior physics, volcanology and Earth's interior chemistry during the time period from 2019 to 2023. It is hoped that this national report helps Chinese scientists in exchanging the visions, ideas, and outcomes in the research, development and application of geodesy and geophysics with scientists all over the world.

Sincere thanks goes to all colleagues who contributed to this national report.

The Quadrennial Report 2019-2023 of the Chinese National Committee can be found [here](#).

Jun Xia, President of the Chinese National Committee  
Yamin Dang, Secretary General of the Chinese National Committee

### ***IUGG CROATIA – Quadrennial Report 2019-2022 of the National Committee***



During the four-year interval, Croatian scientists were active in Geodesy and in five geophysical disciplines (Geomagnetism and Aeronomy, Hydrology and Physical Limnology, Meteorology, Physical Oceanography, and Seismology). Their work has been shaped by at least three external factors. One of them was COVID-19 pandemic, which, on the one hand, has adversely affected field work in various disciplines, e.g., due to

frequent postponement of research cruises, but, on the other hand, has stimulated analysis of data, modelling activities and publication of the results thus obtained. The other factor was a series of earthquakes, the strongest ones being the Zagreb earthquake on 22 March 2020 and the Petrinja earthquake on 29 December 2020. Again, the consequences were twofold. The earthquakes had resulted in serious damage to numerous buildings housing faculties and institutions in Zagreb, which has led to demanding reconstruction work, and even to relocation of several research groups. Still, the Croatian geophysicists and geodesists reacted to the earthquakes in a proper way: the seismological networks were considerably expanded, the earthquakes and the corresponding aftershocks were carefully recorded and studied, the seismological studies were complemented by the remotely sensed data analysed by geodesists, and a possible influence of earthquake-generated noise on the quality of geomagnetic data was explored. Finally, also important for the shaping of research work were weather- and climate-related extremes in the atmosphere and hydrosphere. Consequently, the relevant observation networks were modernised, extreme events (e.g., heat waves, droughts, heavy precipitation episodes and consequent flash floods) were analysed and modelled, and the coastal floods due to sea level rise and exceptional atmospheric conditions were analysed by using a decomposition method that had been developed in Croatia but is now increasingly used in other countries. The Quadrennial Report 2019-2023 of the Croatian National Committee can be found [here](#).

Mirko Orlić, President IUGG National Committee for Croatia

***IUGG GREECE – Quadrennial Report 2019-2022 of the National Committee related to IAG, IAGA, and IAMAS***



This [report](#) was prepared as part of the national report of the Committee of Geodesy and Geophysics of Greece, on the occasion of the 28th General Assembly of the International Union of Geodesy and Geophysics (IUGG) which will be held in Berlin, Germany, 11 to 20 July 2023.

The first part of the report presents the geodetic activities and the progress achieved in Geodesy by Greek Universities, Research Institutions and National Agencies for the period 2019-2023. All the Geodesy-related research studies and contributions to national and international scientific projects, working groups and editorial boards lay mainly within the scope of the four Commissions of the International Association of Geodesy (IAG) (Commission 1: Reference Frames, Commission 2: Gravity Field, Commission 3: Earth Rotation and Geodynamics, Commission 4: Positioning and Applications).

The second part of the report presents the research activities in Geomagnetism and Aeronomy and the progress achieved by Greek Universities and Research Institutions during the reporting period 2019-2023. The report is structured in sections that correspond to the Divisions of the International Association of Geomagnetism and Aeronomy (IAGA).

We would like to express our sincere thanks to all colleagues for their contributions to this report.

Ilias N. Tziavos, IAG National Correspondent for Greece  
Ioannis A. Daglis, IAGA National Correspondent for Greece

The content of the [IAMAS report](#) is divided into eleven sections with each section being entitled with the name of the corresponding university institute or agency. The contribution of each institute is reported based on the material they provided along with the respective list of literature. An attempt was made to slightly homogenize the material provided by the respective contributors. Therefore, the text and, in general, the style of each sub-report, have been maintained in the subsequent sections.

I take the opportunity to express my sincere thanks to all colleagues working at University Departments, Research Institutions and National Agencies in Greece for their contributions, extensive lists of publications and for providing their activities for the compilation of this report.

Christos S. Zerefos, IAMAS National Correspondent for Greece

***IUGG HUNGARY – Quadrennial Report 2019-2022 of the National Committee***



The Hungarian National Committee for IUGG is pleased to present the Quadrennial Report 2019-2022 to the IUGG community. The report covers the research and development performed by Hungarian universities, research institutes, and government agencies, subdivided by subjects in line with the International Associations of IUGG.

The Quadrennial Report 2019-2022 of the Hungarian National Committee can be found [here](#).

László Bozó, Secretary of the Hungarian National Committee

### ***IUGG INDIA – Quadrennial Report 2019-2023 of the National Committee***



This is a report on some of the scientific activities carried out in India in the domains of each of the International Associations, which comprise the IUGG, during the period August 2019 to March 2023. The report is prepared on behalf of the Indian National Science Academy, which is the adhering body for IUGG, and provides a glimpse of some of the work done by Indian scientists on topics related to various aspects of Earth and its space environment, which fall within the domains of the

Associations.

The Quadrennial Report 2019-2023 of the Indian National Committee can be found [here](#).

Archana Bhattacharyya, Chairperson of the Indian National Committee

### ***IUGG ITALY – Annual Reports 2019-2022 of the National Committee***



The National Research Council ([CNR](#)) is the Italian Adhering Body to IUGG. To fulfil the functions of the Italian National Committee, and to provide guidelines and proposals for an effective Italian participation in the activities of the Union, as well as to assist the CNR in matters related to the international initiatives and activities promoted by the Union, the CNR has established a Commission for Participation in the Activities of the IUGG. For the four-year period 1999-2022 the CNR-IUGG Commission was composed of Fausto

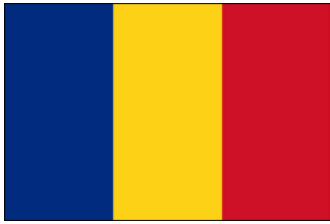
Guzzetti (National Delegate and President of the Commission), Claudia Pasquero (Deputy National Delegate and Deputy President of the Commission), Barbara Stenni (National Delegate to [IACS](#)), Mattia Crespi (National Delegate to [IAG](#)), Umberto Villante (National Delegate to [IAGA](#)), Alberto Montanari (National Delegate to [IAHS](#)), Mario Marcello Miglietta (National Delegate to [IAMAS](#)), Katrin Schroeder (National Delegate to [IAPSO](#)), Warner Marzocchi (National Delegate to [IASPEI](#) and Secretary of the Commission), and Giuseppe de Natale (National Delegate to [IAVCEI](#)), supported by Cecilia LALLE for the Secretariat. On 4 April 2023, the CNR President Maria Chiara Carrozza, confirmed the same team for the period 2023-2026.

Each year, the National Delegates prepare a report summarising the main scientific and organisational activities carried out in Italy and abroad by the Union and its Associations. The reports consist of a short introduction of IUGG and the CNR-IUGG Commission, a description of the main IUGG activities in each year which are relevant for Italy and for the CNR, a summary of the activities carried out by the National Delegates, an evaluation of the Italian participation to the Union in terms of benefits and membership costs, an evaluation of the Italian participation with proposals to increase interest and involvement, a list of prizes and recognitions awarded to Italian scientists, and a short summary of the Commission's activities. The annual reports are published on a [dedicated website of CNR](#) and linked to the [Nation Committee Reports section](#) of the IUGG website.

I take this opportunity to thank my fellow National Delegates of the International Associations and their deputies, as well as my deputy Claudia Pasquero, for the work they have done to promote the IUGG and to organise the activities within the International Associations. I would also like to thank the coordinator and the staff of the CNR International Relations Unit for their constant support to the activities of the CNR- IUGG Commission.

Fausto Guzzetti, IUGG National Delegate for Italy

### ***IUGG ROMANIA – Quadrennial Report 2019-2022 of the National Committee***



The National Report of the Romanian Committee of Geodesy and Geophysics for the 28<sup>th</sup> IUGG General Assembly aims to present the main directions and results of newly initiated and/or developed scientific research conducted by Romanian geoscientists. These research efforts are carried out and supported by all International Associations of the Romanian Committee and focus on the interdisciplinary study of the Earth.

The Quadrennial Report 2019-2022 of the Romanian National Committee can be found [here](#).

Constantin Sava, Secretary General of the Romanian National Committee

### ***IUGG RUSSIA – Quadrennial Report 2019-2022 of the National Committee related to IAG and IAMAS***



This [report](#) of the Geodesy Section of the Russian National Geophysical Committee presents information about results of geodetic research in Russia in 2019-2022.

This [report](#) of the Meteorology and Atmospheric Sciences Section of the Russian National Geophysical Committee presents information about results of atmospheric, meteorological and climate research in Russia in 2019-2022. It is based on reports of 10 National Commissions.

Roman Krasnoperov, Secretary of the Russian National Committee

### ***IUGG SLOVAKIA – Quadrennial Report 2019-2022 of the National Committee***

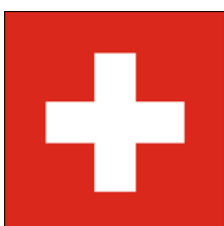


On the occasion of the 28<sup>th</sup> IUGG General Assembly, we have prepared a quadrennial report consisting of separate reports for each of five International Association (IAG, IAGA, IAHS, IAMAS, and IASPEI). This report presents interesting geodetic, gravimetric, geodynamic, geomagnetic, aeronomic, hydrologic and seismic investigations that were carried out in Slovakia between 2019 and 2022. From gravimetry research on volcanoes to ground-based observations of the geomagnetic field, this report highlights the diverse studies carried out by the Slovak National Committee. In addition, it also includes a list of published papers, defended PhD theses and international research/grant projects.

The Quadrennial Report 2019-2022 of the Slovak National Committee can be found [here](#).

Jozef Kristek, President of the Slovak National Committee

### ***IUGG SWITZERLAND – Quadrennial Report 2019-2022 of the Swiss Geodetic Commission***



The Swiss Geodetic Commission (SGC) is an organisation within the Swiss Academy of Sciences (SCNAT). It is devoted to research into scientific problems of Geodesy including the transfer to practical applications in national surveying. Of particular importance is the promotion of international cooperation and national coordination. The SGC has close links to the Swiss Geophysical Commission, in particular in the field of gravimetry where research projects are



being pursued jointly on an interdisciplinary basis.

For the compilation of the national report covering the scientific activities of the past 4 years it was decided to follow the structure of previous national reports and divide it into 4 commissions according to the structure of the International Association of Geodesy (IAG):

- 1 - Reference Frames
- 2 - Gravity Field
- 3 - Earth Rotation and Geodynamics
- 4 - Positioning & Applications

These main chapters were compiled by an editorial staff consisting of E. Brockmann (Commission 1), U. Marti (Commission 2), M. Rothacher (Commission 3), B. Merminod (Commission 4). Our special thanks go to J. Mueller-Gantenbein, secretary of SGC, for the careful editing and preparation of the layout. Without her efforts this report could not have been realised in due time.

The Quadrennial Report can be downloaded [here](#).

The SGC expresses its thanks to all colleagues who have contributed to this report and who are promoting Geodetic Sciences in Switzerland. Financial support was provided by the SCNAT. Its valuable help is gratefully acknowledged.

On behalf of the Swiss Geodetic Commission, June 2023  
Adrian Jäggi, President SGC  
Urs Marti, Vice-President SGC

### ***IUGG UK – Annual Reports 2021 and 2022 of the National Committee***



The IUGG National Committee for the UK, comprising representatives of all eight IUGG Associations, helps coordinate and promote IUGG activities with the associated UK Learned Societies. UK membership fees for IUGG are funded by an annual application to the Royal Society's International Organisation Membership Fees Grant scheme, and is put together by the Chair of the National Committee in collaboration with the IUGG Secretariat. To help deliver its mandate, the National Committee holds annual meetings on specific themes with special invitees. In 2021, the meeting theme was increasing interactions between IUGG Associations and UK Learned Societies. The 2022 meeting focused on infrastructure for IUGG science. Each UK National Representative identified the international science infrastructure associated with their particular Association and also highlighted UK infrastructure needs. A broad definition of 'infrastructure' was used, including field observatories, equipment, scientific services, data and data products and centres. It was noted that future science infrastructure needs to consider personnel and data handling, archiving and access, as well as equipment.

UK-based scientists continue to play an active role in IUGG, contributing to the re-formatting of in-person meetings that were affected by the COVID-19 pandemic, particularly in 2020 and 2021. UK-based scientists hold IUGG leadership roles and posts, including IUGG President (Kathryn Whaler), IACS Secretary General (Richard Essery), IAPSO Early Career Scientist Working Group Chair (Alejandra Sanchez-Franks), and IUGG Liaison Officers (Denise Smythe-Wright, John Turner and Kathryn Whaler). The UK also hosts a number of IUGG Associations and related services for the international science community. These include the Permanent Service for Mean Sea Level (PSMSL) of the IAG responsible for the collection, publication, analysis and interpretation of sea level data from the global network of tide gauges; the IAPSO Standard Seawater Service - the only internationally recognised standard for

the calibration of salinity measurement devices; the IAHS office based at the UK Centre for Ecology & Hydrology (Wallingford); and the International Seismological Centre (ISC) which has strong links with IASPEI. More information about the activities of the IUGG National Committee for the UK are in our [2021](#) and [2022](#) annual reports.

Kate Heal, Chair IUGG National Committee for the UK

## IUGG LIAISON OFFICER REPORTS

For the term 2019-2023, the IUGG had appointed Liaison Officers to the following International and Intergovernmental Organizations:

Name of the Organization	Name of the Liaison Officer (country)
ISC Committee on Data for Science and Technology (CODATA)	Alena RYBKINA (RUSSIA) Anatoly SOLOVIEV (RUSSIA)
ISC Committee on Space Research (COSPAR)	Andrew W. YAU (CANADA) Christopher KOTSAKIS (GREECE)
ISC Scientific Committee on Antarctic Research (SCAR)	Ian ALLISON (AUSTRALIA) John TURNER (UK)
ISC Scientific Committee on Oceanic Research (SCOR)	Trevor MCDUGALL (Australia) Joyce PENNER (USA)
ISC Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)	Renata LUKIANOVA (RUSSIA) Peter PILEWSKIE (USA)
ISC World Data System (WDS)	Toshihiko IYEMORI (JAPAN) Aude CHAMBODUT (FRANCE) Carey NOLL (USA)
UNESCO Section on Earth Sciences and Geo-Hazards Risk Reduction	Alik ISMAIL-ZADEH (GERMANY/RUSSIA) Harsh GUPTA (INDIA)
UNESCO International Hydrological Program (UNESCO-IHP)	Christophe CUDENNEC (FRANCE) Charles FIERZ (SWITZERLAND)
UNESCO Intergovernmental Oceanographic Commission (UNESCO-IOC)	Denise SMYTHE-WRIGHT (UK) Satheesh SHENOI (INDIA)
World Meteorological Organization (WMO)	Roger PULWARTY (USA) Christophe CUDENNEC (FRANCE) Charles FIERZ (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)	David SCHNEIDER (USA) Larry MASTIN (USA)
Intergovernmental Panel on Climate Change (IPCC)	Franz KUGLITSCH (GERMANY/AUSTRIA)
World Climate Research Programme (WCRP)	Lisa ALEXANDER (AUSTRALIA)
Consultative Committee for Time and Frequency (CCTF)	Claude BOUCHER (FRANCE) Gerard PETIT (FRANCE)
Pan American Institute of Geography and History (PAIGH)	Laura SANCHEZ (GERMANY/COLOMBIA)
Group on Earth Observations (GEO)	Michael SIDERIS (CANADA) Chris RIZOS (AUSTRALIA)

IUGG thanks the Liaison Officers for their long-standing support and for providing their quadrennial reports, which can be downloaded [here](#).

# ACTIVITIES OF THE UNION ASSOCIATIONS

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

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

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

# International Association of Cryospheric Sciences (IACS)



IACS website: [www.cryosphericciences.org](http://www.cryosphericciences.org)

## INTRODUCTION

The International Association for Cryospheric Sciences (IACS) is the Association of the International Union of Geodesy and Geophysics (IUGG) 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

To run the day-to-day business of IACS, an Executive Committee consisting of the President, Secretary General and President-Elect holds regular teleconferences in which all Bureau members are welcome to join.

Hybrid IACS Bureau Meetings on 11 and 17 July and an in person IACS Plenary Administrative Meeting on 15 July were held during IUGG Berlin 2023. The plenary meeting included reports from the IACS President and Secretary General, election of the new IACS Bureau for 2023-2027 (<https://cryosphericciences.org/organization/officers/>), election of Charles Fierz as an Honorary Member of IACS, presentation of IACS Early Career Scientist Awards, reports from all of the IACS Divisions, Working Groups, Standing Groups, Joint Bodies and Joint Commissions, and a preview of future IACS activities.

*The newly-elected 2023-2027 IACS Bureau at IUGG 2023 Berlin.*

*Back row, left to right: Mohd. Farooq Azam, Rebecca Mott, Anaïs Orsi, Andrew Mackintosh, Regine Hock, Richard Essery, Christine Schøtt Hvidberg*

*Front row, left to right: Minghu Ding, Liss M. Andreassen, Ted Scambos, Sophie Nowicki, Mathieu Morlighem*

*Inset, left to right: Sandra Barreira, Alex Fraser, Lauren Vargo, Vincent Vionnet*

## ACTIVITIES

### IACS communications

The IACS homepage (<https://cryosphericosciences.org/>) is hosted at the World Glacier Monitoring Service in Zurich. A process of cleaning the homepage to reduce CO<sub>2</sub> emissions per view was started in 2023. IACS newsletters feature announcements and reports of IACS activities (<https://cryosphericosciences.org/newsletter/>). Four newsletters were published in 2023 and announcements were posted on twitter account @iacscryo. A code of conduct for IACS activities and communications was prepared and announced in 2023.

### 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. The currently active IACS Working Groups are:

- Randolph Glacier Inventory and its role in future glacier monitoring and GLIMS (2020-2024) 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. RGI version 7 (<https://www.glims.org/RGI/>) was released in 2023.
- Regional Assessments of Glacier Mass Change (RAGMAC, 2019-2024) 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. RAGMAC organized a pilot study workshop for the Glacier Mass Balance Intercomparison Exercise (<https://glambie.org>) in Zurich, 6 – 8 February 2023.

- A new Working Group on “Delineation of glaciers, ice sheets and ice sheet basins” (2024-2028) has been commissioned to develop community standards and methods for ice mass change estimation that avoid under- or over-counting.

The Debris Covered Glaciers working Group (2018-2023), which aimed 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, presented its final report to IACS. A publication on an intercomparison of sub-debris ice melt models is anticipated.

The IACS/IPA Standing Group on Glacier and Permafrost Hazards in High Mountains (GAPHAZ) 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.

GAPHAZ co-convened a symposium on Mountain Cryosphere Hazards with IASPEI and IAVCEI at IUGG 2023 Berlin.

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 (NSIDC), the Global Land Ice Measurements from Space (GLIMS) initiative, and the World Glacier Monitoring Service (WGMS). IACS led an evaluation of WGMS in 2023; such evaluations are carried out every four years.

### 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:

- IACS-IGAG Joint Commission on Cryospheric Deformation. IACS secured an IUGG grant to support the 2023 Glacial Isostatic Adjustment Training School in Gävle, Sweden.
- IACS-IAPSO Joint Commission on Ice-Ocean Interactions. A side meeting was held during IUGG 2023 Berlin to facilitate an international discussion on ice-ocean interactions opportunities for collaborations and priority research areas.

IACS-IAVCEI Joint Commission on Volcano-Ice Interactions. New IAVCEI co-leaders were elected in 2023, and the current IACS co-leaders will serve for one more year.

### 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.

Joint body meetings were held during EGU Vienna 2023 and IUGG Berlin 2023.

#### Co-sponsored events and activities

IACS supports events that are of interest to the cryospheric community. Our 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. Funding requests must be submitted for deadlines on 1 February, 1 June and 1 October and at least two months prior to the event that is to be supported. Proposers are informed of decisions approximately two weeks after the deadline. After a decrease in applications in the pandemic years, IACS provided support for the Patagonian Icefields Research Program, the Glacial Isostatic Adjustment Training School, the RAGMAC–GlaMBIE Workshop and the Seventh EGU Snow Science Winter School in 2023..

#### Awards

The Graham Cogley Awards for 2023 were awarded to Laura Dietrich (University of Bergen, Norway) and Erik Loebel (Technische Universität Dresden, Germany) for student presentations at IUGG 2023 Berlin. This award, established in memory of Graham Cogley and generously sponsored by the Cogley family, recognizes excellence in glaciological research by early career scientists. It is awarded in alternate years by IACS and the International Glaciological Society.

IACS Early Career Scientist prizes were awarded to Yixi Zheng (University of East Anglia) and Veronica Tollenaar (Université Libre de Bruxelles). This prize is awarded every two years to two early career scientists for scientific papers on cryospheric subjects selected by an independent evaluation committee.

IUGG Early Career Scientist Awards were awarded to 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). The IUGG Gold Medal was awarded to IACS nominee Valerie Masson-Delmotte (LSCE, France).

## **FUTURE ACTIVITIES**

IACS will hold its annual meeting on 26 June 2024. This meeting is held online and over two time zones in years without IACS assemblies to allow for maximum participation.

The call for symposium proposals for the Busan IAMAS-IACS-IAPSO Joint Assembly 2025 (BACO-25) is now open at <https://cryosphericsscience.org/baco-25/>.

The Secretary General will host the Arctic Science Summit Week (Edinburgh, UK, 2024) and is representing IACS on the steering committee for the fourth International Conference on Arctic Research Planning (Boulder, USA, 2025).

The United Nations General Assembly has declared 2025 as the International Year of Glaciers' Preservation and 21 March of each year as the World Day for Glaciers, starting in 2025. IACS is involved in the planning activities coordinated by UNESCO and WMO.

Richard Essery, IACS Secretary General



# International Association of Geodesy (IAG)



IAG website: [www.iag-aig.org](http://www.iag-aig.org)

## INTRODUCTION

The structure of IAG comprises several components: four Commissions (1. Reference Frames, 2. Gravity Field, 3. Earth Rotation and Geodynamics, and 4. Positioning and Applications), the Inter-Commission Committees on Theory (ICCT), Climate Research (ICCC), and Marine Geodesy (ICCM), IAG 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 Services generate scientific products utilizing Operation, Data and Analysis Centres.

The Global Geodetic Observing System GGOS is a component of IAG that 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.

The COB provides communication, public information and outreach links, in particular via the IAG website and the monthly Newsletters. Additionally, the COB is responsible for the promotional activities of the IAG and the communication with its members.

The IAG General Assembly, the Council, the Executive Committee, the Bureau, 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; the Office assists the Secretary-General in fulfilling his/her duties.

## ADMINISTRATION

### IAG Council

The IAG Council elected and approved new officers in the electronic voting in winter/spring 2023. These included the President, Vice-President, Secretary General, presidents of the Commissions, Inter-

commission Committees, COB and GGOS. The in-person Council meetings were held on July 12 and 19, 2023 during the IUGG General Assembly in Berlin. The topics covered approval of the financing from the period 2019-2022 and the budget for 2023-2027, approval of changes in the bylaws and statutes and approval of the IAG resolutions.

### IAG Executive Committee (EC)

The EC 2019-2023 held a hybrid meeting on April 26, 2023, in Vienna and two in-person meetings during the IUGG General Assembly in Berlin, on July 11 and 13. These were the last meetings of the old EC. The new EC held its first meeting at the end of the IUGG General Assembly, on July 20, 2023. The second meeting of the 2023-2027 EC was held as a hybrid meeting on December 10, 2023, in San Francisco.

### IAG Bureau

The IAG Bureau (President, Vice-President, and Secretary General) discussed day-to-day 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 to the IAG Council and preparing meetings, minutes and notes of Council, Executive Committee and Bureau meetings. After the General Assembly in July 2023, the activities were moved from Helsinki to Frankfurt under the new IAG SG.



