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INTERNATIONAL UNION OF GEOLOGICAL SCIENCES

2023 REPORT

Fostering a global voice for the geosciences

In association with ISC and UNESCO

120+ Adhering Organizations

50+ Affiliated Organizations

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THE UNION'S AIMS

The International Union of Geological Sciences (IUGS) is a non-political, non-governmental, non-profit organization. Founded in 1961, it is one of the largest member organizations of the International Science Council (ISC) and one of the world's largest scientific organizations. It has a global membership of about a million earth scientists through more than 120 member countries, which are represented through Adhering Organizations - commonly academies, geological surveys, or geological societies. In addition more than 60 international organizations are affiliated with IUGS.

IUGS promotes development of the earth sciences by supporting broad-based scientific activities. It promotes international collaboration in establishing global geostandards. It strengthens public awareness of geology and advances geological education. IUGS organizes international projects and meetings, sponsors symposia and scientific field visits, produces publications, and addresses issues of standardization. Topics range from fundamental earth science research to economic and industrial applications and extend to social, educational, environmental and developmental issues.

WHAT IS IUGS?

OBJECTIVES OF IUGS

IUGS promotes international collaboration and cooperation with the objectives of:

- expanding awareness of the importance of the earth sciences;
- producing authoritative geological standards;
- improving the exchange of and access to geoscience information;
- enhancing geoscience professionalism;
- supporting education in the earth sciences;
- addressing human and societal needs; and
- capacity building.

These objectives are addressed through Committees, Commissions, Task Groups, Initiatives and Joint Programmes undertaken in collaboration with other organizations.

GOVERNING THE UNION

The Council

Meets every four years at the International Geological Congress

Representatives appointed by the Adhering Organizations from the active IUGS member countries/regions

Inactive or non-member countries/regions may send observers (without voting rights) to Council meetings

Executive Committee (2020–2024)

Bureau

Day-to-day decisions and responsibilities

Secretary General



Prof. Dr. Stanley FINNEY

President



Prof. Dr. John LUDDEN CBE

Treasurer



Prof. Dr. Hiroshi KITAZATO

Past President



Prof. Dr. Qiuming CHENG

Vice Presidents



Prof. Dr. Hassina MOURI



Prof. Dr. Daekyo CHEONG

Councilors
(2020–2024)



Prof. Dr. Jennifer MCKINLEY



Dr. Ludwig STROINK

Councilors
(2022–2026)



Prof. Dr. Lola PEREIRA



Dr. Yamirka ROJAS-AGRAMONTE



Prof. Dr. John LUDDEN CBE



PRESIDENT (2020–2024)

2003 was the warmest year on record for our planet. We are constantly reminded of this by extremes in all aspects of weather. At the same time there are significant advances being made in reducing emissions through decarbonisation. These are not fast enough for some, but the geosciences are at the heart of many of the solutions that need to be implemented. Notably in carbon sequestration in reservoirs and in soils and through erosion and weathering. Consideration is being given to geoengineering operations which must of course be driven by best practice.

IUGS does not have the budgets to actively undertake decarbonisation solutions, but it does have the credibility and global impact to inform the discussions. This needs to be accomplished within the framework of the International Science Council and the Geo-Unions of the ISC have started to discuss joint initiatives in their recent meetings. The same goes for discussions between the international Geoscience Unions (AGU, EGU, JGU and national geological societies and surveys).

The challenge is moving from discussion to action. One example of this might be the role that IUGS plays in defining the Anthropocene through its international Commission on Stratigraphy ISC and making people aware of how earth cycles and human induced ones interact.

Our IUGS executive in February 2023 was held in Belfast Northern Ireland and included a visit

to the Giant's Causeway and underlining the importance of geological heritage in educating people and our IUGS 100 world heritage sites will be complemented by a further 100 in 2024 in the IGC meeting in Busan.

With geoscience partners and members of the executive we celebrated year minus one for the 37th International Geological Congress BEXCO to be held in Busan in August 2024. We met as part of the newly created Korean Geosciences Union in the Congress centre that will host the meeting – the planning was advanced with strong local and national political support. Many of the themes will include dealing with the transition in energy, climate and our lifestyles.

Our IUGS outreach activities were further enhanced on social media and notably with our young reporters who have a global reach and have a You-Tube activity.

Data remains key to geosciences and the Deep Digital Earth project was active at the major union meetings and global geosciences activities and notably at the African Geosciences congress in Namibia this autumn.

IUGS created a Commission on Geoethics this year and it has already proved effective on several issues.

The International Geoscience Programme (IGCP) that we fund with UNESCO celebrated 50 years of activities and is in the process of rethinking the model to ensure the programme



evolves with the needs of science and of society.

I thank all members of the committee and groups associated with IUGS for their ongoing activities which are summarised in this 2023 report. I highlight the support of the IUGS secretariat and their presence in numerous geoscience events this year.

I sent virtual messages to many meetings, but I attended the 100th anniversary of German geosciences in a solemn event in the Humboldt

forum. I also presented IUGS to more than a thousand members at the International Landslide Forum. All events focused on the status of geosciences now and how we need to emphasise the need for geology, geophysics and specialist professions as part of the transition to a decarbonised society.

I hope to see you all in Busan in August 2024.

John Ludden
President of IUGS



Prof. Dr. Stanley C. FINNEY



SECRETARY GENERAL (2020-2024)

The year 2023 was one of many activities and achievements in the IUGS and its constituent groups, which included planning for an ever more ambitious 2024. As Secretary General, I was kept busy.

In January, I served on an Ad-hoc Review Committee that evaluated the International Geoscience Program (IGCP), which has been a joint IGS-UNESCO program since its inception 50 years ago. I organized the 78th IUGS Executive Committee Meeting held in Belfast, UK in February and Virtual EC meetings in July and November. In addition, the IUGS Bureau met virtually and carried out business by email throughout the year.

At the invitation of Dr. Enrique Castellanos Abella, the Director of Geology of Cuban, I attended the X Convención de Ciencias del la Tierra, Geociencias 2023, held in Havana, Cuba, 10-14 April. I opened the convention with a plenary lecture titled “The Anthropocene Epoch or the Anthropocene Event?”, and I welcomed by Vicente de la O Levy, the Minister for Mines and Energy of Cuba.

I attended and represented IUGS at STRATI 2023 – the 4th International Congress on Stratigraphy in Lille, France in early July, where I was honored to be awarded the Certificate of Excellence from the International Commission on Stratigraphy “For many decades of outstanding engagement and excellence in support of the discipline of stratigraphy and the global community of stratigraphers”. In late

July I attended the dedication of the Global Stratotype Section and Point (GSSP) for the Campanian Stage (Cretaceous System) held in Gubbio, Italy.

As Secretary General, I edited the 2022 IUGS Annual Report, and I was often in contact with leaders of IUGS Commissions and Task Groups, to learn of their ongoing activities and events, to help resolve matters, to give advice on all IUGS related matters, and to call for annual reports/budget requests, among other tasks. I managed the votes for ratification by the EC of five GSSPs and one GSSA submitted by the Commission on Stratigraphy, and I continued to be highly involved in the recognition of IUGS Geological Heritage Sites by the Commission on Geoheritage with the start of the identification and call for proposals for the Second 100 sites to be announced at the 37th IGC. And I managed the online votes for approval of new science editor of Episodes and provisional approval of affiliated membership for the International Association of Structural Geology and Tectonics and for the Nigerian Mining and Geosciences Society. I made efforts to return several South America countries to active adhering membership.

The Secretary General manages the schedule and agenda for EC meetings, the schedule for the nomination and selection processes for IUGS Awards and Travel Grants, and for the IUGS-IGC Council Meeting and related IUGS activities at the IGC and consults with those developing Expressions of Interest and Bids

for future IGCs. I had much to manage in 2023 during which IGC planning began, and I look forward to a successful 37th IGC, which will highlight the impressive contributions of IUGS. The IUGS Statutes need update and revision. The team of IUGS President John Ludden, IUGS Councilor Ludwig Stroink, and me made significant revisions, which will be presented to the IUGS Executive Committee for approval in early 2024 and to the IUGS-IGC Council for consideration and ratification when it meets at the 37th IGC.

When you read this - the 2023 IUGS Annual Report - the 79th IUGS Executive Meeting will have been held in Nairobi, Kenya. And it will have been followed by a 2-day IUGS Geoscience in Africa Event that is the idea of

the IUGS President and supported by the EC. Accordingly, I initiated and carried out much of the advance planning and preparations in 2023. It included attending the 29th Colloquium of African Geology to identify and recruit participants to the Geoscience in Africa Event.

For all the IUGS business listed above, the IUGS is very well supported by the staff of the IUGS Secretariat. That support allows me to manage much of the workload listed above. The Secretariat support is at the highest professional level. It includes a diversity of tasks. The yearly design and production of the IUGS Annual Report is a good example. To the IUGS Secretariat, I say Thank You.



Photo: IUGS Secretary General Stan Finney with (left to right) Blasa Delgado Diez, General Director Institute of Geology and Paleontology; Laura García Mendez, coordinator of natural science program UNESCO regional office; Anne Lemaistre, Director of UNESCO regional Office for Culture in Latinamerica and Caribbean; S. Finney; Vicente de la O Levy, Minister of Energy and Mines; Enrique Castellanos Abella, Director of Geology of the Ministry of Energy and Mines; Dulce Maria Buergo Rodrigues, director of Cuban National Comision of UNESCO.

**Prof. Dr. Hiroshi
KITAZATO**



**TREASURER
(2020-2024)**

Ms. Yoshiko OKADA



**TREASURER
SECRETARY**

Total Balance of IUGS Account as of December 31, 2023

(compared to 2022)

	Amount (USD)	
	2023	2022
Current Part (Note 1)	1,621,011.99	1,832,882.59
Reserved Part	-	-
Total Balance	1,621,011.99	1,832,882.59

Current Part is Cash and Deposit at Bank. Reserved Part is for the fund that is kept separately from Current Part, such as fund put in financial instruments.

Currently, all the amount of Total Balance (except cash of EUR 3.50) is kept in accounts in USD, EUR and JPY at MUFG Bank, Ltd., Shibuya Meijidori Branch, in Tokyo (as in Note 1 below). Since IUGS has no legal entity registered in Japan, it is not feasible to make contracts to hold financial instruments in Japan.

Note 1: Breakdown of Current Part as of December 31, 2023

		Amount converted in USD (Note 2)	
USD Account	USD	1,141,363.72	1,141,363.72
EUR Account	EUR	345,600.15	381,438.88
JPY Account	JPY	13,831,766	98,205.53
Cash	EUR	3.50	3.86
Total Current Part			1,621,011.99

The following is included in IUGS account. (Note 3)

Provision for Hutchison Award
(Note 4) 30,000.00

Note 2: Exchange rate as of December 31, 2023

1 EUR = 1.1037 USD

1 JPY = 0.0071 USD

Note 3: In Treasurer's Report of 2022, as "Deposit payable", USD 176,993.60 and USD 26,774.60 were listed, of which USD 176,993.60 has been recognized as the income of 2023, as explained in Page 2. For USD 26,774.60, the balance of the fee overpaid in 2011 by Russian member, the Executive Committee meeting held on 15 March 2023 has made the resolution that IUGS has no longer obligation for repayment on this. Since the overpaid fee amount had been already included in the income of 2011, this has no impact on the income of 2023.

Note 4: This is the provision for the expenses related to Hutchison Award on the occasion of IGC (International Geological Congress) in 2024. For the details of the award, please refer to <https://www.iugs.org/awards>.

Income and Expense of 2023 (compared to 2022)

	Amount (USD)	
Income	2023	2022
Membership Fees	318,118.09	369,584.99
For 2021	1,211.86	For 2020 615.48
For 2022	19,084.61	For 2021 45,479.18
For 2023/Onward (Note 5)	297,821.62	For 2022 323,490.33
Contribution from UNESCO to IGCP (Note 6)	205,301.66	162,500.00
Final payment for previous year	41,827.66	50,000.00
1st payment for current year	80,617.00	60,000.00
2nd payment for current year	82,857.00	52,500.00
Other Income (Note 7)	181,743.41	1,531.08
Total Income	705,163.16	533,616.07

Expense (Note 8)	2023	2022
IGCP	266,500.00	256,196.11
Joint Programmes	20,518.50	20,089.05
IUGS Commissions	132,711.10	117,903.13
IUGS Task Groups	20,957.21	-
Initiatives	35,000.00	9,500.00

Affiliated Organizations	35,300.00	28,000.00
Contributions	30,736.94	16,100.96
Committees	7,137.76	-
Episodes	28,000.00	28,000.00
Awards (Argand, Harrison, and YS Prize)	-	6,901.82
Secretariat expense	15,000.00	15,000.00
IUGS African Project	20,000.00	-
IUGS Associated Event	4,368.27	60,247.73
Other Expense (Note 9)	128,840.58	51,848.56
Translated Exchange Gain/Loss (with No Cash-in/out) (Note 10)	5,030.20	-33,226.57
Adjustment on income on 36th IGC (Note 11)	-176,993.60	176,993.60
Net Increase/Decrease in IUGS Account	-211,870.60	67,595.75
Total Expense	745,070.36	609,787.35
Net Income/Loss	-39,907.20	-76,171.28

Note 5: One member institution paid fee for 2024 in advance.

Note 6: UNESCO reimburses the finance to IGCP based on Implementation Partners Agreement upon submission of payment report by IUGS. Receipt of USD 33,026 as the final reimbursement for 2023 is expected in early 2024. USD 3,267.66 returned as unused fund of 2022 of one project is included in "Final payment for previous year".

Note 7: Other income includes USD 176,993.60 that was listed as "Deposit payable" in Treasurer's Report of 2022 on the ground that, at the EC Meeting on 14-17 February, 2023, it was confirmed that it is the revenue of IUGS related to the 36th IGC (International Geological Congress) and, therefore, it has been converted to Income in 2023. This is utilized for the compensation to those who made a loss of the registration fee on cancellation of the IGC, as explained in Note 9 in Page 3. Also it includes royalty (USD4,637.25) and bank interests.

