Sustainable Earth, sustainable societies

NATURAL SCIENCES

Sustainable Development Goals

unesco
International Geoscience and Geoparks Programme

International Geoscience Programme Enabling Early Career Geoscientists to Achieve Sustainable Development Goals

Özlem Adiyaman Lopes (PhD)
Earth Sciences and Geo-hazards Risk Reduction Section
Division of Ecological and Earth Sciences

UNESCO HQ Contacts

- Kristof Vandenberghe
- Ozlem Adiyaman Lopes
- Marie-Laure Faber

Section on Earth Sciences and Geo-Hazards Risk Reduction
Division of Ecological and Earth Sciences
Natural Sciences Sector
7 place de Fontenoy
F-75352 Paris 07 SP

unesco
International Geoscience and Geoparks Programme

Agenda

NATURAL SCIENCES

1) WHY UNESCO works on Earth Sciences And Earth heritage?
2) Earth sciences at UNESCO for the SDGs and Early career scientists
3) UNESCO designated sites
4) UNESCO Global Geoparks and Early career scientists

unesco
International Geoscience
and Geoparks Programme

Keywords

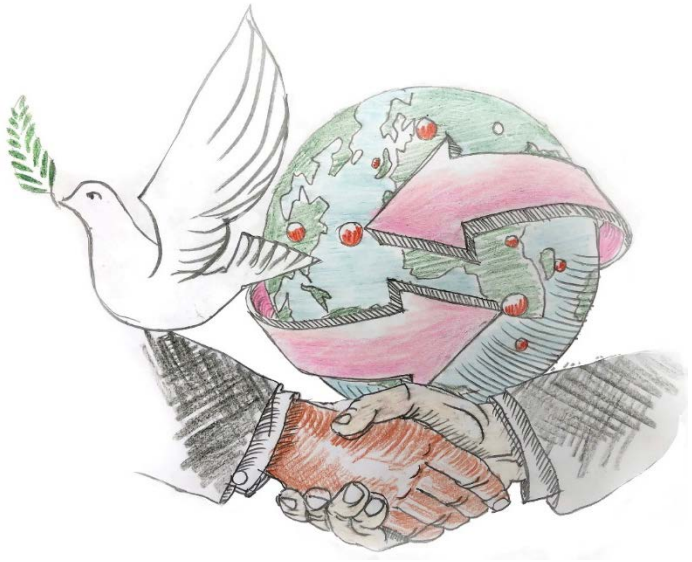
NATURAL SCIENCES

1. UN 2030 Agenda, Sustainable development goals
2. UNESCO International geosciences and geoparks program (IGCP)
3. UNESCO Designated sites
4. Geoparks concept
5. UNESCO Global geoparks capability building activities

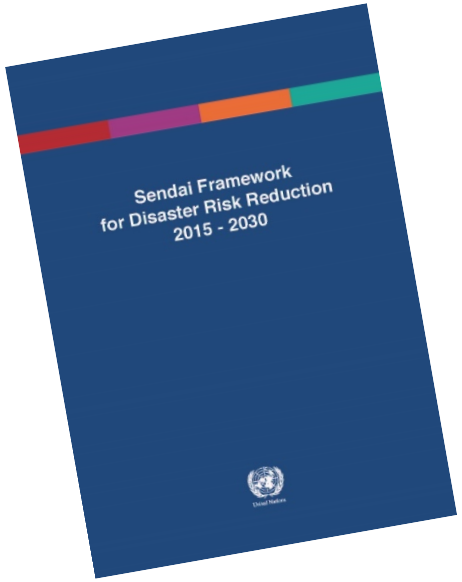
unesco
International Geoscience
and Geoparks Programme

The United Nations Educational, Scientific and Cultural Organization

75 years ago, UNESCO's Constitution adopted



To cement peace between countries, protect human rights and improve living standards



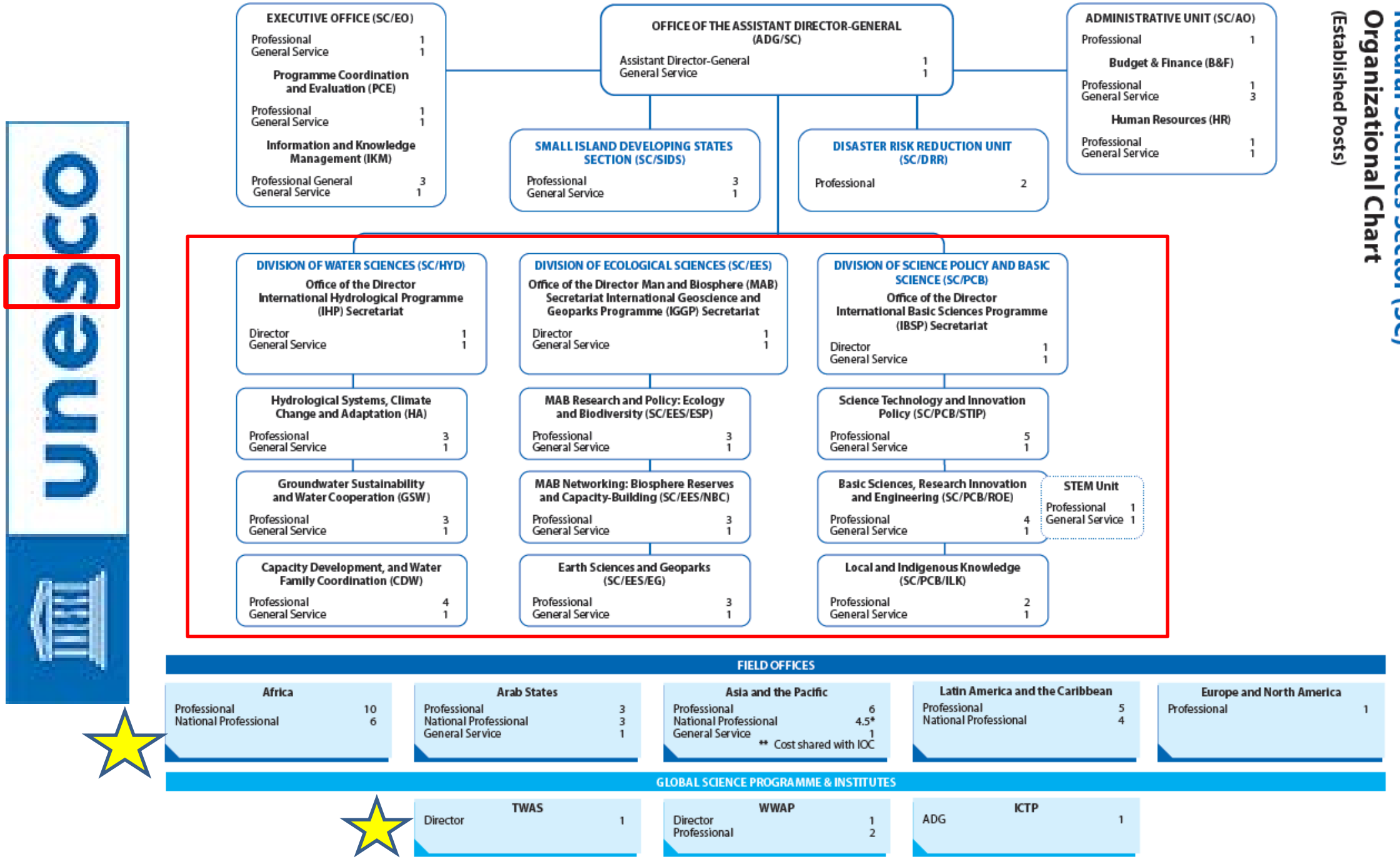
PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

