

# International Union of Geodesy and Geophysics (IUGG)

## Activities' Report - 2024

Fausto Guzzetti

### 1. Introduction

As an international, non-governmental scientific organisation, the **International Union of Geodesy and Geophysics** (IUGG, <http://www.iugg.org/>) aims at the advancement, promotion, and coordination of research activities relating to the planet Earth, the space surrounding it, and the processes that regulate its changes. Founded in 1919, the IUGG is part of the International Science Council (ISC, <https://council.science/>).

The Union comprises **eight International Associations**, each of which operates in Earth and space-related fields. The **Associations** are:

- The ***International Association of Cryospheric Sciences*** (IACS, <https://cryosphericssciences.org/>);
- The ***International Association of Geodesy*** (IAG, <https://www.iag-aig.org/>);
- The ***International Association of Geomagnetism and Aeronomy*** (IAGA, <https://iaga-aiga.org/>);
- The ***International Association of Hydrological Sciences*** (IAHS, <https://iahs.info/>);
- The ***International Association of Meteorology and Atmospheric Sciences*** (IAMAS, <https://www.iamas.org/>);
- The ***International Association for the Physical Sciences of the Oceans*** (IAPSO, <https://iapso-ocean.org/>);
- The ***International Association of Seismology and Physics of the Earth's Interior*** (IASPEI, <http://iaspei.org/>);
- The ***International Association of Volcanology and Chemistry of the Earth's Interior*** (IAVCEI, <https://www.iavceivolcano.org/>).

### 2. National representatives and National committee 2023 - 2026

By order no. 14 of 14 February 2023, the CNR President has appointed the **national representatives** in the Union and in the eight international Associations for the 4-year period 2023-2026. Later, on 29 February 2024, following the resignation of two national representative, by order no. 36, the President of CNR appointed Giuseppe CONSOLINI as representative to IAGA and Gilberto SACCOROTTI as representative to IAVCEI.

Following the mentioned changes, during 2024 the national representative to the International Union of Geodesy and Geophysics (IUGG) has been Fausto GUZZETTI, the alternate was Claudia PASQUERO, and the national representatives to the eight international Associations are:

- Barbara STENNI, Giovanni MACELLONI substitute, for the *International Association of Cryospheric Sciences* (IACS),
- Mattia CRESPI, Paolo MESSINA substitute, for the *International Association for Geodesy* (IAG),
- Giuseppe CONSOLINI, Luigi VIGLIOTTI substitute, for the *International Association of Geomagnetisms and Aeronomy* (IAGA/IUGG),
- Alberto MONTANARI, Tommaso MORAMARCO substitute, for the *International Association of Hydrogeological Sciences* (IAHS/IUGG),
- Marcello MIGLIETTA, Massimiliano PASQUI substitute, for the *International Association of Meteorological and Atmospheric Sciences* (IAMAS/IUGG),
- Katrin SCHROEDER, Andrea CUCCO substitute, for the *International Association of Physical Sciences of the Ocean* (IAPSO/IUGG),
- Warner MARZOCCHI, Andrea ARGNANI substitute, for the *International Association of Seismology and Physics of Earth's Interior* (IASPEI/IUGG),
- Gilberto SACCOROTTI, Claudia PRINCIPE substitute, for the *International Association of Volcanology and Chemistry of the Earth's Interior* (IAVCEI/IUGG).

By order no. 40 of 3 April 2023, the President of the CNR reconstituted the National committee for the participation of the CNR in the International Union of Geodesy and Geophysics (IUGG) with the tasks of (i) fulfilling the functions of the Italian National committee; and (ii) providing guidelines and proposals for an effective Italian participation in the activities of the IUGG and the necessary support to the CNR on issues concerning international initiatives and activities promoted by the IUGG and the interested international Associations.

In 2024, the President of the National committee has been Fausto GUZZETTI and the Scientific secretary Warner MARZOCCHI.

### **3. Main IUGG activities in 2024 relevant for Italy and for CNR**

During 2024, through its General Secretariat, the Union continued its information and coordination activities with the Associations that comprise it, as well as with other international scientific organisations, particularly with the International Science Council (ISC, <https://council.science/>), of which both the IUGG and the CNR are members. The updating of the Union's website (<https://iugg.org/>) also continued, along with the publication of the monthly electronic newsletters, available at <https://iugg.org/publications/ejournals/>. Cecilia LALLE, from the CNR's International Relations Unit, regularly informed the members of the CNR IUGG National Commission of the publication of the newsletters, providing summaries of the most relevant content.

### **4. Activities as national representative within the Union**

In addition to coordinating the activities of the CNR – IUGG National Commission, the information relating to the annual reports, prepared by the

National Representative for the year 2023 in both Italian and English, was sent to the IUGG Secretariat. The reports are available on the Union's website, together with those from other member countries [<https://iugg.org/members/national-committee-reports/>].

In October 2024, the IUGG Secretariat launched a survey among the participating associations aimed at gathering suggestions and recommendations in view of updating its strategic plan. Following consultation with all the national representatives of the associations affiliated with the IUGG, the National Representative responded to the questions as follows.