Note 8: The breakdown and detail of Expense is shown in "Breakdown and Detail of Expense compared to Budget in Allocation Table" of Page 4 - 6.
For the details of the projects and activities, please refer to <https://www.iugs.org/>

Note 9: Other expense includes expenses related to EC Meeting, Representative Scientific Meeting, Treasurer's Office Fee, Bank Charges and Expense related to Audit, Donation to UNCHR, Web Maintenance. For the breakdown, please refer to Page 6.
In addition, IUGS compensates those who made a loss of registration fee due to the cancellation of the 36th IGC (International Geological Congress) in 2020 because of Covid-19, subject to the approval by Bureau, as "support for participation in international geological meetings", as long as possible under the foreign exchange control restrictions. The amount paid in 2023 is USD 45,453.28 and IUGS bore the bank charges for these remittances.



Note 10: This translated exchange gain/loss is due to the difference of the balance amount converted to USD between the beginning and the end of the year. For 2023, the gain is due to the appreciation of EUR against USD towards the end of the year. No cash in/out occurred on this.

Exchange rate as of

December 31, 2023	December 31, 2022
1 EUR = 1.1037 USD	= 1.0704 USD
1 JPY = 0.0071 USD	= 0.0076 USD

Note 11: This adjustment is made as USD 176,993.60 entered in "Other Income" was already included in IUGS Account in 2022 as "Deposit Payable".





Mr. MA Yongzheng



PERMANENT SECRETARIAT

The IUGS Secretariat is hosted within the premises of the Chinese Academy of Geological Sciences (CAGS) under the China Geological Survey, the Ministry of Natural Resources of China. Since the relocation of the Secretariat to Beijing in December 2012, the Chinese government has been providing tremendous and stable financial and logistical support for the smooth operation of the Secretariat.

Under the guidance of the IUGS Bureau and Executive Committee, the Secretariat has maintained professional and efficient operation in line with its duties, and played an active role of communication and coordination in the scientific activities and daily administration of IUGS.

In 2023, the Secretariat assisted in the organization of several regular administrative meetings, including the 78th EC Meeting (13-18 February, 2023), 79th EC Meeting and IUGS Geoscience for Africa Event (19-23 February, 2024), EC Progress Meetings (Virtual, respectively on 3 July, 2023 and 29 November, 2023) and Nominating Committee Meetings (Virtual, respectively on 13 January, 2023 and 3 November, 2023).

To promote IUGS scientific activities and achievements, the Secretariat set up IUGS booth at exhibits of several international events, including 2023 annual meeting of EGU on 8-12 April 2023, the 28th General Assembly of the International Union of Geodesy and Geophysics (IUGG) on 12-18 July 2023, the

2023 annual meeting of GSA on 15-20 October 2023, and the AGU Fall Meeting 2023 on 11-15 December 2023. IUGS publications, IGCP projects, IUGS big science program Deep-time Digital Earth, and the latest version of the ICS Chronostratigraphic Chart attracted a number of meeting participants. The 37th International Geological Congress was also promoted at the IUGS booth. The Secretariat also designed a new batch of promotional gifts that are distributed at the exhibits.

As the 37th International Geological Congress (IGC) is approaching, the Secretariat has started the preparation work related to 37th IGC, including reserving a booth space of 72 m² for IUGS, preparing a draft design for the booth, and designing a series of the IUGS promotional gifts for the 37th IGC booth and the fifth Ordinary Session of the IUGS-IGC Council Meeting.

The Secretariat completed the following work related to the outreach and publications: designing and formatting the 2022 IUGS Annual Report; mailing the hardcopies of Episodes to the IUGS Constituent Groups; distributing E-Bulletins monthly to over 14,000 recipients. The Secretariat updated the IUGS Contact Database on a timely basis and assisted the EC in membership maintenance to strengthen links with IUGS bodies.

The Secretariat would like to thank the Executive Committee for guidance and great support to the Secretariat for its smooth



operation during the past year. The Secretariat staff members will continue full devotion to the Secretariat duties with concerted efforts to

actively support the work of the IUGS Bureau and Executive Committee and the broad-ranging scientific activities of IUGS.

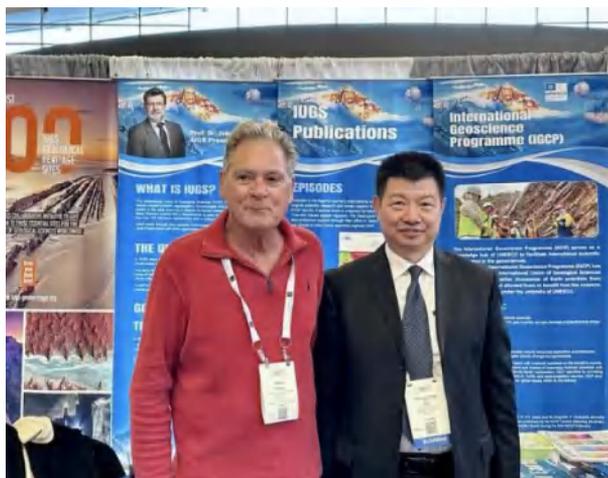


78th IUGS Executive Committee Meeting held in Belfast, Northern Ireland, United Kingdom on 13-18 February, 2023



Draft Design of the IUGS booth at the 37th IGC





IUGS booths at 2023 annual meeting of EGU, the 28th General Assembly of the International Union of Geodesy and Geophysics (IUGG), the 2023 annual meeting of GSA and the AGU Fall Meeting 2023





2023 HIGHLIGHTS

JANUARY 2023

The second meeting of the IUGS Nominating Committee (NC, 2020-2024) was held virtually on 11 January, 2023. During the meeting, the NC members reviewed activities in 2022 and discussed on the draft Nomination Call with definition and references for each IUGS EC position and potential benefits. The NC will make full use of the IUGS website, E-Bulletin and the extensive international networking of IUGS to publicize the call for nominations as widely as possible to attract qualified and capable candidates with geographical distribution and gender balance to take up leading roles of IUGS.

The IUGS Commission on Tectonics and Structural Geology (TecTask) supported a two-day (12-13 January 2023) short course entitled "Microtectonics of fault rocks" in Turin (Italy). The workshop, held by Prof. Renée Heilbronner (Basel University), was mainly addressed to MSc students, PhD students and Early Career Researchers involved in Structural Geology and Tectonics, with the aim of providing them a

general introduction of the study of fault rocks s.l. with the aid of image analysis tools.

FEBRUARY 2023

The IUGS executive committee and IUGS commissions and task forces met in Belfast from the 13-18 February. The meeting was preceded by a visit to the Giant's Causeway by some participants. The IUGS executive discussed budgets requested and made recommendations that will be forwarded soon to chairs of committees and task groups. Of note was the creation of the IUGS Commission on Geoethics. A new task force related to marine risks, especially related to renewable energy infrastructure, was initiated. IUGS EC will continue outreach activities of IUGS in the social media, and we encourage all members to join these activities which in 2022 proved very successful in significantly enhancing IUGS visibility. IUGS EC welcomed two new members (Prof. Lola Pereira and Dr. Yamirka Rojas-Agramonte) to the EC who will serve from 2022 -2026.





Earthquake M 7.8 of Nurdağı, Turkey - Message from the IUGS The International Union of Geological Sciences (IUGS) sends its condolences to the families of the victims of the deadly earthquake that affected Turkey and the north of Syria, as well as other adjacent countries. Once more, nature sends a call on the importance of education on Geological Sciences to know and understand the activity in Earth, helping to prevent and spread awareness on natural hazards. IUGS wishes a full recovery to the injured and the full support to the affected countries.

Dr. Sandra Villacorta was elected as the Chair of the Commission on Geoscience Education (COGE) last year. Under her leadership a new working-strategy plan has been in place and new members have recruited. COGE now has regular and associate members from 22 countries. Recently, in a general assembly, new members were introduced, review of activities of COGE from the past year was held. New goals, vision, and budget for the upcoming year were discussed. New subcommittees for publications and social media were discussed and members are encouraged to get involved in.

On 16 February 2023, the IUGS has officially established the Commission on Geoethics (CG). The proposal for creating the CG was presented at the 78th IUGS Executive Committee (EC) meeting in Belfast (UK) by Silvia Peppoloni (past IUGS Councilor and Secretary General of the International Association for Promoting Geoethics (IAPG). The CG will be the supporting branch of the IAPG to the IUGS and the IUGS body that officially deals with geoethics and social geosciences for the Union.

MARCH 2023

IUGS Executive Member and Treasurer Hiroshi Kitazato (Tokyo University of Marine Science

and Technology) goes where few have gone and sets Guinness world record for reporting the deepest snailfish from the Izu-Ogasawara Trench, Japan. During a two-month expedition carried out on the research vessel DSSV Pressure Drop with the support by Caladan Oceanic and Inkfish, a team of marine biologists from the University of Western Australia (UWA) and the Tokyo University of Marine Science and Technology (TUMSAT) have discovered the snailfish at great depths.

IUGS-IFG was represented at the World Police Summit, Dubai, UAE, 7-9 March 2023, at the Dubai World Trade Centre, hosted by Dubai Police. This includes at least 112 countries, 250 exhibitions, 15,000 visitors, over 100 Chiefs of Police, 6 conferences and 150 conference sessions. The summit provides opportunities to, 'explore the current challenges facing police forces and the latest technological advancements, strategies, and innovations across the law enforcement and security spectrum'.

Forensic Geology and the Geological Society of America: On 19 March 2023, the 2023 Northeastern/Southeastern Geological Society of America meeting held a session on 'Geoscience for National Security and Law Enforcement'. IUGS-IFG was represented, and the session included the goals and methods of forensic soil analysis, environmental DNA in dust and soil, a forensic palynology cautionary tale, standards development, remote sensing (SAR) for detection of illegal dredging, remote sensing for validation of the Kimberly process, and the ongoing activities of IUGS-IFG.

APRIL 2023

IUGS Secretary General Stan Finney attended the X Convención de Ciencias del la Tierra, Geociencias 2023, held in Havana, Cuba, 10-

14 April. He opened the convention with his plenary lecture :The Anthropocene Epoch or the Anthropocene Event?”. He was hosted by Dr. Enrique Castellanos Abella, Director of Geology for Cuba, and was welcomed by the Minister for Mines and Energy of Cuba.

News from the 37th International Geological congress: The first circular of 37th IGC is published online. http://www.igc2024korea.org/2024/down/IGC2024_1st_Circular_Final_03141.pdf
http://www.igc2024korea.org/2024/english/main/index_en.asp

On April 14th to 17th, 2023, a new group of Data-Driven and Earth Science Development (DDES) in affiliation with Geological Society of China, a national member of IUGS, was established and its first National Academic Symposium was successfully held on the Zhuhai Campus of Sun Yat-sen University. The opening

ceremony was chaired by professor Qiuming Cheng, the Past President of IUGS and the inaugural chair of the DDES. Professor John Ludden (IUGS president), Professor Daekyo Cheong (Vice President of IUGS and the Chair of 37th IGC), and Professor David Cohen, President of the Australian Geosciences Council were invited and delivered speeches and presentations virtually at the opening ceremony.

MDPI Forensic Science Journal: Special Issue on Forensic Geology. The MDPI Forensic Science Journal has agreed to produce a 'Special issue on Forensic Geology'.

British Delegation Visits the Clean Gold Program in Brazil: On 17 April 2023, the Clean Gold Program was visited by a British delegation. It included Lord Zac Goldsmith the UK's Minister of Overseas Territories, Commonwealth, Energy, Climate and Environment at the Foreign, Commonwealth & Development Office; and



Photo: IUGS Secretary General Stan Finney giving Plenary Lecture that opened the X Convención de Ciencias de la Tierra, Geociencias 2023, held in Havana, Cuba

Stepahine Al-Qaq UK's Ambassador to Brazil. The delegates were provided with an overview of the Clean Gold Program and examined gold samples recently collected at the Yanomami Indian Territory, in Amazonia, Brazil.

Crime Museum and Forensic Soil Analysis, USA: The Crime Museum, in Washington DC, USA, provides an educational resource on forensic science, crime history and law enforcement, and also contains information on forensic soil analysis to aid criminal investigations.

Not All Gold is Equal: The Clean Gold Program: IUGS-IFG have been supporting and working in collaboration with the Clean Gold Program in Brazil. The Clean Gold Program was launched in 2019 to enable Federal Police create chemical fingerprints of samples, used to as a baseline to cross-reference the provenance of illegal or suspicious gold. This is aimed at the tackling the growing problem of illegal gold trade by criminal gangs and cartels.

IUGS had a booth at the European Geosciences Union General Assembly 2023, which was held in Vienna from the 23rd to the 28th of April 2023. It provided the opportunity to display a hardcopy of the recently published "International Union of Geological Sciences Manual of Standard Methods for Establishing the Global Geochemical Reference Network" (IUGS Manual of Standard Methods).

IUGS Social Media called for Young Geoscience Reporters who can represent the Union in outreach activities. The Task of the reporters are to produce short videos with interesting news about the impact of climate change and natural disasters in their country and/or region and how their country is managing under the stresses of climate change and the energy transition. Videos can also include interviews of relevant authorities and the public on their views of

geoscience and climate change. Short essays are also encouraged.



MAY 2023

After the great success of the The First 100, the Commission on Geoheritage launched the process for selection of the Second 100 IUGS Geological Heritage Sites. Fifteen international organizations and more than 50 countries will participate in this global initiative. ICG is expecting to have around 200 candidates. The Second 100 IUGS Geological Heritage Sites will be announced in 2024 in a special event during the 37th international Geological Congress in Busan, Republic of Korea.

The Governing Board of the IUGS Commission on Geoethics held its first meeting (virtual) on 2 May 2023. The Board decided to create the Task Group on IUGS Ethical Guidelines, which will produce an ethical reference framework for the IUGS and will draft the IUGS codes of conduct for specific issues. The Board also established the Task Group on Diversity, Equity, and Inclusion, which will strive to bring the IUGS constituent groups to a reasonable



balance of their members with regard to gender, geographical provenance, discipline, and career stage and will support IUGS activities within the Standing Committee on Gender Equality in Science.

COGE unveiled a new logo, mission and vision, IUGS-COGE has undergone significant changes based on surveys conducted in early 2023 and presented its fresh COGE logo, along with an inspiring new mission and vision. Progresses can be found at www.iugscoge.org.