Sustainable
Development
Goals

vision of a world at peace
could not be a world without education,
science and culture

Sustainable
Development
Goals

Natural Sciences Sector (SC)
Organizational Chart
(Established Posts)



unesco
International Geoscience and Geoparks Programme

Geoscience and the 21st Century

INTERNATIONAL GEOSCIENCES PROGRAMME-IGCP

17 Sustainable Development Goals

7 Global Targets of Sendai Framework for Disaster Risk Reduction

Paris Climate Agreement
Global Goals of Sustainable Development
Sendai Framework for Disaster Risk Reduction

⇨ **Define the way politicians and the public view the 21st Century's grand challenges..**

Maintaining the environmental sustainability of the planet is fundamental to our future well being and geologists are key stakeholders in this long-term sense of purpose

unesco
International Geoscience and Geoparks Programme

Geology and the Sustainable Development Goals

INTERNATIONAL GEOSCIENCES PROGRAMME-IGCP

Group Definitions		
Earth Materials, Processes & Management	Understanding of 'Earth Materials, Processes & Management' is important to one or more targets/means of implementation relating to the given SDG.	Colour
Skills & Practice	Sharing of and/or changes to geological 'Skills and Practice' is important to one or more targets/means of implementation relating to the given SDG.	Grey

Sustainable Development Goals (SDGs)			Geological Sciences: Earth Materials, Processes & Management								Skills & Practice		
			Agrogeology	Climate Change	Energy	Engineering Geology	Geohazards	Geoheritage & Geotourism	Hydrogeology & Contaminant Geology	Minerals & Rock Materials	Education#	Capacity Building#	Miscellaneous
	1	No Poverty	End poverty in all its forms everywhere.										
	2	No Hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.										
	3	Good Health	Ensure healthy lives and promote well-being for all at all ages.										
	4	Quality Education	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.										
	5	Gender Equality	Achieve gender equality and empower all women and girls.										[a]
	6	Clean Water & Sanitation	Ensure availability and sustainable management of water and sanitation for all.										
	7	Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all.										
	8	Good Jobs & Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.										
	9	Innovation & Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.										[b]
	10	Reduced Inequalities	Reduce inequality within and among countries.										[c]
	11	Sustainable Cities & Communities	Make cities and human settlements inclusive, safe, resilient and sustainable.										
	12	Responsible Consumption	Ensure sustainable consumption and production patterns.										[d]
	13	Protect the Planet	Take urgent action to combat climate change and its impacts.										
	14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.										[e]
	15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems...*										
	16	Peace & Justice	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.										[f]
	17	Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development.										

Notes

Abbreviated SDG titles from Global Goals (2015). Full SDGs from United Nations (2015a).

* (Abbreviated) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Education and Capacity Building are important to some degree within every goal.

Miscellaneous

[a] Promoting equality of opportunities to all (including access to geoscience education). Eliminating all forms of violence and discrimination against women and girls in public and private spheres.

[b] Supporting research and development.

[c] Promoting equality of opportunity, and ending discrimination.

[d] Shared responsibility to improve sustainable practice, particularly in the private sector.

[e] Increased international cooperation on marine protection and research.

[f] Transparency of payments and contracts, helping to fight corruption.

Gill, 2017

unesco

International Geoscience
and Geoparks Programme

The International Geoscience Programme (IGCP), since 1972, has harnessed the intellectual capacity of a worldwide network of geoscientists to lay the foundation for our planet's future, focusing on responsible and environmental resource extraction, natural hazard resiliency and preparedness, and adaptability in the era of a changing climate.

UNESCO Global Geoparks (UGGp) are laboratories for sustainable development which promote the recognition and management of Earth heritage, and the sustainability of local communities. As of July 2020, there are 161 UNESCO Global Geoparks within 44 Member States, covering a total area of 325,179 km².

Watch our animations: https://youtu.be/_nwC2JKQi8U, https://youtu.be/CHkxpr8HXmg, https://youtu.be/iyhtfauzctM

International Geoscience & Geoparks Programme

unesco
International Geoscience and Geoparks Programme

IGGP functions to serve as a knowledge hub of UNESCO to facilitate international scientific cooperation in the geosciences and sustainable use of natural resources, and to advance new initiatives related to geo-diversity and geo-heritage as well as geohazards risk mitigation.

Earth Sciences and Geo-hazards Risk Reduction Section
Division of Ecological and Earth Sciences

unesco
International Geoscience and Geoparks Programme

International Geoscience & Geoparks Programme

The IGGP, with its two pillar, IGCP and UNESCO Global Geoparks, aims to enable UNESCO Member States to use the UNESCO-designated sites as learning sites for inclusive and comprehensive approaches to environmental, economic and social aspects of sustainable development.

