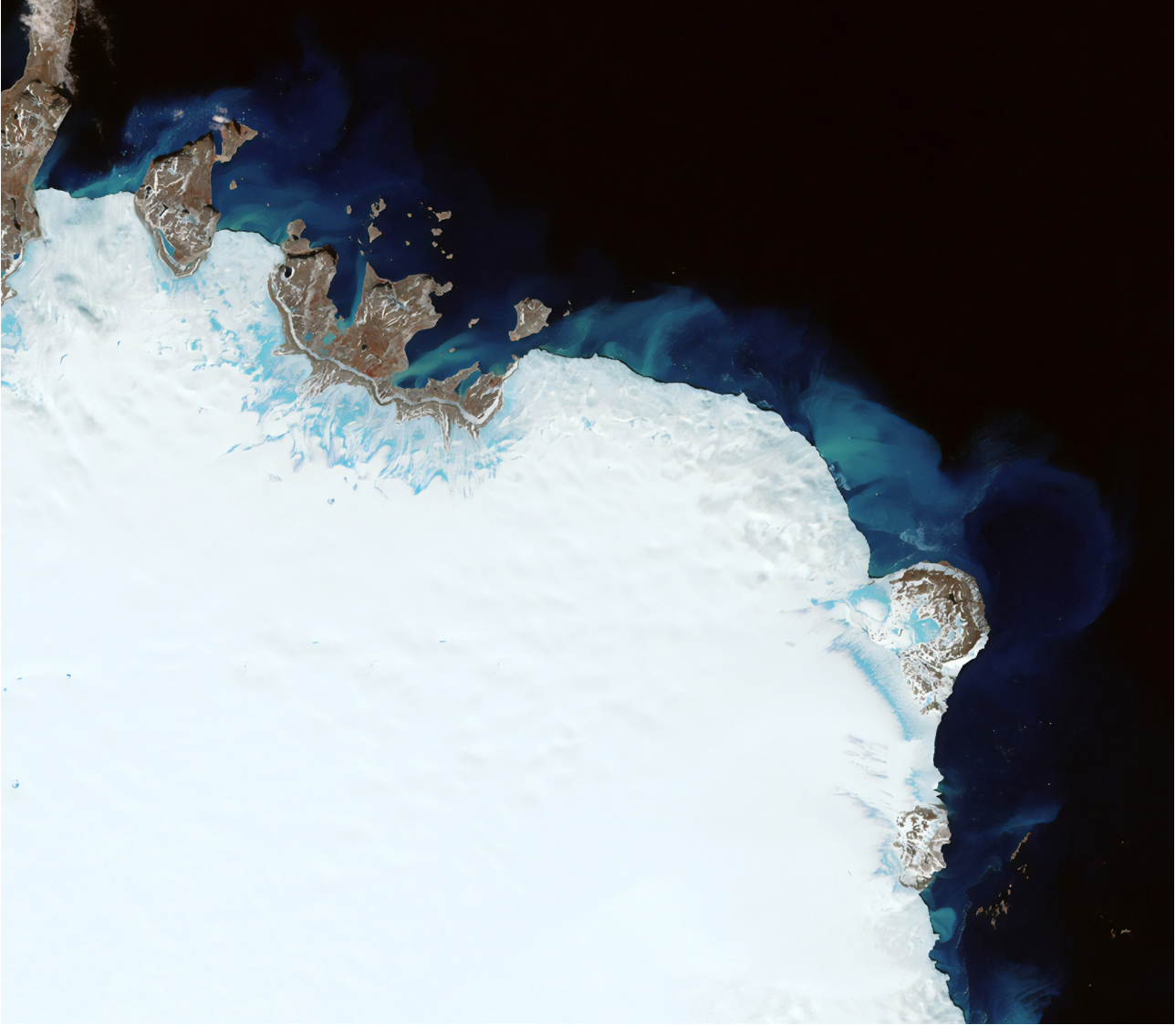


GEO Climate Policy and Finance Workshop

Outcomes Report 21-23 September 2021





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Citation: GEO (2021). GEO Climate Policy and Finance Workshop - Outcomes Report.

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Acknowledgements: We would like to thank all presenters, moderators and contributors to the workshop, notably Patricia Cummins (Esri), Emma Fernandes (Canadian Space Agency), Delali Kemeh (GEO consultant), and Patrick Taylor (NASA) for supporting the report preparation.