IUGS-IFG is represented (Laurance Donnelly, Chair) on the European Union 'Material and digital traceability for the certification of critical raw materials (MaDiTraCe)' project, which develops and combines technical solutions to promote transparent Environment, Social and Governance (ESG) standards for critical raw material (CRM) supply chains. The project will run for three years, until December 2025.

Jiuchen Zhang (INHIGEO member for China) recently won the prestigious Winjin Book Award 2023 from the Chinese National Library in the category of Popular Science for her book *Humanity Earth. The History of Human Understanding of the Earth* was published in 2022 by Peking University Press. The author traces the journey of human understanding of the appearance of the “Pale Blue Dot” by comparison of geoscientific sources from eastern and western civilizations along a timeline encompassing three broad historical periods.

Geoscience in Africa: new survey to assess challenges and foster solutions. The survey is part of the UNESCO International Geoscience Programme (IGCP), entitled *Fostering Researchers in the Geosciences (FoRGe, IGCP project 685c)* under Geology for Sustainable Development project (IGCP 685). FoRGe

aims to build research capacity in developing countries by responding to needs identified by researchers in those countries and by working in collaboration with third-level educational institutions. Researchers based in Africa are invited to participate in this first FoRGe survey, which aims to ensure that programme activities respond to clearly identified needs.

JUNE 2023

Increase of Impact Factor and Cite Score of Episodes: The 2023 Clarivate Analytics Journal Citation Reports® (Journal Impact factor trend 2022) was released on June 29. The 2022 impact factor increased from 2.439 to 3.100, and the percentile rose from Q3 to Q2. The 5-year impact factor also demonstrates a consistent and remarkable increase. It is encouraging that research published in EPISODES is receiving recognition and is being cited.

History of Earth sciences: visual and interdisciplinary approaches amid an environmental crisis Varese (Italy) June 6th 2023: This one-day conference sponsored by INHIGEO, organized by members Maddalena Napolitani (Italy) and Victor Monnin (France), was hosted by the Center for the History of the Mountains, Material Culture and Earth Sciences of the University of Insubria in Varese. Themes pursued two related objectives: (1) considering new interdisciplinary approaches to study the history and the images of Earth sciences and (2) reflecting on the responsibilities that come with studying the history of Earth sciences amid a global, environmental crisis. Eleven speakers representing 8 countries across Europe, Africa and North America took part in this lively and highly interesting forum for young PhD students and early career scholars interested in the history of the geological sciences with talks elaborating on aspects of visual, literary, archival and material sources.



JULY 2023

IUGS EC members held a virtual progress meeting on July 3rd. The EC considered affiliated status of International Association of Structural Geology and Tectonics (IASGT), new adhering members and membership reactivation, candidates of the host of the 38th IGC in 2028, and preparation of the 79th EC meeting in Nairobi, Kenya in February 2024.

STRATI 2023 – the 4th International Congress on Stratigraphy was held July 11-13, in Lille, France. This congress is the scientific forum for the Commission on Stratigraphy. Besides multiple sessions on stratigraphy from the Archean to the Quaternary, excellent plenary lectures, and several field excursions, the congress was the site of business meetings of the ICS and several of its subcommissions. The ICS Digby McLaren Medal was awarded to Isabella Raffi, the ICS Medal to Shuhai Xiao, and a Certificate of Excellence to Stan Finney.

INHIGEO sponsored History of Volcanology session at the 28th International Union of Geodesy and Geophysics (IUGG) General Assembly Berlin, Germany, 17th July 2023. INHIGEO organized a well-attended history of volcanology session at the recent 28th IUGG in Berlin as part of INHIGEO's outreach initiative of cross-disciplinary symposia within scientific congresses

The IUGS Commission on Global Geochemical Baselines (CGGB) participated at the Goldschmidt Conference, held in Lyon (France) 9-14 July 2023. The session entitled “Novel geochemical and mapping methods at global to local scales with applications in environmental sciences, food safety, ecology, archeology and paleontology” was chaired by Anna Ladenberger (1st CoChair of CGGB) together with conveners from Italy, Canada and USA.

The third in the series of ReSToRE Summer Schools will take place from 1 to 5 July 2024 at University College Dublin, Ireland. The meeting was organised by iCrag and IUGS, under the patronage of UNESCO. The theme of the meeting was ‘Transitions; Society, Wind and Water’.

The golden spike ceremony for the Campanian Global boundary Stratotype Section and Point (GSSP) was held on July 26, 2023, in the Bottaccione Gorge (Gola del Bottaccione), Gubbio (Italy). This GSSP defines the base of the Campanian Stage and was ratified by IUGS in October 2022.

AUGUST 2023

The IUGS Secretary General issued a Call for Nominations for the IUGS Awards/Medals: the Emile Argand, the James Harrison, and the Early Career Geoscientist to be presented at the 37th IGC. The Secretary general also issues a call for volunteers to serve on Expert Panels that evaluate nominees for the IUGS (Émile Argand and Early Career Scientist Medals).

Between 28-30 August, IUGS-IFG was represented at ‘Interforensics’ in Brazil, one of the largest forensic events in the world, and the most extensive in Latin America. It was attended by approximately 1000 forensic scientists from multi-disciplinary background including practitioners, researchers and students.

The INHIGEO Early Career Award, for best presentation during the annual symposium by a young scholar under age 35, was presented during the INHIGEO Business Meeting on 4th August 2023 by Martina Kölbl-Ebert (INHIGEO Secretary-Genel) and Ezio Vaccari (INHIGEO President) to Daniele Musumeci (INHIGEO member for Italy) for his presentation Scientific paradigms and complexity in modern and

contemporary volcanology: the contribution of the studies on Mt. Etna and Mt. Vesuvius at the recently held 48th INHIGEO Symposium at the AGH University of Science and Technology in Cracow, (Poland) during July 31st -August 4th 2023.

SEPTEMBER 2023

IUGS President Prof. John Ludden attended the jubilee marking the 175th anniversary of the German Geological Society - Geological Association (DGGV) and 150th anniversary of the founding of the Prussian Geological Survey, whose function is now performed by the Community of State Geological Services. The ceremony was held on Saturday September 2, 2023, at the Humboldt Forum Berlin with 200 guests.



IUGS Secretary General has issued a call for applications for Hutchison Young Scientists Foundation travel awards for young scientists to attend the 37th International Geological Congress in Busan, Korea, 25-31 August 2024.

On Tuesday, 19th September 2023 the dedication ceremony for the base of the Coniacian Stage Stratotype and Section and Point (GSSP) took place in the castle of Salder, Northern Germany. The GSSP defines the boundaries between the Turonian and Coniacian

stages of the Late Cretaceous System and was ratified by IUGS in May 2021.

On September 22-28, the Task Group on Igneous Rocks (TGIR) met in Rome for a workshop. The activities were split in a three-day fieldwork activity and two-day workshop at Sapienza University of Rome.

The IUGS was a major sponsor of the 29th Colloquium of African Geology held in Windhoek, Namibia, 26-29 September 2023. IUGS Secretary General Stan Finney presented the keynote lecture “IUGS and Global Geoscience development: What options for African Geoscientists” and IUGS Vice President Hassina Mouri presented the keynote lecture “Medical Geology: what is it and how it can help to achieve the 2030 UN SDGs goals in Africa?”.

OCTOBER 2023

The 2023 Annual Meeting of Geological Society of America (GSA) was held in Pittsburgh, Pennsylvania, United States on October 15-18, 2023. IUGS Secretariat set up a booth at the exhibition of the Meeting to promote the scientific achievements of IUGS and enhance the international influence of the Union. IUGS publications, including The First 100 IUGS Geological Heritage Sites and Manual of Standard Methods for Establishing the Global Geochemical Reference Network, IGCP projects, IUGS big science program Deep-time Digital Earth, and the latest version of the ICS Chronostratigraphic Chart attracted many meeting participants. The 37th International Geological Congress was also promoted at the booth.

The IUGS Commission on Global Geochemical Baselines co-organised a Joint Annual Meeting together with the Geochemistry Expert Group of EuroGeoSurveys and the Geochemistry Group of ASGMI. A three-day physical meeting (5-7



October 2023) was hosted by the “Dipartimento di Scienze della Terra, dell’Ambiente e delle Risorse” (DiSTAR) at the “Università degli Studi di Napoli Federico II” in Monte Sant Angelo (Naples, Italy). A total of 35 participants from Europe, Chile and Armenia attended in person. INHIGEO member Claudine Cohen (L’École des Hautes Études en Sciences, Paris, France) was the recipient for her contribution to the History of Geology of the 2023 Mary C. Rabbitt History and Philosophy Award of the Geological Society of America, at the annual meeting held in Pittsburgh in October. The Award is presented annually by the Geological Society of America’s History and Philosophy of Geology Division to an individual for exceptional scholarly contributions of fundamental importance to our understanding of the history of the geological sciences and candidates are from a worldwide pool.

NOVEMBER 2023

IUGS EC members held a virtual progress meeting on November 10th. The meeting focused on the ARC review of the UNESCO-IUGS Joint Program-International Geoscience Program (IGCP), updates of the preparation of 37th International Geological Congress (IGC) in Busan, South Korea in August 2024 and 79th EC meeting in Nairobi, Kenya in February 2024 and outreach activities of the Union.

The third meeting of the IUGS Nominating Committee (NC, 2020-2024) was held virtually on November 3rd, 2023. The meeting was organized by the NC Chair Professor Qiuming Cheng with the attendance of 5 NC members from Colombia, Germany, Namibia, Spain, and USA. NC members reviewed the list of nominations received since the first Call for Nominations of the next IUGS EC and NC members (2024-2028) was announced this January with the deadline of October 31st, 2023. To better pursue gender, geographical

and disciplinary balance, NC members agreed to announce the Second Call with an extended deadline of December 31st, 2023. NC members encourage more nominations from Africa and South America and more for female candidates.

DDE-CGI November 2023 in-person meetings on geoscience standards were held in Suzhou, China. Effective communication of information relies heavily on the adoption of global geoscience standards to ensure fairness of data resources. In order to optimize coordination and planning of geoscience standards, to support the success of DDE to enable acceleration of data driven deeptime research and provision of benefits to support geoscience for the society, a workshop on the Geoscience Information Standards for DDE and a forum on Future Geoscience Information Standards co-hosted by Deep-time Digital Earth Secretariat and Commission for the Management and Application of Geoscience Information (CGI) of IUGS were held on 7-8 Nov and 9-10 Nov, respectively, in Suzhou, China and with great success.

Silvia Peppoloni, Chair of the IUGS Commission on Geoethics, delivered the inaugural plenary lecture at the XVI Chilean Geological Congress in Santiago, Chile, on November 26, 2023. This occasion provided a significant platform to discuss geoethics and provoke reflections on the future of geosciences through a geoethical lens, reaching a wide and engaged audience. At the same congress, Silvia Peppoloni and Giuseppe Di Capua were speakers at the workshop titled 'What is Geoethics,' held on November 26, 2023. This workshop was organized by the Geoethics Group/IAPG-Chile of the Chilean Geological Society.

DECEMBER 2023

In 2023, The International Science Council (ISC) appointed over 100 new ISC Fellows, in recognition of outstanding contributions to



promoting science as a global public good. The Fellowship is the highest honour that can be conferred on an individual by the ISC. IUGS President Prof. John Ludden CBE has been appointed as the new ISC Fellow in December 2023. Together with the 123 individuals that were appointed in 2022, the new ISC Fellows will support the Council in its mission at a critical moment for science and sustainability for science as we enter the UN's International Decade of Sciences for Sustainable Development (IDSSD) in 2024.

On 4-5 December 2023, IUGS-IFG and GSL-FGG held a joint event at the headquarters of the Geological Society of London, called, 'New Horizons in Forensic Geoscience: The Bedrock of 23-January 2024 International Security in Minerals, Mining, Metals, Murders and the Missing'. Approximately 70 delegates attended in person, from 14 countries. The principal themes included: search operations; minerals, metals and mining crime; human taphonomy and burials; and forensic geology contributing to the criminal justice system. Keynote presentations were given by Murray Haynes (UK Police National Search Adviser), Fabio Salvador (Brazilian Federal Police and Clean Gold Program) and Roelof-Jan Oostra (Netherlands Taphonomic Facility). An evening public lecture was given by Jodi Webb (Federal Bureau of Investigation) on, 'Ground Search and Geological Trace Evidence in the US System'.

COGE members co-organized two Technical Sessions at the American Geophysical Union Fall Meeting in December, 2023 in San Francisco, USA, along with colleagues from IGEO. The first session was a Town Hall, titled "Advancing Global Geoscience Education: Honoring Legacies and Building Collaborations". It aimed to inform attendees about the past and present efforts of COGE and IGEO, including honoring the legacies of Christopher King and Ian MacKay, encourage new membership,

and generate new ideas on how to grow these organizations and initiatives in the 21st century.

The III International Stone Workshop in India was an extension of the earlier two international stone workshops held in Salamanca, Spain, in 2018 and Torino, Italy, in 2021. The six-day workshop organised under the aegis of IUGS-ICG-HSS, UNESCO-IGCP and Panjab University witnessed delegates engaged in scientific deliberations on heritage stones from across the globe. The meeting started with an opening message from Prof. Stanley Finney, Secretary General of the IUGS. The workshop was attended by a sizeable number of heritage stone group members from 12 countries (Portugal, Germany, Spain, Finland, Belgium, India, Italy, Ireland, New Zealand, 23-January 2024 Slovenia, Romania, and the UK).

The 2023 Annual Meeting of American Geophysical Union (AGU 2023) was held in San Francisco, CA on December 11-15, 2023. IUGS Secretariat set a booth at the exhibition of the Meeting to promote the scientific achievements of IUGS and enhance the international influence of the Union. The 37th International Geological Congress was also promoted at the booth. IUGS Councillor Prof. Jennifer McKinley also visited the IUGS booth to promote IUGS activities.

COGE and UNAM's Geosciences Center are proud to announce the publication of the December 2023 edition of "Enseñanza y Comunicación de las Geociencias," a Spanish language journal for educators. This edition features articles on innovative geoscience teaching in Latin America, including an educational excursion to geological parks and UNESCO's strategies for addressing inequality in geography. Accessible as an open-source, it's a valuable resource for anyone interested in Geosciences education.