*First meeting of the 2023-2027 IAG Executive Committee after the General Assembly in Berlin.*

### Officers of the IAG EC 2023-2027

- Richard Gross (USA) President
- Peter Teunissen (Netherlands) Vice-President
- Daniela Thaller (Germany) Secretary General
- Zuheir Altamimi (France) Immediate Past President
- Markku Poutanen (Finland) Immediate Past Secretary General
- Urs Hugentobler (Germany) Commission 1 President
- Srinivas Bettadpur (USA) Commission 2 President

Rebekka Steffen (Sweden) Commission 3 President  
Pawel Wielgosz (Poland) Commission 4 President  
Riccardo Barzaghi (Italy) Service Representative 1  
Tom Herring (USA) Service Representative 2  
Vincenza Luceri (Italy) Service Representative 3  
Laura Sanchez (Germany) GGOS President  
Szabolcs Rózsa (Hungary) COB President  
Masato Furuya (Japan) EC Member at Large 1  
Maria Virginia Mackern (Argentina) EC Member at Large 2  
Mattia Crespi (Italy) ICCT President  
Annette Eicker (Germany) ICCC President  
Valérie Ballu (France) ICCM President  
Jürgen Müller (Germany) Project QuGe President  
Christina Dimopoulou, Assistant Secretary General

## ACTIVITIES

The situation is returning to normal after almost three years of pandemic restrictions. IAG entities had smaller working group meetings or seminars, but most of the 2023 activities were connected to the General Assembly in Berlin, July 11-20. The administrative meetings were organised during the General Assembly, as well as the meeting of the IAG Council.

A total of 580 IAG registered participants were present at the General Assembly in Berlin (total IUGG ~5000 participants). 661 abstracts were submitted for IAG Symposia. Six Symposia were IAG-alone, and seven IAG-lead joint Symposia with other Associations.



*Participants of IAG General Assembly in Berlin, July 2023.*

### Activities of Commissions, Inter-Commission Committees, GGOS and Services

The four IAG Commissions, Sub-Commissions, three Inter-Commission Committees, IAG Project, GGOS, and the twelve Services are gradually returning to their normal activities. Several online or hybrid symposia, webinars or seminars were organized during 2023. This implicates a permanent change in the ways to organise such events.

- 2nd Workshop of the Inter-Commission Committee on Geodesy for Climate Research (ICCC): March 28-30, 2023, online.
- GGOS Days 2023: September 20-22, 2023, Yebes, Spain. Hybrid, 192 participants (40 in-person).
- ILRS Technical Workshop 2023: October 16-20, 2023, virtual.
- WGAAL2023, Geosciences in Active Areas: October 16-20, 2023, Lanzarote, Spain.

- 20th WEGENER Assembly 2023: October 24-27, 2023, Sousse, Tunisia.
- International School on the Geoid: November 13-17, 2023, Buenos Aires, Argentina, 40 participants.

*IAG Services* continued their activities almost normally. Data repositories, analysis centres and products of Services have been continued without interruptions. The IAG entities maintain their web pages (accessible also via the IAG Homepage) where more details can be found, as well as on the IAG Newsletter.

### 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](http://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).

### Publications

The IAG Newsletter was published monthly online and 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. Two books were published in 2023 in the IAG Symposia Series:

- (1) 5th Symposium on Terrestrial Gravimetry: Static and Mobile Measurements. This open-access volume contains the proceedings of the 5th Symposium on Terrestrial Gravimetry: Static and Mobile Measurements (TG-SMM2019) held in St. Petersburg, Russia, October 1 – 4, 2019.
- (2) Geodesy for a Sustainable Earth. Proceedings of the 2021 Scientific Assembly of the International Association of Geodesy, Beijing, China, June 28 – July 2, 2021.

The number of submissions to the Journal of Geodesy remained well above 300, with about a 30% acceptance rate. The impact factor of the Journal is 4.4 (2022). The JoG is within the top ten geosciences-related journals.

### IAG membership

By the end of 2023, there were a total of 239 members, of which 38 were students and 43 were retired members. Students and retired members are free of the annual fee.

### Awards

The Levallois Medal is awarded in recognition of distinguished service to the IAG. The medal was presented on the occasion of the General Assembly to Professor Georges Balmino and Professor Hermann Drewes.

The IAG Guy Bomford Prize 2023 was awarded to Dr Amir Khodabandeh.

The IAG Young Author's Award 2021 was awarded to Dr Radosław Zajdel and the 2022 Award to Dr Matthias Willen. The Best Reviewer Award was granted to Dr Jan Martin Brockmann.

IAG granted 88 Travel Awards with a total amount of more than 60000 € to students and early career scientists, mainly from low/mid-economy countries to participate in the IUGG General Assembly in Berlin.

Other IAG Travel Awards to participate in IAG sponsored Symposia, Summer Schools or other scientific meetings were granted to eight early-career scientists, in total of 14000€.

## Obituaries

The following obituaries were published in the IAG Newsletter:

József Ádám (1950-2022)

Bjørn Engen (1941-2022)

Hilaire Legros (1941-2023)

Ivan Mueller (1930-2023)

## FUTURE ACTIVITIES

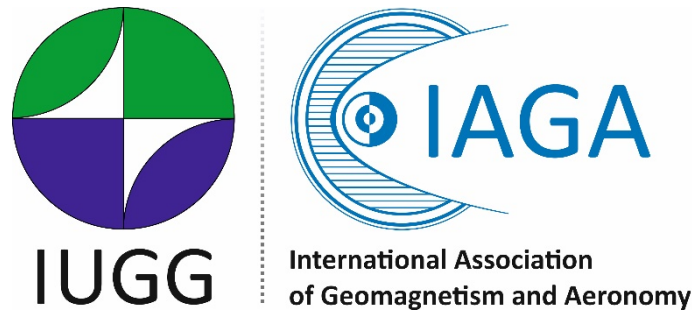
GGOS and COB together with the IAG Office are planning the reorganisation of the outreach and web services to improve the visibility of IAG and its services and to avoid duplication of work. This will be one of the largest internal efforts during the next quadrennial period.

During the first IAG EC meeting in Berlin it was decided to establish a Task Force on Inclusion with the goal to have a closer look on three aspects of diversity: gender, geographical distribution, generation / career stage ("3G"). The Task Force started to look at the actual situation within IAG components and to identify weaknesses regarding the three diversity criteria. During the setting up of all IAG components for 2023-2027, the presidents and other responsables were advised to take into account diversity aspects. In the near future, the Task Force will take further steps and actions to increase diversity within IAG.

The IAG will closely cooperate with the Subcommittee on Geodesy of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) and its newly established Global Geodetic Centre of Excellence (UN-GGCE). The UN-GGCE started so-called listening tours with interested IAG individuals and will continue discussing with groups from the IAG Services in order to assess the needs, which will hopefully lead to a better and sustainable geodetic infrastructure. Emerging new techniques in geodesy, new needs and practices following this development, and improving the global geodetic infrastructure to meet new requirements are in the scope of the coming years, as well.

Markku Poutanen, Immediate past IAG Secretary General  
Daniela Thaller, IAG Secretary General

# International Association of Geomagnetism and Aeronomy (IAGA)



IAGA website: [www.iaga-aiga.org](http://www.iaga-aiga.org)

## 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 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.

As a basis for these studies the IAGA community is also strongly involved in present and past magnetic field observations from ground observatories, magnetic surveys, space missions and paleomagnetic data measured in laboratories.

More information on IAGA is provided on its websites: <https://www.iaga-aiga.org>.

## ADMINISTRATION

IAGA is organised in six Divisions and four Inter-divisional Commissions. Each Division may form Working Groups in specialised topics and elects officers to run the business of the Working Groups. The terms of office are linked to the IUGG General Assemblies, and new officers were elected during the XXVIII IUGG General Assembly in Berlin in July 2023. Lists of the Division/Inter-divisional Commission leadership and the Working Group names and officers can be found on the following website: <https://www.iaga-aiga.org/about/>.

IAGA is administered by an Executive Committee (EC) on behalf of IUGG Member Countries in accordance with the IAGA's Statutes and By-Laws. The current Executive Committee members are:

**President:** Andrew Yau (Canada)

**Vice-presidents:** Kusumita Arora (India), Klaus Spitzer (Germany)

**Secretary General:** Monika Korte (Germany)

**Treasurer:** Aude Chambodut (France)

**Members:** Anna Kelbert (USA), Michael Kosch (South Africa), Dominika Niezabitowska (Sweden, Early Career Representative), Masahito Nosé (Japan), Katia Pinheiro (Brazil), Pornchai Supnithi (Thailand), Ricardo Trindade (Brazil)

The EC had three meetings at the IUGG General Assembly in July, two virtual meetings in March and November 2023, and communicated frequently by e-mail.

IAGA communicates with Member Countries through National Correspondents nominated by appropriate National Bodies. Member Countries are represented at IAGA Assemblies by accredited Chief Delegates who may vote on matters, according to the voting rules set out in the Statutes and By-Laws, at the Conference of Delegates. More information on all aspects of IAGA administration can be found at: <https://www.iaga-aiga.org/about/>.

## ACTIVITIES

### IUGG General Assembly

The main event for IAGA in 2023 was the participation in the 28<sup>th</sup> IUGG General Assembly, held from July 11 - 20 in Berlin, Germany. IAGA was well represented with an active involvement in 22 joint association symposia and 24 own ones. Over 500 of the ca. 5000 participants gave IAGA as their main affiliation. The IAGA contribution to the Union Lectures was given by Max Moorkamp (Germany), an excellent and well-received lecture entitled "From Ground Water to Tectonic Plates: Imaging the Earth Across the Scales with Electromagnetic Methods". Another highlight was the IAGA Ceremony, where the IAGA awards were presented and Nils Olsen, recipient of the Shen Kuo Medal gave an exciting lecture on planetary magnetism entitled "Earth's magnetic field – From the core to the magnetosphere". The financial budget of the meeting was able to partly support the attendance of 89 IAGA participants, mainly early career scientists from developing countries.

### IAGA Awards and Honours



*IAGA Award Ceremony at the IUGG General Assembly 2023. From left to right: Early Career awardee Bram Vaes, IAGA President Mioara Manda, Shen Kuo Medalist Nils Olsen, IAGA Secretary General Monika Korte, Early Career awardee Miroslav Hanselka.*

The following awards were presented at the IAGA Ceremony during the IUGG General Assembly:

***Shen Kuo Medal***

The Shen Kuo Medal for interdisciplinary achievements was given to Nils Olsen (Denmark) to recognize his fundamental contributions to our knowledge of the Earth's magnetic field, including studies of the core magnetic field and its variations, the core fluid flow and electromagnetic induction in the mantle, as well as his leading role in geomagnetic space observations.

***Early Career Awards***

Two of these awards were given to two early career scientists who had been nominated by IAGA-sponsored topical workshops: Miroslav Hanzelka (Czech Republic) and Bram Vaes (Netherlands).

**6<sup>th</sup> IAGA School**

The IAGA Schools, held every two years attached to the IAGA Scientific or IUGG General Assemblies, aim at providing excellent early career scientists with a good basic understanding of a wide range of the scientific topics covered by IAGA. The 6th IAGA School was held at the Niemegek geomagnetic observatory of the German Research Centre for Geosciences, GFZ, on July 6 - 12, 2023, i.e. in the week before the IUGG General Assembly. The observatory is located about 60 km outside of Berlin, Germany, where the IUGG assembly took place. The IAGA School was attended by 25 participants from 15 different countries and lectures on six different topics, partly with practical exercises, were given by seven internationally recognized experts from six different countries.



*Participants of the 6<sup>th</sup> IAGA School at the Niemegek Geomagnetic Observatory of GFZ.*

**Sponsored topical meetings**

Topical workshops and meetings that were sponsored by IAGA in 2023 are listed in the table below.

Workshop title	Location	Dates
2023 MagIC Workshop: Magnetism and Earth History: Field Evolution, Environmental Change, and Paleogeography	San Diego, USA	February 28 – March 02, 2023
PLANCKS by IAPS	Milan, Italy	May 12 – 16, 2023
19th IAGA workshop on geomagnetic observatories, data acquisition and processing	Sopron, Hungary	May 22 – 26, 2023
Workshop on Current Challenges in Data Assimilation for Geospace Systems	Neustrelitz, Germany	July 20 – 21, 2023
ICPS by IAPS	Manila & Baguio, Philippines	September 7 – 13, 2023



## Outreach activities

Katia Pinheiro and Shivangi Sharan from the IAGA community received an outreach grant from IUGG in fall 2022 for producing outreach videos. Their animation movie “Earth-human connections” won the Audience Award at the Braga Science Film Fest in November 2023. Additionally, they produced a documentary called “Geoscience Connections” which includes interviews from eight early-career researchers (ECR) representing the eight IUGG Associations, short movies with ECRs talking about their research and their careers and short movies with interviews of the Presidents and Secretary Generals of the eight Associations. All the movies are available on the IUGG YouTube channel (<https://www.youtube.com/@internationalunionofgeodes3442>).

IAGA also decided to support further outreach video activities by Katia Pinheiro, in a project called “A magnetic journey: from core to space”. This consists of a documentary of the same name connecting the IAGA Divisions through interviews with established researchers and animations, and short movies with early career researchers from around the world who participated in the IAGA School about their research and their careers. All videos are available on the IAGA YouTube channel (<https://www.youtube.com/@iaga-aiga>).

## Publications and outreach

The latest issue of the annual IAGA Newsletter, nr. 60, was distributed in December 2023. It can be downloaded from the IAGA website <https://www.iaga-aiga.org/publications>. Current versions of a IAGA Flyer and Poster are also available on the website.

IAGA operates websites at <https://www.iaga-aiga.org> and is active on the following social media:

Facebook: [www.facebook.com/IAGAandAIGA/](http://www.facebook.com/IAGAandAIGA/)

X (former Twitter): [www.twitter.com/IAGA\\_AIGA](http://www.twitter.com/IAGA_AIGA)

Instagram: [www.instagram.com/iaga\\_aiga/](http://www.instagram.com/iaga_aiga/)

Blog: <https://iaga-aiga.blogspot.com/>

Linkedin: <https://hr.linkedin.com/company/iaga-international-association-of-geomagnetism-and-aeronomy>

## FUTURE ACTIVITIES

**Meetings and workshops.** Current and future activities include the preparation of the programme for the 2025 IAGA-IASPEI Joint Assembly in Lisbon, Portugal, and the 7<sup>th</sup> IAGA School to be held in the week before this Assembly. IAGA will also be involved in a several topical meetings in 2024.

**Division and Working Group activities.** The 14<sup>th</sup> generation of the International Geomagnetic Reference Field (IGRF) is due to be released at the end of 2024. A task group of IAGA Division V Working Group V-MOD is active towards this aim.

A new IAGA Division I Working Group, named FAIR-MOD, formed at the IUGG General Assembly. The goal of this group is to enhance interactions across researchers engaged in geomagnetic and paleomagnetic modeling of observational data and the production of numerical simulations, and to make existing models available to the community under the FAIR (Findable Accessible Interoperable and Reproducible) standards.

**Outreach activities.** Following the ad-hoc funding of an outreach project in 2023, IAGA decided to establish a framework for regular outreach project funding. Starting from 2024, one outreach project per year can be funded for a duration of up to two years with up to 5000 Euro. Application guidelines have been published in the IAGA Newsletter and on the IAGA Websites (<https://iaga-aiga.org/grants/outreach/>).

Monika Korte, IAGA Secretary General

# International Association of Hydrological Sciences (IAHS)



IAHS website: <http://iahs.info>

## INTRODUCTION

The year 2023 saw a considerable number of IAHS activities herewith summarised in this annual report. In 2023 IAHS continued to promote and facilitate hydrological research and publications across the globe through the various commissions, working groups and regional committees. As of December 2023, the total membership of IAHS was 11088 representing 162 countries.

## ADMINISTRATION

In terms of partnerships, work with UN agencies with a strong engagement with UN water and UNESCO IHP programme took place throughout the year. The World Meteorological Organisation (WMO) jointly with UNESCO provided the technical and financial support toward the medals that were awarded in the year 2023. The landmark activity for the year 2023 was the IUGG General Assembly in Berlin, Germany where new officers from the IAHS bureau, commissions, working groups and regional committees were voted into office. Approximately 500 IAHS members attended the IUGG General Assembly in Berlin.

The following International Commissions, Working Groups and regional Initiatives of IAHS organised conferences, symposia, workshops, courses, and research cooperation's in the course of 2023:

- International Commission on Continental Erosion (ICCE)
- International Commission on the Coupled Land-Atmosphere System (ICCLAS)
- International Commission on Human-Water Feedbacks
- International Commission on Groundwater (ICGW)
- International Commission on Remote Sensing (ICRS)
- International Commission on Snow and Ice Hydrology (ICSIH)
- International Commission on Statistical Hydrology (ICSH)
- International Commission on Surface Water (ICSW)
- International Commission on Tracers (ICT)
- International Commission on Water Quality (ICWQ)
- International Commission on Water Resources Systems (ICWRS)
- Working Group MOXXI on Measuring and Observing in the XXIst century
- Working Group CandHY on Citizens AND Hydrology
- Working Group for History of Hydrology
- Working Group for Unsolved Problems in Hydrology (UPH)
- Early Career Scientists Committee
- Africa Regional Committee
- Latin America Regional Committee

Details of all IAHS officers now steering the various organs of IAHS are provided below.

	Position	Officer	Nationality / Residence
IAHS	P	Berit Arheimer	Sweden
	PE	Salvatore Grimaldi	Italy
	SG	Jean-Marie Kileshye Onema	DR Congo / South Africa
	3 VPs	Christophe Cudennec	France
		Archana Sarkar	India
		Fuqiang Tian	China
T	Kate Heal	UK	
ICCE	P	Paolo Porto	Italy
	PE	Sergey Chalov	Russia
	3 VPs	Yuri da Silva	Brazil
		Allen Gellis	USA
		Peter Molnar	Slovakia/Switzerland
S	Michal Habel	Poland	
ICCLAS	P	Richard Petrone	Canada
	PE	Christopher White	Australia/UK
		Tirtha Banerjee	India/USA
	3 VPs	Lindsay Beevers	UK
		Shanshui Yuan	China
S	Rodolfo Nóbrega	Brazil/UK	
ICGW	P	Felipe de Barros	Brazil/USA
	PE	Michelle Newcomer	USA
	3 VPs	Makoto Kagabu	Japan
		Chengpeng Lu	China
		Rajendra Prasad	India
S	Antonio Zarlenga	Italy	
ICRS	P	Amir AghaKouchak	Iran/USA
	PE	Maria-José Polo	Spain
	3 VPs	Gilles Boulet	France
		Lisa Milani	Italy/USA
		Yanjun Shen	China
S	Pankaj Ramji Dhote	India	
ICSH	P	Elena Volpi	Italy
	PE	Krzysztof Kochanek	Poland
	3VPs	Eleonora Dallan	Italy
		Simon Papalexiou	Greece/Canada
		Sahani Pathiraja	Australia
S	Svenja Fischer	Germany	
ICSIH	P	Melody Sandells	UK
	PE	James McPhee	Chile
	4 VPs (after a tie at 1 <sup>st</sup> & 2 <sup>nd</sup> rounds)	Vsevolod Moreydo	Russia
		Dhiraj Pradhananga	Nepal
		S. McKenzie Skiles	USA
		Shiqiang Zhang	China
S	Timothy E. Link	USA	
ICSW	P	David Hannah	UK
	PE	Alain Dezetter	France
	3 VPs	Ernest Amoussou	Bénin
		Elizabeth W. Boyer	USA
		Faiza Hallouz	Algeria
S	Yonca Cavus	Turkey	

ICT	P	Zhonghe Pang	China
	PE	Maki Tsujimura	Japan
	3 VPs	Søren Jessen	Denmark
		Koichi Sakakibara	Japan
		Matthias Sprenger	Germany/USA
S	Wei Jiang	China	
ICWQ	P	Xiaohong Chen	China
	PE	Dedi Liu	China
	3 VPs	Remegio B. Confesor	USA/Norway
		Stefan Krause	Germany/UK
		Ann van Griensven	Belgium
S	Alena Bartosova	Czech Rep. / Sweden	
ICWRS	P	Barry Croke	Australia
	PE	Pedro Chaffe	Brazil
	3 VPs	Emmanouil Anagnostou	USA
		Suxia Liu	China
		Alberto Viglione	Italy
S	Gökçen Uysal	Turkey	

#### Newly created ICHWF:

President: Heidi Kreibich (Germany) Vice-President: Anne van Loon (Netherlands) Vice-President: Saket Pande (Netherlands) Vice-President: Tobias Krüger (Germany) Secretary: Melissa Haeffner (USA).

#### Committees and Chairs:

- Early Career Scientists Committee - Chair: Moctar Dembélé (Burkina Faso/Ghana)
- Africa Regional Committee - Chair: Hodson Makurira (Zimbabwe)
- Latin America Regional Committee - Chair: James McPhee (USA/Chile)

#### Working Groups and Chairs:

- CandHy – Chair: Wouter Buytaert (UK)
- MOXXI – Salvatore Manfreda (Italy)
- History of Hydrology – Keith Beven (UK)
- Unsolved Problems in Hydrology (UPH) – Günter Blöschl (Austria)

## ACTIVITIES

The new scientific decade **HELPING (2023-2032)** conducted several consultative workshops in order to further articulate its content. Hence, IAHS members met in Córdoba, Spain (1-3 February 2023) and in Vienna, Austria (29th April 2023) during the EGU. The HELPING decade was officially launched during the IUGG assembly in Berlin, Germany.

The main meetings where the bureau met were twice at the **IUGG General Assembly** in Berlin (10th and 17th July 2023) as well as an online meeting on 4th December 2023. Approximately 500 IAHS members from across the globe managed to join the big scientific mass in Berlin. The considerable attendance was possible due to financial support from IUGG and IAHS SYSTA travel awards. The year 2023 saw reduced incidence of participants who could not attend due to COVID. On the other hand, some participants from emerging economy countries could not secured their visas in time and missed the gathering as a result. The Hydrological Sciences Journal (HSJ) of IAHS conducted statutory meetings and the editorial board convened their retreat during the IUGG assembly in Berlin. More papers have now been accepted as part of the 2022 Assembly, the PIAHS Volume should be published in the course of 2024.

*IAHS group photo at the IUGG 2023 General Assembly, Berlin, 15<sup>th</sup> July 2023*

**Awards.** The 2023 Tison Award for Young Hydrologists has been granted to Gunther Liebhard (Austria). The 2022 IAHS-UNESCO-WMO International Hydrology Prize medals have been bestowed to Aldo Fiori (Italy) and Efi Foufoula-Georgiou (Greece/USA), Dooge medal and Junguo Liu (China), Volker medal. The Falkenmark Award for best PhD thesis recognises outstanding contributions to hydrological understanding of water scarcity and water supply, was awarded to Afua Owusu (Ghana). The Prize ceremony was held during IUGG 2023 in Berlin.

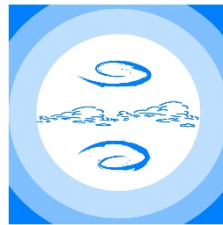
The above mentioned SYSTA (Sivapalan Young Scientists Travel Awards) travel award scheme was extended to eight for the IUGG assembly and five for the STAHY 2023 workshop that was convened in Boston USA (8-10 November 2023). In 2023, IAHS continued to support the attendance of 11 early career researchers in order to attend the 24th WaterNet symposium that took place in 25-27 October 2023 in Zanzibar, United Republic of Tanzania.

**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 disadvantaged countries. 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. A special issue on Africa was initiated after the summer meeting and the submissions will be received throughout 2024.

We have contributed to the World Water Development Reports WWDR 2023 (Groundwater, Making the invisible visible); and attended online meetings of the UNESCO IHP drafting strategy and action plan, the WMO Hydrological Coordination Panel, the WMO HydroHub Innovation think tank, the WMO Capacity Development Panel, the WMO research strategy, UN Water, the UN Groundwater summit. IAHS attended the UN water conference (21-24 March 2023) in New York (US). The bid from Roorkee IIT, in partnership with NIH, to organize the 2025 IAHS Scientific Assembly in Roorkee, India, 5-10 October 2025 was approved and communication was shared with the Local Organising Committee so that preparations can start. In addition to the organisation of the IAHS part of the IUGG General Assembly, including elections, implementation of decisions, a Digital Water Globe initiative was launched in 2023 and it is anticipated that it will accompany the new HELPING decade.

Jean-Marie Kileshye Onema, IAHS Secretary General

# International Association of Meteorology and Atmospheric Sciences (IAMAS)



International Association of Meteorology and Atmospheric Sciences

IAMAS website: [www.iamas.org](http://www.iamas.org)

## INTRODUCTION

IAMAS is a research association of the International Union of Geodesy and Geophysics (IUGG) that focuses on all aspects of the gaseous envelope around the Earth and other planets. The main work is conducted, coordinated, and communicated through IAMAS's 10 International Commissions, which, in alphabetical order, are the:

- International Commission on Atmospheric Chemistry and Global Pollution (iCACGP),
- International Commission on Atmospheric Electricity (ICAE),
- International Commission on Climate (ICCL),
- International Commission on Clouds and Precipitation (ICCP) 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), and
- International Radiation Commission (IRC).