IGGP provide an opportunity for geoscientists in the understanding of the transformation of nature within the territories of the
UNESCO Global Geoparks: and elsewhere

Earth Sciences and Geo-hazards Risk Reduction Section
Division of Ecological and Earth Sciences

unesco

International Geoscience Programme

Earth Sciences and Geo-hazards Risk Reduction Section
Division of Ecological and Earth Sciences

International Geoscience Program, soon will be 50 years old

The first IGCP Scientific Board, Paris UNESCO HQ, 1973. Members, from left to right are R. Said (Egypt), F. Kabbanni (Saudi Arabia), J. Marçais (France), C, Nishiwaki (Japan), M. Oyawoye (Nigeria), D. McLaren (Canada), R. Chowhury (Germany), J. Reinemunde (USA)

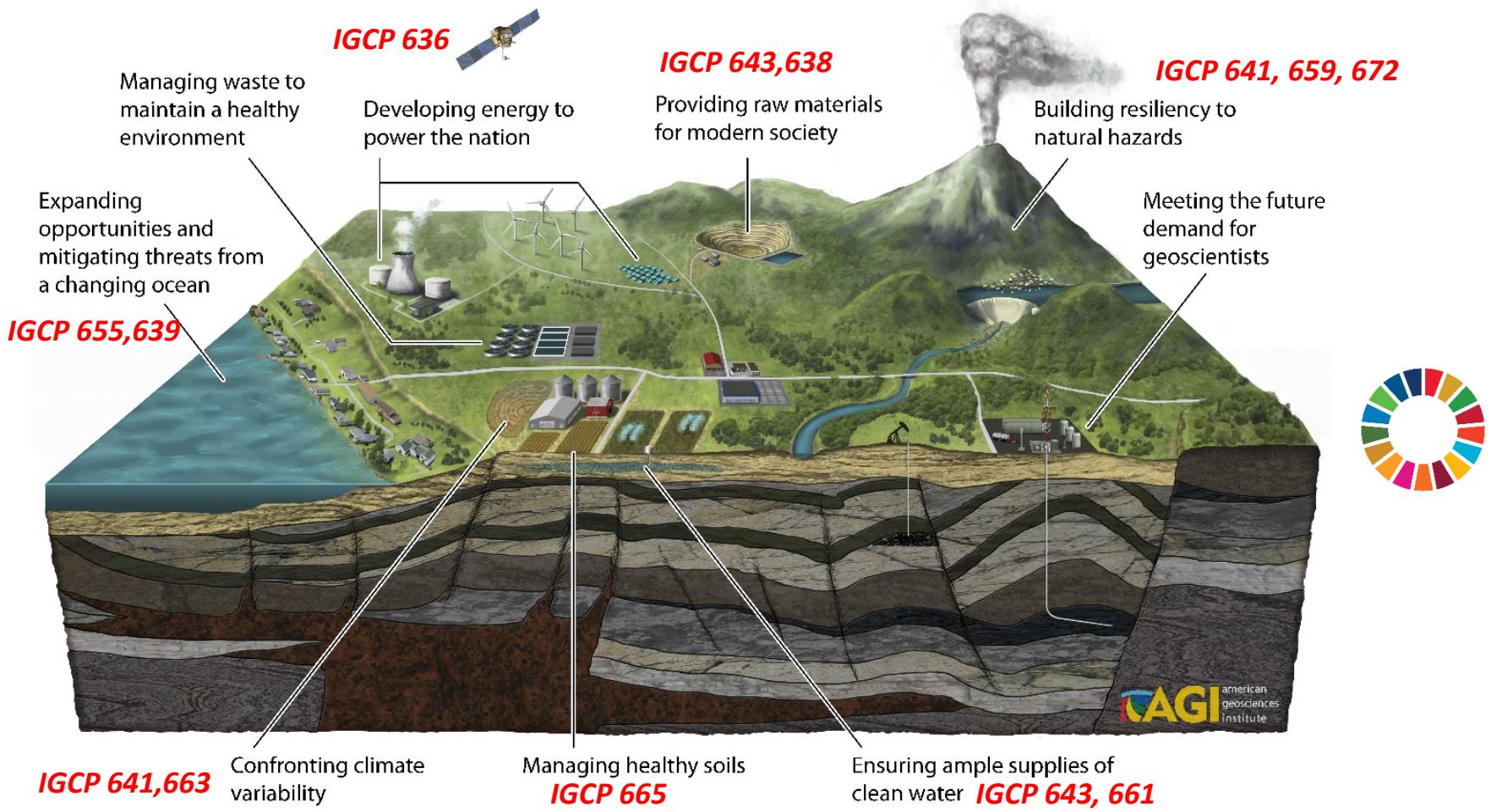
unesco
International Geoscience Programme

Since 1972, the International Geoscience Programme (IGCP) has partnered with the International Union of Geological Sciences (IUGS) and international scientific and governmental organization to bring together thousands of Earth scientists from around the world and allowed them to benefit from the cooperative spirit generated under the umbrella of UNESCO.