IUGS BODIES

THE REAL LIFE OF THE UNION

The International Union of Geological Sciences promotes and encourages the study of geological problems, especially those of world-wide significance throughout the activities of IUGS Commissions, Task Groups and Initiatives.

At present IUGS gives special consideration to:

- International standards;
- Geoscience education;
- Geoscience information;
- Environmental management.

IUGS believes that it is of mutual benefit to establish close links with other organizations engaged in geosciences activities and especially those organizations whose work relates to some of the major activities of IUGS.

The list of currently active IUGS bodies testifies to these major aims of the Union. Links allowing description of the organization and activities of the IUGS bodies are provided on the IUGS website (www.iugs.org):

Scientific Commissions

Commission on Geoscience Education, Training & Technology Transfer (COGE)
International Commission on History of Geological Sciences (INHIGEO)
Commission for the Management and Application of Geoscience Information (CGI)
International Commission on Stratigraphy (ICS)
Commission on Tectonics and Structural Geology (TECTASK)
Commission on Global Geochemical Baselines (CGGB)
International Commission on GeoHeritage (ICG)
Commission on Geoethics (CG)

Task Groups

Task Group on Isotope Geology and Geochronology (TGIG)

Task Group on Igneous Rocks (TGIR)
Task Group on Submarine Geohazards (TGSG)
Task Group on Diversity, Equity and Inclusion (TGDEI)

Joint Programs

International Lithosphere Program (ILP)
International Geoscience Programme (IGCP)
International Geological Congress (IGC)

Initiative

Initiative on Forensic Geology (IFG)

Big Science Program

Deep-Time Digital Earth (DDE)

IUGS Website



Giuseppe Di Capua IUGS Webmaster

The webmaster's activity was focused on maintenance of the website by creating and updating pages regularly. During the year, the webmaster worked in strict cooperation with the President, Secretary General, the E-Bulletin editor, Chairs of IUGS bodies, and the Secretariat staff to assure continuous support to IUGS Executive Committee and bodies and to promote events and activities organized or supported by the Union.

The IUGS website was monitored through Google Analytics until 31 December 2022, and from 1 January 2023 is monitored through the Analytics & Reports tool by WIX (the company that provides the web-hosting service).

The access statistics for the years 2019-2023 (Table 1) indicate a consistent number of unique visitors in 2023 as compared to 2022. Furthermore, there is a notable surge in the number of sessions (a session is a visit to the website that ends after 30 minutes of

inactivity) and page views that commenced in 2022 and persisted into 2023. This increase can be attributed to the direct promotion of the IUGS image through activities organized for the sixtieth anniversary of the Union's foundation in 2022 and which has renewed interest in the activities carried out by the IUGS even in the last year.

In 2023, an average of 98 visitors, 131 sessions, and 239 page views per day were recorded. Table 2 displays the percentage increase in the number of unique visitors, sessions, page views, and average time on page from 2022 to 2023. Additionally, there is a decrease in the number of pages consulted per session. Finally, the bounce rates remained stable compared to 2022. This is attributed to the majority of IUGS website users visiting the homepage (49% of visits), with the homepage serving as their primary landing page; of those users, 34% subsequently exit the website.

Table 1. Comparison of access statistics to the IUGS website for the years 2019- 2023, period 1 January-31 December (Source: Google Analytics for 2019, 2020, 2021, and 2022; Analytics & Reports tool by WIX for 2023).

	2019	2020	2021	2022	2023
Unique visitors (n)	33786	29227	29930	35736	35827
Sessions (n)	35971	31757	32080	38937	47640
Page views (n)	77515	67601	62668	71429	87321
Average pages/session (n)	2.2	2.1	2.0	1.8	1.5
Average time on page* (min.)	1:44	1:41	1:25	1:22	1:30
Bounce rates** (%)	66	62	68	71	71

* Time spent on each page is calculated as the time gap between a visitor looking at one page and looking at the next page. Time spent on the last page in a session is not included.

** The Bounce Rate is the percentage of visitors who access the website to visit a page and then leave website from that page rather than continuing to view other pages within the same website. The bounce rate is calculated by counting the number of single page sessions and dividing that by the total sessions. It is then represented as a percentage of total sessions.

Table 2. Comparison of access statistics to the IUGS website for the years 2022 and 2023, period 1 January-31 December (Source: Google Analytics for 2022 and Analytics & Reports tool by WIX for 2023).

	2022	2023	Difference 2023-2022(n)	Difference 2023-2022(%)
Visitors (n)	35736	35827	+ 91	+ 0.3
Sessions (n)	38937	47640	+ 8703	+ 22.4
Page views (n)	71429	87321	+ 15892	+ 22.2
Pages/Session (n)	1.8	1.5	- 0.3	- 16.7
Average time on page (min.)	1:22	1:30	+ 0:08	+ 9.8
Bounce rates (%)	71	71	0	0

There were 13 instances of session peaks reaching or exceeding 200, with 7 occurrences specifically in the month of November. In the year 2022, there were a total of 6 peaks equal to or greater than 2000. The highest peak in 2023 occurred on July 12th when a total of 281 sessions occurred. Sessions originated from visitors in 180 countries, predominantly from China (15.9%), USA (11.1%), India (9.5%),

and the United Kingdom (4.0%). Less than 4% of sessions come from each of the remaining countries. The most visited pages of the website were the following: Homepage (33.7%), ICS (7.7%), IGC (6.4), History (6.0%), Calendar 2023 (5.8%), Calendar 2024 (4.3%), Flagship Activities (2.9%), DDE (2.8%), Executive (2.7%), Episodes (2.2%). Other pages received less than 2.0% of visits.

IUGS E-Bulletin



Gurmeet KAUR E-Bulletin Editor

The IUGS e-Bulletin is the most efficient and user-friendly means of disseminating information regarding IUGS commissions, task groups, initiatives, IGCP projects, other adherent bodies, as well as their work and accomplishments, events, activities, and projects. All IUGS commissions, task groups, initiatives, IGCP projects, and adherent bodies contribute regularly to the e-Bulletin with brief texts supplemented by a few images (pictures, diagrams, etc.). Research papers, book reviews, and science reports are not included. Published monthly, the e-Bulletin is extensively disseminated within the geoscientist community. The e-bulletin is published on the IUGS website and sent via email to over 17,000 contacts. It is widely publicised on the IUGS social media as well. A new format has been designed and circulated for providing e-Bulletin news. This format will be used from January 2024 onward.

The cooperation extended by the IUGS secretariat, the IUGS webmaster, and the IUGS social media is highly appreciated in publicising the IUGS e-bulletin every month.



Prof. Dr. Sung Keun LEE
Editor in Chief



EPIISODES
Journal of International
Geoscience

Eighty-nine manuscripts were submitted to Episodes in 2023, and 52 manuscripts were published in Vol. 46, no.1-4. These included 31 original articles, 1 review, 4 communications regarding IUGS geological standards, 4 reports, 5 History of Geology articles, 3 book reviews, 2 obituaries/profiles, and 2 editorials. Their distribution among the four issues of volume 46 are as follows:

Volume/ Issue	Publication Date	Number of published manuscripts
Vol. 46, No. 1	2023.03.01	12 (7 articles, 1 communication regarding IUGS geological standards, 1 review, 1 history of geology, 1 book review, and 1 profile)
Vol. 46, No. 2	2023.06.01	15 (9 articles, 1 communication regarding IUGS geological standards, 1 history of geology, 2 report, 1 book review and 1 editorial)
Vol. 46, No. 3	2023.09.01	10 (7 articles, 1 communication regarding IUGS geological standards, 1 history of geology, and 1 book review)
Vol. 46, No. 4	2023.12.01	15 (8 articles, 1 communication regarding IUGS geological standards, 2 report, 2 history of Geology, 1 obituary, and 1 editorial)

In 2023, submission to first decision time on manuscripts decreased from 36 days in 2022 to 32.5 days in 2023. Published manuscripts increased from 41 in 2022 to 52 in 2023.

The impact factor of Episodes rose from 2.439 for 2021 to 3.1 for 2022, and the CiteScore increased from 5.3 for 2022 to 5.6 for 2023.

Starting in January 2024, Dr. Sung Keun Lee at Seoul National University (SNU), Korea took on the role of Editor-in-Chief for the journal

Episodes. The Associate Editors which include 28 experts in earth and environmental sciences, are diverse in global distribution and gender: Africa (1, F1), South America (2, F1; M1), North America (4, F1; M3), Asia (8, F4; M4), Europe (12, F6; M6), and Oceania (1, F1).

Two special issues of Episodes will be published in 2024. Their themes are Recent Advances in Korean Geosciences and International Geoscience Education Strategies: innovations, collaborations and future directions.



**Prof. Dr. Yamirka Rojas-
Agramonte**
**IUGS Councillor and Social
Media Manager**



IUGS Social Media

The year 2023 marked significant advances in the International Union of Geological Sciences (IUGS) social media presence, with a focus on expanding outreach, engagement and community networking efforts. Yamirka Rojas-Agramonte and María Daniela Muñoz-Granados assumed responsibility for managing the IUGS presence on Facebook, Instagram, x, LinkedIn and a newly created YouTube channel. Their collaborative efforts aimed to ensure consistent messaging and engagement across all of these platforms, promoting an online presence for the organization. The official release of the IUGS YouTube channel was a major milestone (<https://www.youtube.com/@theIUGS/featured>). This platform with now 142 subscribers provided an avenue for the organization to share educational content, interviews, featured lectures and other multimedia resources, enhancing accessibility and engagement with a global audience.

As shown in the digrams, in 2023 Instagram received 1900 views and gained 247 followers, and Facebook posts received 157,712 views and gained 8,703 followers. Most followers are in the 25-34 year age group.

An innovative initiative led by Rojas-Agramonte and Muñoz, the IUGS Young Reporters Initiative, attracted widespread attention among young early-career scientists around the world (<https://www.iugs-young-reporters.com/>). The goal of launching this program is to give voice to

a generation concerned about the future of our planet, a generation that believes we are not doing enough. Therefore, our organization (the IUGS) is offering itself as a platform to help this new generation raise their voice by informing the public through videos and essays about the geological and environmental challenges and dangers in their region and/or country and how geology can be important to help solve the climate crisis. We have now reporters from 9 countries.

The efforts of this year resulted in a notable increase in the IUGS's social media engagement metrics. Key indicators such as likes, shares, comments, and followers exhibited significant growth across platforms, reflecting heightened interest and interaction within the geological community. The 100 IUGS Geological Sites posts are the ones with more reach and engagement.

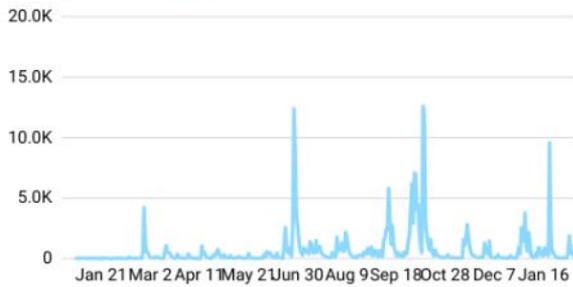
The year 2023 witnessed remarkable advancements in the IUGS's social media endeavors. Through strategic initiatives such as the establishment of a YouTube channel and the creation of the IUGS Young Reporters Initiative, the organization successfully expanded its online footprint, enhanced engagement, and is fostering a vibrant global community of geoscientists.

Metrics and Analytics:

Reach

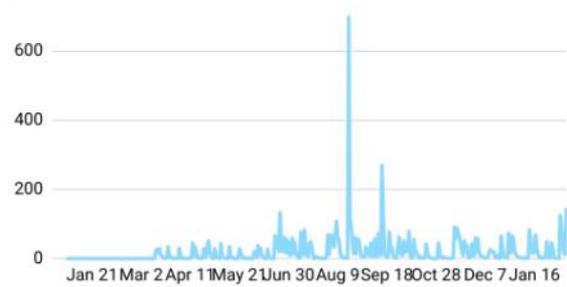
Facebook reach ⓘ

157,712 ↑ 350.3%



Instagram reach ⓘ

1,900 ↑ 100%



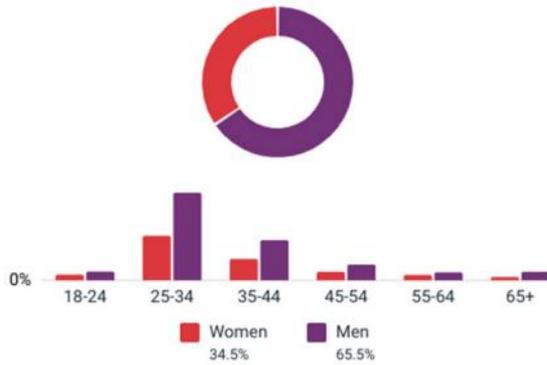
Facebook followers ⓘ

8,703

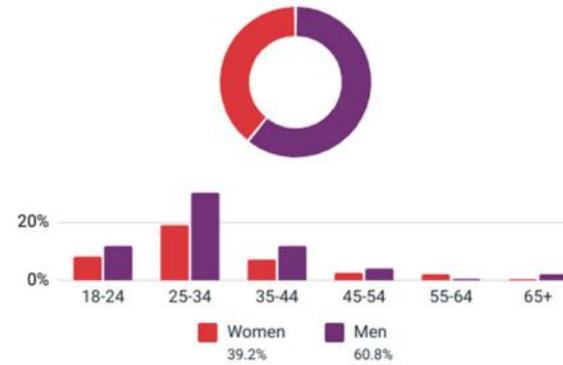
Instagram followers ⓘ

247

Age & gender ⓘ



Age & gender ⓘ





The International Commission on Stratigraphy (ICS)



David A.T. Harper
Chair



Shuzhong Shen
Vice Chair



Philip L. Gibbard
Secretary General

An executive and 17 active subcommissions involving over 750 scientists, globally, comprise the International Commission on Stratigraphy, the largest cluster of geoscientists within the IUGS. Two key areas, the ICS Chronostratigraphic Chart itself, based mainly on Global Stratigraphic Sections and Points (GSSPs), and the modernization of the webpages (www.stratigraphy.org) continue to be a primary focus. The approval of five GSSPs, the dedication of two Cretaceous stages and the 4th International STRATI Congress in Lille, France provided highlights for the year.