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

## ADMINISTRATION

### IAMAS Bureau Meetings

Monthly meetings are held virtually by zoom. The bureau regularly invites different members-at-large and commission presidents to attend these meetings. The next in-person (hybrid) meeting of the Bureau will be held 21-23 May 2024 at the Ecole Nationale Supérieure, in Paris, France.

## Funding

IAMAS held an open call for proposals for activities to be undertaken in 2024 by its commissions with a deadline in October 2023 for consideration both by IAMAS directly, and forwarding to IUGG for its consideration. As a result, IUGG funded eight proposals totalling 41,500 USD and IAMAS funded another seven proposals totalling 40,500 USD. The next open call for proposals from our commissions will have a deadline in October, 2024 and will be focused on activities planned for 2025. For 2025 priority will be given to activities held at and alongside our Joint Assembly with IACS and IAPSO, 20-25 July, 2025 in Busan, Korea (<http://www.baco-25.org/>).

The list of funded IUGG and IAMAS activities in 2024 is as follows.

### ICACGP:

- Online Early Career Researcher Conference, 17 November 2023. [Website](#).
- ICACGP Business Meeting (Kuala Lumpur, Malaysia), 7-8 September 2024.
- Molecular Level Understanding of Atmospheric Aerosols Conference (Corsica, France), 1-5 April 2024. [Website](#).
- 9th SOLAS Open Science Conference (Goa, India) 10-14 November 2024.

ICAE: Workshop at AGU Fall Meeting (San Francisco, USA), 9-13 December 2024

### ICCL:

- Pacific Island Nations Forum on Climate Change (Qingdao, China) 21-22 October 2024.
- 9th GEWEX Open Science Conference (Sapporo, Japan) 7-12 July 2024. [Website](#).

ICCP: Workshop and Sessions at the International Conference on Clouds and Precipitation (Jeju, Korea) 14-19 July 2024. [Website](#).

IRC: International Radiation Symposium (Zhejiang University, Hangzhou, China) 17-21 June 2024. [Website](#).

ICPAE: Sessions at Europlanet Science Congress (Berlin, Germany) 9-14 September, 2024.

ICMA: 12th International Workshop on Long-Term Changes and Trends in the Atmosphere (University of Vigo, Spain) 6-10 May 2024. [Website](#).

IOC3: Quadrennial Ozone Symposium (University of Colorado, Boulder) 14-20 July 2024. [Website](#).

ICPM: International Atmospheric Rivers Conference (La Jolla, California) 24-27 June 2024. [Website](#).

### IAMAS EXECUTIVE COMMITTEE 2023-2027

President:	Andrea Flossmann FRANCE
Vice-Presidents:	John Burrows GERMANY Mary Scholes SOUTH AFRICA
Past President:	Joyce E. Penner USA
Secretary General:	Keith Alverson CANADA
Members at large:	Neil Holbrook AUSTRALIA Mu Mu CHINA Marilyn Raphael USA Tirusha Thambiran SOUTH AFRICA John Turner UK
Early Career Scientist Representative:	Jing Li CHINA
Commission Presidents (Ex Officio Members):	see listings below

## IAMAS COMMISSIONS

### Atmospheric Chemistry and Global Pollution (ICACGP)

Website: [www.icacgp.org](http://www.icacgp.org)

President: Mary Barth USA

Vice-Presidents:

- Hugh Coe UK
- Christian George FRANCE
- Judith Hoelzemann BRAZIL

Secretary: Hiroshi Tanimoto JAPAN

### Atmospheric Electricity (ICAE)

Website: <http://www.icae-iamas.org/>

President: Xiushu Qie CHINA

Secretary: Weitao Lyu CHINA

### Climate (ICCL)

Website: [www.iccl-iamas.net](http://www.iccl-iamas.net)

President: Jianping Li CHINA

Secretary: Qiuzhen Yin BELGIUM

### Clouds and Precipitation (ICCP)

Website: [www.iccp-iamas.org](http://www.iccp-iamas.org)

President: Greg McFarquhar USA

Vice-President: Heike Wex GERMANY

Secretary-Treasurer: Martina Krämer GERMANY

### ICCP - Committee on Nucleation and Atmospheric Aerosols

Website: [www.icnaa.org](http://www.icnaa.org)

Chair: Markku Kulmala FINLAND

### Dynamic Meteorology (ICDM)

Website: <http://icdm.atm.ucdavis.edu/ICDM.html>

President: Thomas Spengler NORWAY

Vice President: Tim Woollings UK

Secretary: Craig Bishop AUSTRALIA

Past President: Richard Grotjahn US

### Middle Atmosphere (ICMA)

Website: <https://www.iamas.org/icma/>

President: Natalia Calvo SPAIN

Vice-President: Seok Woon Son KOREA, Rep. of

### Ozone (IO3C)

Website: [www.io3c.org](http://www.io3c.org)

President: Sophie Godin-Beekmann FRANCE

Vice-President: Paul A. Newman USA

Secretary: Irina Petropavlovskikh USA

### Planetary Atmospheres and their Evolution (ICPAE)

Website: <http://iamas.org/icpae>

President: Ann Carine Vandaele BELGIUM



Secretary: Yeon Joo Lee KOREA, Rep. of

### **Polar Meteorology (ICPM)**

Website: [www.iamas.org/icpm/](http://www.iamas.org/icpm/)

President: Matthew Lazzara USA

Secretary: Tracy Moffat-Griffin UK

### **Radiation (IRC)**

Website: <https://www.iamas.org/irc/>

President: Peter Pilewskie USA

Vice-President: Manfred Wendisch GERMANY

Secretary: Hajime Okamoto JAPAN

## **ACTIVITIES**

### Events

IAMAS held its General Assembly during IUGG-2023, in the CityCube Conference Centre, Berlin, Germany, July 2023.

The next IAMAS Assembly will be held jointly with IAPSO and IACS from 20-25 July 2025 in Busan Korea.

### Awards

The [IAMAS Early Career Medal for 2023 was awarded at the IUGG general assembly, Berlin 2023 to Dr. Cheng Sun](#) for his outstanding contributions to the understanding of Atlantic climate variability.

### International Commission Reports

#### **Early Career Scientist (ECS) committee**

In 2023, our major activity is attending the IUGG assembly in Berlin. During this meeting, 4 of our committee members met in person and discussed future plans, ideas for the BACO-25 meeting as well as feedback from the IUGG assembly. We also participated in organizing the ECR event at the Berlin assembly. Jing Li joined as the panelist of this ECR event. Jing Li also had an interview with Geoscience Connections, representing the ECS community of IAMAS.

We held a virtual webinar on November 30, 2023. Our speaker is Dr. Ilias Fountoulakis from the Academy of Athens, Greece. He talked about Long-term variability of human health-related solar ultraviolet-B radiation doses from the 1980s to the end of the 21st century. The webinar was moderately attended and the video was uploaded to the IAMAS ECS Youtube Channel.

We continue to extend our network. In 2023, we connected with the AGU Early Career Committee, with the help of Steve Ackerman and Paul Newman. We learnt about the events that AGU organizes for ECS. The AGU EC committee also agreed to help advertise our future events. Our member Nikos Daskalakis is also connected with the IGAC ECS committee. We will advertise each other's events, and we will work together to organize a Nature master class soon.

In China, our local ECS group actively participated in organizing various seminars, webinars and meetings. We organized an ECS session during the 5<sup>th</sup> CCGG (Congress of China Geodesy and Geophysics) meeting, with 24 oral presentations and more than 100 attendants. We co-hosted the cloud-precipitation workshop on November 23-24, 2023 and the IGAC-SOLAS joint online conference on December 22, 2023.

Finally, we continue to manage the IAMAS Twitter and WeChat accounts.

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

During 2023, the iCACGP held a hybrid meeting in mid-July during the IUGG 28<sup>th</sup> General Assembly in Berlin. In addition to the Commission members, three early career scientists, serving as liaisons to the IAMAS early career scientists committee and the IGAC/iCACGP early career researcher SSC attended. Topics of discussion included reviewing iCACGP's objectives and its brand, and receiving updates of conference planning, position papers, and the iCACGP website.

At the IUGG General Assembly, iCACGP convened a session, M27 Atmospheric Chemistry in the Anthropocene: From the Urban to Global Scales. The session topics ranged from recent GEMS (geostationary satellite) measurements for air quality to multiscale modeling to urban systems affecting climate to biomass burning impacts. The iCACGP in collaboration with IGAC began planning the September 2024 ICACGP/IGAC Atmospheric Chemistry Open Science Conference to take place in Kuala Lumpur, Malaysia. The Science Program Committee has defined the conference agenda, identified keynote and invited speakers, and has recently begun accepting abstract submissions for the conference.

A highlight for iCACGP and IGAC in 2023 was the first IGAC-iCACGP Early Career Researchers Conference held online on 17 November 2023 that was organized by the newly formed IGAC-iCACGP early career researcher steering committee. This innovative conference, attended by ~300 participants, was designed to accommodate participants from different time zones, with the schedule being repeated three times over the course of the day, with each session lasting six hours. This conference was aimed at the IGAC-iCACGP community at large, with the intent to feature the work and contribution of early career researchers to the field as well as include skill development and networking activities. Six poster prizes were awarded to further engagement by providing the winners with registration and travel to the upcoming 2024 IGAC/iCACGP conference to be held in Kuala Lumpur, Malaysia.

Members of the iCACGP completed the transfer of the iCACGP website to the IAMAS-hosted website. We are now in the process of updating links to iCACGP as well as having the old site redirect to the IAMAS-hosted site.

In addition to co-hosting the iCACGP/IGAC conference in September 2024, iCACGP is co-sponsoring a workshop on advancements in the molecular understanding of atmospheric aerosols to be held in April 2024 and an open science conference hosted by SOLAS (Surface Ocean Lower Atmosphere Study) planned for November 2024. During 2024, iCACGP also hopes to make progress on two position papers, one on the benefits of long-term measurements for atmospheric chemistry research and the second on the benefits of research aircraft for atmospheric chemistry, which is timely during a phase when agencies are retiring old aircraft and planning for new research aircraft.

ICAE (<https://www.iamas.org/icae/>)

ICAE Activities in 2023:

- Three sessions in IUGG 2023 were organized by ICAE.
- Online publication of two issues of newsletters in 2023. All the two ICAE newsletters were distributed to the ICAE mailing list.
- Maintenance of the ICAE website
- The ICAE mailing list has been updated and the google group for ICAE colleagues, [icae-colleagues@googlegroups.com](mailto:icae-colleagues@googlegroups.com), was created.

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

ICCL Activities in 2023:

1. Organization of 11 symposia at the 28th IUGG 2023 in Berlin, as listed below.

IAMAS symposia:

- M02 Dynamics and Variability of the Warming Hole(s) in the Climate System
  - Conveners: Léon Chafik, Mojib Latif
- M03 Climate Extremes in the Atmosphere-Land-Ocean System: Physical Processes, Predictability, Impacts and Adaptation
  - Conveners: Jules Kajtar, Nicolas Freychet, Eunice Lo, Vikki Thompson, Mat Collins, Neil Holbrook
- M04 Past Climate Changes and Their Relevance for the Future
  - Conveners: Qiuzhen Yin, André Paul, Anne de Vernal, Jerry McManus, Emilie Capron, Ayako Abe-Ouchi
- M05 Atmosphere-Ocean-Ice Interactions: Physical, Biogeochemical and Biological Processes in the Ross Sea
  - Conveners: Zhaomin Wang, Walker Smith, Paola Rivaro, Jisoo Park, Mike Williams
- M06 Monsoon Systems in Rapid and Intensifying Climate Change and Their Role in Extreme Events
  - Conveners: Jianping Li, V. Krishnamurthy, Andrew Turner, Bin Wang, E. Hugo Berbery, Jun Matsumoto, Kyun-Ja Ha, R. Krishnan, Fred Kucharski
- M07 Earth System Response to Solar Radiation Modification: Modeling, Impacts and Uncertainties
  - Conveners: Govindasamy Bala, Hauke Schmidt, Long Cao, Simone Tilmes, John Moore, Michael MacCracken
- M08 Variability and Near-Term Predictability of the Antarctic Climate System
  - Conveners: Tom Bracegirdle, Zhaomin Wang, Irina Gorodetskaya, Erik Behrens
- M09 Geosciences for Sustainable Development (Merged with Union Symposium)
  - Conveners: Keith Alverson, Tom Beer, Jianping Li, Tonie van Dam
- M10 El Niño/Southern Oscillation and its Regional and Global Impacts
  - Conveners: Fei-Fei Jin, Wenju Cai, Jianping Li, Soon-Il An

Joint symposia:

- JM01 Recent Advances in Regional Climate Modelling (IAMAS, IACS, IAHS)
  - Conveners: Tomas Halenka (IAMAS), Sven Kotlarski (IACS), Erika Coppola (IAHS)
- JM05 Earth System Models: Assessing the Earth System's State and Fate From Regional to Planetary Scales (IAMAS, IAHS, IACS, IAPSO, IAVCEI)
  - Conveners: François Massonnet (IAMAS), Sophie Nowicki (IACS), Richard Petrone (IAHS), Anna von der Heydt (IAPSO)

2. Organization of the 5th Congress of China Geodesy and Geophysics (CCGG) 2023 in Wuhan.
3. Organization of workshop "Definition, dynamics and predictability of marine heatwaves" in Queensland, Australia, supported by the Climate Extremes Ocean Extremes Research Program (2023).
4. Organizations of 4 EGU sessions on monsoon and past interglacials.
5. Organization of an international workshop on "High and Low Latitude Climate Variability and Their Interactions Across Time Scales" in Louvain-la-Neuve, Belgium, on November 30th and December 1st, 2023.

6. Organization of “2023 International Forum on Pacific Island Countries Response to Climate Change (PICC2023)” in Qingdao, China, on October 21, 2023.
7. Organization of “2023 International Forum on Carbon Neutrality and Sustainable Development (CNSD 2023)” in Qingdao, China, on November 25-26, 2023.
8. Nominations, awards and honours:
  - Dr. Valerie Masson-Delmotte, ICCL Member, was awarded the IUGG Gold Medal in 2023.
  - ICCL nominated Dr. Cheng Sun who was awarded an Early Career Scientist Award of IAMAS in 2023.

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

In 2023, the major activity of ICCP was the convening of multiple sessions at the 28<sup>th</sup> General Assembly of the IUGG in Berlin, and the sponsorship of a workshop on “Clouds Containing Ice Particles” at Joh. Gutenberg University in Mainz.

At IUGG Berlin 2023, ICCP was the lead IAMAS commission for sessions on “Cloud and precipitation studies”, “Cloud-radiative interactions”, “Weather and climate extremes: understanding, modeling, prediction and impacts”, “Dynamics and microphysics of moist convection”, “Cloud nucleation studies”, and “Weather modification and small scale geoengineering: theory, practice and technology.” In Berlin, the ICCP commission also held an executive meeting where the following topics were discussed: updates on ICCP 2024 to be held in Jeju Island, discussion on resolution of geoengineering being considered by IAMAS, planning for the IAMAS meeting in Busan in 2025, and procedures for election of new members and a new honorary member in 2024. Members of the ICCP leadership team also participated in the IAMAS business meetings.

The Clouds Containing Ice Particles Workshop in Mainz discussed all aspects of cirrus and mixed-phase clouds- the least understood cloud type that contributes significantly to uncertainty in climate predictions. The topics were comprehensive, from in-situ and remote sensing observations of clouds to their modeling on all scales. Contributions emphasize current state of knowledge, new findings and open questions, as well as experimental, theoretical and computational methods used in research. The workshop had 75 participants from 11 countries and 32 institutions and had sessions on “Cirrus clouds: in-situ measurements”, “Cirrus clouds: remote sensing observations”, “Cirrus clouds: theory and simulations”, “Mixed-phase clouds: in-situ measurements”, “Mixed-phase clouds: theory and simulations”, “Ice nucleating particles”, “Ice multiplication processes”, and “Lab studies, including a visit to the Mainz cloud chamber. The format of the meeting, with an overview presentation followed by short poster presentations stimulated a lot of conversation between conference participants.

The ICCP had an election at the end of 2023 to determine who would be granted the status of honorary member at the 2024 meeting in Jeju. There were several nominations and several deserving candidates. Dr. Darrel Baumgardner was elected as an honorary member. Over the course of several decades, he has made major contributions to the field of cloud physics, including the development of airborne instruments to measure cloud and aerosol particles, and the use of data from these instruments to conduct cloud and aerosol research resulting in more than 200 publications. He has also sought multiple collaborations with international scientists, organized an ICCP conference in 2008 in Cancun, Mexico, served on the ICCP commission, and organized 5 workshops on cloud instrumentation and the processing of measurement data between 2010 and 2018.

The ICCP journal club is continuing its monthly seminar series, with invited volunteer speakers giving presentations on various aspects of cloud physics. The link to register for the event is [available here](#).

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

ICDM has a total of 24 members as well as 3 emeritus members from overall 13 countries. A third of the members in ICDM are women.

ICDM organised 10 symposia at IUGG 2023 Berlin and contributed to the organisation of 5 joint symposia with other associations at the same meeting.

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

The ICMA Business Meeting (BM) was held on Thursday July 13<sup>th</sup> (12:00-13:30h) at the 28<sup>th</sup> IUGG General Assembly in Berlin. Since then, the new executive is formed by Natalia Calvo (President, Spain) and Seok-Woo Son (Vice President, Rep. Korea). In addition to the executive, the ICMA membership is updated with 11 continuing members and 13 new members elected at the BM. New members are Gabriel Chiodo, Sean Davis, Alvaro de la Cámara, Chaim Garfinkel, Hella Garny, Peter Hitchcock, Laura Holt, Clara Orbe, Riwal Plougonven, David Plummer, Takatoshi Sakazaki, Miriam Sinnhuber and Timofei Sukhodolov.

In 2023, we worked to prepare the Middle Atmosphere Science Symposium, which took place at the 28<sup>th</sup> IUGG General Assembly. It was a successful meeting that extended over 4 days (July 12<sup>th</sup> to 15<sup>th</sup>), with a total of 64 oral presentations and 22 posters.

### IO3C (<https://www.io3c.org/>)

IO3C is organizing the Quadrennial Ozone Symposium (University of Colorado, Boulder) 14-20 July 2024. [Website](#).

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

ICPAE organized a session at the 2023 IUGG General Assembly in Berlin: M35 - Exploration of the Diversity of Planetary Atmospheres: From the Solar System to Exo-Planets, which attracted 9 oral presentations (2 of them being invited talks) and 4 posters.

### ICPM (<https://www.iamas.org/icpm/>)

ICPM held their business meeting at IUGG Berlin in hybrid format. Matt Lazzara and Tracy Moffat-Griffin were re-elected as president and secretary with no objections. Jing Li, chair of the IAMAS ECR committee, has requested to have Lee Welhouse continue as ICPM representative to her committee.

ICPM sponsored/co-sponsored 11 sessions at IUGG, all of which were well attended:

- The Year of Polar Prediction (YOPP)
- Climate Change in the Polar Regions
- Polar Modelling
- Atmosphere-Ocean-Sea Ice Interactions: Local Processes and Global Implications
- Cloud and Precipitation Studies
- Tropical-Polar Interactions, Arctic Amplification and Its Influence on Midlatitude Weather
- Polar Regions Instrumentation
- Variability and Near-Term Predictability of the Antarctic Climate System
- Machine Learning in Geo-, Ocean and Space Sciences
- Atmospheric Circulations and Surface Mass Balance of Ice Sheets
- Atmosphere-Ocean-Sea Ice Interactions: Physical and Chemical Processes

The 18th Workshop on Antarctic Meteorology and Climate (WAMC) was endorsed by ICPM. It was a hybrid meeting hosted by University of Wisconsin-Madison, May 31 - June 2nd, 2023. The WAMC brings together those with common interests in Antarctic meteorology, climate, forecasting and related disciplines. The three-day event focused on observational networks, numerical modeling, weather forecasting, operational/logistical interests, and Antarctic meteorological and climate research from contributors around the world. Meeting [recordings can be found here](#).

ICPM president Matt Lazzara was invited to the British Antarctic Survey to talk about ICPM activities and to strengthen Antarctic meteorology links between UK and US.

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

The IRC held its annual business meeting on 13 July 2023 during the 28th IUGG General Assembly in Berlin. The main topics of discussion included: the IRC financial status; a review of upcoming meetings; a report from the IRS 2024 local organizing committee chair; presentations from the 12 current IRC working groups; and a discussion on the IAMAS Resolution on Weather and Climate Engineering. A consensus was reached that the International Radiation Commission Statement on Radiation Management for Climate Engineering that was published in 2014 sufficiently addressed the IRC's view on this issue. No significant changes have occurred since that time that warranted a change in the IRC position.

Approximately 30 IRC commissioners participated in the 28th IUGG General Assembly in Berlin. The following sessions were led by the IRC or held jointly with other commissions:

- M11 Earth's Energy Budget
- M12 Advances in Atmospheric Radiation
- JA05 Solar Influence on the Atmosphere and Climate (Joint with IAGA)
- M23 Cloud-Radiative Interactions (IAMAS/Joint with ICCP)

Some other major international meetings that included significant contributions from IRC members are:

- [EGU General Assembly 2023](#), 23-28 April 2023, Vienna, Austria
- [World Climate Research Programme \(WCRP\) 2nd Open Science Conference \(OSC\)](#), 23-27 October 2023, Kigali, Rwanda
- [2023 LASP/Goddard Sun-Climate Symposium](#), 16-20 October 2023, Flagstaff, Arizona, USA
- [AGU Fall Meeting](#), 11-15 December 2023, San Francisco, CA, USA

The following comprise the Working Groups of the IRC:

1. ASA - Atmospheric Spectroscopy Applications
2. BSRN - Baseline Surface Radiation Network
3. CR - Clouds and Radiation
4. GEB - Global Energy Balance
5. ICLAS - International Coordination group for Laser Atmospheric Studies
6. IPRT - International Polarized Radiative Transfer
7. ITWG - International TOVS Working Group
8. UV - Solar UltraViolet Radiation
9. 3DRT (I3RC) - Three-Dimensional Radiative Transfer
10. HRMM - Hyperspectral Radiation: Measurements and Modelling
11. TSSI - Total and Spectral Solar Irradiance
12. MLRS - Machine Learning Applications in Remote Sensing

Annual reports, including publications, meetings and related activities can be found on the [IRC website](#).

## FUTURE ACTIVITIES

The primary activities in 2023 were directed toward the organization and planning of the [International Radiation Symposium 2024 \(IRS 2024\)](#) in Hangzhou, China, from 17-21 June, 2024. This quadrennial symposium of the IRC provides a comprehensive international forum for presenting and discussing recent research achievements and technological developments in atmospheric radiation and related topics covering a wide spectrum of disciplines. Internationally recognized senior scientists, young scientists, and students will have a unique opportunity to discuss important scientific issues, exchange new ideas and establish far-reaching collaborations.

We estimate approximately 500 participants and roughly the same number of abstracts to be distributed over the following 10 scientific sessions:

1. Topical Union Session: Current Problems in Atmospheric Radiation
2. Radiative Transfer Theory and Modeling
3. Particle Radiative Properties
4. General Remote Sensing
5. Ground-based Measurements and Field Observations
6. Radiation Budget and Forcing
7. Weather, Climate, and Environment Applications
8. Solar UV Radiation
9. China's Satellite Remote Sensing Programs
10. Radiation Sciences in the Tibet regions

### Plans of IAMAS commissions for 2024

#### ICAE

- Organize one ICAE session in EGU 2024.
- Organize an ICAE Commission member meeting at AGU 2024.
- Issue two newsletters, one in spring and one in the fall.
- Maintain the website for ICAE.
- Update the ICAE colleague mailing list as needed.

#### ICCL

In 2024, ICCL is representing IAMAS in sponsorship of the GEWEX Open Science Meeting and will be holding the Pacific Island Nations Forum on Climate Change (Qingdao, China) 21-22 October 2024.