60 IUGS

unesco
International Geoscience Programme

NATURAL SCIENCES

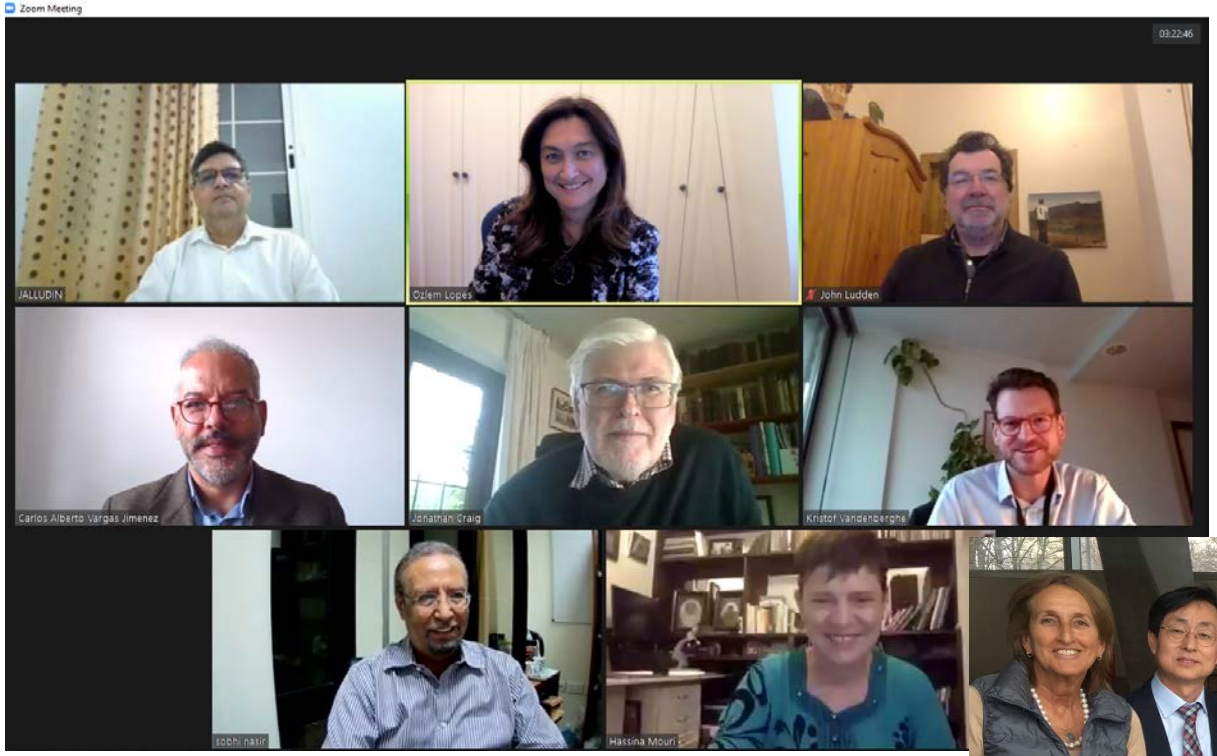


- ✓ **for sustainable use of natural resources,**
- ✓ to advance new initiatives related to **geo-diversity** and **geo-heritage,**
- ✓ as well as **geohazards risk mitigation**

unesco

International Geoscience Programme

IGCP Council members and Scientific Board members



- Ms Hassina Mouri (South Africa): Geodynamics
- Mr Jonathan Craig (United Kingdom and Northern Ireland): Earth resources
- Mr Mohammed Jalludin (Djibouti): Hydrogeology
- Mr Carlos Vargas-Jimenez (Colombia) Geohazards
- Ms Weijian Zho (China) Global Change

Earth Resources: Sustaining our Society

The call for proposals under the Earth Resources Theme will support innovative research and capability building projects in the areas of mineral resources and Geoenergy. The call will provide seed funding to projects addressing:

- environmentally responsible and innovative methods of exploration and exploitation of mineral resources and their recycling
- sustainable approaches for the exploration and extraction of energy derived from the earth such as fossil fuels, coal, peat and geothermal energy
- Carbon Capture and Storage (CCS), Geological Sequestration of CO_2

Hydrogeology: Geoscience of the Water Cycle

The call for project proposals under the Hydrogeology Theme will support innovative research and capacity building projects in the areas of water resources and services that are essential to achieving global sustainability. The call will provide seed funding to projects addressing:

- Water provision issues associated with climate change: water availability, quality and health, which are emerging critical issues for the future sustainability of our society
- Small islands developing states (SIDS) and Africa, being UNESCO priority regions, are especially vulnerable with respect to contamination and (sufficient) water supply, hence proposals addressing these regions will be given priority

Geohazards: Risk and Mitigation Assessment for Sustainable Development

The Geohazards Theme will support research projects focusing on measuring, analysing, modeling, forecasting, prediction or mitigation of natural hazards (volcanoes, earthquakes, tsunamis, floods, droughts, landslides, hurricanes, meteoric impacts, etc.) and triggered by recent human interactions (e.g. earthquakes derived from O&G industry, mining-related landslides, dam-made floods.). In this call we welcome proposals with particular emphasis in:

- Geohazards nearby metropolitan areas
- Geohazards disaster risk reduction related to human activities

- ✔ Efficient, safe, sustainable and renewable natural resources exploration and extraction
- ✔ Better understand, predict and mitigate climate change and geohazards.

Geodynamic: Control our Environment

The call for proposals under the Geodynamic Theme will prioritize projects using inter alia (geochemical, petrological, mathematical and geophysical) techniques to study deep Earth processes (ranging from changes in the Earth's magnetic field to plate tectonics) which are also relevant to natural resource exploration, distribution and management of groundwater resources and the study and mitigation of natural hazards such as earthquakes and volcanoes. IGCP 2020 project proposal call will provide seed funding to project proposals that focus on the research and capacity building for the application of multidisciplinary geosciences techniques to study:

- Earth processes with outcomes addressing global scientific, environmental, economic and societal challenges (such as responsible use of natural resources, geoheritage, geohazards and climate change mitigation) in developing countries.

Global Change: Evidence from the Geological Record

The call for projects under the Global Change Theme will support innovative research and capacity building projects in the areas of understanding earth's past climate as well as environment and ecosystem changes to learn important lessons about present-day environmental challenges and ways to mitigate and manage future environmental damage. This call will welcome proposals with a special emphasis on:

- Knowledge enhancement of the Earth's paleoclimate, paleoenvironment and paleontology, improving our ability to predict future climate and environment changes, and to provide scientific data for sustainable development strategies
- Gathering global scale geological evidence for the Anthropocene, such as geopolitical processes and human-driven species invasions on the Anthropocene environmental changes, and establishing a forum for academic exchanges of the Anthropocene Global Stratotype Section and Point (GSSP) studies

Special topics are defined annually by the Council

GEOHAZARDS: MITIGATING THE RISKS

Geohazards include earthquakes, volcanic activity, landslides, tsunamis, floods, meteorite impacts and the health hazards of geologic materials, and can range from local events such as a rock slide or coastal erosion to events that threaten humankind such as a supervolcano or meteorite impact. IGCP projects undertake research to better understand these hazards and contribute to risk management policies related to social and technical issues associated with geohazards as well as disaster mitigation.