The 2023 version of the chart was regularly updated on the ICS website: three versions appeared in 2023 as new GSSPs were ratified and a substantial number of numerical ages revised including that for the base of the Archean (i.e., the age for the oldest bedrocks on the planet). Translations of the chart have been

kept up-to-date with over 20 available. Most recently the Catalan and Kurdish versions have been revised.

Three GSSPs were approved by the ICS and ratified by the IUGS: the redefined Wichiapingian (Permian), Guanxi, China, the Barremian (Cretaceous), Murcia, Spain and the Langhian (Neogene), Ancona, Italy. In addition replacement GSSPs for the Aeronian (Silurian), Trefawr, Wales and the Telychian (Silurian), Seville, Spain were approved by the ICS in 2023 and ratified by the IUGS in very early in 2024.

The Commission was actively involved in the First 100 IUGS Geological Heritage Sites and continues to front Stratigraphy and Sedimentology with the evaluation and promotion of candidates for the second 100 Geological Heritage Sites.



Figure 1. Dedication ceremony for the GSSP for the Campanian Stage, at Gubbio, Umbria, Italy. From left to right: Information plaque, on the left David Harper (Chair of the ICS) and on the right Maria Rose Petrizzo (Chair of the Subcommission on

Cretaceous Stratigraphy); the Golden Spike; the room fills up for presentations on the GSSP and its local, regional and international importance. Photos David Harper. [<https://cretaceous.stratigraphy.org/news/campanian-ceremony>].

A number of key publications, reflecting the work of the Commission, appeared in Episodes over the last year (see <https://www.episodes.org/>): The ICS has maintained a high profile in Episodes over the last year (see <https://www.episodes.org/>) covering the ratification of GSSPs and other aspects of chronostratigraphy: Global Stratotype Section and Point (GSSP) for the base-Artinskian Stage (Lower Permian); The Global Boundary Stratotype Section and Point (GSSP) of the Campanian Stage at Bottaccione (Gubbio, Italy) and its Auxiliary Sections: Seaford Head (UK), Bocieniec (Poland), Postalm (Austria), Smoky Hill, Kansas (U.S.A), Tepayac (Mexico); The Standard Auxiliary Boundary Stratotype: a proposed replacement for the Auxiliary Stratotype Point in supporting a Global boundary Stratotype Section and Point (GSSP).

Standard Auxiliary Boundary Stratotype (SABS) were approved to support the Global boundary Stratotype Section and Point (GSSP). The Anthropocene is a prospective epoch/series, not a geological event. The last was the most downloaded and the most read paper in the Episodes 2023 publication cycle. Lethaia (<https://www.idunn.no/journal/let>) has published investigations on the replacement of the GSSP

for the Aeronian Stage.

The two most downloaded papers in Episodes involved the debate over the status of the Anthropocene: A practical solution: the Anthropocene is a geological event, not a formal study; The Great Acceleration is real and provides a quantitative basis for the proposed Anthropocene Series/Epoch.

A highlight of the year was the 4th STRATI congress. The palaeontology research team, led by Thomas Servais, from the CNRS unit Evo-Eco-Paleo of Lille University (UMR 8198) organized a three-day indoor meeting at the campus of the Cité Scientifique at Villeneuve d'Ascq, from Tuesday, July 11th to Thursday, July 13th 2023. Over 300 delegates from over 40 countries attended the meeting. The indoor sessions took place in the new Congress Centre of Lille University 'Lilliad,' that includes lecture halls, poster halls, but also numerous smaller rooms that were booked for smaller group meetings. Plenary lectures by invited speakers were supplemented by parallel sessions, with keynote speakers, covering all 17 subcommissions. It was a wonderful occasion with a dinner in the Hermitage Gantois.



Figure 2. Dedication ceremony for the GSSP for the Coniacian Stage, at Salzgitter-Salder, Germany. On the left, information plaque. Middle, spike being hammered in by Irek Walaszczyk and Silke Voigt. Right, from the left Ian Jarvis, Maria Rose Petrizzo, Frank Wise and Phil Gibbard. Photos collected by Silke Voigt. [<https://cretaceous.stratigraphy.org/news/coniacian-ceremony>]



In education, the chart continues as a teaching resource for schools and colleges. A number of authors, university teachers and other educators together with professional societies were granted permission to use and reproduce the ICS International Chronostratigraphic Chart in their publications. The Timescale Calibration Subcommittee continues develop teaching materials for the Cyclostratigraphy Intercomparison Project (CIP: cyclostratigraphy.org) to explain the use of tools for detecting cyclicity in the stratigraphical record and is capturing current radioisotope dates to enhance

calibration of the chart. Data remodelling work on the Semantic Web representation of the Chart (<http://resource.geosciml.org/vocabulary/timescale/gts2020>) to better represent and communicate stratigraphic and temporal typologies continues with a new Knowledge Graph of Chart and related information continues at <https://github.com/i-c-stratigraphy/geologic-timescale-kg>. CGI has agreed to provide a technical facility for the publication of machine-readable vocabularies for its peer organisations' products, such as the up-to-date Data version of the Chart.



Figure 3. Pre- and post-STRATI congress fieldtrips project. From left to right the pre-congress fieldtrip visits Hutton's Unconformity at Siccar Point (the two field trip leaders, Stuart Jones second from left and David Harper on far right). Photo Carolyn Ripley. The post-congress fieldtrip visits the type Namurian at Namur. Photo Thomas Servais.

The chart continues to initiate and support a range of research programmes in the earth and planetary sciences. The chart is used extensively in scientific papers, sometimes cited (the original chart-describing paper by Cohen, Finney, Gibbard & Fan 2013 in *Episodes* has been cited some 3050 times, whereas specific versions of the chart published in the last three years have been cited some 100 times). The primary source, Cohen et al. (2013) will be revised and updated this year. The chart is the authorized geological timescale and the single point of truth, where rock meets time, for global chronostratigraphy and geochronology. It is colour coded following the scheme used on the Map of the World. It forms the framework for geochronometry. A two-volume work on 'Global

Synthesis of the Ordovician' published by the Geological Society, supported by the ICS and IUGS (see lyellcollection.org). The volumes include a global coverage of Ordovician successions and includes topical subjects such as orbital-tuning, palaeobiogeography, sea-level changes and the Ordovician timescale. Cretaceous colleagues will also publish a two-volume opus on Cretaceous 200 this year marking the establishment of the system including contributions from the ICS (see lyellcollection.org).

Strong links remain and are being enhanced with the DDE (Deep-time Digital Earth) program (OneStratigraphy.ddeworld.org) and the Geobiodiversity Database (Geobiodiversity.org).





com). The ICS archive is stored in the Geobiodiversity Database; the DDE's Stratigraphy Working Group, has worked with DDE to build a so-far most comprehensive domain ontology for stratigraphic knowledge, which contains ontologies for seven major stratigraphic subdisciplines and over 1200 knowledge nodes. A wide range of data management, analytical and modelling functions is available. Many key sections are or will be digitized. This work forms the foundation for the interchange of stratigraphic data in a computer-readable way in the future.

The Commission continues to focus on sustainability and contributes to a range of UN

Sustainability Development Goals, through its products together with conferences, meetings and workshops: Quality Education through its outreach and use of the chart (4), Gender Equality across the subcommissions, task and working groups (5), Industry, Innovation and Infrastructure through development of big science databases and electronic communication (9), Reduced Inequalities through capacity building in its focused work groups and at meetings (10), Responsible Consumption by electronic communication and encouragement of sustainable travel (12) and Climate Action through presenting the lessons from deep time (13).



COMMISSION ON GEOSCIENCE EDUCATION (COGE)



Sandra Villacorta Chambi
Chair

In 2023, the IUGS Commission on Geoscience Education (COGE) made significant strides in its mission to develop activities and resources to support geoscience education worldwide through active collaborations with other IUGS Commissions and global organisations. Expanding our global representation with ten new members from nine countries was a significant highlight, emphasising our growing international influence in geoscience education.

Furthering this international reach, the Geoscience Education Field Officer (GEFO) Program included three new officers from Pakistan, Paraguay, and Ghana, bringing nine active educators. These officers were instrumental in organising global training sessions for teachers and students, adapting to the digital landscape through online meetings and training alongside in-person gatherings where feasible.

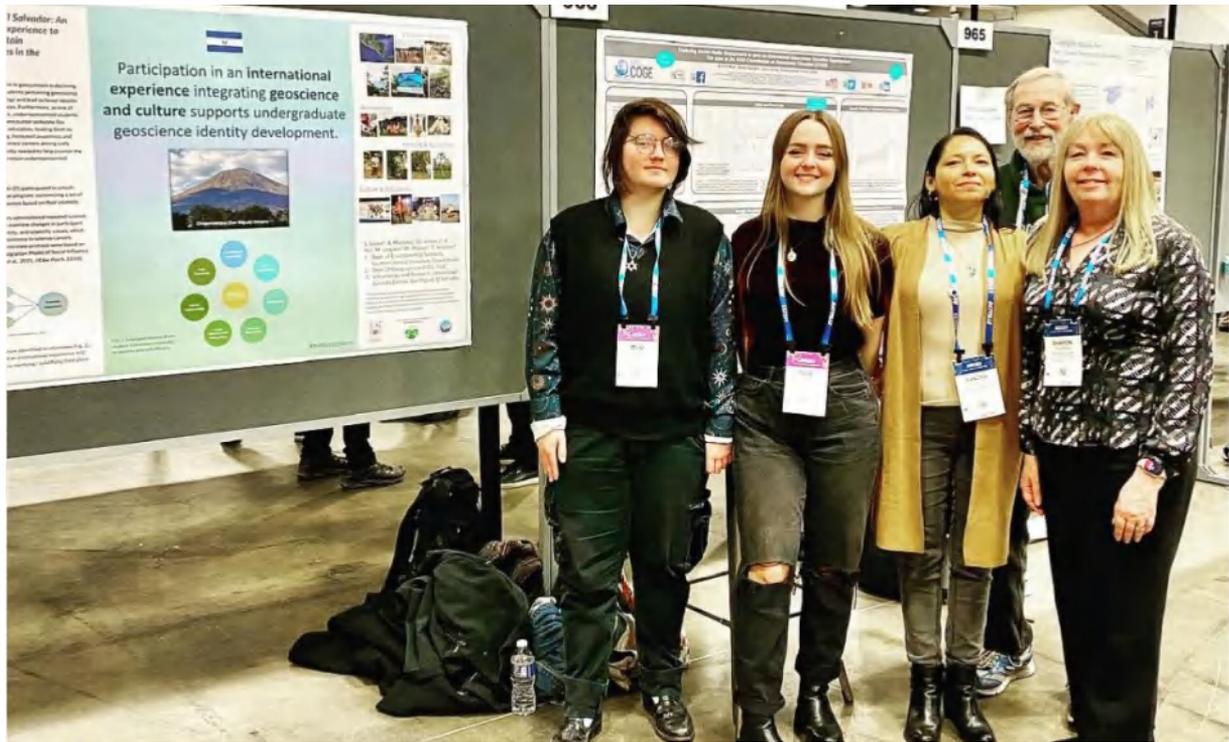
Our International Relations Committee has successfully established new partnerships with Women in Earth and Environmental Science Australasia and the Geosciences Centre of the National Autonomous University of Mexico. These partnerships have played a key role in strengthening our global network and reaffirming our commitment to promoting inclusion and diversity in geoscience education. We also opened ongoing discussions with various organisations to set up more Memorandums of Understanding in 2024. This includes

formalising relationships with the International Geoscience Education Organization (IGEO) and the Education Committee of the EGU, which will further enhance our collaborative efforts.

Our Publications Committee secured a Special Issue of the Episodes journal that will be released in December 2024. The issue will showcase groundbreaking international geoscience education practices. The year also saw the inaugural Chris King Medal award given to Dr. Hector Luis Lacreu for his remarkable contributions to geoscience education in the Ibero-America region.

In 2023, COGE established a Social Media Committee to enhance its digital outreach. The committee was tasked with managing and promoting COGE's activities across various online platforms, including a new YouTube channel. This committee played a crucial role in organising and promoting sessions at the American Geophysical Union Fall Meeting 2023 in coordination with IGEO. The rejuvenated social media efforts led to an increase in COGE's digital footprint, attracting new memberships from Nigeria and expanding COGE's digital presence in Latin America and Australasia.

COGE is proud of these accomplishments and excited about the future, as 2024 will be a year of progress towards new partnerships that advance geoscience education worldwide.



Presenters and attendees at the COGE-sponsored poster session titled “International Geoscience Education: Formal and Informal Efforts, Organizations, and Future Directions” at AGU 2023. From left to right: (Milo and Tena (from Southern Illinois University Edwardsville), Sandra Villacorta (COGE Chair), Michael Passow (IGEO Newsletter Editor), Sharon Locke (IGEO Vice-Chair and COGE International Relations Committee). Abstracts here: <https://agu.confex.com/agu/fm23/meetingapp.cgi/Session/191787>.

Geoscience Education Field Officer	2023 Activity Highlights of some of them
Seydou Sogoba (Burkina Faso)	managed a conference on geosciences for the benefit of teachers at the National Institute for the Training of Educational Personnel of the Central Plateau of Loumbila.
Venkatraman Hegde (India)	coordinated multi-day online and in-person workshops focused on technical writing, teaching earth science components in engineering, and general geoscience topics for school teachers and college teachers.
Yaseen Muhammad (Pakistan)	conducted a three-day field trip for students and teachers to the UNESCO Salt Range and Khewar Salt Mine, which is on Pakistan’s Tentative List for UNESCO World Heritage Sites.
Paulina Yawoa da Costa (Togo) Nestor Damian Salinas Franco	held a workshop for fifteen secondary school teachers discussing the geology of West Africa, minerals, rocks, and fossil identification. held different workshops for students checking the propriety of minerals



INTERNATIONAL COMMISSION ON THE HISTORY OF GEOLOGICAL SCIENCES (INHIGEO)



Ezio Vaccari
President



Martina Kölbl-Ebert
Secretary General

The International Commission on the History of Geological Sciences (INHIGEO) includes an active and growing community of individuals and institutions around the world, with 309 members from 56 countries. Our aim is not only the historical study of geological sciences in all their forms, but also its promotion and dissemination, as well as the creation of effective links between this historical knowledge and the broader contemporary context of the Earth sciences and humanities.