#### ICCP

In 2024, the 19th ICCP Conference will be held in Jeju Island, South Korea from 14 July to 19 July 2024. A total of over 550 abstracts were submitted to the conference. A number of oral and poster sessions are planned. In addition, the 11th International Cloud Modeling Workshop (ICWM) will take place in Seoul, Korea from 8 to 12 July 2024, the Workshop on Evaluation of Cloud Probe Processing Software will take place in Jeju, Korea from 12 to 13 July 2024, the Workshop on Scientific Directions for Cloud Chamber Research will take place in Jeju, Korea from 13 to 14 July 2024, and a Short Course on Cloud Microphysics and Radar Observations will take place in Jeju, Korea on 20 July 2024. More details are on the conference website at <https://iccp2024.kr>.

### ICDM

For 2024, ICDM is organising the ICDM workshop on Linking Weather and Climate Dynamics across Scales, held at Nanjing University International Conference Center, China, 13-19 October 2024. Workshop website.

### ICMA

ICMA will be sponsoring the 12<sup>th</sup> International Workshop on Long-Term Changes and Trends in the Atmosphere (Trends 2024: <https://trends2024.uvigo.es/>) to be held in May in Ourense, Spain.

The next ICMA Business Meeting will be held sometime in September 2024.

### IO3C

IO3C is organizing the Quadrennial Ozone Symposium (University of Colorado, Boulder) 14-20 July 2024. [Website](#).

Keith Alverson, IAMAS Secretary General



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



International Association  
for the Physical Sciences of the Oceans

IAPSO website: <https://iapso-ocean.org/>

## 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, especially early career scientists and students from developing and notably from least developed 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 2023 during the IUGG General Assembly in Berlin. It comprises:

President:	Hans van Haren (the Netherlands)
Past President:	Trevor McDougall (Australia)
Secretary General:	Silvia Blanc (Argentina)
Treasurer:	Ken Ridgway (Australia)

The Executive Committee comprises the Bureau members and

Vice-President:	Agatha de Boer (Sweden) Toshiyuki Hibiya (Japan)
Members at Large:	Juliet Hermes (South Africa) Joellen Russell (USA) Yukio Masumoto (Japan) Jae-Hun Park (Republic of Korea) Alejandra Sanchez-Franks (United Kingdom) Regina Rodrigues (Brazil) Peter Zavialov (Russia) Malin Ödalen (Germany, chair IAPSO-EC)

The IAPSO office and day-to-day business is managed by Secretary General (SG) Silvia Blanc. The SG is responsible for the IAPSO website.

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

Except during the Berlin meeting, IAPSO business meetings were conducted by email and videoconference where appropriate.

## ACTIVITIES

### 28<sup>th</sup> IUGG General Assembly 11-20 July 2023, Berlin

IAPSO participated in the Berlin General Assembly of IUGG in July 2023. Of the total number of attendees of about 5,000, about 400 had the IAPSO affiliation. This was a very successful meeting, and because of the cancellation of the 2021 Joint Assembly in Busan in 2021 (due to COVID-pandemic), this was the first scientific assembly of IAPSO in four years.

At the Berlin 28<sup>th</sup> IUGG General Assembly the **IAPSO Early Career Scientist Medal** was awarded to Dr Malte Stuecker (University of Hawai'i) *"in recognition of his fundamental contributions to understanding the dynamics of tropical climate variability, its interactions with other parts of the climate system, and elucidating the spatial patterns of climate change"*.

IAPSO's premier Medal, the **Prince Albert I Medal** was awarded in July 2023 to Professor John Church AO (University of New South Wales, Sydney) *"for his research on sea level change in the 20<sup>th</sup> and 21<sup>st</sup> centuries and its response to natural and human factors. John has reconstructed the global sea level record back to the 1870s, and his work has been central to the IPCC WG1 reports and to the projection of sea level change as it will affect the 100 million people living within 1m of present mean sea level."*

The 2023 **Eugene LaFond Medal**, given in memory of Eugene LaFond (IAPSO Secretary General 1970-1987) to an ocean scientist from a developing country who makes an oral or poster presentation at an IUGG or IAPSO assembly was awarded to Dr. Helenice Vital from Brazil for her oral presentation *"SeabedMap Project - Sensing, integration and analysis of digital information in marine geological mapping, Brazilian equatorial margin"*.

### SCOR Administration

IAPSO President Hans van Haren attended the SCOR Annual Meeting held in Guayaquil Ecuador in October 2023. The many subsidiary bodies of SCOR were reviewed and memberships renewed. Many of these bodies coordinate physical, biogeochemical and fisheries research in the global ocean. Two new SCOR working groups were selected for funding, each receiving sufficient funds for three face-to-face meetings.

## ACTIVITIES OF ASSOCIATION COMMISSIONS, WORKING GROUPS

### Early Career Scientist Working Group

IAPSO ECS are in contact with a large and growing number of other networks, within and outside of the IUGG. They have co-organised ECS activities at the IUGG Joint Assembly in Berlin, and joint webinars for networks in the Early Career Ocean Professionals (ECOP) programme in 2023. They also contributed to the IUGG's outreach activities (<https://www.youtube.com/@internationalunionofgeodes3442/videos>). Their website has been extended (<https://www.iapsoecs.org>) with educational resources, job- and fellowship opportunities, and

continues to grow. In 2023 they extended their social media presence to LinkedIn. They steadily reach 500+ subscribers across their communication channels. In 2023, IAPSO ECS became chaired by Malin Ödalen (Germany).

### **IAPSO Best Practice Study Groups**

In October 2023 IAPSO has launched its third call for proposals to fund IAPSO Best Practice Study Groups at the rate of two every two years (<https://iapso-ocean.org/funding-opportunities/best-practices-study-groups.html>). An IAPSO Best Practice Study Group will address an issue whose resolution will assist in the conduct of oceanographic research. In carrying out oceanographic research, a choice must frequently be made between a few options for measuring data, analysing data, processing software, or modelling a system. The reasons for choosing between competing methods are often not well documented and the relative strengths and weaknesses of these routes are usually not published or well known. Each Best Practice Study Group will receive up to US\$12,000 towards the costs of a meeting.

### **Joint Commission on Ice-Ocean Interactions (JCIOI, joint with IACS)**

This JCIOI continued their discussions session in the 28<sup>th</sup> IUGG General Assembly held in Berlin. They hosted a joint session (JP04: Ice-Ocean Interactions: Challenges and Insights from Theory, Observations and Modelling) as well as they co-hosted with OCEAN:ICE a discussion session (*on Ice sheet impacts on ocean circulation and climate feedbacks*)

They were successful in securing funding for an IAPSO Best Practice Study Group to develop a framework for observing and modelling ocean-driven ice melt rates in Antarctica. Their proposal included a workshop in mid 2024 to develop this framework in advance of - and to inform fieldwork planning for - the Antarctica. Additionally, the JCIOI plan for the framework for observing and modelling ice-ocean interactions was presented at AGU23 (advancing Earth and Space Sciences).

### **Joint Committee on the Properties of Seawater (JCS)**

Members continued working on tasks identified during the 2018 Workshops and on maintaining the TEOS-10 website ([www.teos-10.org](http://www.teos-10.org)) and associated software, as well as other items relevant to JCS. These include important publications on the long-term stability of conductivity, density, and chemical composition of IAPSO Standard Seawater. A new taskgroup on chemical speciation was formed to continue working on issues identified by SCOR WG-145 (Chemical Speciation Modelling in Seawater) and in June publicly released their first version of software for speciation calculations at [marchemspec.org](http://marchemspec.org). A draft JCS website was created but a permanent host for it is not yet established.

### **Permanent Service for Mean Sea Level (PSMSL)**

In 2023 the PSMSL added 1350 station-years from 693 stations to the global mean sea level databank and re-established contact with suppliers in Brazil, Denmark, Iceland, India, Italy, Lithuania and South Africa, who hadn't supplied data in recent years. In May its staff helped organise the 2<sup>nd</sup> online tide gauge workshop under the EuroSea project, which brought together the tide gauge community to discuss global networks, datasets and data portals, case studies in the use of tide gauge data, new methods and technologies such as low cost sensors and GNSS Interferometric Reflectometry (GNSS-IR) and the latest developments in automated quality control.

The PSMSL led the IAPSO Best Practice Study Group on Tidal Analysis, culminating in a workshop in Liverpool in November, where scientists from around the world shared their experience in tidal analysis.

## Tsunami Commission (JTC, Joint with IASPEI and IAVCEI)

The JTC organized a hybrid Business Meeting on July 16<sup>th</sup> 2023, in Berlin. Six The Working Groups have been endorsed, namely: Tsunami Terminology WG, Science-based Tsunami Warning WG, Tsunami Magnitude WG, GNSS Data for Tsunami Warning WG, Meteotsunami WG, and Tsunami Data WG. They presented their recent activities during the Commission business meeting in Berlin. An International Tsunami Symposium was held during the 28<sup>th</sup> IUGG General Assembly (JP05: Tsunamis). The 8th Joint ICG/PTWS– IUGG/JTC Technical Workshop “Understanding and lessons learned from the tsunami generated by the Hunga Tonga-Hunga Ha'apai volcano eruption on 15 January 2022 for development of Tsunami Warning and Mitigation System for tsunamis generated by volcanoes and other non-seismic sources” was held in Tonga. Members of the JTC actively participated in organization of numerous tsunami sessions in AGU, EGU, AOGS General Assemblies and other Int. conferences in 2022-2023. The JTC published current tsunami research in Pure and Applied Geophysics as topical volumes, such as the three papers published online in the Turkey-2023 Earthquake and Tsunami Topical collection.

## Supported Meetings

IAPSO endorsed the [Summer School “From meso to sub-mesoscale ocean circulation structures: satellite and in-situ measurements, physical mechanisms and biological impact”](#) that will be held in Buenos Aires, Argentina, 15 to 20 July 2023, through the presentation of a proposal to the IUGG Support Programme 2024 which was awarded.

## Awards

- Prof. Em. John Church (UNSW) has been appointed Fellow of the International Science Council (ISC).
- IAPSO scientist, Prof. Toshiyuki Hibiya (University of Tokyo, Japan) was awarded the IUGG Fellowship for being a global leader in understanding the production of ocean turbulence by the internal tide and the parameterization of mixing in ocean and climate models.

## Obituaries



**Prof. Toshihiko Teramoto** (Japan) passed away on December 1, 2023 at the age of 97. As a professor in the Dept. of Physical Oceanography at the Ocean Research Institute affiliated with the Univ. of Tokyo, he has pioneered various researches based on the measurement of physical processes in the open ocean, with outstanding achievements in the study of Kuroshio variations, ocean tides and Deep circulation in the North Pacific. He has made major contributions to the development of satellite-based oceanographic observations and to the introduction of direct ocean current measurement methods, including the measurement of ocean currents based on geopotential differences across straits and ultrasonic current velocity systems. He an honorary member of the Oceanographic Society of Japan for his efforts in conducting and developing research in physical oceanography in Japan. He also served in many oceanographic service roles and was Vice President of IAPSO from 1983 to 1987.

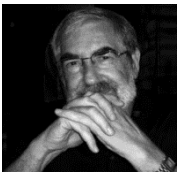


**Prof. Dr. Wilhelmus P.M. de Ruijter** RSSA (Netherlands) passed away 12<sup>th</sup> January 2023, age 71. He was well recognised as one of the great original thinkers on ocean dynamics and stimulated the cohesive efforts of a large group of creative colleagues to work on central problems at the forefront of ocean science. He received the Royal decoration in the Order of the Dutch Lion in 2011 and he was an Ordinary Fellow (foreign) of The Royal Society of South Africa since 2001. Prof. Dr. de Ruijter has participated for a long time in the activities of IAPSO, also in the functions of National Correspondent of the Netherlands. He

was a full member of SCOR WG #136 on Climatic Importance of the Greater Agulhas System. He was well loved by his colleagues and students given his vibrant mentorship and inquisitive nature.



**Prof. Mathieu Rouault (South Africa) – 17 January 2023.** He was the director of the Nansen Tutu Center for Marine Environmental Research and an associate professor in the Dept. of Oceanography, University of Cape Town. He was also the president of the South African Society for Atmospheric Science. In 2002, he was a POGOSCOR fellow joining the PIRATA FR11 cruise and receiving training in all aspects regarding deployment of the ATLAS system. His research was focused on ocean atmosphere interaction from numerical modelling to experimental work at sea, from meteorology and physical oceanography to climatology and the impact of climate change and variability on marine ecosystems and water resource. J. Hermes wrote: "... his work on air-sea interaction over the Agulhas was seminal. The oceanographic community in South Africa are all shocked and saddened by his untimely passing."



**Prof. Bjorn Sundby (Canada) – 23 January 2023.** He was a retired Professor from the Université du Québec à Rimouski (UQAR) and adjunct professor from McGill University in Canada. He served SCOR as Secretary (1996-2000), President (2004-2008) and Past President (2008-2012). He was a SCOR Nominated Member for Canada serving the Canadian SCOR Committee as Secretary (1996-2000) and as Chair (2003-2006). He earned his PhD in physical organic chemistry at the Univ. of Bergen in 1966 and then moved to Dalhousie Univ. in Halifax for a postdoctoral position. He held many relevant positions and worked on a broad array of topics, including the marine phosphate cycle, processing of organic matter in permeable and soft sediments, transient diagenesis, the use of redox tracers as paleo indicators, micro-scale redox cycling in the rhizosphere and the development of Au/Hg amalgam microelectrodes for measuring redox species at fine spatial scales. Through his extensive service to SCOR, he contributed to shape the focus of international oceanographic research and inform marine policy.



**Prof. Miguel Dino Fortes (Philippines) – 30 April 2023.** He was a Professor at the University of the Philippines, and a full member of WG #158, Coordinated Global Research Assessment of Seagrass System (C-GRASS). He was a tireless advocate for seagrasses and for building the seagrass community of practice globally. He was the author of *Seagrasses: A resource unknown in the ASEAN*, which was inspirational for generations to come working in seagrass beds and their relation to food security.

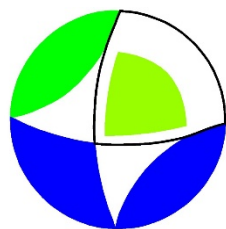
## FUTURE ACTIVITIES

The following activities are scheduled for 2024 and beyond:

- Participation in the 2024 SCOR Annual Meeting in Qingdao, China from 16 to 18 October 2024.
- Organization of the next Joint Assembly with IAMAS and IACS in Busan, Republic of Korea, 20-25 July 2025.
- 29th IUGG General Assembly, July 2027, Incheon, Republic of Korea.

Silvia Blanc, IAPSO Secretary General  
Hans van Haren, IAPSO President

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



IASPEI

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

IASPEI website: <http://iaspei.org>

## 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, 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.

Most of the IASPEI efforts during 2023 were directed towards the IUGG General Assembly in Berlin, and in particular the IASPEI Symposia and the IASPEI-led Inter-Association Symposia.

## ADMINISTRATION

**EC & Bureau meetings.** The IASPEI Bureau / Executive Committee (EC) had two joint meetings in 2023, one organized as video conference in April and one during the General Assembly in Berlin in July. There were additional, regular e-mail exchanges regarding all Association related questions (as e.g., financial support, requests, planning of future Assemblies or business to be solved immediately) between the members of the IASPEI Bureau and EC throughout the whole year.

**Changes in administration.** The general interest in an IASPEI Commission on Earth Structure and Geodynamics has vanished during the last years and no new chair could be found. In addition, there is a large topical overlap with the IUGG Union Commission Studies of Earth's Deep Interior (SEDI) (<https://iugg.org/associations-commissions/commissions/sedi/>), in which many seismologists are already active. Therefore, the IASPEI ExeCom decided in Berlin to declare the Commission on Earth Structure and Geodynamics as dissolved and asks the IASPEI membership to participate instead in SEDI activities. Therefore, the IASPEI ExeCom decided in Berlin to declare the **Commission on Earth Structure and Geodynamics** as dissolved and asks the IASPEI membership to participate instead in SEDI activities.

In the aftermath of the Berlin Assembly, some Early Career Scientists (ECSs) have become active and started to organize an ECSs Group in IASPEI.

**Website.** The IASPEI website has the address <http://iaspei.org>.

*The new elected board of IASPEI and members of the new IASPEI Executive Committee after the Closing Plenary of the General Assembly in Berlin.*

**Statutes.** After some discussion during the (virtual) ExeCom meeting on 3 April 2023, paragraph “XIV. Meetings of the Bureau and of the Executive Committee” of the By-laws have been unanimously extended by the new clause:

3. The president of each Regional Commission or their designee shall be invited to participate in Executive Committee meetings with consultative capacity without vote.

IASPEI is registered as a Norwegian organization (Norwegian Org. Number 916 047 495).

**Newsletters.** IASPEI Newsletters were regularly sent as PDF-file attachments to more than 4200 e-mail addresses. The Newsletters are also available for download from the IASPEI website. Four Newsletter issues were distributed in 2023.

## ACTIVITIES

### **2023 IUGG General Assembly in Berlin**

IASPEI participated actively in the conference, 750 of the officially registered more than 5000 participants associated themselves with IASPEI, with 90 participants had been supported financially with grants. The scientific program included 21 IASPEI and 30 Inter-Association symposia with IASPEI participation (of which 9 had been led by IASPEI). IASPEI also contributed to the Union program with one Union Lecture and participated in the Union Symposia.

IASPEI supported a workshop on „International Training Course on Ocean Bottom and Amphibian Experiment Seismological Dataworkshop“, which was organized by Prof. Krüger, University of Postdam before the Assembly.

During the Assembly, the IASPEI Commissions and the IASPEI-sponsored bodies FDSN and IHFC also had their business meetings.

### ***SEDI/IASPEI/ILP Workshop on Improving Earthquake Preparedness Through Geoscience Education in the Himalaya***

A two-day workshop for Nepali school teachers from 1 to 3 May 2023 in a centrally located city in Nepal, Pokhara. There were 49 teachers participating, of which most were science, computer science, and social science teachers, as well as several school principals. (see IUGG E-Journal – 1 December 2023, <https://iugg.org/wp-content/uploads/2023/11/IUGGej2312.pdf>).

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

Some 2,000 hard copies of the first printed edition of the IASPEI New Manual of Seismological Observatory Practice (NMSOP, 2002) are currently being used in more than 100 countries at seismological observatories, data and analysis centers, and for teaching, research, and field applications. In addition, it is used as basic material within national and international seismology training courses, or by private enterprises and individual scientists. In 2014, a rigorously updated and amended electronic second edition, NMSOP-2, was completed and put online, thanks to the efforts of 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***

In 2023, IASPEI continued to financially support the work of the Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes (EMSEV).

### ***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 during the IASPEI Assemblies. The IASPEI Medal 2023 was awarded during the Opening Plenary at the General Assembly in Berlin to Prof. Harsh K. Gupta, India.

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 researcher, pre-tenure faculty member) from their commission at each even-year Assembly of that Regional Commission. New awardees will be selected during the planned General Assemblies of the Regional Commissions in 2024.

### ***Obituaries***

Obituaries for internationally recognized scientists of the IASPEI community are regularly published in the IASPEI Newsletters and on the IASPEI webpage. In 2023, sadly, six obituaries had to be published.



## FUTURE ACTIVITIES

In 2024, the IASPEI main activities will be again concentrating on the General Assemblies of the four regional commissions of IASPEI (AfSC, ASC, ESC, LACSC).

- LACSC will hold its 5<sup>th</sup> General Assembly in San José (Costa Rica) in June.
- ESC will hold its 38<sup>th</sup> General Assembly on Corfu (Greece) in September.
- AfSC plans its 4<sup>th</sup> General Assembly for October in Namibia.
- ASC will hold its 15<sup>th</sup> General Assembly in Belek, Antalya (Türkiye) in November.

The next IASPEI Scientific Assembly will be a Joint Assembly together with IAGA in Lisbon, Portugal in September 2025.

Johannes Schweitzer, IASPEI Secretary General

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



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

IAVCEI website: [www.IAVCEIvolcano.org](http://www.IAVCEIvolcano.org)

## INTRODUCTION

IAVCEI represents the international focus for research in Volcanology and Chemistry of the Earth's Interior. IAVCEI scientists are affiliated with 69 different countries and are involved in a variety of disciplines of Earth Sciences, including physical volcanology, igneous geochemistry, geochronology, petrology, and geophysics. Moreover, many IAVCEI members are involved in continuous monitoring of active volcanoes in Volcano Observatories worldwide.

## ADMINISTRATION

PRESIDENT	Costanza BONADONNA	SWITZERLAND
SECRETARY GENERAL	Ulrich KUEPPERS	GERMANY
VICE-PRESIDENT	Marta CALVACHE	COLOMBIA
VICE-PRESIDENT	Andrew HARRIS	FRANCE
ECR REPRESENTATIVE	Joali PAREDES	NEW ZEALAND
COUNCILORS	Alessandro AIUPPA	ITALY
	Alvaro AMIGO	CHILE
	Alessandro BONFORTE	ITALY
	Nobuo GESHI	JAPAN

The 2023-2027 IAVCEI Advisory Board includes past-president (Patrick ALLARD, France) past-secretary (Roberto SULPIZIO, Italy) and the following non-elected members:

BULLETIN OF VOLCANOLOGY (EDITOR-IN-CHIEF)	Marie EDMONDS	UK
International Network for VOLcanology Collaboration (INVOLC) (CO-LEADER)	Karen FONTIJN	BELGIUM
World Organization of Volcano Observatories (WOVO) (LEADER)	Nico FOURNIER	NEW ZEALAND
Diversity, Equity, and Inclusion (DEI) (ADVISOR)	Elisabeth GALLANT	USA

Similarly to other Associations, the meeting plans, and activities of IAVCEI were strongly impacted by the COVID-19 pandemic. Two of our major meetings – the 11th Conference Cities on Volcanoes

(COV11) in Crete and our Scientific Assembly in New Zealand (Rotorua) - ought to be twice postponed and re-programmed. In 2023, IAVCEI had to face the unexpected situation of having its Scientific Assembly (New Zealand, January-February 2023) and its General Assembly in the same year (28th IUGG General Assembly, Berlin, July 2023).

## ACTIVITIES

### Membership

By the end of 2023 (evaluated in March 2024), IAVCEI had 2861 members, representing 69 countries. Members with due-paid membership fee were 1465. We are developing the strength of “benefits for members” to increase this rate. 43% of our members are female and 50% of all members are Early Career Researchers. This attests the vitality and attractiveness of our Association.

### Website, communication, and webinars

- A new **IAVCEI Communication Team** was instituted that is composed of diverse members in terms of discipline, region, and gender (including representatives of our 3 partner institutions ALVO, AIV and VSJ):

Joali PAREDES (ECR REPRESENTATIVE)	(New Zealand, LEADER)
Juan David ALVAREZ SILVA	(Colombia - ALVO representative)
Chris E CONWAY	(Geological Survey of Japan – VSJ Representative)
Valentin FRERET-LORGERIL	(Clermont-Ferrand, France)
Johana Andrea GÓMEZ ARANGO	(Universidad Nacional Autónoma de México)
Omari GRAHAM	(Seismic Research Centre, West Indies)
Martin KELKO	(Volcano Discovery, GmbH)
Alicia MANZO	(Dos Rios Ranch State Park, USA)
Silvia MASSARO	(Univ. Bari, Italy - AIV representative)
Indranova SUHENDRO	(Univ. Yogyakarta, Indonesia)
Alexis YAYING PENG	(ETH Zurich, Switzerland)
- The **e-Volcano platform** we created in 2021 for hosting peer-reviewed video docs, with DOI, on all subjects and lessons in Volcanology, destined to specialists, teachers, students and the public, now hosts 2 e-video sessions. Two more projects are ready for future display.
- **Webinar series:** traveling restrictions imposed by the Covid-19 pandemic stimulated the organisation of special IAVCEI webinars on ongoing or/and recent eruptions of major interest. These attracted a wide audience and promoted membership increase. In 2022, several online webinars were sponsored by our Early Researchers Career Network, as well as thematic webinars of our Commissions. Recording of each webinar was subsequently posted on our website. Webinars are now individually organised by the hosting commission.
- **IAVCEI Newsletters**  
Four Newsletters were published in 2023, 2 within the previous EC mandate and 2 within the new EC mandate (<https://www.iavceivolcano.org/newsletter/>). Each newsletter contains a chapter with upcoming events under IAVCEI organisation or its involvement, as well as meeting reports. A new format has also been introduced with the second (September) newsletter of 2023, where a section is devoted to invited articles featuring the activities and focus of IAVCEI Commissions and Networks, as well as Volcano Observatories, and profiles on Early Career Researchers and the jobs of those whose roles are critical in allowing IAVCEI members to operate.