- IGCP 659- Seismic risk assessment in Africa
- IGCP 669- Identification of seismogenic faults in populated areas of Latin America and its incorporation into seismic hazard assessment (2020)
- IGCP 672- Himalayan glaciers: assessing risks to local communities from debris cover and lake changes using new satellite data
- IGCP 692- Geoheritage for Geohazard Resilience
- IGCP 693- Seismic risk assessment in Haiti (2020)
- IGCP 701- Seismic vulnerability of buildings located on hillsides (2020)
- IGCP 705- Building Global Capacity for the Observation of Volcanic and Atmospheric Change (2020)
- IGCP 713- Changing the paradigm in observational volcano science: Community plan for the Global Volcano Observatory (GloVO) Initiative (2020)
- IGCP 719- Building Research Capacity for Coastal Resilience in West Africa
- IGCP 740- West Makran Paleo-tsunami Investigation (2020-2021)
- IGCP 718- Bringing geology and geoheritage to life
- IGCP 716- Asian Coastal Resilience Network (ACoRN)
- IGCP 725- Forecasting coastal change
- IGCP 734- REFRA-SOS (Realtime Flood Risk Assessment in developing countries using Social media, Optical and SAR satellite data)

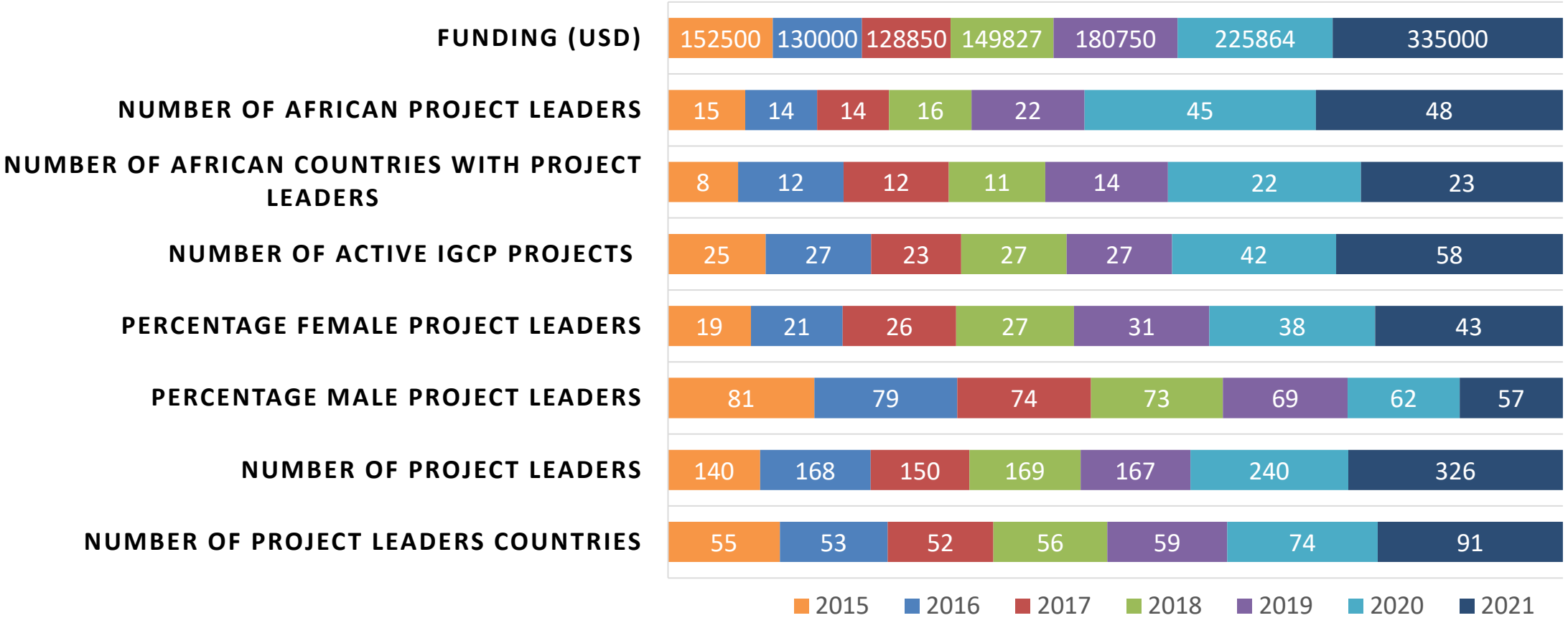
unesco
International Geoscience Programme

trainings, field trips, scientific papers, conferences to support Early career scientists