**Q1. What should be the IUGG's strategic priorities over the next few years, given the IUGG's mission?**

A1. Foster collaboration across the Earth and Space Sciences to address complex global challenges contributing to the UN SDGs. Inform the public and policy makers about the importance of Earth and space sciences. Promote educational programs. Support next generation of geoscientists. Support early career scientists from developing countries. Improve diversity in the Union's governing bodies.

**Q2. Which existing areas of work should be developed further, and why?**

A2. Non-linear geophysics and systems science approaches. Polar and ocean research to understand their global role and response to climate change. Impact studies, strategies for sustainable resources, environment, public health. Facilitate participation in calls, grants, awards. Improve relations with society and stakeholders, with a focus on adaptation. Educate the public and inform policy makers.

**Q3. Which existing areas of work should be reduced, and why?**

A3 Focus efforts on areas where IUGG has the most expertise and potential for significant contributions. Partner with other organizations in complementary areas. Refocus the mission of existing areas to better address new challenges.

**Q4. In which areas should new initiatives be considered?**

A4. Digital tools for data collection, analysis, sharing, diagnostic, prediction (AI for Geosciences). Foster monitoring and modelling of climate change, for sustainable development and early response. Support One Health. Foster partnerships to address global challenges. Align with UN SDGs. Inform, advise policy makers. Invest in educational resources. Enhance IUGG Awards and Medals programme.

**5. Evaluation of the participation in the Union in terms of benefits and costs of membership**

The Union and its eight International Associations cover research areas of considerable interest to the national academic and scientific community in the broad and diverse field of Earth and Space Sciences. Directly and through its individual Associations, the Union contributes to the international governance of research in the Earth and Space Sciences by promoting inter-Association

commissions and by maintaining relations with other scientific bodies in neighbouring or complementary fields.

In the Associations and in specific interdisciplinary commissions, national representatives have played and will continue to play an important role in promoting Italian research and fostering international cooperation and synergies.

The Union continues to promote young researchers in the Earth and space sciences through support programmes and awards.

The membership fee paid by the CNR to the Union covers participation in the activities of the Union and its eight international Associations, which therefore have no additional membership costs. This is particularly important for the larger and more established Associations, as well as for the younger ones, which need organisational support to grow and establish themselves as reference points in the Italian scientific community.

## **6. Evaluation of Italian participation with proposals to improve interest and participation**

The national academic and scientific community working in the broad field of Earth and space sciences is heavily involved in the activities of the Union and its eight Associations, and is also active in other scientific, technical and research organisations close to the topics covered by the Union and its Associations, in particular - but not exclusively - the European Geosciences Union (EGU) and the American Geophysical Union (AGU).

Greater involvement of the national community in the Union's interdisciplinary commissions is desirable, as is greater proactivity in proposing scientific events and meetings for Union support.

## **7. Summary of the activities of the National committee**

During 2024, the CNR – IUGG Commission met four times, remotely: the first on 5 February, the second on 7 and 12 March, the third on 3 June, and the fourth on 11 September. Minutes were taken for all meetings and are available on the Commission's webpage (<https://www.cnr.it/it/organismo-scientifico-internazionale/31/iugg-international-union-of-geodesy-and-geophysics>).

At the request of the Union's Secretariat, the secretary of the CNR – IUGG Commission submitted updated information concerning the Italian National Committee for inclusion in the 2025 IUGG Yearbook.

A particularly significant event in 2024 was the organisation of the workshop **“Potentially Hazardous Natural Events: Models, Uncertainties, Communication”** (Eventi naturali potenzialmente pericolosi: modelli, incertezze, comunicazione), held in the Marconi Hall at the CNR Headquarters in Rome on 25 and 26 September 2024. The workshop examined how scientific communities working on natural hazards and risks define, estimate, and communicate to decision-makers and the public the uncertainties associated with the hazardousness of various natural events and phenomena. The workshop

featured 16 speakers, who delivered the following contributions, in Italian:

- **A probabilistic view of the world** (Prof. Fernando Sansò)
- **Managing uncertainty in weather forecasting** (Dr. Carlo Cacciamani)
- **Sources of uncertainty in forecasting coastal flood risk and saltwater intrusion** (Dr. Christian Ferrarin)
- **Managing uncertainty in tsunami risk and warning** (Prof. Jacopo Selva)
- **Probabilistic forecasting of rainfall-induced landslides and related uncertainties** (Dr. Alessandro C. Mondini)
- **Uncertainty in hydrometeorological forecasting** (Prof. Marco Borga)
- **The role of uncertainty in assessing volcanic hazard** (Dr. Paolo Papale)
- **Uncertainties in modelling Sun–Earth relationships** (Prof. Francesco Berrilli)
- **Uncertainty in the acquisition of glaciological data and its implications** (Dr. Marta Chiarle)
- **Glaciers, water resources, and “mega droughts”** (Prof. Francesca Pellicciotti)

The workshop, which was attended by one hundred participants including researchers from the CNR and other research institutions, university academics and researchers, research fellows and PhD students, and technical experts from agencies and institutions concerned with the modelling of potentially hazardous natural events, the definition and treatment of uncertainties, and their communication, featured two particularly significant moments of collective discussion, which were an integral and qualifying part of the event.

At the conclusion of the workshop, given its success, a proposal was made to consider organising a follow-up event focused specifically on communication issues. The new workshop is expected to take place in 2025.

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