## Bulletin of Volcanology

Bulletin of Volcanology, the official journal of IAVCEI published by Springer, is the oldest journal in volcanology (established in 1922). During 2023 the journal continued to attract high quality manuscript submissions and the impact factor rose to 3.5. In July 2023 the Editor-in-Chief, Andy Harris, and Editorial Assistant, Frances van Wyk de Vries handed over to the new team Marie Edmonds and Richard Herd, who will serve as Executive Editor and Deputy Executive Editor/Managing Editor respectively until 2027.

## Meetings, workshops and courses

- ***IAVCEI Scientific Assembly, Rotorua, New Zealand (January 29-February 3) followed, still in Rotorua, by the 8th IWVA workshop coordinated by WMO and timed with IAVCEI.***

The IAVCEI 2023 Scientific Assembly in Rotorua, Aotearoa New Zealand was finally held on 30 January to 3 February 2023. The long and uncertain COVID era had delayed the Assembly by two years. In the week before the event, we were expecting approximately 940 in-person delegates and a further 120 were registered for the virtual platform. This was to be the first large (>500) international conference for New Zealand in three years. On Friday 27 January it rained in Auckland and across the upper North Island. It became Auckland's wettest day on record – a one-in-200-year flooding event.

The biggest impact for the Assembly was flooding at Auckland Airport and closure of the international terminal until Sunday morning, disrupting flight plans for many delegates. Two flights en route from Dallas and Dubai, with cohorts of delegates on board, were returned to their port of origin, and many others (or their luggage) were stranded at airports around the Pacific, and maybe even on a tropical island or two. Domestic flights around New Zealand were also disrupted. Pre-conference field trips were underway when the weather bomb hit. Unexpected travel experiences were shared thanks to social media (see #IAVCEIstranded). Despite these troubles, delegates and the organising committee found ways to get themselves and others to the conference venue: over 600 delegates had checked in by the Sunday evening for the Icebreaker function. Disrupted travellers eventually arrived during the week, and the final official number of in-person attendees reached 894. Thanks to the digitally-innovative COVID era, a virtual conference platform was in place which meant delegates who could not arrive, could be transferred to the virtual programme, so the total number of virtual attendees reached 205. In-person attendees also had access to the virtual platform which was helpful for those delayed by flights or who were unwell.

The scientific committee of the Assembly accepted 82 symposia and received 1,265 abstracts. 594 abstracts were accepted for oral presentations, 606 for poster presentations and the remaining 65 were withdrawn. The regular oral programme was run across nine parallel streams over Monday, Tuesday, Thursday and Friday. Five mid-conference field trips had been organised for the Wednesday and 620 delegates had been registered for these. Unfortunately, three field trips across the northern end of the central North Island had to be cancelled due to poor weather. Two southerly field trips to a developed geothermal field and to the Taupō volcano were still able to go ahead amidst mixed rain and sunshine, and these were thoroughly enjoyed by those who attended.

A significant new initiative of IAVCEI 2023 was VolcanoFest, which amalgamated and highlighted a range of social functions for delegates (movies, music, sports and games), volcano art and photography displays and public outreach activities mostly held in a dedicated arena space at the venue. The public outreach programme included a school teacher professional development workshop, meet-a-volcanologist panels, outreach booths, volcano games and experiments demonstrations. Activities on the Tuesday were focussed on school teachers. The Thursday programme was open all day to the public and, although it was the first week of the New Zealand school year, the space was buzzing with children, parents, seniors and all manner of interested persons.

Evening films were shown on Monday (Fire of Love), Tuesday (Lava Bombs: Truths behind the Volcano, re the La Palma eruption) and Thursday (The Volcano: Rescue from Whakaari), and panel discussions were held following the latter two films. Many IAVCEI Commissions, starved of in-person interaction for over three years, finally regrouped over various lunch time meetings and evening dinners.

44 countries were represented at the Assembly with strong contingents from North American and European countries, Japan, Singapore and Australia, along with the strong local New Zealand cohort. About 2% were collectively from a range of Latin American countries, and smaller contingents from other Asian and Pacific nations. Unfortunately, we do not have other demographic data to report (e.g. age, gender). The hybrid format was also important for increasing accessibility. A code of conduct was established and communicated. Attention was given to communication and assistance, the range of food and drink options, managing spare food and waste, audio, mobility, bathrooms (e.g., provision of gender-neutral bathrooms and period products), childcare and provision of a quiet room. Some of our aspirations were not feasible within the physical constraints of the venue and audiovisual technology (e.g., closed captions during presentations) but we hope they will be explored for future IAVCEI events.

- **IAVCEI General Assembly, 28th IUGG GA, Berlin, Germany (July 15-19)**

- Total IUGG registrations: 5.020 (4.610 picked-up the badge onsite); Waived registrations: 382
- Delegate countries: 105. Top 8 countries attendance: Germany (958), China (662), USA (454), Japan (279), Italy (272), UK (244), France (203), India (170)
- Associations attendance: IAMAS (890), IASPEI (700), IAG (591), IAGA (531), IAHS (510), IAPSO (415), IACS (315), IAVCEI (212)
- 14 IAVCEI Symposia of Volcanology and 22 joint Symposia with other IUGG Associations
- 2023 IUGG Early Career Scientist Award to IAVCEI member Tarsilo GIRONA HERNANDEZ (Volcanology, University of Alaska Fairbanks, USA) for his pioneering and innovative approaches for studying the degassing and eruptive behaviour of volcanoes by combining remote sensing, numerical modelling and machine learning.
- IUGG Union Lecture by IAVCEI member Robin MATOZA (UC Santa Barbara) on: “Advances in Global Volcanic Eruption Monitoring and Cataloguing using Seismo-Acoustic Observation Systems”.
- IAVCEI General Assembly and Awards ceremony with key points including:
  - Summary of main IAVCEI developments for the 2019-2023 Mandate
  - Presentation of newly elected Executive Committee for 2023-2027
  - Discussion of potential changes of Statutes and By-Laws
  - Delivery of 5 awards (Walker award, Wager medal, Fisher medal, Krafft medal, Thorarinsson medal)

- **Other meetings co-organized and/or sponsored by the IAVCEI in 2023**

- 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
- 11th Workshop IAVCEI Commission on Crater Lakes, Sao Miguel, Azores, Portugal, August 28-September 5
- Oceanic Volcanism Workshop (12-15 September; Kiel, Germany)

## IAVCEI Awards

- GEORGE WALKER AWARD (This award recognizes the achievements of a recent outstanding graduate in the fields of research encompassed by IAVCEI, or a recent graduate whose achievements in volcanology involved operating in difficult circumstances):
  - Emma Nicholson (Liu) (UCL, UK)
  - Andrea Bevilacqua (INGV, Italy)
  - Thomas Jones (Lancaster University, UK)
- KRAFFT MEDAL (This medal honours individual who has made outstanding contributions to volcanology through service to the scientific community or to communities threatened by volcanic activity. The Krafft Medal honours those who have shown altruism and dedication to the humanitarian and applied sides of volcanology and those who have made selfless contributions to the volcanological community):
  - John Pallister (USA)
- THORARINSSON MEDAL (This medal is the most senior medal of IAVCEI. It is given every four years at the IAVCEI Scientific Assembly to a scientist of outstanding distinction who has made fundamental contributions to research in volcanology):
  - Katharine V. Cashman (USA)
- FISHER MEDAL (The medal is given every 4 years at the IAVCEI Scientific Assembly to a scientist who has made outstanding contributions to volcanology based primarily upon field observations):
  - Karen Fontijn (Belgium)
- WAGER MEDAL (This medal honours a scientist up to 15 years after the Ph.D. acquisition, who has made outstanding contributions to volcanology, particularly in the eight-year period prior to the Award):
  - Yves Moussallam (USA)
  - Michael J. Heap (France)
- A new award for COLLECTIVE RESEARCH that recognizes excellent work through collaboration. It can involve multidisciplinary, interdisciplinary, transdisciplinary, national or international research groups that have contributed to a significant shift in understanding of science related to volcanology and/or chemistry of the Earth's interior. It is awarded every 2 years during the General and Scientific Assemblies.

## IAVCEI Award Committees

Within the new EC mandate, two award committees have been established that are responsible for different awards. The new composition of these committees is:

2023-2027 Award Committee VW2 (VSCM, Walker, Wager – every 2 years)

1. Silvana Hidalgo (IG-EPN Ecuador)
2. Steffi Burchardt (Uppsala University, Sweden)
3. Masato Iguchi (Sakurajima Obs., Japan)
4. Jake Lowenstern (USGS, USA)
5. Ailsa Naismith (University of Bristol, UK)
6. Marco Pistolesi (University of Pisa, Italy)
7. Richie Robertson (UWI, West Indies)

2023-2027 Award Committee FKTC (Fisher, Krafft, Thorarinsson – every 4 years; Collective Research - every 2 years)

1. Chair: Fidel Costa (IPGP, France)
2. Lizeth Caballero (UNAM, Mexico)
3. Kathy Cashman (Oregon University, USA)
4. Julia Eychenne (Clermont Ferrand, France)
5. Mie Ichihara (University of Tokyo, Japan)
6. Mike Ramsey (Pittsburgh University, USA)
7. Freysteinn Sigmundsson (University of Iceland, Iceland)

## **IAVCEI Commissions, Networks and Working Groups**

In 2023, the Executive Committee continued its work to promote and support the activities of both the IAVCEI commissions and the inter-associations and networks.

- Communication with the leaders of the commissions and networks to interact and update information about elections, activities carried out, information about membership, communications with the EC and perspectives of the groups.
- In the IAVCEI Newsletter, a structure was created: Who we are and What we do is reported, where the commissions and networks have a space for the dissemination of their activities and achievements.
- Commission leaders workshop at the IAVCEI GA at Rotorua (NZ) in January and February 2023.

The updated list of Commissions, Networks and Working Groups (joint Commissions) is reported below. Today the IAVCEI hosts 18 purely IAVCEI Commissions, 3 Networks, and 7 Joint Commissions (with other IUGG's Associations):

### **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. Volcanogenic Sediments
11. Volcano Geology
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. IAGA/IASPEI/IAVCEI International Heat Flow Commission
6. IAVCEI/IACS Commission on Volcano-Ice Interaction
7. IAPSO/IASPEI/IAVCEI Commission on Tsunamis

#### Working group for the restructuring of the World Organization of Volcano Observatories (WOVO)

Restructuring the WOVO as an efficient operational network *of* and *for* Volcano Observatories has been one of the primary objectives of the previous IAVCEI Executive Committee. This project has been slowed down by the Covid-19 pandemic, but several steps were pushed ahead. However, significant advances had been achieved including a dedicated Survey sent to all VOs worldwide in order to analyse their expectations and suggestions. A new working group was instituted in September 2023 to advance the rejuvenation of WOVO to be fully launched in 2024.

#### Working group on Volcano Tourism

A new Working group on Volcano Tourism was established in September 2023 involving 3 main tasks:

- 1) task 1 to analyse recent disasters (Ontake, White Island and Marapi) and identify: i) stakeholders involved (tourists, tourist-related organisations, responsible authorities), ii) responsibility/communication flow, iii) the role of the volcano observatory in communicating hazards and risk information and in supporting decision-making, iv) what is common between the cases and what are unique features of each case.
- 2) task 2 to identify categories of: i) volcano contexts (e.g. land, island, open conduit vs closed conduit) (using specific case studies, e.g. Stromboli, Fuego, St Vincent, Campi Flegrei, Vulcano, Kilauea, Reykjanes), ii) hazards with the potential to kill tourists (e.g. ballistics, PDCs, gas), iii) responsibility/communication actors (municipality, park, civil protection, scientists, search and rescue), iv) flow of information (using specific observatory-based case studies, e.g. Iceland, USA, Italy, Chile, Japan) (possibly discuss: i) responsibility of communication vs accountability, ii) business-related resistance/short circuit to implementation of risk mitigation measures)
- 3) task 3 to compile IAVCEI recommendations based on results of tasks 1 and 2 that has the objective to reduce casualties around volcanoes with recommendations for: i) effective communication, ii) quantification of acceptable societal and individual risk in different countries, iii) role of scientists during a volcanic disaster.  
This document would also include: i) examples of successful safety management at various volcanoes around the world, and ii) links to useful resources such as videos (e.g. VOLFILMS, Krafft video), relevant publications, etc...

### **Statutes and By-Laws**

As a result of the discussion of the IAVCEI General Assembly during the 28th IUGG GA, it was demanded that the Statutes and By-Laws (SBL) are revised and updated. A working group was instituted in August 2023 including some members of the current EC and IAVCEI members that were present at the 28th IUGG GA. The working group mostly worked through zoom meetings between August and December 2023 to increase transparency, diversity, equity, inclusion and efficiency of IAVCEI procedures and activities. Main changes:



- The wording of the SBL was revised to respect Diversity, Equity, and Inclusion (DEI) principles.
- IAVCEI base will be in Munich, Germany.
- Definitions were revised (e.g. ECRs, members).
- The Executive committee consists of elected members: President, 2 Vice- Presidents, Secretary, Representative of ECR Network, 4 Councillors; the EC has right of vote.
- An Advisory Board was established that includes past president, past secretary general, Bulletin of Volcanology Editor, Representative of International Network for VOLcanology Collaboration (INVOLC), Representative of World Organization of Volcano Observatories (WOVO), DEI Advisor; the Advisory Board does not have the right of vote.
- A DEI Advisor was established to be included in the IAVCEI Advisory Board.
- Two new award committees were instituted.
- A new advocating committee was established that is responsible for the identification of diverse award recipients as well as diverse candidates for the new EC election in 2027.
- Election procedures were updated and made more clear.
- Awards definition are now outside of SBL and described on the IAVCEI website.
- A new Code of Conduct for IAVCEI conferences, workshops and activities was established.

### IAVCEI and the UN's Initiative for 'Global Early Warning Systems'

After preliminary discussions during COV11 in Crete (June 2022) by previous EC, continues the discussion on potential involvement of IAVCEI within 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 highly interested in participating into this 5-yr 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.

## FUTURE ACTIVITIES

2024 will be a year dense of activities for the new IAVCEI EC that will need to implement new Statutes and By Laws in addition to regular activities.

Major milestones will include:

- 12th Cities on Volcanoes Conference (Antigua, Guatemala; February 2024)
- Organisation of IAVCEI SA 2025 and COV13 2026
- Institution of new Advocating Committee
- IAVCEI website update
- Publication of the **IAVCEI Newsletters 2024-1, 2024-2, 2024-3, 2024-4.**
- Finalisation of the restructuring of the new **World Organization of Volcano Observatories** (WOVO) (e.g. update of webpage and Member Directory, identification of new leadership team).
- Financial updates (e.g. reports, supports to meetings and Commissions' activities)

Costanza Bonadonna, IAVCEI President

# ACTIVITIES OF THE UNION COMMISSIONS

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

## Union Commission on Climate and Environmental Change (CCEC)



### INTRODUCTION

The history and purpose of CCEC may be found on the CCEC web site at: [www.ccec-iugg.org](http://www.ccec-iugg.org).

### ADMINISTRATION

The Chair is Jianping Li (China), the Vice-Chair is Keith Alverson (Canada/USA), the Secretary-Treasurer is Tonie van Dam (USA/LU), and the Immediate Past Chair is Tom Beer (Australia).

Commission members include Harry Bryden (UK), Mark Clilverd (UK), Annette Eicker (Germany), Domenico Giardini (Switzerland), Andrew Mackintosh (Australia), Alberto Montanari (Italy), Joyce Penner (USA), Alan Robock (USA), Dan Rosbjerg (Denmark).

### ACTIVITIES

#### Business meeting

On 13 July 2023, we organized a business meeting at the 28th IUGG2023 in Berlin. In attendance: Jianping Li (Chair, China), Keith Alverson (Vice-Chair, USA/Canada), Andrew Mackintosh (IACS, Australia), Annette Eicker (IAG, Germany), Alberto Montanari (IAHS, Italy), Torsten Dahim (IASPEI, Germany).

#### Scientific Meeting Organizations

- (1) Coordinated the Union Session U01 and several symposia at the 28th IUGG2023 in Berlin, as listed below:
  - Union symposia U01: Geoscience and Mathematics for Sustainable Development  
Convener(s): Keith Alverson, Ottawa, Canada (CCEC/IAMAS); Alik Ismail-Zadeh, Karlsruhe, Germany (CMG/IASPEI);

Co-Convener(s): Tom Beer, Aspendale, Australia (CCEC/IAMAS); Roberto Carniel, Udine, Italy (CMG/IAVCEI); Enamundram Chandrasekhar, Bombay, India (CMG/IAGA); Salvatore Grimaldi, Viterbo, Italy (CMG/IAHS); Ute Herzfeld, Boulder, Colorado, USA (CMG/IACS); Jianping Li, Qingdao, China (CCEC/IAMAS); Trevor MacDougall, Sydney, Australia (CCEC/IAPSO); Malcolm Sambridge, Canberra, Australia (CMG/IASPEI); Tonie van Dam, Luxembourg, Luxembourg (CCEC/IAG); Ilya Zaliapin, Reno, USA (CMG/IASPEI);

- IAMAS symposia M06: Monsoon Systems in Rapid and Intensifying Climate Change and Their Role in Extreme Events  
Convener(s): Jianping Li (China), V. Krishnamurthy (USA), Andrew Turner (UK);  
Co-Convener(s): Bin Wang (USA), E. Hugo Berbery (USA), Jun Matsumoto (Japan), Kyun-Ja Ha (South Korea), R. Krishnan (India), Fred Kucharski (Italy);
- IAMAS symposia M10: El Niño/Southern Oscillation and its Regional and Global Impacts  
Convener(s): Fei-Fei Jin (USA);  
Co-Convener(s): Wenju Cai (Australia), Jianping Li (China), Soon-Il An (South Korea);

- (2) Organization of the 5th Congress of Chinese Geodesy and Geophysics (CCGG) 2023 from April 21-23, 2023 in Wuhan, China. More than 3900 attendees participated in the conference.
- (3) Organization of “2023 International Forum on Pacific Island Countries Response to Climate Change (PICC2023)” on October 21, 2023 in Qingdao, China. More than 100 participants from China, the United States, Canada, the Solomon Islands, South Korea, Tuvalu, Australia, France and other countries attended the conference.
- (4) Organization of “2023 International Forum on Carbon Neutrality and Sustainable Development (CNSD 2023)” from November 25-26, 2023 in Qingdao, China. Nearly 100 participants from 14 countries including China, the United States, Italy, Switzerland, and Denmark and etc. attended the conference.
- (5) At EGU 2023 Assembly (23-28 April 2023), organized Session AS1.24 (CL1.2): Monsoon systems in a changing climate: past, present and future (Conveners Andrew Turner, Roberta D'Agostino, Kyung-Ja Ha, and Jianping Li).

## IPCC Activities

- (1) As an expert, Chair Jianping Li was invited by IPCC (Intergovernmental Panel on Climate Change) to participate in the IPCC Workshop on the Use of Scenarios in AR6 and Subsequent Assessments which took place at the UNESCAP Conference Centre in Bangkok, Thailand from 25 April to 27 April 2023.
- (2) IUGG is one of IPCC Observer Organizations. Chair Jianping Li is the IUGG Liaison Officer to IPCC (2023-2027). As an observer, he was invited by IPCC to attend the Sixtieth Session of the IPCC in Istanbul, Türkiye, from 16 to 19 January 2024.

## Keynote Speeches and Invited Talks

- Invited Talk, Jianping Li, Extreme Rainfall in Northern China in September 2021 Tied to Air–sea Multi-factors, Asia Oceania Geosciences Society 20th Annual Meeting, July 30-August 4 2023, Singapore.
- Invited Talk, Jianping Li, Climate Change, Carbon Neutrality and Sustainable Development, Global Ocean Summit 2023, September 25-27 2023, Qingdao, China.
- Keynote Talk, Keith Alverson, Global Environmental Agreements: How They Can Benefit Small Island Developing States, 2023 International Forum on Pacific Island Countries Response to Climate Change (PICC2023), October 21, 2023, Qingdao, China.

## Other activities

Chair Jianping Li was invited to engage in the high-level leaders' dialogues on the Sustainable Development Impact hosted by the World Economic Forum from 18-22 September 2023 in New York.

## FUTURE ACTIVITIES

We plan to organize the following Scientific Meetings:

- Co-organization of “2024 International Forum on Pacific Island Countries Response to Climate Change (PICC2024)” in June 2024 in Qingdao, China.
- Co-organization, EGU 2024 General Assembly session AS1.18 (CL4), Monsoon systems in the past and present and under future climate change, 14–19 April 2024, Vienna, Austria (Convener: Andrew Turner; Co-conveners: Roberta D'Agostino, Kyung-Ja Ha, Jianping Li).

Preparing sessions for Busan IAMAS-IACS-IAPSO Joint Assembly 2025 (BACO25) from July 20 to 25, 2025 in Busan, Republic of Korea.

Jiangping Li, CCEC Chair

# Union Commission on Mathematical Geophysics (CMG)

CMG website: <https://iugg.org/associations-commissions/commissions/cmg/>

## INTRODUCTION

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

In 2023, the Commission has organised a successful Union symposium at the IUGG General Assembly in Berlin on 12 July, and published a monograph describing recent advances in the fields of data assimilation and inverse theory, and their application to the geosciences. Preparations are well under way for the 34<sup>th</sup> IUGG Conference on Mathematical Geophysics (CMG2024), to be held in June 2024 at IIT Bombay, Mumbai, India (<https://www.cmg2024.org>).

## ADMINISTRATION

After the IUGG General Assembly in Berlin, in July 2023, the CMG Executive Committee has been renewed. Its current membership is as follows: Alik Ismail-Zadeh (Chair; Germany), Enamundram Chandrasekhar (Vice-Chair; India), Andrew Valentine (Secretary; UK), Yehuda Ben-Zion (Past Chair; USA), Roberto Carniel (Italy), Fabio Castelli (Italy), William Dewar (USA), Alexander Fournier (France), Shin-Chan Han (Australia), Sang-Mook Lee (Republic of Korea), Elisa Mantelli (Germany), Oleg Melnik (France), Pavel Novák (Czech Republic) and Leslie Smith (USA). The Commission's Advisory Board has been also renewed: Salvatore Grimaldi (Italy), Ute Herzfeld (USA), Dick Peltier (Canada), Annick Pouquet (USA), Daniel Rothman (USA), Malcolm Sambridge (Australia), and Frederik J. Simons (USA). A number of business meetings were held online during the course of 2023, with an in-person meeting of the executive committee, during the IUGG General Assembly.

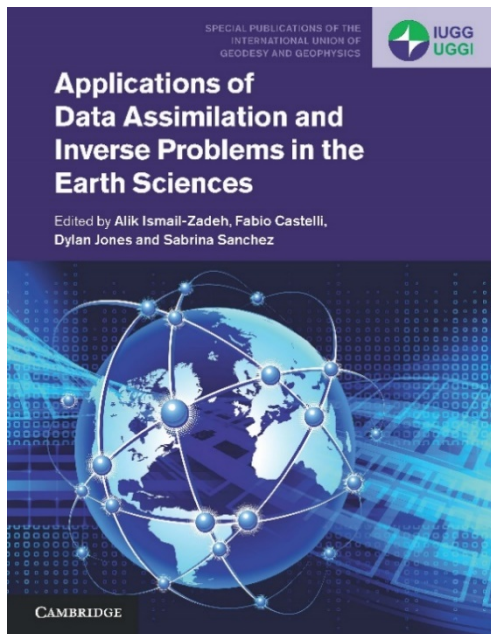
## ACTIVITIES

### Union Symposium at IUGG 2023

The Commission together with the Commission on Climatic and Environmental Change (CCEC) organised a one-day Union symposium "U01: Geoscience and Mathematics for Sustainable Development" as part of the 28<sup>th</sup> IUGG General Assembly held in Berlin in July 2023. This symposium contributed to the U.N. International Year of Basic Science for Sustainable Development (IYBSSD, 2022-23) and the U.N. Decade of Ocean Science for Sustainable Development (2021-30). The United Nations Sustainable Development Goals (SDG) provide a set of quantitative indicators to assess progress in Sustainable Development. The symposium brought together contributions from IUGG disciplines highlighting how fundamental scientific understanding, monitoring and modelling the Earth System contribute to sustainability both globally, in response to planetary pressures, as well as locally, in response to specific localized developmental constraints.