Field training exchange opportunity from IGCP

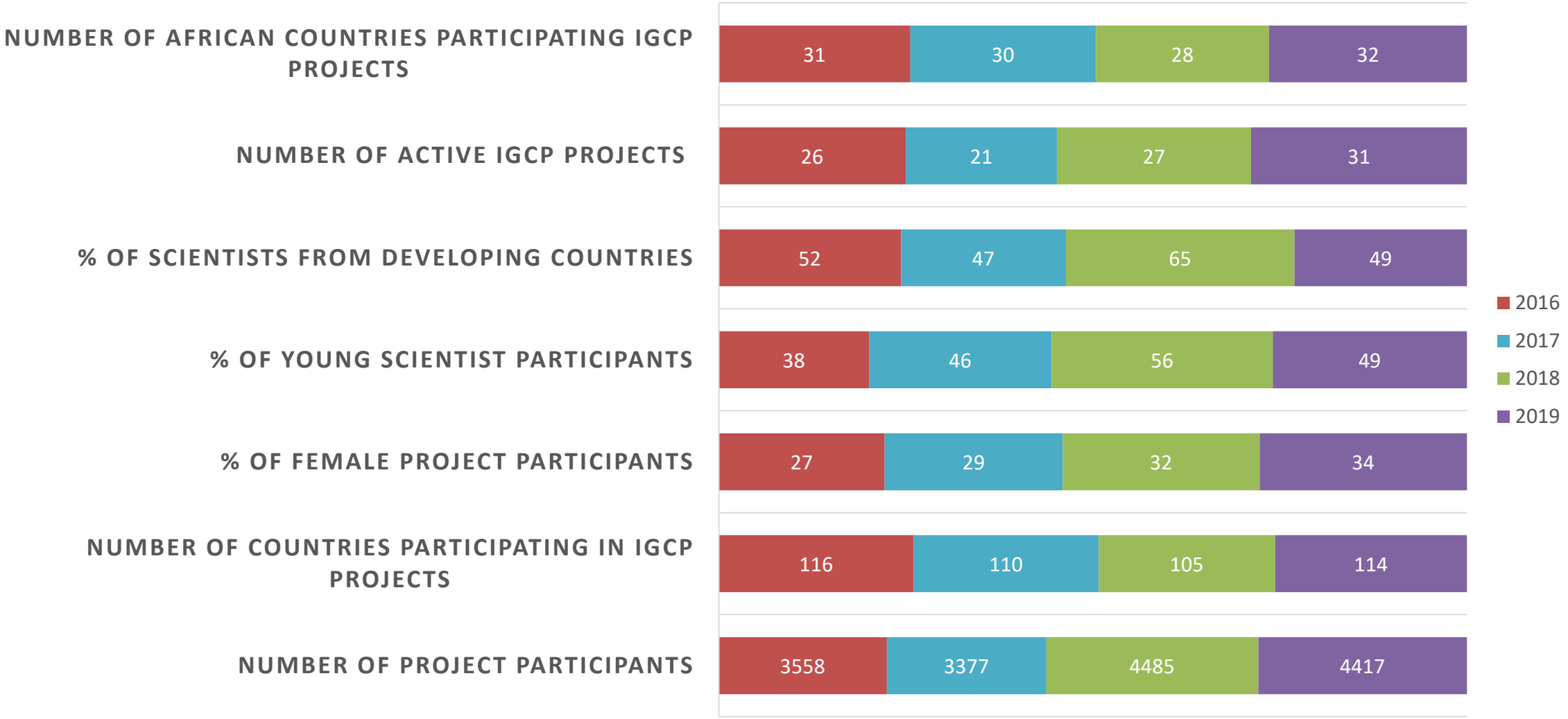
IGCP 2021 STATUS

Following the approval of 18 new and 39 ongoing projects by the IGCP Council during their 6th Council session in March 2021, **57 IGCP projects** will be delivered by **326 IGCP project leaders from 91 countries** in 2021. One area of particular interest is the gender representation; in 2021, woman geoscientists make 43% of all IGCP project leaders, the highest percentage since 2015.



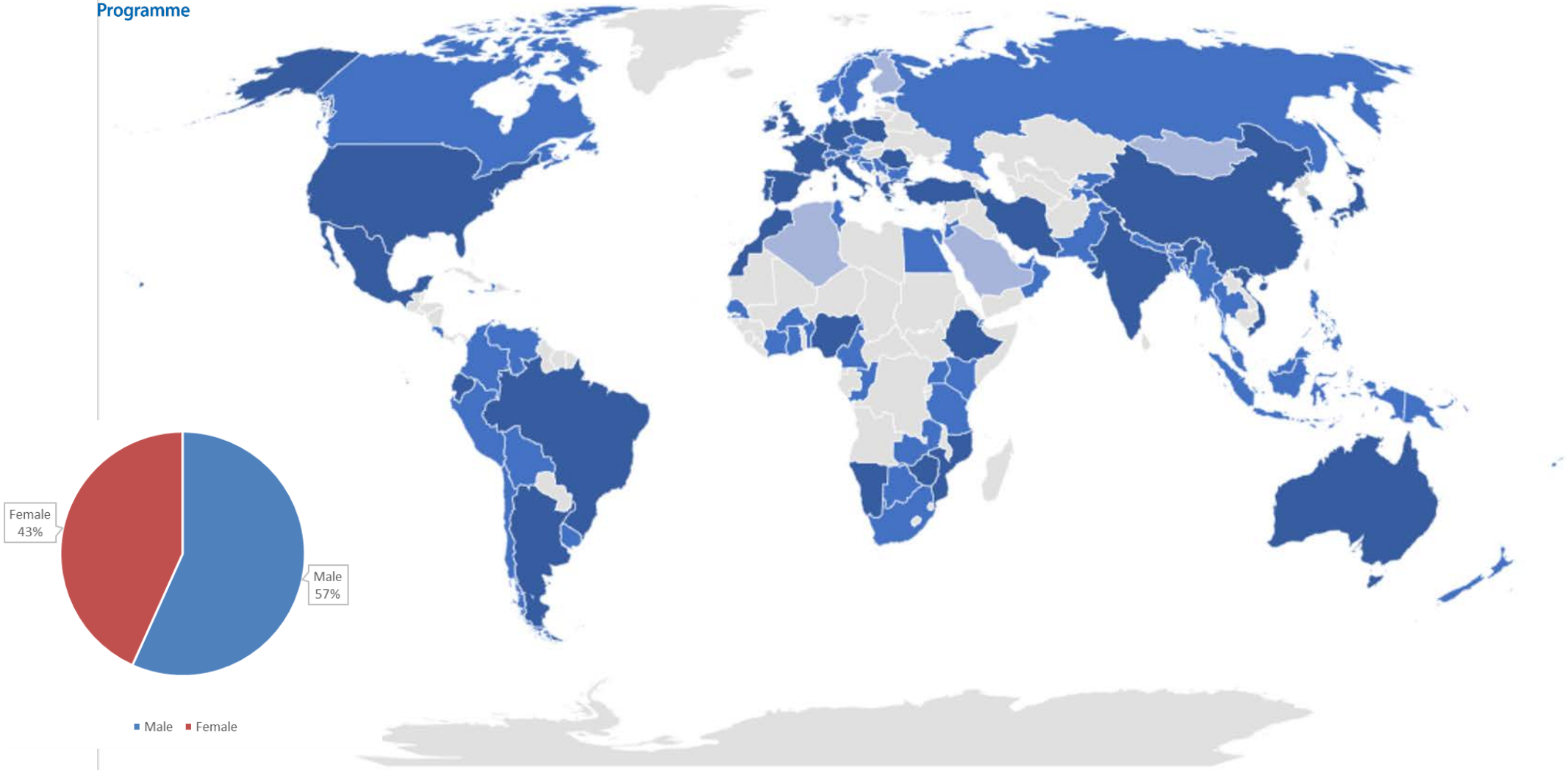
Trainings, field trips, scientific papers, conferences to support Early career scientists

unesco
International Geoscience Programme



unesco
International Geoscience Programme

Active IGCP Countries in 2021



The boundaries and names shown, and the designations used in this map do not imply official endorsement or acceptance by the United Nations

How to apply for an IGCP project

The IGCP financially supports about 30 projects per year which are assessed by a peer-review process and have a lifetime of five years. Annual funding levels range between 5,000 and 10,000 USD to be used exclusively for meetings or workshops. Additional resources are usually needed to ensure realisation of the projects' research goals, and scientists are strongly encouraged to raise such funds.Projects must focus, inter alia, on high-quality science, be of international importance and societal relevance, show interdisciplinary cooperation, and constitute international participation, including scientists from developing countries.Project proposals may be submitted by individuals or groups to the IGCP Secretariat accompanied by a letter of endorsement (if possible) from one of the project leader's National IGCP Committees. Project leaders are strongly advised to inform the UNESCO National Commission representatives and UNESCO Permanent Delegation of their home country.