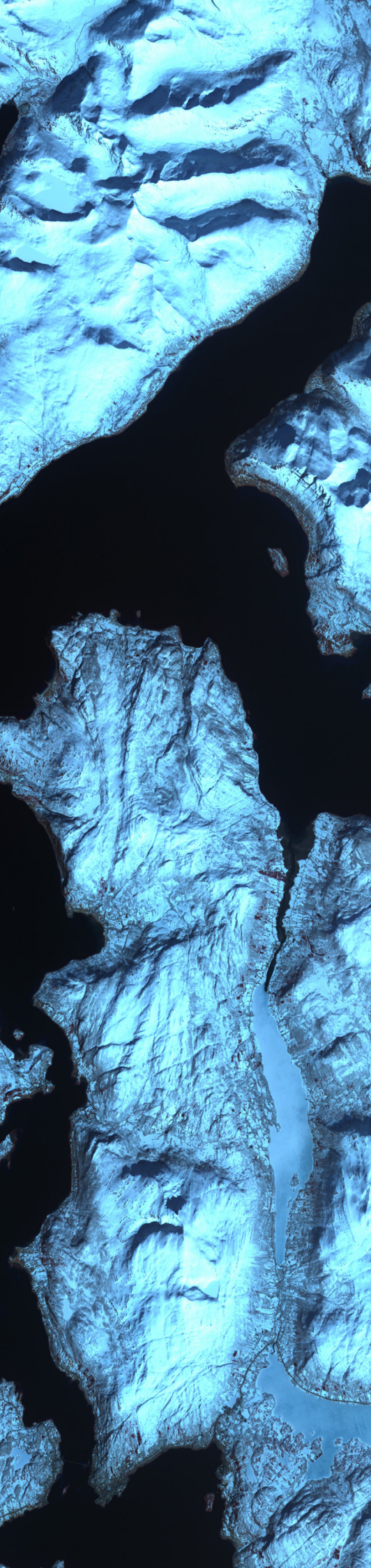


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Abbreviations

Acorn - Agroforestry CRUs for the Organic Restoration of Nature

AFOLU - Agriculture Forestry and Other Land Use

AMIS - Agricultural Market Information System

ARA - Adaptation Research Alliance

AWS - Amazon Web Services

BC3 - Basque Centre for Climate Change

CC-WG - Climate Change Working Group

CENIGA - National Center for Geoenvironmental Information - Centro Nacional de Información Geoambiental

CEOS - Committee on Earth Observation Satellites

CGMS - Coordination Group for Meteorological Satellites

CIS - Commonwealth of Independent States

CM4EW - Crop Monitor for Early Warning

CNES - National Centre for Space Studies - Centre National D'Etudes Spatiales

CoP - Community of Practice

COP26 - 26th Conference of the Parties

DE Africa - Digital Earth Africa

Defra - UK Department for Environment, Food and Rural Affairs

DRR - Disaster Risk Reduction

EBVs - Essential Biodiversity Variables

ECMWF - European Centre for Medium-range Weather Forecasts

ENEE - National Electric Energy Company - Empresa Nacional de Energía Eléctrica

EO - Earth Observation

ESA - European Space Agency

ESG - Environmental and Social Governance

ESRIN - European Space Research Institute

ESVs - Essential Societal Variables

FAIR - Findable, Accessible, Interoperable, and Reusable

FAO - Food and Agriculture Organization

FCI - Finance, Competitiveness and Innovation Global Practice

HPI - Human Planet Initiative

GCF - Green Climate Fund

GCOS - Global Climate Observing System

GEO - Group on Earth Observations

GEO BON - GEO Biodiversity Observation Network

GEOGLAM - GEO Global Agricultural Monitoring

GEOGloWS - GEO Global Water Sustainability

GEO Mountains - Global Network on Observations and Information in Mountain Environments

GFOI - Global Forest Observations Initiative

GHG - Greenhouse gas

GIZ - German International Cooperation- Deutsche Gesellschaft für Internationale Zusammenarbeit

GWIS - Global Wildfire Information System

ICIMOD - International Centre for Integrated Mountain Development

IMEO - International Methane Emissions Observatory

IPCC - Intergovernmental Panel on Climate Change

JAXA - Japan Aerospace Exploration Agency

JRC - Joint Research Centre

LAC - Latin America and the Caribbean

LDCs - Least Developed Countries

MGD - Methods and Guidance Documentation

MINAE - Costa Rica Ministry of Environment, Energy, and Telecommunications - Ministerio de Ambiente y Energía