The participants of the symposium were welcomed by the IUGG President Kathy Whaler, Chairman of the Steering Committee of IYBSSD2022 Michel Spiro, Chairman of the Commission Alik Ismail-Zadeh, and CCEC Secretary Keith Alverson. A number of leading experts gave talks highlighting the importance of basic science in contributing to sustainability, and a poster session provided opportunities for intensive discussion. Regina Hock (Norway) discussed world-wide glacier meltdown and its implications for global sea level and stream flow. Valerio Lucarini (UK) showed the importance of mathematics in predicting and fingerprinting the climate. Sang-Mook Lee (Rep. of Korea) gave a talk on rethinking the meaning of our existence and value of knowledge for a sustainable world. Isabelle Ansorge (South Africa) presented a successful ship-based education programme developed in South Africa “Floating University SEAmester”. Jun Xia (China) told about the Developments in water systems science and technology for Clean Water and Sanitation (SDG 6) in large river basins. Roger Pulwarty (USA) highlighted in his talk the importance of early warnings and early action in a changing climate, while Anny Cazenave (France) discussed how space observations assist in studies of global environmental changes. Magdalena Scheck-Wenderoth (Germany) highlighted several contributions of geosciences to sustainable development, and Toshio Koike (Japan) spoke about promoting water cycle consilience. The symposium had posters preview at the last oral session followed by intensive discussions during a poster session.

### Applications of Data Assimilation and Inverse Problems in the Earth Sciences



In July 2023, Cambridge University Press published *Applications of Data Assimilation and Inverse Problems in the Earth Sciences* (<https://doi.org/10.1017/9781009180412>).

This book, organised by the Commission and edited by Alik Ismail-Zadeh, Fabio Castelli, Dylan Jones and Sabrina Sanchez, contains 22 chapters contributed by Commission members and colleagues and is part of the IUGG Special Publications series. This multi-authored book is organised into the three parts. Part I describes the basic knowledge about inverse problems and data assimilation. Part II presents the applications of data assimilation and geophysical inversions to problems related to atmospheric chemistry, cryosphere, hydrology, volcanic cloud propagation, and near-Earth electron radiation. Part III discusses application of data assimilation and inversions to geochronology, lava dynamics, ground shaking due to

earthquakes, seismic tomography, gravity and geodetic inversions, geodynamics, geomagnetism and joint geophysical inversions. This book is believed to inspire more researchers to focus on data assimilation and inverse problems in the Earth sciences and to provide a useful theoretical reference and practical applications of data assimilation and inverse problems.

### Preparing for the 34<sup>th</sup> Conference on Mathematical Geophysics (CMG2024)

The 34<sup>th</sup> Conference on Mathematical Geophysics will be held in Mumbai, India between 2-7 June 2024. The Commission’s Executive Committee has developed a scientific program of the conference (<https://www.cmg2024.org/programme>) and provided further support. The Local Organising Committee is led by Enamundram Chandrasekhar, IIT Bombay, and Vice Chair of the Commission. The theme of the conference is *Mathematical Geophysics for Sustainable Development*, and a wide-ranging scientific programme has been developed. CMG2024 is a contribution to the United Nations General Assembly-proclaimed International Decade of Sciences for Sustainable Development (2024-2033).

To complement the conference, the Commission is also organising a three-day workshop on *Computational Geosciences for Sustainable Development* in IIT Bombay ([https://www.cmg2024.org/pre\\_conference\\_workshop](https://www.cmg2024.org/pre_conference_workshop)). This will provide the attendees with training on cutting-edge mathematical and computational techniques, free of charge thanks to generous support from the IUGG and IIT Bombay.

## FUTURE ACTIVITIES

The Commission's main focus for the coming months is the 34<sup>th</sup> Conference on Mathematical Geophysics, and associated workshop, as described above.

The next face-to-face business meeting is planned to be held during the CMG2024.

The commission also looks forward to announcing the second winner of the Vladimir Keilis-Borok Medal, and the winner's lecture at the Conference. The Medal recognizes middle career scientists, who made important contributions to the field of mathematical geophysics.

Alik Ismail-Zadeh (CMG Chair) and Andrew Valentine (CMG Secretary)

# Union Commission on Geophysical Risk and Sustainability (GRC)



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

## 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 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 decision making by emergency managers, policy-makers, scientists and the general public via initiatives, meetings, workshops, and publications.

## ADMINISTRATION

### Executive Committee:

**Chair:** John LaBrecque (IAG, USA)

**Vice-Chair:** Vyacheslav Gusiakov (IAPSO, RUSSIA)

**Vice-Chair:** Chun-Chieh Wu (IAMAS, CHINA: ACADEMY OF SCIENCES IN TAIPEI)

**Secretary/ Treasurer:** Yekaterina Kontar (IACS, IAHS, USA)

**Past Chair:** Joan Marti (IAVCEI, Spain)

- Mohsen Ghafory-Ashtiany (IASPEI, IRAN)
- Michael Krautblatter (IACS, GERMANY)
- Christa von Hillebrandt-Andrade (IAPSO, PUERTO RICO)
- George Balasis (IAGA, GREECE)
- Roberto Sulpizio (IAVCEI, ITALY)
- Kosuke Heki (IAG, JAPAN)

### Members in Active Advisory Capacity:

- Tom Beer (IAMAS, AUSTRALIA)
- Harsh Gupta (IASPEI, INDIA)
- Alik Ismail-Zadeh (CMG, GERMANY)
- Vladimir Kossobokov (IASPEI, RUSSIA)
- Gordon McBean (IAMAS, CANADA)
- Ramesh P. Singh (IASPEI, USA)
- Stephen McNutt (IASPEI, USA)
- Ester Sztein (USA)



## ACTIVITIES

**The GRC serves as the IUGG liaison the ICL.** In 2023 we provided an endorsement for the ICL submission of a proposal to the IUGG grants program. A grant of \$10,000 was awarded the ICL in May, 2024.

**The GRC in May 2024 received its second \$10,000 grant in support of the GeTEWS Oceania Initiative.** The full \$20,000 will be used in support to the GeTEWS Oceania 2024 Joint Workshop scheduled for November 4-7, 2024 in Suva, Fiji.

**The GRC conducted its annual membership meeting during the 2023 IUGG General Assembly in Berlin.** The meeting addressed the role of Commissions versus Associations within the Union Structure. President Chris Rizos presented ongoing discussions within the governing council. President Rizos also viewed the current work program of the GRC as appropriate and productive. Stephen McNutt spoke based upon his expiring membership on the IUGG Board. Stephen recommended strengthened interaction with other groups within the IUGG who are also pursuing tsunami related goals. John LaBrecque spoke of his views on these issues and the goals of the GeTEWS Oceania Initiative. John LaBrecque also expressed support for the presentations of Chris Rizos and Steven McNutt. He also related that similar recommendations came from the review by the IUGG Board the previous day. This section of our report will include a proposal to be presented and discussed amongst the GRC membership in response to the views of the IUGG governing council presented by Chris Rizos and Stephen McNutt. Click [here](#) to access a recording of the annual GRC meeting.

**GeTEWS Oceania Initiative:** The GRC worked during the past eight years in 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 contributed with close collaboration on project the IAG [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 (APEC), and NASA. and the IUGG Commission on Geophysical Risk and Sustainability (GRC) to conduct the GeTEWS 2017 workshop to explore the feasibility and utility of GeTEWS. The following describes some of these activities.

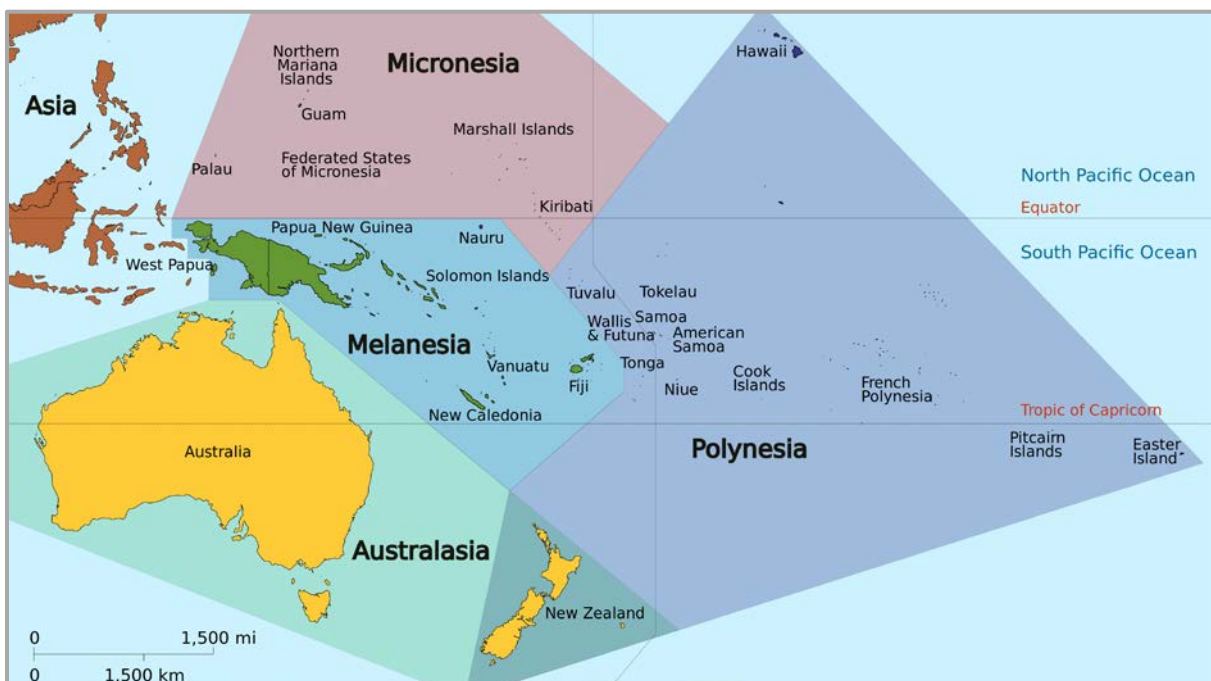
- [GeTEWS Demonstrated Capability during Tohoku Oki](#)
- [GeTEWS 2017 workshop- UNDRR GAR-19 Contributing Paper](#)

During 2023 the GRC hosted monthly GeTEWS\_Oceania Working Group with the purpose of invoking the Resolution #4, 2015 to encourage discussion amongst the nations and territories of Oceania concerning GeTEWS. There were ten working group meetings throughout 2023. Meeting #5 was held in conjunction with the annual meeting of the GRC at the 2023 General Assembly in Berlin. The Meeting #5 was well attended by a broad swath of the international community in support of a GNSS real time network for the Oceania Region in support of Tsunami Early Warning. The Joint Tsunami Commission representatives the meeting included Diana Greenslade, Vasily Titov and Tony Song. Recordings of the GeTEWS Working Group meetings can be accessed [here](#).

Achievements of the GeTEWS Initiative of the GRC:

- The GRC is an active member of the GeTEWS Oceania working group;
- Concept of a regional GeTEWS was presented to the 12th UNGGIM-AP Plenary with a resolution supporting resolution for regional GeTEWS networks.;
- Installation of multiple GeTEWS stations on the Fiji Islands to strengthen programs by Australia, NZ and Fiji was initiated by Tim Melbourne of CWU;

- Presentation to the Pacific Geospatial and Surveying Council (PGSC) Plenary in Sydney on GeTEWS Oceania Initiative with an invitation to the PGSC to host the GeTEWS Oceania 2024 joint workshop.
- The workshop is a collaboration between the PSGC, GRC, and the Joint Tsunami Commission (all represented on the working group. GeTEWS\_Oceania workshop, in Suva, Fiji during November 4 to 7, 2024.
- [The agreement between the PGSC and the GeTEWS Working Group](#) to support the GeTEWS Oceania 2024 workshop. signed by Vaipo Mataora, Chair PGSC and Timothy Melbourne chair of the GeTEWS Oceania working group and endorsed by the IUGG (IAG/GGOS, JTC, and GRC).
- The workshop will focus upon the deliberation upon the recommendations of the GeTEWS Oceania working group’s proposal to the Pacific Community that includes
  - The establishment of the Oceania Geospatial Network to consist of multi-GNSS receivers and analysis
  - A draft charter for management of the Oceania Geospatial Network



GeTEWS\_Oceania: The Region

## FUTURE ACTIVITIES

***The chair proposes a discussion within the GRC membership on the goals and structure of the GRC.*** As discussed above, President Chris Rizos and Stephen McNutt summarized discussions within the IUGG Board concerning the role of the Commissions vis a vis the Associations with the IUGG. There is a clear request by the IUGG that the GRC seek to better define itself and improve its interaction with the Union. There is concern that Union Commissions such as the GRC need to define their activities and goals to be differentiated from that of the Union Associations while still maintaining a strong bond to the recommendations and concerns of the Associations. The chair supports these observations and recommendations. The chair proposes *the GeoRisk Commission become an organization for the implementation Disaster Risk Reduction strategies within the IUGG.*

The GRC activities will be overseen by the Executive Committee comprised of representatives of the IUGG Associations and Commissions. The GRC should undertake initiatives that are designed to inform society of the importance and advantages of resolutions related to Disaster Risk Reduction supported by of the IUGG General Assemblies that are resolved and approved by Associations. The GRC will identify one for more resolutions as initiatives for significant support by the GRC during any current

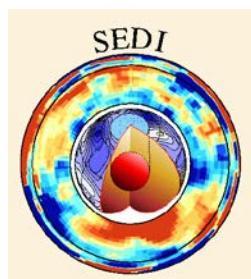
year. To the best of its ability, the GRC would provide development focus and fund raising to the implementation of the selected initiatives. This effort will add strength and recognition to IUGG resolutions.

The GeoRisk Commission has been very active in the development of its GeTEWS Oceania Initiative which is the promotion of Resolution #4 of the 2025 General Assembly. The Chair believes that GeTEWS Oceania Initiative should serve as a model for future GRC Initiatives. These activities be beneficial to the health of the IUGG.

It does not appear that the proposals require a revision of the GRC charter but the structure of the Executive Committee may require revision.

John LaBrecque, GRC Chair

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



SEDI website: [www.sedigroup.org](http://www.sedigroup.org)

## INTRODUCTION

SEDI is an international scientific organization dedicated to the Study of the Earth's Deep Interior. The scope of SEDI includes the core and lower mantle, but interest may extend to the surface. 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](http://www.iugg.org)). As such, it cuts across the traditional discipline-oriented bounds of the Associations of the IUGG [such as the International Association of Geodesy ([IAG](http://www.iag.org)), the International Association of Geomagnetism and Aeronomy ([IAGA](http://www.iaga.org)), the International Association of Seismology and Physics of the Earth's Interior ([IASPEI](http://www.iaspei.org)), and the International Association of Volcanology and Chemistry of the Earth's Interior ([IAVCEI](http://www.iavcei.org))], which normally study the Earth from a particular point of view. The intent of SEDI is to amalgamate all sources of data and all points of view to generate the most coherent and consistent picture of the workings of the Earth's deep interior.

## ADMINISTRATION

SEDI is currently chaired by Mathieu Dumberry (University of Alberta, Edmonton, Canada), who took over from Christine Thomas (WWU Münster, Germany) at the 2023 IUGG meeting in Berlin. The vice-chair is now Lauren Waszek (James Cook University, Townsville, Australia), with Michael Bergman (Simon's Rock College, Great Barrington, USA) acting as Secretary- General. SEDI has a membership of about 600, as recorded on the email list used to broadcast information related to SEDI activities, upcoming meetings, funding opportunities, and academic openings.

## ACTIVITIES

The main activity of SEDI is to organize a meeting every second summer. The previous meeting took place in July of 2022. This 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 (which had

been scheduled to be in Taipei). The local organizing committee included Frederic Deschamps and Ban-Yuan Kuo (co-leads) along with Wen-Che Yu, Wen-Pin Hsieh and Kenny Vilella and 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 ETH. The scientific program of the meeting is available at the web site <https://sedi2022.earth.sinica.edu.tw/>

During the past year, our efforts were focused on the preparations for the SEDI meeting that will take place this coming summer. Two SEDI members offered to organize the meeting: Peter Driscoll in Washington DC and Mike Bergman in Simon's Rock College, Great Barrington, MA. We conducted an online vote with the SEDI membership, and the winning bid was Great Barrington. The meeting will take place from June 23-28. The list of speakers and session leaders is finalized, and the scientific program (and other meeting details) can be viewed at: <https://sedi-conference-2024-2675c.ingress-baronn.ewp.live/>

In addition to the preparation for this upcoming meeting, the SEDI officers also organized and convened a Union session at the 2023 IUGG in Berlin (U03: New discoveries in Deep Interior of Earth and Planets) with 8 invited talks covering topics related to SEDI activities

## FUTURE ACTIVITIES

The next big event on the SEDI calendar is the 2024 SEDI meeting which will be held in Great Barrington, Massachusetts, USA June 23-28. The head of the Local Organizing Committee is Michael Bergman. There are several key activities that require our attention in the next few months, including attributing travel grants to early career investigators and finalizing the program for the poster sessions. Prior to the meeting, the SEDI officers will ensure that bids for the 2026 meeting will be presented at this summer's meeting, with plan to conduct an online vote either in the fall of 2024 or winter of 2025. One last task, that will take place at the 2024 meeting, is to award prizes (Doornbos medal) to early career investigators.

The joint IASPEI-IAGA meeting will be held in Lisbon, Portugal in 2025. SEDI typically sponsors one session at each IAGA and IASPEI meetings. Initial planning for these will take place this summer.

Mathieu Dumberry, Chair, SEDI  
Lauren Waszek, Vice-Chair SEDI  
Michael Bergman, Secretary-General, SEDI I

# Union Commission on Planetary Sciences (UCPS)



UCPS website: <http://202.127.29.4/geodesy/ucps>

## 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.

## ADMINISTRATION

### 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

- 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)

- 10-20 July 2023, Shuanggen Jin attended International Union on Geodesy and Geophysics (IUGG) Executive Committee Meeting and IUGG Union Commission on Planetary Sciences (UCPS) Business Meeting, Berlin, Germany.



- 28-30 July 2023, IUGG Union Commission on Planetary Sciences (UCPS) co-organized the Second Industry-University-Research Conference on Spatial Information, Jiaozuo, China.



- 6-7 July 2023, Shuanggen Jin attended Expedition Ceremony and Applications Meeting of HNLG-1 Satellite as PI, Shanghai Institute of Aerospace Systems Engineering, Shanghai, China.



- 5-6 September 2023, IUGG Union Commission on Planetary Sciences (UCPS) organized Workshop on exploration of habitable environments and biosignatures on Mars, Shanghai, China.



- 20-22 November 2023, IUGG Union Commission on Planetary Sciences (UCPS) co-organized 1st International Symposium on Satellite Navigation (ISSN2023) - Advances, Opportunities and Challenges, Jiaozuo, China.



## FUTURE ACTIVITIES

- 2nd IUGG Symposium on Planetary Science (IUGG-PS 2025): New Observations and Advances in Solar System, 2025.

Shuanggen Jin, UCPS Chair



# THE INTER-ASSOCIATION WORKING GROUP: Electro-magnetic Studies of Earthquakes and Volcanoes (EMSEV)



EMSEV website: [www.emsev-iugg.org/emsev](http://www.emsev-iugg.org/emsev)

## INTRODUCTION

EMSEV ('Electromagnetic Studies of Earthquakes and Volcanoes') is an Inter-Association Working Group of the [IUGG](#). [IAGA](#), [IASPEI](#), and [IAVCEI](#) powerfully support EMSEV and promote its activities.

EMSEV has continuously investigated earthquakes and active volcanoes and has worked to better understand the physical and dynamic processes. Based on the expertise of a worldwide community of more than 350 researchers and students, EMSEV sustains innovative research and findings mainly on electromagnetism (EM), integrating with other geophysical data to describe, monitor, analyse, and model fault systems and volcanoes.

EMSEV objectives are (1) evaluation and endorsement of advanced studies in the electromagnetic field through international cooperation, conferences, and workshops, (2) integration of electromagnetic methods together with other geophysical techniques to identify physical processes on all scales before, during, and after earthquakes and volcanic eruptions, (3) organization and management of international and regional workshops, and (4) participation in educational and field programs relating to observed results and the reduction of the earthquake and volcanic hazards.

## ADMINISTRATION

In 2018, the structure of the EMSEV changed significantly. The current EMSEV structure is now as follows: 1) Bureau, 2) Country Liaison Members, 3) EMSEV members, and 4) EMSEV Collaborators.

**EMSEV bureau.** Since March 2019, Toshiyasu Nagao (Japan) assumes the EMSEV Chair, Valerio Tramutoli (Italy) was elected as Vice-Chairperson, and Jann-Yeng Liu (Taiwan) was selected as Secretary.

EMSEV bureau gathers the following association liaison members:

- IAVCEI: Takeshi Hashimoto from Hokkaido University (Japan),
- IASPEI: Qinghua Huang from Beijing University (China),
- IAGA: Jann-Yeng Liu from the National Central University (Taiwan),

At this moment, EMSEV bureau contains 15 members from 10 countries. Detailed member list is presented on <https://www.emsev-iugg.org/emsev/profile.html>. You can find Country liaison members and EMSEV Members, and EMSEV Collaborators at <https://www.emsev-iugg.org/emsev/>.

## ACTIVITIES

In 2023, the IUGG general meeting was organized in Berlin, and sessions related to EMSEV were also organized at IAVCEI, EGU, JpGU, IWEF7, AOGS, and AGU meetings.

### IUGG General Assembly (11-20 July 2023, Berlin, Germany)

Since the 2019 general assembly in Montreal, many international conferences have been held remotely due to the spread of COVID-19. The IUGG Berlin General Assembly was organized as an on-site meeting. At the Berlin Meeting, EMSEV organized two sessions.

JA07 Interdisciplinary Observations of Pre-Earthquake Processes. The Concept of Lithosphere-Atmosphere-Ionosphere Coupling (IAGA, IASPEI (EMSEV)), Convener(s): M. Bagiya (India, IAGA), D. Ouzounov (USA, IASPEI/EMSEV), S. Pulnits (Russia, IASPEI/EMSEV), K. Hattori (Japan, IASPEI/EMSEV), P. Taylor (USA, IASPEI/EMSEV).

JA08 Ground and Satellite Electromagnetic Observations Related to Earthquakes, Tsunami's and Volcanic Activity (IAGA, IASPEI (EMSEV), IAVCEI), Convener(s): Ramesh Singh (India/USA, EMSEV), K. Yamazaki (Japan, IAGA), Q. Huang (China, IASPEI/EMSEV), T. Hashimoto (Japan, IAVCEI/EMSEV).

*Some convenors and contributors of JA07 and JA08*

During IUGG in Berlin, EMSEV held a business meeting to discuss future bureau membership rejuvenation, additions, etc.

### OTHER MEETINGS

IAVCEI Jan 29-Feb3, 2023, Rotorua, New Zealand, Monitoring and exploration of hydrothermal systems aiming at forecasting "wet" eruptions by electromagnetics and non-conventional techniques, Convener(s): T. Hashimoto, W. Kanda, M. Uyeshima, H. Ichihara, C. Miller, W. Heise.

EMSEV supported registration fee of Dr. P. K. Alanis (PHIVOLCS). Dr. Alanis presented "Electromagnetic studies at Taal Volcano before and after the 2020 eruption". This talk was the culminating report of the Taal Volcano Project, Philippines, which has been conducted over many years by EMSEV.

EGU 23-28 April-2023, Wien, NH4.1 Short-term Earthquakes Forecast (StEF) and multi-parametric time-Dependent Assessment of Seismic Hazard (t-DASH), Co-organized by EMRP1/G16/SM3, co-sponsored by JpGU and EMSEV, Convener(s): V. Tramutoli, P. F. Biagi, C. Filizzola, N. Genzano, I. A. Moldovan.

JpGU May 21-26, 2024, Chiba, Japan, M-IS04 Interdisciplinary studies on pre-earthquake processes, Convener(s): K. Hattori, J. Y. Liu, D. Ouzounov, Q. Huang.

IWEP7 7th International Workshop on Earthquake Preparation Process, ~Observation, Validation, Modeling, 24-25 May, 2023, Chiba, Japan, Organizing Committee Chair: K. Hattori, Secretary: R. Song, P. Han; Program Committee: J. Y. Liu, D. Ouzounov, Q. Huang X. Shen, T. Nagao.

AOGS 30 Jul to 04 Aug 2023 Singapore, Session: Ionospheric Weather Induced by Solar and Terrestrial Activities, Convener(s): J. Y. Liu, K. Hattori, D. Ouzounov, X. Shen, V. Tramutoli.