Deadline for project proposals: 15 september 2021

- **Project proposal form (.pdf)**
- **IGCP Operational Guidelines**

IGCP PROJECT PROPOSAL CALL

The Council of the International Geoscience Programme (IGCP) agreed, during the 6th Council session in March 2021, to launch new call for project proposals to promote collaborative projects under UNESCO umbrella with a special emphasis on the benefit to society, capacity-building, and the advancement and sharing of knowledge between scientists.

The call emphasizes and prioritizes proposals addressing the Vision Themes and annually defined topic of the IGCP detailed below. We also welcome proposals that include Artificial Intelligence (AI), big data and cloud computing methodologies for application in the Geosciences.

Women, young and early career scientists from developing countries are especially encouraged to apply. Proposals will be ranked taking into account gender equality, geographic distribution of the leaders, project beneficiaries. The top multidisciplinary project will receive a Council Award and special funding.

Successful projects will be sponsored for up to five years jointly by UNESCO, the International Union of Geological Sciences (IUGS), the Jeju Province Development Corporation (JPDC) of the Republic of Korea and the UNESCO National Commission for the People's Republic of China.

For the year 2021, only one special topic has been agreed on during the 6th council meeting held in March 2021. "Enhancing Societal Acceptance of the Sustainable Development of Earth's Geological Resources".

- **Call for application 2021 (.pdf)**

If you are a scientist wishing to submit a research proposal of relevance to one of the aforementioned topics, please contact:

- Ozlem Adiyaman Lopes
- Marie-Laure Faber

unesco
International Geoscience Programme

United Nations Educational, Scientific and Cultural Organization

Sustainable Development Goals

UNESCO Designated sites

- World Heritage **sites**,
- Biosphere Reserves and
- **UNESCO** Global Geoparks

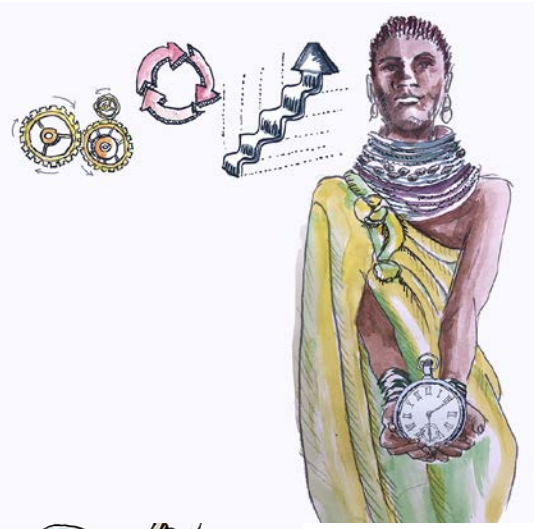
promote sustainable development, and focus on the protection of natural and cultural heritage or the conservation and sustainable use of biodiversity and geological resources.

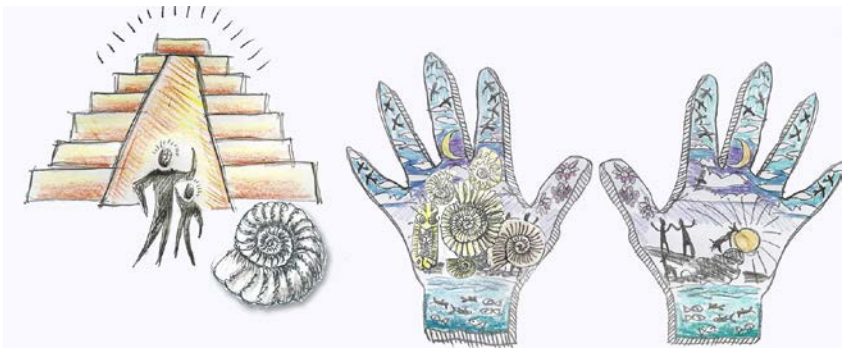
PATRIMONIO MUNDIAL · WORLD HERITAGE · PATRIMOINE MONDIAL

MaB UNESCO Man and the Biosphere Programme Programme sur l'homme et la biosphère

unesco Global Geopark

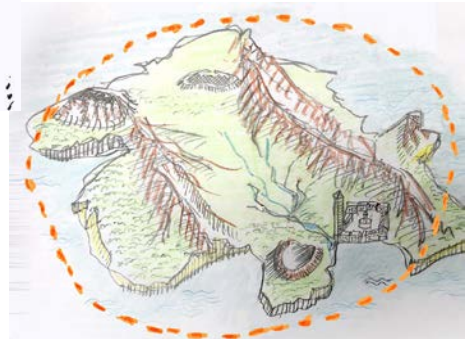
Most recent UNESCO site designation

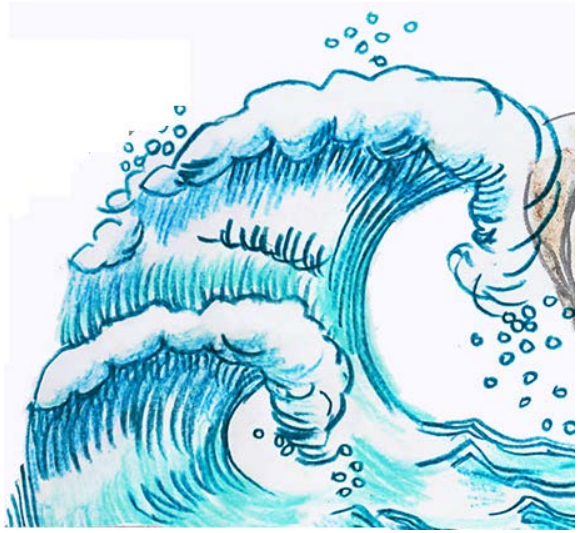




unesco

Global Geopark





unesco
Global Geopark

161 Unesco
Global Geoparks
in 44 Member States

UGGP Capacity Building Activities

unesco Global Geopark

NATURAL SCIENCES

Regional Workshops:
Cao Bang, Vietnam
Qeshm Island, Iran
Mexico
Uruguay
Colombia
Yangan Tau (RF)