MRI - Mountain Research Initiative

MRV - Measurement, Reporting, and Verification

NAP - National Adaptation Plan

NASA - National Aeronautics and Space Administration

NOAA - National Oceanic and Atmospheric Administration

NDC - Nationally Determined Contribution

OGMP - Oil and Gas Methane Partnership

PROFOR - Program on Forests

REDD+ - Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries

SCO - Space Climate Observatory

SDGs - Sustainable Development Goals

SIDS - Small Island Developing States

SOFF - Systematic Observations Financing Facility

SPC - The Pacific Community

TCFD - Task Force on Climate-related Financial Disclosures

TOPC - Terrestrial Observation Panel for Climate

UK - United Kingdom

UN CBD - United Nations Convention on Biological Diversity

UNDP - United Nations Development Programme

UNEP - United Nations Environment Programme

UNEP FI - United Nations Environment Programme Finance Initiative

UNITAR - United Nations Institute for Training and Research

UNFCCC - United Nations Framework Convention on Climate Change

UNOSAT - United Nations Satellite Centre

UNOOSA - United Nations Office for Outer Space Affairs

USGS - United States Geological Survey

WGIC - World Geospatial Industry Council

WMO - World Meteorological Organization

WTW - Willis Towers Watson

GEO Climate Change Working Group

Background

The Group on Earth Observations (GEO) Climate Change Working Group (CC-WG) was established in 2020 to develop and implement a comprehensive GEO strategy to advance the use of Earth observations (EO) in support of climate adaptation and mitigation. This includes actions related to the Paris Agreement on climate change.

The CC-WG supports the translation of the Canberra Declaration adopted at the 2019 GEO Summit into concrete actions within the GEO Work Programme, and ultimately drives actions to promote the GEO climate engagement priority.

The CC-WG is one out of four Working Groups established as part of the GEO 2020-2022 Work Programme: they focus on the key issues related to Climate Change, Disaster Risk Reduction, Capacity Development, and Data.

The CC-WG itself is structured into four subgroups, whose duties involve improving coordination and uptake of GEO Work Programme activities relevant to climate change, supporting countries' action within the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC), and strengthening the collaboration with GEO's partners in the climate domain including the World Meteorological Organization (WMO) and the Committee on Earth Observation Satellites (CEOS).

The CC-WG is composed of almost 100 members covering a wide range of countries, the typology of members varies widely, including government, academia, UN agencies and intergovernmental organisations, non-governmental organisations, and the commercial sector. A multitude of GEO members directly contributed to the CC-WG Climate Policy and Finance Workshop.

Fig.1- Structure of the GEO Climate Change Working Group



GEO Climate Policy and Finance Workshop

Theme, aim and structure

The theme of the GEO Climate Policy and Finance Workshop was “EO for climate ambition” which reflected the focus on the role of EO in supporting national climate action and the overall Global Stocktake process under the UNFCCC Paris Agreement.

The workshop built upon the outcomes and recommendations from the first GEO Climate Workshop held in 2018 and the GEO Plenary in 2019.

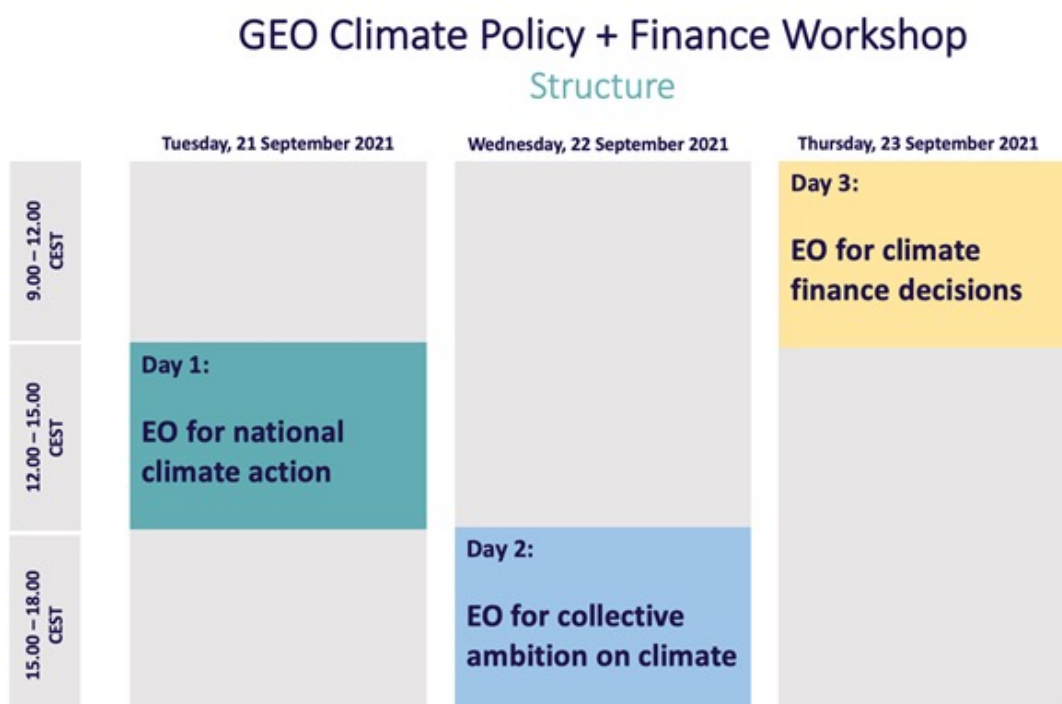
The main objective of the 2021 GEO Climate Policy and Finance Workshop was to present the results of ongoing activities of the GEO CC-WG and to foster collaboration with key EO and climate partners. The workshop also aimed to explore the role of EO to support investment decisions for climate resilience, measure the level of

readiness in the GEO community, and expand relevant collaborations with the sustainable finance sector.