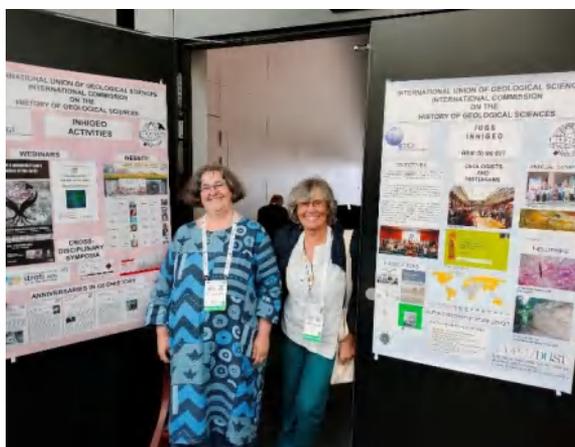
The highlights of our activities in 2023 included a new series of well attended webinars, a successful historical-scientific session at the 28th IUGG General Assembly, and the 48th INHIGEO Annual Symposium with fieldtrip. All these events allowed not only to reinforce the network of studies within the Commission, but also to establish interdisciplinary interactions with other scientific groups, as well as to promote our geo-historical research to a new audience.



Speakers and organizers at the 3rd INHIGEO Webinar, 21 April 2023

The INHIGEO Webinar Series, entitled New Perspectives in the History of Earth Sciences and organized by Maddalena Napolitani (Italy) and Victor Monnin (France), provided a dynamic virtual forum for discussion and focused in particular on some remarkable research works recently carried out by young and early career scholars. The three webinars presented in 2023 are Histories of Volcanology from Ancient Catastrophes to a Contemporary Discipline (talks by Loredana Lancini, France and Daniele

Musumeci, Italy); The State, the Church, and the Earth: Collecting Practices in Geosciences (talks by Maria Toscano, UK and Angela Strauß, Germany); and Approaches to the History of Climatology and Glaciology (talks by Tatiana Carboirell, Switzerland and Danielle Inkpen, Canada). More webinars are planned for 2024 and everyone is welcome: please check the latest updates and the links for joining on our website (<http://www.inhigeo.com>).



INHIGEO at IUGG: (left) co-convenors Martina Kölbl-Ebert and Claudia Principe at the entrance of a crowded session room (right), 28th IUGG Assembly, Berlin, 17 July 2023



The INHIGEO session History of Volcanology and Historical Volcanology was held at the 28th International Union of Geodesy and Geophysics (IUGG) General Assembly in. The cross-disciplinary symposium forms an important part of outreach activities, where we interact with scientific congresses in order to raise awareness of the history of the Earth sciences. Eleven papers were presented on topics ranging from history of experiments, models, paintings, archives and publications about volcanic eruptions, together with historical studies of eruptions and their effects on society, as well as scientific theories related to Laki, Vesuvius, Etna, Phlegrean Fields, Ries Crater, St. Vincent, Montserrat and Dominica.

The 48th INHIGEO Annual Symposium took

place in Cracow (Poland). It included a five-day conference from 31 July to 4 August 2023, and a six-day fieldtrip to historical mining sites and other noteworthy localities in southern Poland. Participants from 16 countries presented 43 papers on topics ranging from history of geological mapping, history of mining and mining heritage, history of geodiversity conservation, origin and development of geological research, biographies of geologists and general contributions on the history of the Earth sciences. The Book of Abstracts of the 48th INHIGEO Annual Symposium, including the fieldtrip guides, is available at the link: <https://www.pgi.gov.pl/en/dokumenty-pig-pib-all/prezentacje-3/inhigeo-2023/9935-48th-inhigeo-symposium-krakow-poland-2023-book-of-abstracts-and-tour-guide/file.html>



Ready to enter in a newly discovered tunnel in theuranium mine of Kowary (active from 1948-1967), Poland, 26 July 2023





COMMISSION FOR GEOSCIENCE INFORMATION (CGI)

Chair Harvey Thorleifson



The IUGS Commission for the Management and Application of Geoscience Information (CGI) fosters the interoperability of geoscience information, through leadership, collaboration, education, standards, and best practices.

CGI was active throughout 2023. We now have 531 members in 82 countries. We have a Chair, Past Chair, Secretary General, Treasurer, and eight Councilors, from Australia, Botswana, Brazil, China, France, Japan, NZ, Slovenia, UK, and USA. CGI hosts or co-hosts the DDE Standards Task Group (DDE-STG) and five working groups, and we coordinate with partners.

Our 2023 highlight was a magnificent set of superbly arranged DDE/CGI meetings from November 7th to 10th, in Suzhou, China, on Future Geoscience Information Standards. The DDE geoscience information metadata standard (Edition 1.0–2023) was formally released at the meeting, after three years of work on drafts and revisions among DDE working groups globally.

At the initial DDE-focused two-day workshop on Nov 7-8, ten DDE Science Working Groups presented their progress and plans. The DDE platform and related major geoscience initiatives were then introduced, with presentations on OneGeology, GSEU, and the DDE Platform. Progress on the DDE knowledge system was then presented, as well as construction of knowledge graphs. Prof. Marshall Ma presented a Keynote on Machine-Readable Semantics in Data Science for Geosciences, and talks were on terminology, and knowledge management.

At the CGI-focused Nov 9-10 forum, there were presentations on mature data models, emerging data models, vocabularies and governance, promoting standards, connecting geoscience domains, and connecting to other disciplines. At the ensuing session, new and refined geoscience standards were discussed on industry applications, ontologies, and the semantic web. Talks on Digital Twins, Data Science, AI, and other topics were then presented. Concluding discussion focused on



next steps for global geoscience standards, and valuable suggestions to both CGI and DDE were provided by participating experts and scientists.

CGI will have a busy 2024, focusing on preparations for meetings and sessions at the 37th IGC in Korea, and further development of

planning and project work. We will ensure that our work groups receive the support they need. We will support the DDE Standard Task Group focus on FAIR and Open Science. We will sustain our broad communication mechanisms. We will sustain our partnerships. Support from IUGS, and from our employers, is appreciated.



November 2023 DDE/CGI Suzhou Meetings on Future Geoscience Information Standards



François Robida, Past Chair of CGI, has won the 2024 EGU Ian McHarg Medal! This medal was established by the Earth and Space Science Informatics Division in recognition of the scientific achievements of Ian McHarg. It is awarded for distinguished research in information technology applied to Earth and space sciences. Congratulations, François!





COMMISSION OF TECTONICS & STRUCTURAL GEOLOGY (TECTASK)

The Commission on Tectonics and Structural Geology (TecTask) represents an initiative of Earth Scientists dedicated to stimulating communication and coordination within the international science community and to providing information to the public. The group encourages innovative research and continued education in Tectonics and Structural Geology. It reaches out to scientists and students, particularly those from developing countries and early career researchers, to share cutting-edge research and development, and state-of-the-art training. The current TecTask executive committee (EC) has focused on the activities that the commission has been running over the years and on the transition of the commission into a professional society - the International Association for Structural Geology and Tectonics (IASGT), now an affiliated IUGS organization.



ex solo ad solem, वसुधैव कुटुम्बकम्
ex solo ad solem, Vasudhaiva Kutumbakam
from the earth to the sun, the world is one family

TecTask has evolved from an IUGS Commission into an IUGS Affiliated Organization – the International Association for Structural Geology and Tectonics (IASGT). This evolution requested by the IUGS occurred over the term of 2020-2024. The new international association is legally based in Kharagpur (India) and is led by Prof. Manish A. Mamtani (Indian Institute of Technology in Kharagpur) and a committee

of 26 members with a wide representation of geographic origin, gender and career stage. The IASGT already has more than 1,000 registered members and will remain the leading international voice in Structural Geology and Tectonics. Furthermore, it will maintain the activities and products of TecTask.

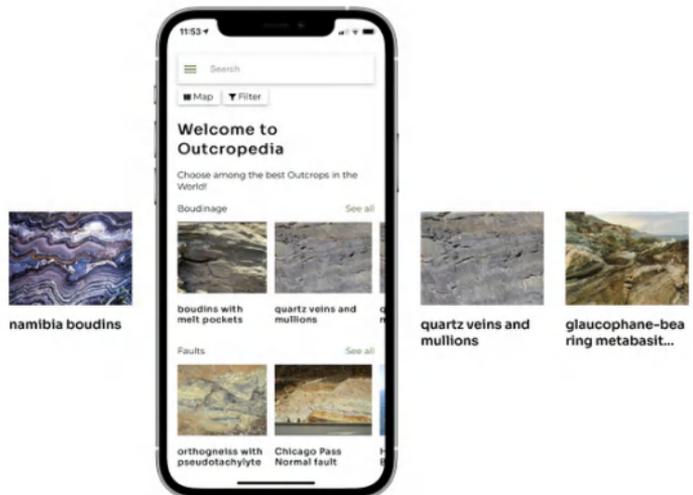
The Association will maintain the TecTask and the new IASGT Web Portals (<http://www.tectask.org/> and <https://iasgt.org/>) and social network accounts for communication and exposure to the public and science community. These include Facebook (<https://www.facebook.com/Tectask/>), Twitter (<https://twitter.com/iugsc>) and LinkedIn (<https://www.linkedin.com/company/tectask>) accounts.

The Open Terminology & Standards initiative is a major initiative that aims to define and maintain a database of professional terminology and scientific standards. It provisionally works as a dynamic wiki (<http://tnt.iasgt.org/>). This platform is populated with terms and their definition, which can be publicly discussed by the enrolled members before they are elevated into a formal glossary to be published regularly (e.g., every five years). The open-source and open-access nature of Open Terminology & Standards aim to provide a tool to promote the dynamic changes in geological terminology over time. It is intended to be linked to Outcropedia. **Outcropedia, born in 2004, is a tool to collect, publish and disseminate key outcrops, as well as Geo-Tours.** A new smartphone and tablet app that allows collecting and uploading georeferenced outcrop photos, descriptions and geotours from the field was launched in 2021.



World Web Cast seminars on Structural Geology and Tectonics are published at the TecTask YouTube channel. TecTask created a global monthly seminar on structural geology and tectonics in June 2018. The seminar is published in the TecTask You Tube channel (with ~1,370 subscribers). There are currently 24 talks, with nearly 50,000 views

TecTask supported a two-day short course "Microtectonics of fault rocks". The course was led by Prof. Renée Heilbronner (Basel University) and mainly addressed MSc students, PhD students and Early Career Researchers, with the aim of providing them a general introduction of the study of fault rocks. 28 participants from different European countries attended the short course, exchanging their experiences and ideas on the study of deformed rocks.



TecTask and IASGT officers are involved in the organization of the 24th International Conference on Deformation Mechanisms, Rheology and Tectonics, which will be held in Barcelona (Spain) in July 2024



COMMISSION ON GLOBAL GEOCHEMICAL BASELINES

<https://www.globalgeochemicalbaselines.eu/>

The Commission on Global Geochemical Baselines (CGGB; Fig. 1) has compiled a comprehensive Manual of Standard Methods for the establishment of the harmonised Global Geochemical Reference Network leading to the

preparation of a compatible global geochemical database and for the documentation of the concentration and distribution of chemical elements and species in the Earth's near-surface environment.



Figure 1. Group photograph taken during the Joint Annual Meeting in Naples, Italy (October, 2023).

During 2023 and after the publication in 2022 of the International Union of Geological Sciences Manual of Standard Methods for Establishing the Global Geochemical Reference Network, CGGB members promoted the Manual by organising and/or participating in oral presentations in sessions at international conferences, webinars and the first physical workshop. These included the 38th International Conference on Geochemistry and Health, held in Athens, 2-6 July, 2023, where the

Commission organized the workshop "Applied geochemical methods described in the International Union of Geological Sciences Manual of Standard Methods for Establishing the Global Geochemical Reference Network". The first day was devoted to classroom lectures with hands-on exercises (31 participants). On the second day, field sampling methods were demonstrated (Figs. 2). In total, there were 21 participants in the field training course.



Figure 2. demonstration of sampling of different sampling media; group photo of participants



The Commission also participated in the Goldschmidt Conference, held in Lyon (France) 9-14 July 2023. The session entitled “Novel geochemical and mapping methods at global to local scales with applications in environmental sciences, food safety, ecology, archeology and paleontology” was chaired by Anna Ladenberger (1st Co-chair of CGGB). The session comprised 23 oral presentations and 14 posters. The keynote lecture “Geochemical provenancing, can it meet evidentiary standards?” was delivered remotely by Jurian Hoogewerff from the National Centre for Forensic Studies (NCFS) at the University of Canberra. Paula Adánez (CGGB Scientific Secretary) introduced the audience to the IUGS Manual of Standard Methods with the oral presentation A manual of standard methods for establishing the global geochemical reference network.

Over 100 participants from Latin America, the Caribbean, Europe, and Africa participated in the

webinar "Geochemical Mapping in Latin America and the Caribbean - Geochemical Knowledge for Societal Use", which was organised by the Commission in collaboration with the ASGMI (Asociación de Servicios de Geología y Minería Iberoamericanos) Geochemistry Expert Group on November 8, 2023. It was the first time in Latin America that two important geochemistry groups have come together to promote and encourage geochemical mapping of the Earth's land surface as an imperative social need. The webinar emphasised the importance of using standardised methodologies to increase geochemical knowledge of the Earth on a global, continental, national and local scale to satisfy the urgent need for information to be used (a) in the planning of each territory in harmony with the natural environment, (b) for the well-being of society, and (c) to monitor the continuous changes that occur on planet Earth.