Intensive Courses:
Lesvos
Beijing

Field visits:
Muscau Arch, Germany/Poland
Mongolia
Vietnam

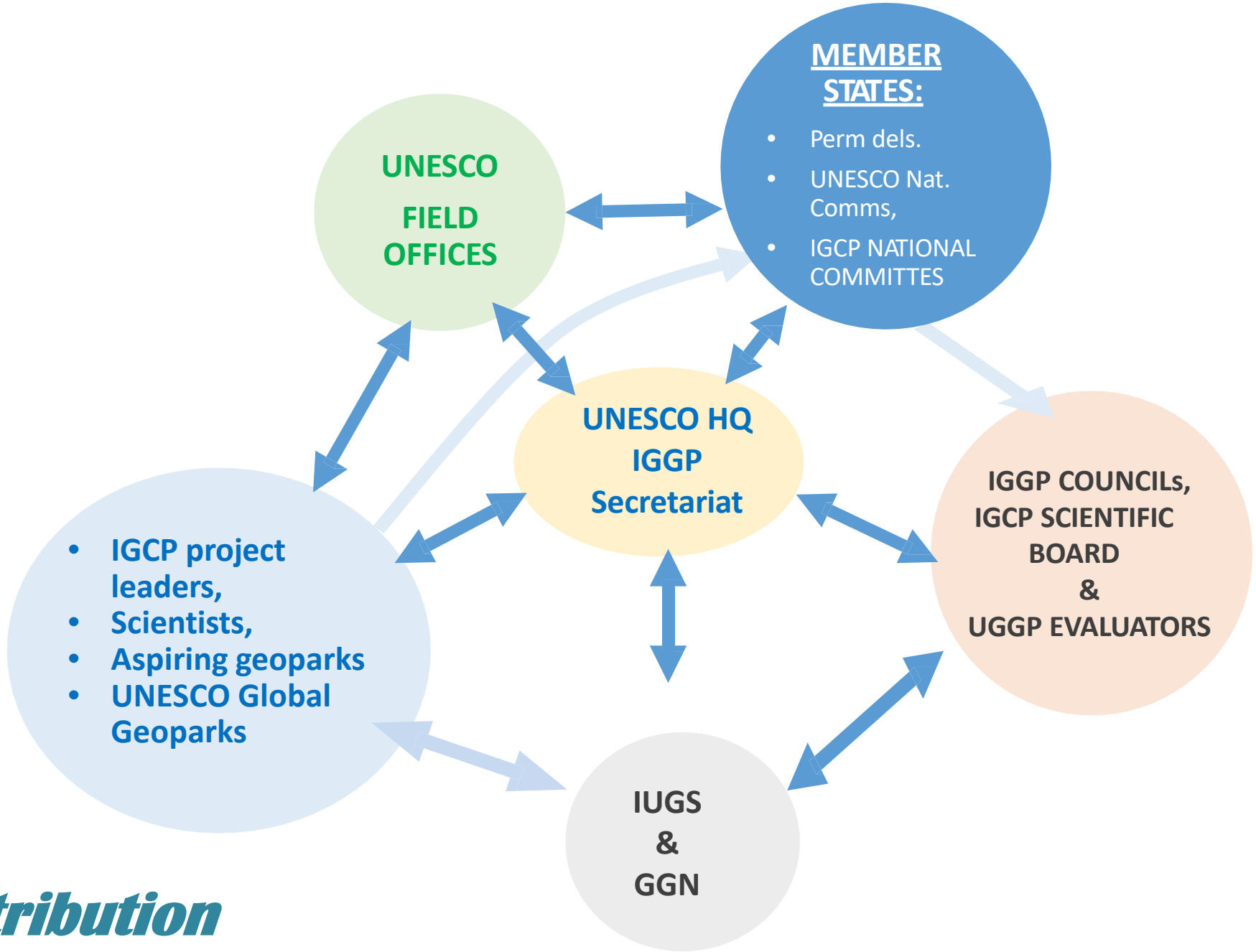
Mentorship Exchange:
New initiative launched in 2019

unesco

International Geoscience and Geoparks Programme

Sustainable Development Goals

STAKEHOLDERS



UNESCO's contribution

Click on the SDG to find out how IGCP supports them !

IGCP's contribution to the Sustainable Development Goals

unesco
International Geoscience Programme

How does Earth Sciences contribute to the implementation of the SDG's ?

Geoscience, or Earth Science, is the study of the Earth. This includes its surface and the processes that shape it but also its interior and the dynamics that occur beneath the crust. Through the study of the oceans, the atmosphere, rivers and lakes, ice sheets and glaciers, volcanoes and earthquakes, earth science aims to understand how these systems work today, how they operated in the past and to predict how they may behave in the future. The study of geoscience also covers how living things, including humans, interact with the Earth, for example, through the resources we use or how water and ecosystems are interconnected. The overall aim of the SDGs is to pave the way for a sustainable world and, as it is demonstrated in this booklet, geoscience is at the core of this mission. This discipline has the ability to grasp the complex interconnections between the atmosphere, hydrosphere, lithosphere cryosphere, giving
biosphere, and a unique whole-planet perspective of the Earth system. However, it suffers from inherent limitations - incomplete data, lack of experimental control or the inability to make direct measurements - that are related to the fact that geoscience studies a 4.6 billion year old planet where most events occur at temporal scales much larger than the human lifetime. These challenges are very similar to those faced by sustainability science. It therefore becomes evident that geoscience is paramount for the successful implementation of the Sustainable Development Goals.

Sustainable Development Goals

THANK YOU

Özlem Adiyaman Lopes (PhD)
Earth Sciences and Geo-hazards Risk Reduction Section
Division of Ecological and Earth Sciences

How UNESCO contributes to society by supporting Earth Sciences:

•(Video available in: English(link is external) | Français(link is external) | Español(link is external) | Русский(link is external) || Japanese(link is external) | Korean(link is external))