AGU 11-15 Dec 2023, San Francisco, CA., NH33E - Integrated Studies of Geospheres Interaction Associated with Pre-earthquake Processes, Geohazards, and Space Weather, Revealed with Ground and Spaceborne Multi-instrument Observations. Convener(s): D. Ouzounov, J. Y. Liu, L. Conti.

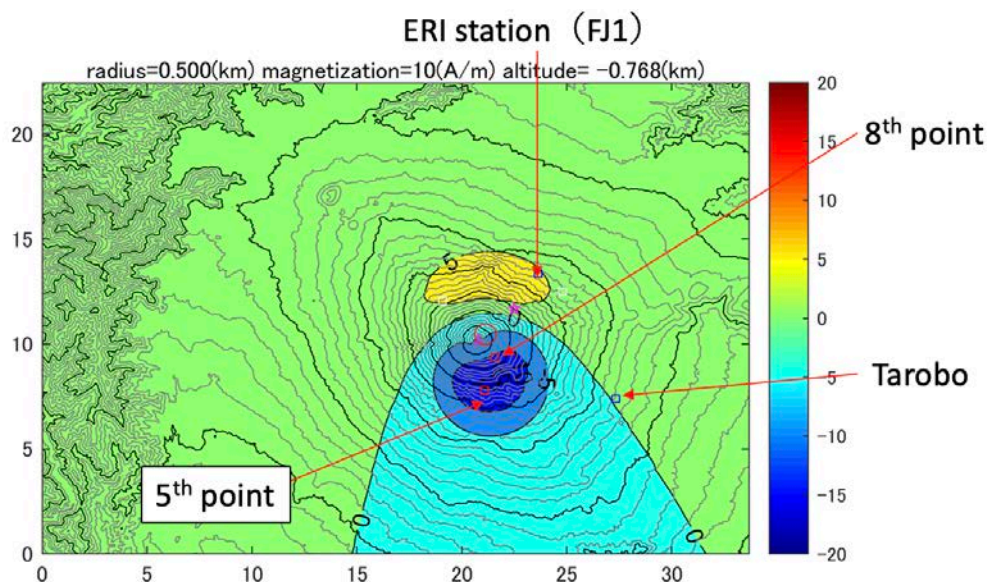
## JOINT INTERNATIONAL ACTIVITIES

### Activity on volcanoes (Taal, Philippines)

In 2020, the Taal volcano in the Philippines had a catastrophic eruption. At this moment, researchers can enter the volcanic island carefully. PHIVOLCS has decided to rebuild the electromagnetic observation stations by their budget, and EMSEV is also advising it.

### Activity on volcanoes (Mt. Fuji, Japan)

In FY2023, model calculations were intensively conducted. As a result, we concluded that it would be more effective to install a total magnetic observation point near the fifth station on the mountainside rather than near the summit. Another advantage is the easiness of maintenance. We can access the summit area only two months per year. In contrast, the fifth point can be accessed at least 8 months per year.



Model calculations revealed that the area near the fifth station is suitable for capturing the total magnetic field change due to magma rise. The model assumes a spherical hot region (magma pool) with a radius of 500 m rising toward the summit. The figure above shows the geomagnetic variation when the center of the sphere reaches -0.768 km above sea level. Geomagnetic stations are in operation at FJ1 and Tarobo.

### Continuation of Atmospheric field measurement in Kakioka, Japan

For nearly 100 years, Kakioka Geomagnetic Observatory, JMA has conducted atmospheric electric field observations with the classical water-drop type instrument by Lord Kelvin, which ended in February 2021. EMSEV conducted parallel observations with two different instruments to ensure the continuity

of observations, and both showed good agreement. We published the results in 2023; Kamogawa et al., Continued atmospheric electric field measurements following cessation of the long-term water dropper potential equalizer at Kakioka, Japan. *Geoscience Data Journal*, 00, 1-9. <https://doi.org/10.1002/gdj3.224>, 2023.

### **IAVCEI eVolcano project**

As for IAVCEI's eVolcano project, improvements were made to the PowerPoint presentation materials, etc., as was the case last year. We are currently waiting for instructions from IAVCEI.

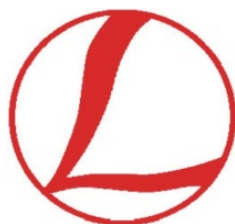
## **FUTURE ACTIVITIES**

In 2024, the most important biennial EMSEV General Assembly for EMSEV will be held in October in Crete, Greece. The 2024 budget which will be provided by IUGG will be used primarily for this EMSEV2024. During EMSEV 2024, a session will be held in honor of Seiya Uyeda, the first EMSEV chairperson who passed away in January 2023.

EMSEV plans to deeply work in two directions. The first one is to continue strong participation in international meetings such as not only IUGG meetings but also EMIW2024, EGU, AOGS, JpGU, CSES, and AGU. The second direction is to strengthen EMSEV activities through international cooperation. For instance, close cooperation with the Chinese satellite mission (CSES mission), and so on.

Toshiyasu Nagao, EMSEV Chair  
Valerio Tramutoli, EMSEV Vice-Chair  
Jann-Yeng Liu, EMSEV Secretary

# THE INTER-UNIONS COMMISSION: International Lithosphere Programme (ILP)



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

## INTRODUCTION

The International Lithosphere Program (ILP) is a joint project of IUGG and IUGS and receives additional funding from member countries. 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 and the Executive Secretary. ILP is supported by a science advisory board and its honorary members. The ILP Secretariat is complementarily located at Nanjing University, China. The 2023 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 IUGG	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  
Honorary President  
ILP Fellow

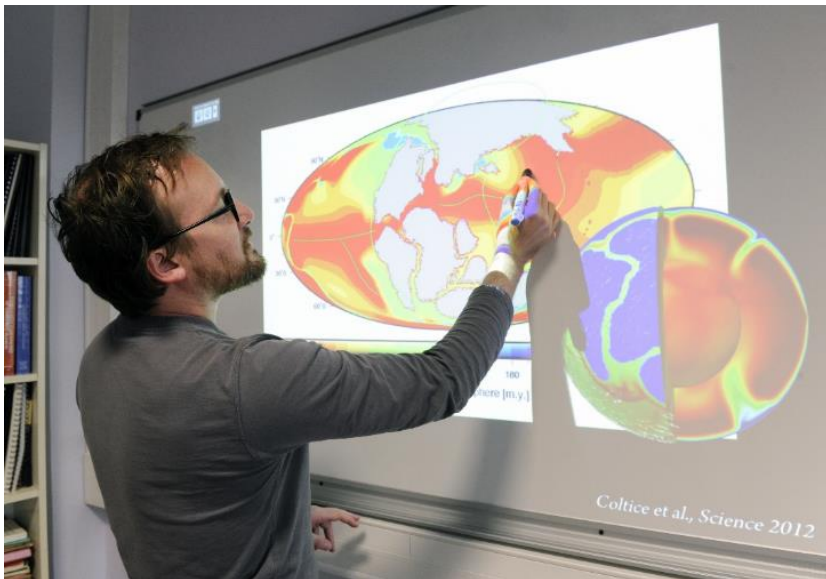
S. Cloetingh  
A. Green  
J.F.W. Nègendank

Netherlands  
Switzerland  
Germany

## ACTIVITIES

ILP had a strong representation at the IUGG, EGU and AGU meetings, where several symposia were co-sponsored by ILP or convened by members of the Task Forces and Coordinating Committees.

The Evgueni Burov Medal for 2023 was awarded to Prof. Nicolas Coltice, Ecole Normale Supérieure, Paris for “his outstanding contributions to the studies of geodynamics, his significant scientific leadership, and unselfish service”.



*The Evgueni Burov Medal for 2021 was awarded to Professor Nicolas Coltice for “his outstanding contributions to the studies of geodynamics, his significant scientific leadership, and unselfish service”.*

An online meeting was held on 23. February 2023 to discuss the strategy of ILP with participants from the bureau, advisory board and task force/coordinating committee leaders. The discussions included topics such as initiation of a society relevant programme with IUGG and IUGS as participants, initiation of projects on exoplanets and on links between lithosphere and biological evolution; broadening of the participation in ILP, increase of the number of member countries, and increase of the visibility and also funding to ILP.

A bureau meeting was held on 25 April 2023. The president reported on the activities during the past year. The TFs and CCs are now really gaining momentum after the COVID-19 years. China has increased its membership fee. A proposal for a new Task Force “2023-TF1: Formation, character, history, and behavior of Earth's oldest lithospheres, T. Kusky (China), T.M. Harrison (USA)” was evaluated and accepted by the bureau. The ILP involvement in DDE (Deep/Time Digital Earth) was discussed and supported. To strengthen the relation to its mother-organisations, ILP will initiate a new large-scale programme together with IUGS and IUGG; the initiative may build on the ongoing task force on Global Geoscience Transects.

The business meeting was held on 25 April 2023 with partial hybrid participation. The Evgueni Burov medal was presented, and the medallist, Prof. Nicola Coltice, gave a scientific presentation focused on his own scientific achievements. The meeting included short presentations of the new TFs/CCs, and discussion of ILP’s strategic plan.

### ***Highlights from 2023 for the current Task Forces and Coordinating Committees projects***

TF1 on the lithosphere and mineral resources has focus on geodynamics, geological evolution and geophysical modelling of major Palaeozoic orogenic belts worldwide, including the Eastern Tethys Belt, the Central Asia Orogenic Belt, the Central Tethys Belt, and the Western Tethys Belt. TF1 had a session at EGU GA23 together with ILP CC4 and also at AOGS 2023. Highlights of the TF were presented in invited lectures at EGU23 and AOGS23 as well at International Archaean Symposium in Perth, July 2023.



*Participants in the 2022-CC1 Topo-Europe workshop in Sopron, Hungary*

TF2 develops studies at several volcanic areas in different continents, and merges field geological, geomorphological, and geophysical data with analogue and numerical modelling, resulting in 82 peer reviewed papers.

TF3 on the world Stress map has the objectives of extending the WSM database with a quality ranked compilation of stress magnitude data and to enlarge the database with data from deeper than 40 km to represent the sub-crustal lithospheric stress. TF has also begun to work on mine-scale stress. Convened an EGU symposium and gave several invited talks at international meetings.

TF4 on Continental Lithosphere interprets the structure and evolution of the lithosphere in the Alpine area and compares to other orogens based on newly acquired large geophysical datasets. Has collected new gravity data. TF is part of the IUGG supported project on "Improving earthquake preparedness through geoscience education in the Himalaya", participated in the DIVE DT-1A deep drilling in Italy. An open gravity-modelling contest is planned for 2024. Symposia were organised at EGU23 and IUGG23 and several presentations were given at various meetings.

TF5 on Relationships between Lithospheric Processes and Seafloor Topography has acquired new data from the oceans to e.g. analyse how volcanism has developed in conjunction with tectonic structures. S symposia at EGU23 and the INQUA conference in July 23 in Rome.

TF6 on sedimentary Basins held a large international meeting with excursions in Abu Dhabi and has published a special issue as well as held several symposia.

TF7 was building, stimulating, and coordinating the international multi-disciplinary bio-geodynamical research community related to Bio-Geodynamics of the Lithosphere, and took part in the founding of two excellence centres on planetary habitability, one funded by the COST programme.

TF8 on Global assessment of heat Flow Data has developed quality criteria for the database during a series of monthly virtual workshops; they have held several online workshops and defined new standards for heat-flow assessment, held the second annual 24 hours online video meeting session and held an international symposium.

TF9 (new) has the objective of collecting and assessing quantitative data on the first two-billion years of well-preserved geological records from cratons to place quantitative constraints on the timing and mechanism of the initiation of plate tectonics.

CC1 (TopoEurope) stands for the geoscience of coupled deep Earth and surface processes, taking Europe and its continental margins as a natural laboratory. CC has published a special issue and submitted two proposal to the COST programme.

CC2 on seismicity in the Himalaya has expanded its network in the region and set up an IUGG sponsored teaching programme in Bhutan, Nepal and India together with TF4.

CC3 on Anatolian Tectonics tests geodynamic processes and their evolution at all scales to provide insight on the interaction between crust and mantle dynamics, controlling tectonic evolution of orogenic systems.

CC4 on Global Geoscience Transects has substantially expanded its global network and made progress with the planning of its first major transect across Eurasia, in particular with new contacts in Mongolia. Organised several symposia at international meetings.

CC5 on Eastern Antarctica has made progress in integrated interpretation of the region. CC organised symposia at IUGG23, EGU and INSTANT 2023.

## **FUTURE ACTIVITIES**

- Provide support to the Task Forces/Coordinating Committees.
- Presence at the IGC in Busan 2024.
- Several sessions with TF and CC contributions at EGU24 in Vienna and at AGU 2024.
- Several workshops of individual task forces are planned.
- ILP Business meeting and meeting of the bureau during EGU annual meeting in Vienna, April 2024.
- Rotate members of the Advisory Board
- Meeting between the ILP officers and the new advisory Board.
- An ILP townhouse meeting and a dedicated ILP session at AGU 2024.
- Award the E. Burov medal and Flinn-Hart award with lectures at EGU 2024.
- 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.

### **Budget Request for 2024**

To assure continuity and enable us to support the selected Task Forces and Coordinating Committees, we request an IUGG subvention of 15,000.00 USD as in previous years.

Hans Thybo, ILP President



# IUGG FINANCIAL REPORT 2023

## INTRODUCTION

This report describes the status of the IUGG finances for the year 2023, the last year of the IUGG quadrennium 2020-2023. The report will be presented at the next Bureau meeting. The [budget](#) for 2020-2023 was approved at IUGG2019 in Montreal.

As of 1 January 2024, IUGG has 74 members, of which 59 are paying members representing 278 units. On 1 January 2023, Latvia changed from associate member status to cat. 1 paying member status. Otherwise, the membership situation has not changed; for details, see section *Membership information and statistics as of 1 January 2024* below. Paraguay joined IUGG in 2023 in A category.

The paying members pay membership dues according to their category. Each category is assigned a certain number of units. The price of 1 unit in a given year is calculated using the September value of the U.S. inflator index for the previous year. The September 2022 index was up 8.2 % compared to its value one year earlier. Much more than anticipated in the budget. Consequently, in 2023 the price was USD 2,375/unit as compared to USD 2,180 in the budget.

The COVID-19 pandemic has affected the finances of IUGG considerably due to less travel and in person meeting activities. However, in 2023 the activities of international scientific cooperation, including those of IUGG, are now close to the level we saw before the pandemic. In the 2024-2027 quadrennium full recovery is expected, in fact a small overspending is allowed to bring the 2027 balance back to approximately one year's turnover.

The accounting method is a cash flow system, with the money kept in three bank accounts. Therefore, the 4-year accounting for the whole budget period is more representative for the financial status of the union than the individual accountings year by year. The 2023 accounting is especially affected by the cash flow issue because due to a very long delay it was not possible to settle the IUGG involvement in the finances of IUGG2023 in Berlin: the grant scheme for IUGG2023 and the head tax put on all participants. And this also postponed the 2023 allocations to the associations to 2024.

The IUGG accounts are audited by a chartered auditor. Starting in 2024 a new book keeping and accounting method will be introduced.

The IUGG webmaster is based in Potsdam, Germany. IUGG has signed a contract with Nord Space to do the book-keeping as part of a new financial administrative strategy. Former IUGG Treasurer, Dr. Aksel Walløe Hansen, is hired as a special consultant for the period 2024-2027.

### Overview of the report:

- Summary of the IUGG accounts for 2023, in USD
- General comments and notes
- Overview of IUGG grants and allocations in 2023
- Membership information and statistics

# SUMMARY OF THE IUGG ACCOUNTS FOR 2023, IN USD



## SUMMARY OF IUGG ACCOUNTS 2023

US dollars	Accounts	Budget
<b>RECEIPTS</b>		
1. Membership Subscription	573 486,27	566 800,00
2. Assembly Surcharge	0,00	20 000,00
3. Royalties	127,34	200,00
4. Miscellaneous		
a. Interest	23 266,21	100,00
b. Gain on exchange	0,00	
c. Other	42 169,21	
d. Associations, 2023 surcharge	0,00	
5. Total Receipts	639 049,03	587 100,00
6. Cash in hand	700,00	0,00
7. Bank balance on 1/1 2023	1 082 101,58	642 800,00
<b>Check Sum</b>	<b>1 721 850,61</b>	<b>1 229 900,00</b>
<b>EXPENDITURES</b>		
11. Administration		
11.1 Personnel	12 878,96	15 000,00
11.2 Equipment	1 436,82	1 000,00
11.3 Supplies	25,38	4 000,00
11.4 Communications	255,49	5 000,00
11.5 Travelling	80 839,12	90 000,00
11.6 Miscellaneous	18 956,14	10 000,00
11.7 special	36 548,26	0,00
12. New initiatives		
12.1 Education and outreach	40 128,93	30 000,00
12.2 Science	36 480,11	40 000,00
13. General Assemblies		
13.1 Organizational expenses	27 157,92	10 000,00
13.2 Travel grants	130 899,35	100 000,00
14. Symposia	3 000,00	0,00
15. Annual allocations		
15.1 Annual allocations	485 223,00	278 200,00
16. Dues and Grants		
16.1 ISC	27 116,80	32 000,00
17. Union activities		
17.1 GRC, SEDI, CMG, UCDI, UCPS, CCEC	5 367,14	24 000,00
17.2 Inter-Union Science (ILP)	15 000,00	15 000,00
18. Fees		
18.1 Professional services	50 026,61	5 000,00
18.2 Bank fees	1 629,86	3 000,00
19. Contingencies	0,00	2 500,00
20. Loss on exchange	227,33	
21. Total Expenditures	973 197,22	664 700,00
22. Balance on 31/12 2023	1 034 381,39	565 200,00
23. line 15.1, paid in 2024	-285 728,00	
<b>Check sum</b>	<b>1 721 850,61</b>	<b>1 229 900,00</b>

### USD/DKK

	Exchange rates Line 8	6,987 =DEC 31, 2022
December 31, 2023	Line 24	6,801 =DEC 31, 2023
Niels Andersen/Aksel Walløe Hansen	Other	6,889 average

### USD/EUR

	Line 8	0,939 =DEC 31, 2022
	Line 24	0,912 =DEC 31, 2023
	Other	0,925 average

**Note 1** IUGG offered LOC, IUGG2023, a guarantee of up to \$300K  
The final accounting of IUGG2023 showed no deficit  
The guarantee is therefore now cancelled

**Note 2** IUUG has promised former IUGG web master, Dmitry Krupski, a payment of USD 3,6K when it is possible again to transfer money to Russia

## GENERAL REMARKS AND NOTES

### General Remarks

The financial status of IUGG in 2023 is still affected by the COVID-19 pandemic. This is reflected in the bottom line of the summary of IUGG accounts with total assets of more than \$1M. The 2023 balance is of the same size of two years' normal turnover. Double the normal.

The budget adopted at IUGG2023 is designed to lower the balance by the end in 2027, by allowing a higher expenditure than income for the whole period, resulting in a deficit of almost USD 300K for the whole period 2024-2027.

The currency of IUGG is USD. Therefore, the summary of the IUGG accounts is shown in USD. It is the sum of three different accounts at Danske Bank in USD, EUR, and DKK, respectively. In addition, IUGG has a Mastercard account, which is mainly used in connection with travel.

In 2022, financial transactions between Denmark and Russia were stopped in late winter time due to the international sanctions imposed on Russia. This situation was unchanged in 2023.

Currently, IUGG also hosts the funds of the IUGG/IUGS inter-union activity "International Lithosphere Program" (ILP), and the IUGG Union Commission on Climatic and Environmental Change (CCEC). The corresponding accounts are not included in this report.

As part of a new financial strategy, more funds are expected to be hosted by IUGG. Already in 2023 one association, IAG, moved its funds to Copenhagen. Three commissions, SEDI-IHFC-ESC, opened new accounts with Danske Bank. The new administrative strategy is taking the finances of IUGG into a more professional era.

### Notes

#### Income

##### Line 1, Membership Subscription

The amounts given in the summary are a mixture of late payments for previous years and regular payments for 2023 plus early payments for 2024.

Several members postponed their 2023 payments of dues to 2024. On 1 May 2024, the total payment received for 2023 for the year 2023 represents the equivalent of 245 units corresponding to 42 paid up members.

##### Line 3, Royalties

The IUGG publishing contract with Cambridge University Press resulted in a small royalty fee in 2023.

##### Line 4.a, Interest

In 2023, Danske Bank again paid interest on the USD account, of the order 2% on an annual basis.

#### **Line 4.b, Gain on exchange**

This line, together with the corresponding line 20 (loss on exchange), is used to balance the combined accounts (USD, EUR, DKK) for a particular year. In reality the loss/gain is not realized in the given year. Due to fluctuations in currencies, gains/losses will change from year to year. In the long run, the gains/losses tend to cancel each other. It should also be noted that an averaged exchange rate is used for all account movements within the year.

#### **Line 4.c, Other**

This line was introduced in 2020 to handle the payments of various contributions to ILP. Line 4.c should be compared to line 11.7 representing the transfer of all received ILP funds to the special ILP account, see below. The line is also used for other purposes.

#### **Line 4.d, associations 2023 surcharge**

This line becomes only active after a general assembly and is used to record the surcharge from the general assembly, which is usually paid to the union instead of going directly to the associations. In 2023 the surcharge was calculated as 6% of the total registration fee paid to the organizers of IUGG2023.

### **Expenditures**

As explained above, because of the cash flow principle used, the accounting for 2023 is strongly affected by the delay of the final accounting of IUGG2023.

#### **Line 11.1, Personnel**

In contrast to the previous years, this line does not show the 2023 payment of the new IUGG web master, now located in Potsdam, Germany. During 2023, Aksel Walløe Hansen, IUGG treasurer 1999-2019, has assisted as a special consultant.

#### **Line 11.5, travel expenses**

The major part of the expenditure under this line is the expenses in connection with the Bureau members traveling to IUGG2023 in Berlin.

#### **Line 11.6, miscellaneous**

The payment of the web master is debited under this line. The line also includes the special insurance against attacks by hackers. The line also covers expenses in connection with promotion activities.

#### **Line 11.7, special**

This line will cover transfers of money paid into the IUGG accounts on behalf of ILP, which corresponds to line 4.c.

#### **Line 12, New Initiatives**

The line represents IUGG support for two types of initiatives: Co-funding IUGG-related activities of the International Centre for Theoretical Physics (ICTP) and a grant programme to support smaller scientific projects, in 2023 the IUGG grant programme was directed towards the IYBSSD programme.

#### **Line 13, General Assemblies**

Line 13.1 covers expenses on site in Berlin, for instance the IUGG Dinner and catering. Line 13.2 is IUGG money allocated to travel grants. Transferred to be handled by the organizers.

#### Line 14, Symposia

Except for a special contribution to the German Geophysical Society celebrating its 100 yr anniversary, there are no grants offered in a General Assembly year.

#### Line 15.1, Annual allocations to Associations

The annual IUGG allocation to the associations (50% of the dues paid the year before) is determined after receipt of the financial reports for the previous year. The distribution percentages for the period 2020-2023 and the allocations in 2023 are shown in the following table:

	%	2023 amounts in USD
IACS	10.50	30,001
IAG	12.56	35,888
IAGA	15.10	43,145
IAHS	12.55	35,859
IAMAS	15.06	43,031
IAPSO	10.79	30,830
IASPEI	12.94	36,973
IAVCEI	10.50	<u>30,001</u>
		<b>285,728</b>

As seen in the summary, the allocations were actually not paid out due to the delay in the settlement of the IUGG2023 finances. The amount is debited line 15.1, but line 23 shows that the money was paid in 2024, together with the grant scheme and the head tax.

By definition, IACS will get the same contribution as that of IAVCEI. After 2023, IACS will no longer be coupled to IAVCEI. The allocations to IACS will then follow the normal procedure laid out in the IUGG Guidelines.

#### Line 17, Union activities

CCEC was the only commission that received the annual support in 2023.

#### Line 18.1, Professional fees

Beginning in 2023, IUGG has signed a contract with a bookkeeping company NORD SPACE to do the book-keeping and run the new administrative financial system. The service charge includes the cost of the annual audit.

IUGG paid a special audit of IASPEI's accounts, the cost will be reimbursed in 2024.

#### Line 20, loss on exchange

For details, see the explanatory text for line 4.b.

#### Line 23, association allocations

This line is inserted to balance the 2023 accounting, the 2023 allocation is actually paid in 2024.