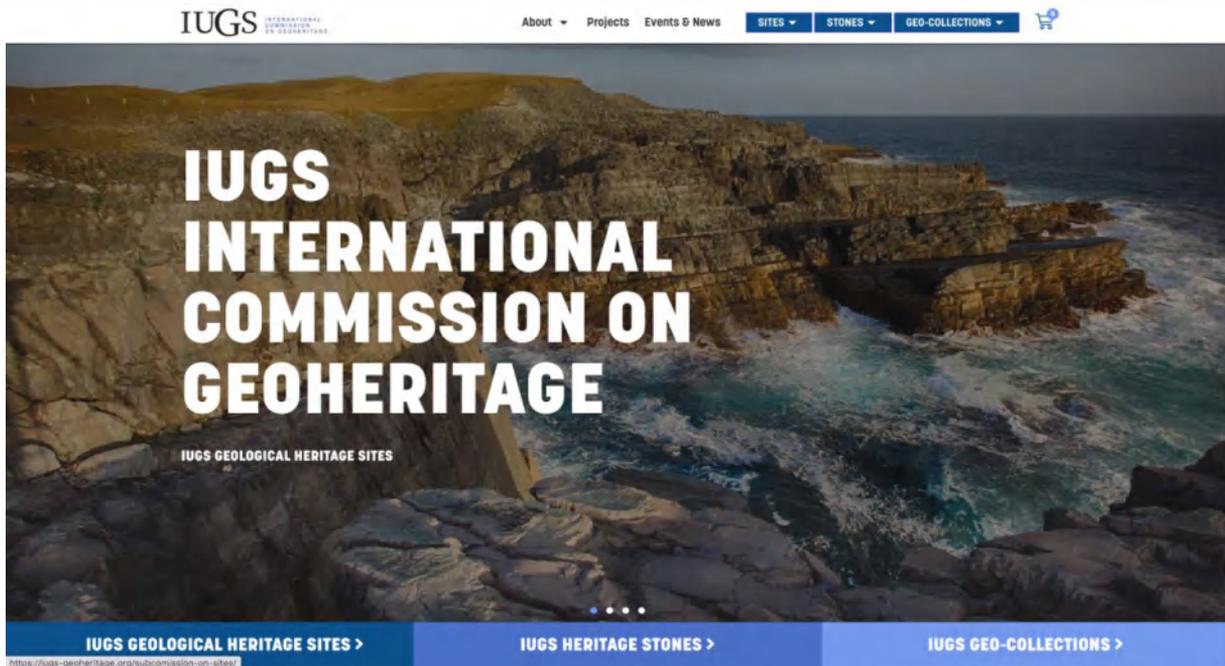




INTERNATIONAL COMMISSION ON GEOHERITAGE



Asier Hilario
Chair



The newly reformulated International Commission on Geoheritage has taken important steps forward to consolidate its position in the field of Geoheritage.

The IUGS International Commission on Geoheritage has attracted the interest of the geoscience community worldwide with the First 100 IUGS Geological heritage Sites announcement during the IUGS 60th anniversary event in October 2022 in Zumaia, Since then the Commission website www.iugs-geoheritage.com received **47.000 visitors** from **204 nations**.

The process for **The Second 100 IUGS Geological Heritage Sites** was opened at the beginning of 2023. 174 candidate sites from 64 countries (including 23 new nations) were presented. 91 experts representing

16 international organizations that cover all geological disciplines evaluated all the proposals. **714 evaluations** have been received and the list of the Second 100 has been completed in time. The Second 100 will be announced at the IGC 2024 in Busan with an special event T27 – session 8.

THE SECOND
100
IUGS GEOLOGICAL
HERITAGE SITES

LIST OF CANDIDATES





The IUGS International Commission on Geohritage provides also a very important contribution to the development of the UNESCO Global Geoparks Program (UGGP). **15 dossiers** have been evaluated in 2023 and the **new guidelines for the IUGS desktop assessment** have been finally approved by the UGGp Council.

The designation scheme and standards for **Geocollection designations** have been discussed and approved. The Subcommittee worked on a list of 1.273 collections from 129

The **Heritage Stones initiative** has been also consolidated with the approval of **10 new IUGS Heritage Stones in 2023**. The organization of the III International Stone Workshop in Jaipur (India) with 51 participants from 12 countries was a success. The book of the First 50 Heritage Stones recognized by IUGS will be presented at the IGC 2024 in Busan.

countries. The first IUGS Geocollections will be selected in 2024 and presented at the IGC 2024 in Busan.



COMMISSION ON GEOETHICS



Silvia Peppoloni
Chair

On 16 February 2023, the IUGS Executive Council officially established the Commission on Geoethics (CG: <https://www.geoethics.org/iugs-cg>) and nominated Silvia Peppoloni

(past IUGS Councilor and Secretary General of the International Association for Promoting Geoethics - IAPG) as Chair of the CG (Fig. 1).



Fig. 1: Silvia Peppoloni at the IUGS Executive Council meeting in Belfast (UK), while presenting the proposal to establish the IUGS Commission on Geoethics (on the left) and logo of the CG (on the right).

The CG is the supporting branch of the IAPG to the IUGS and the IUGS body that officially deals with geoethics and social geosciences for the Union.

The CG has a light organization made up of a Governing Board, a Supportive Structure, and an Operative Structure consisting of Task Groups working on specific issues. The members of the Governing Board are experts in ethical and social issues related to geosciences, who have been involved in the IAPG activities for years (Fig. 2). They include: a Vice-Chair (Peter Bobrowsky, Canada), a Secretary/Treasurer (Giuseppe Di Capua, Italy), and four councilors: David Mogk (USA), Ruth Allington (UK), Soumaya Ayadi-Maasri (Lebanon), Roberto Lencina (Argentina).

The core business of the CG consists of the following activities, to be developed in cooperation with the IAPG:

- Drafting and updating ethical guidelines for the IUGS.
- Supporting the IUGS (officers and bodies) regarding questions such as unprofessional conduct, misconduct, harassment, retaliation, racism, sexism, conflicts of interest and others.
- Fostering the participation of women in activities, events, and other initiatives organized or supported by the IUGS with the aim of reducing the gender gap and increasing diversity.
- Cooperating with IUGS bodies to focus on geoethical issues or other themes of mutual interests.

- Contributing to IUGS events (congresses, including the International Geological Congress - ICG, conferences, videos, webinar, etc.) or any other scientific or public events.
- Supporting the IUGS in developing activities at the geoscience-policy interface and delicate issues related to geoscience-society interaction.
- Promoting the adoption of the Geoethical Promise within Universities and geoscience organizations.
- Organizing events that address ethical and social implications of geoscience knowledge, research, practice, education, and communication.
- Training on geoethics, professional ethics, data ethics, and publication ethics.
- Networking with geoscience (affiliated or not to the IUGS) and humanities organizations to

create opportunities for bridging geosciences and human and social sciences.

- Fostering opportunities to increase the impact of IUGS in Latin American and African countries by promoting activities to foster the culture of geosciences among local geoscience communities.
- Supporting the IUGS in enlarging its network in countries in which the presence of the IUGS is missing or to be developed/increased.
- Preparing an annual report containing the outcomes of the reference year, a plan of activities for the new year, and a financial request to the IUGS. The annual report will contain results, activities, events, publications, or any kind of outcomes of the IAPG to be considered as outcomes of the CG.



Fig 2: Members of the Governing Body of the IUGS Commission on Geoethics in their 1st meeting on 2 May 2023.

After the first meeting of its Governing Board (on 2 May 2023), the CG proceeded to create the first two task groups to work on urgent ethical issues for the Union:

Task Group on IUGS Ethical Guidelines. Members: Vitor Correia (Portugal), Vincent Cronin (USA), Jorge Gomes Tapias (Colombia), Rie Hori (Japan). Contact person with the Governing Board: Ruth Allington (UK). This task group has the goal to draft 1) the ethical guidelines to be followed in the organization

and conduct of IUGS scientific events; and 2) a proposal of IUGS Ethical Guidelines, covering the diverse ambits of IUGS internal and external relationships.

Task Group on Diversity, Equity and Inclusion. Members: Chris Atchison (USA), Yong Ge (China), Éva Hartai (Hungary), Rachele Kernén (Australia), Billy M. Williams (USA). Contact person with the Governing Board: Silvia Peppoloni (Italy). This task group has to define an action plan for the IUGS in bringing



its constituent groups (commissions, sub-commissions, task groups, initiatives) to a reasonable balance of their members with regard to issues such as gender, geographical provenance, discipline, career stage; as well as supporting IUGS in its activities within the Standing Committee on Gender Equality in Science.

In recent months, the GC has actively engaged with the IUGS Presidency to offer assistance concerning disputes among various IUGS bodies, affiliated organizations, and adhering members. Additionally, the GC has been involved in verifying documents of general interest for the Union. Due to confidentiality constraints, specifics about the cases analyzed by the Commission cannot be disclosed. However, it's worth noting that the Commission promptly furnished the Union's Presidency with reports and documents pertaining to the requested assistance.

Regarding the activities of the two Task Groups, progress is underway in finalizing the initial draft of Ethical Guidelines for the IUGS. This document aims to establish a streamlined ethical reference framework and is slated for proposal to the IUGS EC for potential adoption.

The Task Group on Diversity, Equity, and Inclusion (DEI) successfully submitted a comprehensive action plan to the GC Governing Board for comments. This document encompasses a series of recommendations, categorized into primary and secondary sections, along with fundamental initiatives and a list of resources for the IUGS. The aim of the document is to enhance awareness about diversity, equity, inclusion, and accessibility and to influence policies and practices that encourage broader participation and representation within the various bodies constituting the IUGS.

The CG is part of the international network of organizations and institutions that will contribute to the activities of the newly formed Chair on Geoethics of the International Council for Philosophy and Human Sciences (CIPSH, an organization within UNESCO), hosted at the National Institute of Geophysics and Volcanology in Rome, Italy. The CIPSH Chair on Geoethics is focused on creating a research network aimed at developing discussions on a global ethics grounded in geoethics and to bridge geosciences and humanities.

The International Geoscience Programme in 2023

The eighth closed session of the IGCP Council, convened at UNESCO Headquarters in Paris on 13 – 14 March 2023. During the deliberations, the Council reviewed new application proposals, evaluated ongoing projects, and granted approval to four postponed project entries. This resulted in a total of 43 active IGCP projects in 2023.

In accordance with UNESCO priority on gender equality and Africa, the IGCP Council has been prioritising projects led by female and early career scientists from developing nations since 2015.

In 2023, 45% of IGCP project leaders were female, and 11% of project leaders were African, representing 42 countries across the continent. In total, IGCP had 272 project leaders from 77 countries in 2023, representing a cross section of expert geoscientists from around the world. The focus on gender equality and developing countries extended to scientists participating and benefiting from capacity-building activities; the programme's training initiatives reached over 3,100 participants from 112 countries, of which approximately 38% were female, 42% were youth, and 53% were from developing countries.

In 2021, the IGCP Council committed to addressing the UN2030 SDGs by linking IGCP projects with society. Specifically, projects should contribute toward the efficient, safe, sustainable, and renewable exploration/extraction of natural resources, and/or improving the understanding, prediction, and migration of climate change and geohazards. Here we highlight three of the many IGCP projects that are making a difference through capacity-building and supporting the UN2030 SDGs.

IGCP 765: aims to improve the quantity, quality, and accessibility of soil data, especially regarding carbon storage. Given that soil plays a fundamental role in the functioning of ecosystems and societies, this directly contributes to many SDGs, including zero hunger, good health and well-being, clean water and sanitation, life on land, and climate action.

IGCP project 765 developed the first digital soil mapping training course for Spanish-speaking communities in 2023 and trained nearly 100 participants. In addition, the project team trained over 30 soil scientists on digital soil mapping. The project's objectives include unifying and standardising existing methodologies for measuring SOC sequestration and minimizing uncertainties in estimates, spanning from country-level to global scales, which will aid scientific understanding and policy development.



The International Geoscience Programme (IGCP) Council and UNESCO Secretariat, during the Council's 8th meeting held in March 2023 © UNESCO

IGCP 767: is conducting a comprehensive study of the Mount Nyiragongo region in Rwanda to understand the potential health risks to inhabitants in this region, particularly with regard to volcanic emissions, soils, and lakes. This project contributes to a number of SDGs, including good health and well-being, quality education, and partnerships for the goal.

Mount Nyiragongo is an active stratovolcano in the Virunga Mountains that poses a constant risk to the nearby densely populated areas. IGCP 767



researchers aim to explore the long-term health effects of the volcano's passive degassing, as well as links between soils composed of volcanic ash and a chronic health issue known as podoconiosis (severe and debilitating swelling of the lower limbs). Simultaneously, the team is investigating Lake Kivu, recognising it may represent a greater danger than Mount Nyiragongo due to its massive reservoir of dissolved carbon dioxide and methane mixed with toxic hydrogen sulfide.



Mount Nyiragongo is a prominent feature of the landscape. It benefits the local communities through creation of soils fertile for agriculture, but also creates many significant risks. © MONUSCO

In 2023, a study was carried out by the project team to understand the first-order effects of the Nyiragongo volcanic edifice and the local topography on magma propagation. By employing both analytical and numerical modelling techniques, the reasons behind the alteration in the propagation direction of the subterranean magmatic intrusion were established, occurring just five kilometres from Mount Nyiragongo. Furthermore, a new strategy was developed to analyse the competition between vertical and lateral magma propagation within the dyke by calculating magma overpressure gradients. The study revealed how local topography favours lateral propagation within the propagation plane.

A field study of andosol and other soils impacted by the volcanic ash fallout from Mount Nyiragongo has been carried out along the shores of Lake Kivu and in the Virunga Mountains. This study

builds upon a thorough initial examination of soil data already collected. Soils sampled at podoconiosis prevalence hotspots, according to local health providers and previous studies, will be analysed to find a link between the disease and soil mineralogy.

IGCP 722: is conducting capacity building activities related to mining and sustainable use of development minerals. These minerals, which are essential for many major industries, compose most of the global mineral production. This project contributes directly and indirectly to many SDGs, including decent work and economic growth, industry, innovation and infrastructure, sustainable cities and communities, responsible consumption and production, and climate action, among others. Development minerals are resources that are mined, processed, and used domestically in the construction, manufacturing, infrastructure, and agricultural sectors. Although they compose 84% of global mineral production, these minerals are often produced by artisanal, small, or medium businesses. IGCP 722, *Stone for Development*, aims to introduce early career geoscientists to the challenges and opportunities available through the sustainable use of development minerals.

To that end, they have established comprehensive online and in-person training programs for participants from around the world, with a strong emphasis on Small Island Developing States (SIDS), young geoscientists, and women. During the two-week field course in January-February 2023, eleven participants (ten young, seven female, all from developing countries) gathered in Fiji for the in-person component of the workshop. During this eighty-hour field placement they received classroom and hands-on training in aspects of quarry management, community engagement, governance, and sustainable development. The workshop also explored the possibility of establishing low carbon cement production in the southern Pacific Ocean region.



A development mineral processing site in Fiji. © IGCP 722: Stone for Development

PROGRAMME'S 50TH ANNIVERSARY

In 2022, the International Geoscience Programme celebrated its 50th anniversary by hosting a conference titled 'Healing the Earth: UNESCO and Earth Sciences – Past, Present, and Future.' On 16 March 2023, approximately 400 attendees joined at UNESCO headquarters in Paris and online for the anniversary conference in the presence IUGS President Professor John Ludden. The conference's theme, 'Healing the Earth,' reflected the programme's increasing emphasis on integrating planetary well-being with human

well-being. This facilitated a dialogue among government representatives of UNESCO Member States, global geoscience leaders, policymakers, industry professionals, and academic experts through a panel-led discussion. The discussion revolved around how the science of our planet can contribute to developing people-centred solutions for many of society's 'grand challenges.'





International Lithosphere Program



Hans Thybo, President

The lithosphere forms the connection between deep Earth and the surface. This basic observation was the background for International Union of Scientific Unions (ICSU - today ISC) to form ILP in 1980 charged to:

- promote interdisciplinary research on the lithosphere
- at the interface between IUGS and IUGG
- through multidisciplinary research projects

ILP is a bottom-up organisation that takes initiatives to bring together individuals and organisations in Task Forces and Regional Committees, selected solely on the basis of scientific quality and societal needs. Key features of the projects are their dynamic nature and focus on bringing in new talent. The task forces are organised within four thematic subjects:

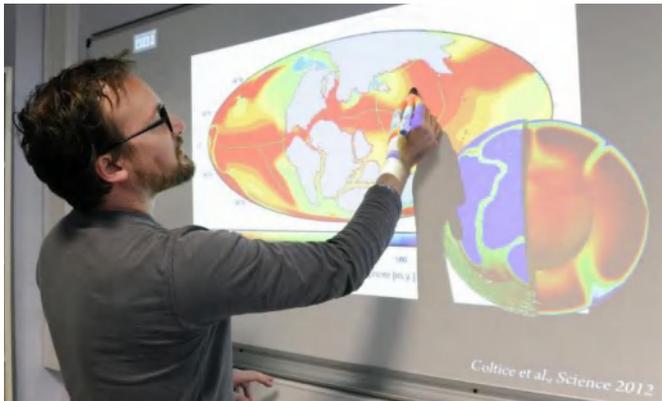
- Geoscience of Global Change
- Contemporary Dynamics and Deep Processes
- Continental Lithosphere
- Oceanic Lithosphere

The activities in 2023 were characterised by the full revitalisation of the Task Forces/Coordinating Committees as well as several in-person meetings held by these projects as separate workshops and as symposia at international conferences, in particular EGU23, AGU23, AOGS23, and the International Archaean Symposium.

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 IUGS and IUGG 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.

The hybrid business meeting was held in Vienna on 25 april 2022 with short presentations on the achievements of the ongoing projects, introduction to IUGS and IUGG, and discussion of ILP's strategic plan. The Evgenyi Burov medal 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 medallist gave a presentation with overview of his scientific achievements.

ILP is more active than ever, with a record number of 14 active projects. The projects include researchers from all continents and represent a broad coverage of lithosphere research. We are in particular pleased that the group of PIs include an increasing number of early career scientists.



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



Participants in the 2021-CC1 Topo-Europe workshop in Sopron, Hungary





INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS), INITIATIVE ON FORENSIC GEOLOGY (IFG):

SUMMARY FOR THE IUGS 2023 ANNUAL REPORT

Throughout 2023, the IUGS Initiative on Forensic Geology (IFG) continued to internationally promote and advance forensic geology including crime scene examination and sampling, geological trace evidence analysis and ground searches for burials. This was achieved by collaboration with industry, academia, police, law enforcement and government organisations. IUGS-IFG was invited to attend, co-organise and co-chair several international conferences and workshops including; the World Police Summit in Dubai, Interforensics 2023 in Brazil, the Geological Association of America in Virginia USA, the Geological Society of London, the European Union Critical Raw Materials Week in Brussels, the Society for Economic Geologists in London, the British-Finnish Geoscience Initiative at the British Embassy in Helsinki.

In 2023, IUGS-IFG published a document following the, '5th IberoAmerican Congress on Forensic Geology, which was held in Bogota, Colombia', with a focus on the search for missing persons' graves associated with homicide, cartels and drug trafficking, and included anthropology, (odontology, genetics and taphonomy), soils (inorganic, mycology and palynology), geographic information systems and remote sensing applied to isolated locations.

The most significant development in 2023 was the expansion and progression of IUGS-IFGs involvement and progression in the

provision of geological support associated with international illegal mining and the trading of illicit minerals and metals. The global demand for minerals continues to increase driven by the so called 'battery revolution', 'green transition', technology and construction raw materials requirements. These include base metals, rare earth elements, precious metals such as gold and platinum group metals, conflict minerals (tungsten, tantalum and tin) and sand. The beneficiaries of illegal mining and trading of illicit minerals are well-organised syndicates, criminal gangs, cartels and terrorist groups, via established trading routes. Money laundering and a host of other crimes like women and child labour, extortion, displacement of people is associated with these illegal activities. IUGS-IFG has brought together geologists with appropriate expertise and capabilities, co-organised, supported and collaborated with international law enforcement, to help detect, deter and disrupt crimes such as; falsified documents of origin, theft, extortion, fakery, substitution, adulteration and fraud. From a geological perspective, IUGS-IFG has led methods for sampling, sample preparation, provenance determination (predictive geolocation) and traceability to verify that such critical raw materials are responsibly sourced. IUGS-IFG continued to support the 'Clean Gold Programme' with colleagues working with the Brazilian Federal Police, Colombian National Police and FBI Laboratory. The IUGS-IFG founder and chair, Dr Laurance Donnelly was invited to INTERPOL's headquarters in Lyon,



France, to collaborate with a team focusing on illegal mining. He also co-organised a workshop on, 'Responsible Sourcing and Traceability of Critical Raw Materials' at the European Union in Brussels, in association with the International Raw Materials Observatory (Intraw), European Federation of Geologists (EFG), Responsible Minerals Initiative (RMI), Mine Spider, EU-Africa Partnerships on Sustainable Raw Materials Value Chain (AfricaMaVal), America Geosciences Institute (AGI), International Peace Information Service (IPS) and the Organisation for Economic Co-operation and Development (OECD). This work has led to collaboration with the Mine Security Working Group (MSWG), for subject matter experts and practitioners to share insights, challenges, technology advances to further the objective of the, 'Voluntary Principles on Security and

Human Rights and UN Declaration of Human Rights'. IUGS-IFG members also supported the MaDiTraCe (Material & Digital Traceability for CRM Certification) project that aims to reinforce the transparency, reliability and sustainability of complex critical raw material (CRM) supply chains. All of these activities supported the IUGS-IFG 'Special Project' on illegal mining, minerals and metals crimes and the role of geologists to mitigate associated risks. An article was presented on 'Gold forensics and illegal gold trade investigation' in 'Geoscientist' (the magazine of the Geological Society of London). Two PhD projects were established in Italy and Chile with an illegal mining and minerals focus, that was supported by IUGS-IFG. A new forensic geology course was also agreed to be supported by IUGS-IFG in Switzerland.



Operations in Colombia to disrupt illegal gold mining, including the destruction of mining assets and the seizure of the gold (source: Prof Carlos Molina, IUGS-IFG Co-officer for Latin America).



Photographs from a poached site in the Gobi Desert, Mongolia, showing partial illegally excavated skeleton of an armoured dinosaur. The poachers stole the head and left the skeleton behind (source: Prof Federico Fanti, IUGS-IFG Forensic Paleontology Adviser (left) and Dr Greg Funston (right)).



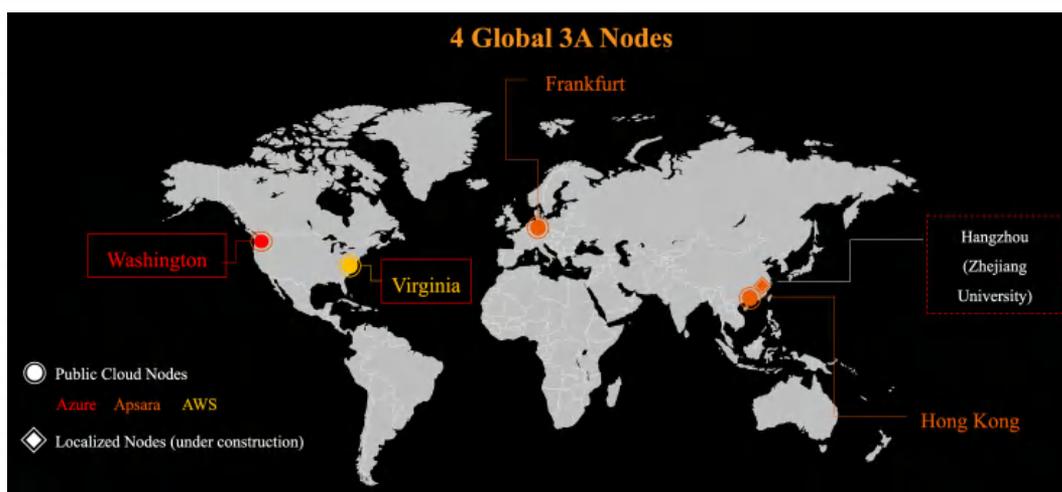


IUGS-IFG Chair, Dr Laurance Donnelly and IUGS-IFG Illegal Mining Advisor (Mr Riccardo Moraes) collaborating with the INTERPOL Illegal Mining Team (source: IUGS-IFG Chair, Dr Laurance Donnelly).

DDE 2023

Deep-time Digital Earth (DDE), IUGS' first ever big science initiative, is dedicated to advancing a data-driven research paradigm in geological sciences. The DDE Platform (www.deep-time.org) significantly improved its appeal to scientists from all parts of the world. At the end of 2023, the platform offers access to an extensive

dataset linked to a global network of thousands of institutions and hosts 1.6 million records, 9 disciplinary hubs, over 60 cases, more than 100 models guided by real world scenarios and is anchored on a Cloud infrastructure that is networked globally.



World-wide DDE Cloud Computing Nodes

At an international workshop convened in Kunshan City, China, from 7 to 11 November 2023, the DDE geoscience metadata standard (Edition 1.0-2023), jointly developed by CGI-IUGS and the DDE Standards Task Group (STG) as part of a 3-year, DDE funded project, was formally released. Application of the standard to DDE Platform databases will test and improve their fulfilling FAIR principles and guidelines. DDE signed an MoU with CODATA in August 2023 and CGI-IUGS and DDE STG have initiated discussions with CODATA to explore building on CODATA's experience and knowledge in applying FAIR data principles and guidelines to the databases hosted on the DDE Platform.

The Geological Society of Africa (GSAf) was one of the five new Members that joined DDE in 2023, raising the total DDE Membership to 29. GSAf invited and collaborated with DDE to organize a 1-day technical workshop on

“Enabling African Geodata” on 25 September 2023, day 1 of the 29th Colloquium on African Geology, hosted by the Namibian Geological Survey in Windhoek. This was the first-ever DDE event in Africa and since then African interest on DDE has been on the rise. The development of a DDE RCE (Research Center of Excellence) in DRC is moving forward and Nigeria and Namibia have expressed an interest in establishing additional RCEs. The Botswana Geosciences Institute (BGI) has initiated discussions to explore collaboration with DDE. BGI and University of Lubumbashi, DRC, geologists were served with webinars by Prof. Mike Stephenson, DDE Director for Africa, Europe and the Middle East, on the use of the DDE Platform for their research. Sudanese researcher Salma Hamed is developing a DDE-supported podcast series to interview specialists in resources and climate change to understand how they see the energy transition.



receiving 1:5 m geological map of Africa from DDE's Dr. Yan Song.



GSAF President, Prof. Okunlola, Sudanese researcher Salma Hamed

In 2023, DDE presented its progress and achievements in two major events in the US: the Geological Society of America (GSA) conference in Pittsburgh, PA, USA (14-19 October) and the American Geophysical Union (AGU) in San Francisco, CA, USA (11-15 December). In GSA, DDE conducted a DDE Platform based training course for 25 participants, convened technical and poster sessions on themes linked to paleogeography, energy and mineralogy, hosted a booth and reception. At the AGU, with 22,000 registered attendees, the DDE booth and the presentations at the booth, as well as the DDE Town Hall meeting were quite popular among the attendees. Speakers at the booth and panelists in the Town Hall meeting

included Prof. Rob Hazen, a DDE Scientific Committee Member and the originator of the first US DDE RCE on Carnegie Science Institute in Washington, D.C; and Prof. Antonio Abreu, Director of the Division of Ecological and Earth Sciences in UNESCO, Paris. The AGU 2023 theme, "Wide.Open.Science", resonated, in many ways, with the discussions and presentations at the DDE Open Science Forum and its outcomes co-organized by IUGS, UNESCO, IYBSSD and DDE on 9 November 2022 in UNESCO, Paris. DDE continues to liaise closely with UNESCO to use the DDE Platform and other DDE services to implement UNESCO Open Science Recommendation.



Prof. Rob Hazen, Antonio Abreu and Richard Chuchla with Panel Moderator Dr. Susan Nash at the DDE Town Hall meeting at AGU 2023.



Prof. Sabin Zahirovic, Leader of the DDE Paleogeographic Reconstruction Working Group at the DDE booth at GSA 2023



ACKNOWLEDGEMENT

Prof. Stanley Finney, IUGS Secretary General is acknowledged with deep appreciation and gratitude for his great efforts in and contributions to compiling the 2023 IUGS Annual Report.

Sincere gratitude is also given to the colleagues from IUGS constituent groups who have contributed to the 2023 IUGS Annual Report.