## OVERVIEW OF IUGG GRANTS AND ALLOCATIONS IN 2023

IUGG is supporting science in different ways:

- i) Annual allocation to Associations, line 15
- ii) New initiatives, line 12
- iii) Smaller scientific meetings/workshops, line 14
- iv) Union activities, line 17
- v) Travel grants in connection with General Assemblies, line 13.2

Below, find the main figures for the amounts allocated for the year 2023, in USD:

<b>i) Line 15.1 (Associations)</b>		
8 Associations (paid in 2024)		<u>285,728</u>
Line 15.1 in the summary also includes IUGG's payment of 199,495 as travel grants to IUGG2023 on behalf of the Associations		
<b>ii) Line 12 (New initiatives)</b>		
Various grants, including IYBSSD and ICTP		76,609
<b>iii) Line 14 (Symposia grants)</b>		
special grant to German Geophysical Society, 100 yr		3,000
<b>iv) Line 17 (Union activities)</b>		
17.1, SEDI, CCEC, CMG	5,367	
17.2, ILP	15,000	
Total		20,367
<b>v) Line 13</b>		
13.2 Travel grants, IUGG		<u>130,899</u>
<b>Grand total</b>		<u>516,603</u>

## MEMBERSHIP INFORMATION AND STATISTICS

On 1 January 2024, IUGG has 74 members, 59 paying members and 15 associate members. In 2023 Paraguay became a member in cat A.

The 59 paying members represent 278 units. On 1 May 2024, 17 paying members representing 33 units are in observer status.

### In category 1, 10 members, 10 units

Iran (13. year as observer) special situation  
 Azerbaijan (9. year as observer)  
 Vietnam (8. year as observer)  
 Jordan (7. year as observer)  
 Mozambique (5. year as observer)  
 Bulgaria (3. year as observer)  
 Algeria (2. year as observer)  
 Colombia (1. year as observer)  
 Costa Rica (1. year as observer)  
 Romania (1. year as observer)

### In category 2, 5 members, 10 units

Nigeria (10. year as observer)  
 Saudi Arabia (8. year as observer)  
 Pakistan (5. year as observer)  
 Egypt (5. year as observer)  
 Ireland (1. year as observer)

### In category 3, 1 member, 3 units

Brazil (1. year as observer)

### In category 6, 1 member, 10 units

Russia (2. year as observer) special situation

In summary, the membership overview is

Category	No. of members	No. of units/ member	Total units
11	1	35	35
8	3	20	60
7	1	15	15
6	5	10	50
5	3	7	21
4	6	5	30
3	5	3	15
2	17	2	34
1	18	1	18
A	15	0	0
In total	74		278

# ADDITIONAL UNION MATTERS

## Awards and Honors

### ***International Union of Geodesy and Geophysics (IUGG)***

The IUGG, at its 2023 General Assembly, awarded the following scientists:

**Valerie Masson-Delmotte** (France) was awarded the IUGG Gold Medal for ‘her leading role in deep ice core climate-record projects, unravelling isotope deposition on polar snow, and for her outstanding contributions to increasing society’s awareness of climate change’.

**Antonio J. Busalacchi** (USA) was elected IUGG Fellow for ‘seminal contributions to tropical oceanography and climate dynamics/prediction research and impactful leadership in national and international Earth and space sciences programs’.

**Toshiyuki Hibiya** (Japan) was elected IUGG Fellow for ‘being a global leader in the production of ocean turbulence by the internal tide and the parameterization of mixing in ocean and climate models’.

**Paolo Papale** (Italy) was elected IUGG Fellow for ‘ground-breaking and highly considered research in geochemical modelling, volcanology and volcanic risk assessment, with significant societal impact’.

**Makoto Taniguchi** (Japan) was elected IUGG Fellow for ‘outstanding international contributions to environmental geosciences, especially groundwater hydrology, strongly linking with global climate and environmental changes’.

**Peter Teunissen** (Netherlands) was elected IUGG Fellow for ‘exceptional contributions and international leadership in the Geodetic Sciences, Satellite Positioning, and Navigation’.

Steve Ackerman (USA), Patrick Allard (France), Zuheir Altamimi (France), Günter Blöschl (Austria), Christophe Cudennec (France), Aksel W. Hansen (Denmark), Regine Hock (Norway), Trevor McDougall (Australia), Joyce Penner (USA), Markku Poutanen (Finland), Harald Schuh (Germany), Michael G. Sideris (Canada), Stefania Sparnocchia (Italy), and Robert Sulpizio (Italy), were conferred IUGG Fellows.

Mohd Farooq Azam (India), Jana H. Börner (Germany), Jayashree Bulusu (India), Johan Gaume (Switzerland), Jose Társilo Girona Hernandez (USA), Natalya Gomez (Canada), Patrick Hupe (Germany), Christina Karamperidou (USA), Xingxing Li (China), and Norimitsu Nakata (USA), were awarded the IUGG Early Career Scientist Awards.

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

**Laura Dietrich** (Norway) and **Erik Loebel** (Germany) were awarded the 2023 Graham Cogley Award.

**Veronica Tollenaar** (Belgium) and **Yixi Zheng** (UK) were awarded the 2023 IACS Early Career Scientist Awards.

### ***International Association of Geodesy (IAG)***

**Georges Balmino** (France), IUGG Secretary General (1991-1999), and **Hermann Drewes** (Germany), IAG Secretary General (2007-2019), were awarded the two 2023 IAG Levallois Medals.

**Jan Martin Brockmann** (Germany) was awarded the IAG Best Reviewer Award.



**Amir Khodabandeh** (Australia) was awarded the 2023 Guy Bomford Prize.

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

**Miroslav Hanzelka** (Czech Republic) and **Bram Vaes** (Netherlands) were awarded the 2023 IAGA Early Career Scientist Awards.

**Nils Olsen** (Denmark) was awarded the 2023 Shen Kuo Medal.

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

**Aldo Fiori** (Italy) and **Efi Foufoula-Georgiou** (Greece/USA) (Dooge medal), and **Junguo Liu** (China) (Volker medal) were awarded the 2023 IAHS-UNESCO-WMO International Hydrology Prize.

**Gunther Liebhard** (Austria) was awarded the 2023 Tison Award.

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

Cheng Sun (China) was awarded the 2023 IAMAS Early Career Medal.

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

**John A. Church** (Australia) was awarded the Prince Albert I Medal 2023.

**Malte F. Stuecker** (USA) was awarded the 2023 IAPSO Early Career Scientist medal in Physical Oceanography.

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

**Harsh K. Gupta** (India), IUGG President (2011-2015), was awarded the 2023 IASPEI Medal.

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

**Kathy Cashman** (USA, UK) was awarded the 2023 Thorarinsson Medal.

**Karen Fontijn** (Belgium) was awarded the 2023 Fisher Medal.

**Michael Heap** (France) was awarded the 2023 Wager Medal.

**Suzanna Jenkins** (Singapore) and **Yves Moussallam** (USA) were awarded the 2023 IAVCEI Wager Medal.

**Thomas Jones** (UK) was awarded the 2023 Walker Award.

**Emma Liu-Christopher** (UK) and **Andrea Belvilacqua** (Italy) were awarded the 2023 IAVCEI George Walker Award.

**John Pallister** (USA) was awarded the 2023 Krafft Medal.

#### **American Geophysical Union (AGU)**

The AGU, at its 2023 Fall Meeting, awarded the following scientists who have been active in IUGG:

**Natalya Gomez** (Canada), Vice-Chair of the IACS-IAG Joint Commission on Cryospheric Deformation (since 2021) was awarded the James B. Macelwane Medal.

**J John Taber** (USA), Co-Chair of the IASPEI Commission on Education & Outreach (2004-2017) was awarded the Excellence in Earth and Space Science Education Award.

**Nick van de Giesen** (Netherlands), Secretary of the IAHS International Commission on Water Resources Systems (ICWRS, 2008-2015) and IAHS National Correspondent (2018-2022) was awarded the Ambassador Award.

### **European Geosciences Union (EGU)**

The EGU, at its 2023 General Assembly, awarded the following scientists who have been active in IUGG:

**Étienne Berthier** (France), IACS National Correspondent since 2014, was awarded the Julia and Johannes Weertman Medal.

**Marc F.P. Bierkens** (Netherlands), Vice-President of the IAHS International Commission on Groundwater (ICGW, 2002-2003), was awarded the Henry Darcy Medal.

**Athena Coustenis** (France), IAMAS President (2011-2015), was awarded the Jean Dominique Cassini Medal.

**Jürgen Müller** (Germany), President of the German National Committee since 2011, was awarded the Vening Meinesz Medal.

**Taikan Oki** (Japan), Chair of the IAHS Working Group Hydrology 2020 (2004-2007), was awarded the John Dalton Medal.

**Lisa Tauxe** (USA), IAGA National Correspondent since 2017, was awarded the Petrus Peregrinus Medal.

**Alberto Viglione** (Italy), Secretary of the IAHS International Commission on Water Resource Systems (ICWRS) since 2016, was awarded the Plinius Medal.

### **International Science Council (ISC)**

The following scientists who have been active in IUGG, were awarded Fellows of the ISC:

**John A. Church** (Australia), IAPSO Prince Albert I Medalist 2023.

**Corina Rizzo** (Argentina), Chair of the IUGG Finance Committee (2019-2023).

**Carlos A. Vargas Jiménez** (Colombia), IASPEI National Correspondent (2005-2023).

**Jun Xia** (China), IUGG Bureau Member (2019-2023).

### **Others**

**Mioara Manda** (France), IAGA President (2019-2023) was promoted to the rank of 'Officier dans l'Ordre National du Mérite'.

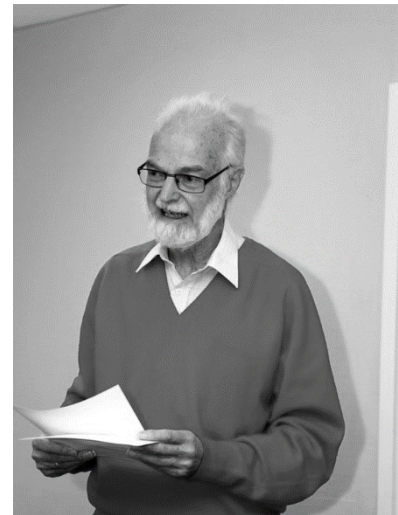
**Kathy Whaler** (UK), IUGG President (2019-2023), was awarded the Geological Society's highest award, the Wollaston Medal.

The IUGG funded movie 'Earth-human connections' (by **Katia Pinheiro**) won the Audience Award of the Braga Science Film Fest 2023 for Best Short Film, in a field of 29 other competitors.

## Søren Gregersen (1942-2023)

On 28 September 2023, Søren Gregersen Dr. Scient., State Seismologist and former IUGG Treasurer from 1987 to 1999, passed away in Hørsholm, Denmark, at the age of 81.

Søren Gregersen was born on 27 April 1942 and from a young age had a strong interest in science. At that time growing up in Denmark, science was dominated by Niels Bohr, and major advances in physics were being made. In October 1960, at the age of 18, Søren was selected along with an American scout, to live for 6 months at the Camp Century base, where drilling into the Greenland ice sheet was underway. During his time at the base, Søren worked with researchers and the US military staff running the base and operating a nuclear reactor for a power supply. In regular letters, Søren's adventures on the Greenland ice sheet were published in Danish newspapers, making him famous throughout Denmark as 'Søren the scout'. At University of Copenhagen, Søren studied geophysics and specialized in seismology, earning the master of science degree in 1968.



*Søren Gregersen*

After completing his degree, Søren was employed as a geodesy assistant at the Danish Geodetic Institute, where the seismic service at that time was hosted and that operated and reported on data from seismographs in Denmark and Greenland since 1927. In 1970 Søren went to the Lamont- Doherty Geological Observatory at Columbia University in New York, USA., where he graduated with a Ph.D. in seismology in 1974. His thesis was on the amplitudes of horizontally refracted Love waves. As a researcher, he returned to the Danish Geodetic Institute and continued his work in seismology focusing on earthquakes in Denmark and Greenland, Lg wave propagation and Lg wave tomography. Søren's studies on Lg waves constituted a major part of his Dr. Scient thesis which he successfully defended at University of Copenhagen on 6 December 1985. Søren presented his research on many journeys around the world and often was provided with gifts for Inge Lehmann, which he presented to her during coffee at her apartment in Copenhagen.

In 1994 the seismic service was transferred to the National Survey and Cadastre where Søren was appointed senior researcher. In 1997, Søren was appointed State Seismologist and headed the section managing the seismic service. In addition, Søren was appointed adjunct professor at University of Copenhagen lecturing in solid earth physics and supervising student projects. As a supervisor Søren Gregersen was always welcoming students to the seismology field.

Many students across Europe benefited from Søren's leadership during the Teleseismic Tomography experiment across the Tornquist Zone, in short the TOR project, one of the first large multi-national deployments of broad band and short period digital mobile seismic stations, in Germany, Denmark and Sweden.

In 2004 the seismic service was transferred to the Geological Survey of Denmark and Greenland, where Søren continued his work as State Seismologist until 15 November 2009, when he retired.

After his retirement Søren enjoyed life with his wife Allis and their grandchildren. Søren also received the Emeritus title at the Geological Survey of Denmark and Greenland, publishing several papers mainly focused on postglacial uplift and earthquakes in Scandinavia.

Over a period of 16 years Søren Gregersen was engaged in the IUGG leadership. He served as Assistant Treasurer 1983-1987 and from 1987-1999 he took on the full responsibilities as Treasurer. This period was a period where major changes were made to the financial/membership structure of the union. Søren Gregersen played an active role in the restructuring that was approved by the Council in 1995 in Boulder. The system is still in function.

Both as an IUGG officer and as a scientist Søren Gregersen was very dedicated to the advancement of the sciences of IUGG. He always stressed IUGG's role as a true global scientific union.

We have met Søren at various times of his life. It goes back to the late 60's where Søren Gregersen was hired as an instructor for the first Solid Earth Physics course at the University of Copenhagen.

Working together with Søren has always been a pleasure. And traveling with Søren was also a great pleasure, especially when Allis joined Søren at the many conferences. Søren had an enormous network in the research community from his engagement at the IUGG, the CTBTO, and many other international collaborations. He was always eager to share his network and to bring people together with a contagious kindness, enthusiasm, and optimism.

Peter Voss, Member of the IUGG National Committee for Denmark  
Aksel W. Hansen, President of the IUGG National Committee for Denmark  
and IUGG Treasurer (1999-2019)

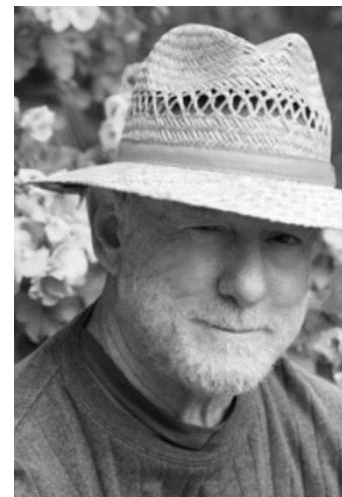
Niels Andersen, IUGG Treasurer and Member of the IUGG National Committee for Denmark

## David D. Jackson (1943-2023)

David D. Jackson, Emeritus Professor at the University of California-Los Angeles (UCLA), passed away on 30 March 2023 in Pacific Palisades, California. Professor Jackson graduated from Caltech in 1965 in Physics, followed by a PhD in Geophysics at MIT in 1969. He joined the faculty at UCLA starting in 1969 and retired as a Distinguished Professor in 2011. He was elected a Fellow of the American Geophysical Union in 1993. He served as Director of the Southern California Earthquake Center 1996-1999.

Prof. Jackson served on the U.S. National Committee for IUGG from 1995 to 2007, as Committee Chair 1999-2003 and Committee Secretary 2003-2007. He served on the IUGG Finance Committee 2003-2007 and the IUGG Bureau 2007-2011. Dr Jackson served as the IASPEI Liaison to the IUGG Georisk Commission 2007-2015.

A [memorial](#) by Paul Davis and Peter Bird contains this summary of Prof. Jackson's contributions:



*David D. Jackson  
(photo provided by Kathy Jackson)*

'In his 54 years since arriving at UCLA in 1969, Professor Jackson rose to a position of national and international distinction that implicitly recognized the need for his careful statistical approach in assessing the likelihood of natural hazards such as earthquakes, as well as his preeminence in this area. His nomination to leadership positions in the foremost world organization in geophysics (IUGG), his contributions to the State of California's earthquake preparedness and insurance issues, to the University in the Geosciences and Environmental Sciences initiatives, and his contributions to the

morale of staff, students and faculty in the Department leave us a legacy of intellectual rigor, dedicated energy, and human warmth which will be a model for the next generation.'

An additional [remembrance](#) has been posted by Dr. Ross Stein of Temblor, Inc., scientist emeritus at the U.S. Geological Survey.

Prof. Jackson is survived by his wife Kathy Jackson and children Kelly and Morgan. The family encourages donations in Dave's memory to the [Hertz Foundation](#).

Pricilla Grew, Member of the IUGG Finance Committee (2019-2023)

## Ilya Zaliapin (1973-2023)

Professor Ilya Zaliapin passed away on 2 May 2023 in Reno, Nevada, at the age of 50. He is survived by his wife Elena and two sons. Professor Zaliapin graduated in Mathematics (Probability and Statistics) at the Lomonosov Moscow State University in 1995, followed by a PhD in Mathematics and Physics at the Russian Academy of Sciences in Moscow in 1999. He spent several years in the University of California at Los Angeles (UCLA), initially as a postdoc (1999-2001) in the group of Professor Vladimir I. Keilis-Borok, and then as Assistant Researcher at the UCLA's Institute of Geophysics and Planetary Physics (2001-2006). Ilya moved to the Department of Mathematics and Statistics, University of Nevada at Reno (UNR) in 2006 as Assistant Professor and was promoted to Associate Professor in 2009 and full Professor in 2016. He held the positions of Vice Chair of the Department and Director of the UNR Graduate Program in Statistics and Data Science between 2015 and 2023.



*Ilya Zaliapin*

The primary research field of Ilya Zaliapin was in statistical seismology, with a focus on preparation processes of large earthquakes, understanding the limits of earthquake predictability, development and assessment of operational earthquake forecast methods, and identification and classification of earthquake clustering, including declustering techniques. His work combined development of novel statistical techniques, analysis of high-quality earthquake catalogs, data from laboratory fracturing experiments, and physical modelling to improve the ability to understand the preparation process of large failure events. His studies also covered the emergence of scaling laws and extreme events in hierarchical geophysical systems, including geomorphologic (river and delta stream networks) and lithospheric systems. Methodologically, his research interests were in applied probability and statistics, with a focus on random self-similar trees and networks, that describe earthquake clusters or river networks, coalescent and branching stochastic processes, random sums of heavy-tailed variables, and multiscale methods of time series analysis. Many of the above results in statistical seismology and river networks are rooted in the theory of random self-similar trees co-developed by Ilya Zaliapin during the past decade. The theory synthesises mathematical rigour and flexibility to explain multiple symmetries and structural constraints discovered in dendritic systems of hydrogeomorphology, seismology, phylogenetics, and neurobiology.

Ilya Zaliapin played notable scientific leadership roles via his various professional services, including the American Geophysical Union (AGU) and IUGG. He was an inaugural Secretary of the AGU Section on Natural Hazards, and helped immensely in establishing this Section in 2009-2012, and since 2016 was an JGR's Associate Editor. Ilya was Secretary of the IUGG Commission on Mathematical Geophysics since 2013 and significantly contributed to organisation and success of four IUGG Conferences on Mathematical Geophysics held in Mexico (2014), France (2016), Russia (2018), and the Republic of Korea (2022). He co-convended international workshops in Italy, Mexico, South Africa, and USA, and

many special sessions and symposia at AGU, IUGG, and other national and international meetings. Professor Zaliapin was a trailblazer in mathematical and statistical geophysics. His research achievements were stunning, and his original works earned him international recognition and stature. When the history of modern mathematical and statistical geophysics comes to be written, Ilya Zaliapin's pivotal work will be praised as a landmark. We lost a bright mathematician and scientist, excellent colleague, good friend, and a very kind person.

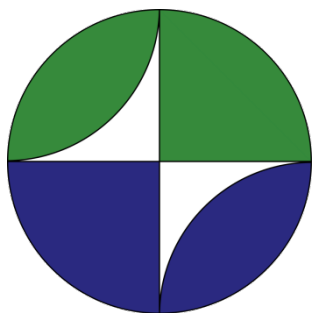
Alik Ismail-Zadeh, Chair of the IUGG Commission on Mathematical Geophysics

# LIST OF ACRONYMS

AAAS	American Association for the Advancement of Science
AGU	American Geophysical Union
AOGS	Asia Oceania Geosciences Society
APECS	Association of Polar Early Career Scientists
CAST	China Association for Science and Technology
CCEC	Commission on Climatic and Environmental Changes
CCTF	Consultative Committee for Time and Frequency
CEA	China Earthquake Administration
CMG	Commission on Mathematical Geophysics
CNC-IUGG	Chinese National Committee for Geodesy and Geophysics
CODATA	Committee on Data for Science and Technology
COSPAR	Committee on Space Research
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DFG	German Research Foundation
EGU	European Geosciences Union
EMSEV	IAGA/IASPEI/IAVCEI Inter-Association Working Group on Electromagnetic Studies of Earthquakes and Volcanoes
GEO	Group on Earth Observation
GGOS	Global Geodetic Observing System
GOOS	Global Ocean Observing System
GRC	Commission on Geophysical Risk and Sustainability
IACS	International Association of Cryospheric Sciences
IAEA	International Atomic Energy Agency
IAG	International Association of Geodesy
IAGA	International Association of Geomagnetism and Aeronomy
IAHS	International Association of Hydrological Sciences
IAMAS	International Association of Meteorology and Atmospheric Sciences
IAPSO	International Association for the Physical Sciences of the Ocean
IASPEI	International Association of Seismology and Physics of the Earth's Interior
IAU	International Astronomical Union
IAVCEI	International Association of Volcanology and Chemistry of the Earth's Interior
ICACGP	International Commission on Atmospheric Chemistry and Global Pollution
ICAE	International Commission on Atmospheric Electricity
ICAO	International Civil Aviation Organization
ICCL	International Commission on Climate
ICCP	International Commission on Clouds and Precipitation
ICDM	International Commission on Dynamical Meteorology
ICMA	International Commission on the Middle Atmosphere
ICPAE	International Commission on Planetary Atmospheres and their Evolution
ICPM	International Commission on Polar Meteorology
ICSU	International Council for Science
ICTP	Abdus Salam International Centre for Theoretical Physics
IGCP	International Geoscience Programme
IGOS-P	Integrated Global Observing Strategy Partnership
IGU	International Geographical Union
IHP	International Hydrological Programme
ILP	International Lithosphere Program
INQUA	International Union for Quaternary Research

INTERMAGNET	International Real-time Magnetic Observatory Network
IOC	UNESCO Intergovernmental Oceanographic Commission
IOC	International Ozone Commission
IRC	International Radiation Commission
IRDR	Integrated Research on Disaster Risk
ISC	International Science Council
ISC	International Seismological Centre
ISPRS	International Society for Photogrammetry and Remote Sensing
ISSC	International Social Sciences Council
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
IUSS	International Union of Soil Sciences
IUTAM	International Union of Theoretical and Applied Mechanics
JBGIS	Joint Board of Geospatial Information Societies
NKGG	German National Committee for Geodesy and Geophysics
OECD	Organisation for Economic Co-operation and Development
ÖNK	Austrian National Committee for IUGG
PAIGH	PanAmerican Institute of Geography and History
PHIVOLCS	The Philippines Institute of Volcanology and Seismology
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Ocean Research
SCOSTEP	Scientific Committee on Solar-Terrestrial Physics
SEDI	Study of the Deep Interior of the Earth
UCDI	Union Commission on Data and Information
UCPS	Union Commission on Planetary Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations International Strategy on Disaster Reduction
UNOOSA	United Nations Office for Outer Space Affairs
UN-SPIDER	United Nations Platform for Space-based Information for Disaster Management and Emergency Response
URSI	International Union of Radio Science
WCRP	World Climate Research Programme
WDS	ISC World Data System
WMO	World Meteorological Organization
WPMG	Western Pacific Geophysics Meeting
WSF	World Science Forum
VAACs	Volcanic Ash Advisory Centers
VASAG	Joint WMO-IUGG Volcanic Ash Scientific Advisory Group





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