Ultimately, the workshop aimed to help GEO prepare for the upcoming 26th Conference of the Parties (COP26) to the UNFCCC, held in Glasgow, UK, from 31 October to 12 November 2021.

The workshop was held as a virtual event from 21 to 23 September 2021. The three-day event included two days dedicated to EO in support of climate policy on national and global scale, and a third day dedicated to EO as a basis for climate finance decisions. The timing of the dedicated 3-hour sessions were chosen to allow for a global reach and participation, covering all time zones from the Americas to Asia and Oceania.

Fig.2 - GEO Climate Policy and Finance Workshop structure and focus topics



Key outcomes

The Climate Policy and Finance Workshop established three clear and actionable outcomes, in relation to the ongoing efforts across the GEO Work Programme activities:

1. The workshop brought clarity on the unique contribution and role of GEO especially with regard to the support to climate adaptation which appears to be the main focus of the current Work Programme. The process to seek a mandate under the UNFCCC for GEO to deliver on this area of support has been initiated at COP26 and will be further pursued.
2. The workshop officially launched a new Climate Finance workstream within GEO to be implemented in 2022, which will involve opportunities to apply EO as a critical tool to unlock finance for climate projects in developing countries funded by public funds. As well as opportunities to use EO to support private investment decisions, asset-level management and risk assessments by corporates and banks, pension funds, and insurance companies.
3. The workshop strengthened engagement and built new collaborations among GEO members, participating organisations and prospective

associates from the sustainable finance industry and beyond.

Notably, the newly launched GEO Climate Finance workstream aims at closing the gap between the EO and climate finance communities. The proposed workstream, through the agency of the GEO CC-WG, will address two priority areas where the GEO community can play a critical role in order to drive knowledge sharing and climate action forward:

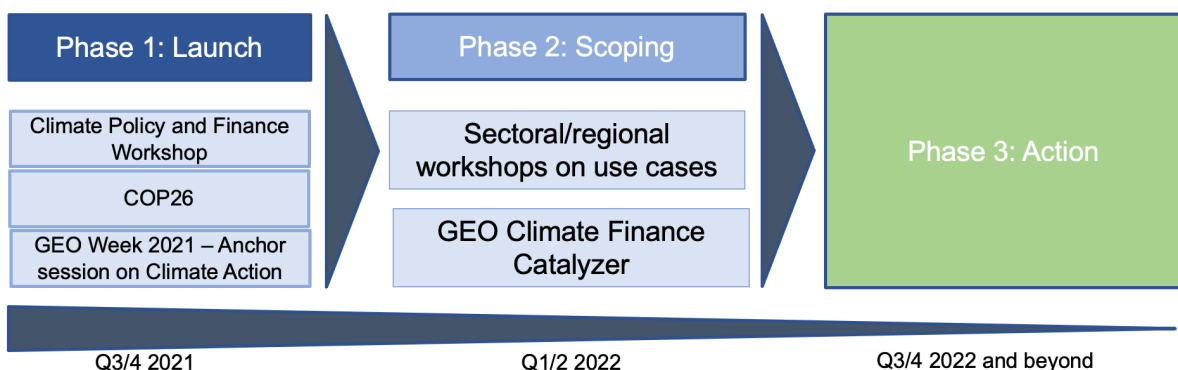
1. Strengthening the evidence base with EO to support beneficiary countries in improving their access to public climate finance and enable greater adoption of adaptation projects and programmes.
2. Providing EO-based data and information on climate change impacts to improve risk assessments by financial institutions and corporates and ultimately increase private sector investments in climate resilience.

More detailed inputs, discussions, and outcomes of the three-day event are contained in the next sections of this report.

Fig.3 - Overview of outcomes of the GEO Climate Policy and Finance Workshop



Fig.4 - Outline of the proposed phases of the newly launched GEO Climate Finance workstream



Workshop contributions and participation

The workshop featured 35 presentations by 57 speakers from international organizations, private sector and the EO community.

Fig.5 - Overview of all participating entities



In total, 300 attendees participated in the workshop over the course of three days with a peak of about 200 at one time, covering GEO members as well as non-member countries. Regarding regional distribution, most participants joined from Europe, followed by the Americas, Africa, Asia and Oceania, as well as GEO non-member states and the Commonwealth of Independent States (CIS). Despite the consideration to adapt to the Asia and Oceania time zone, participation from the region could not be increased significantly.

Fig.6 - Workshop participation: total per day

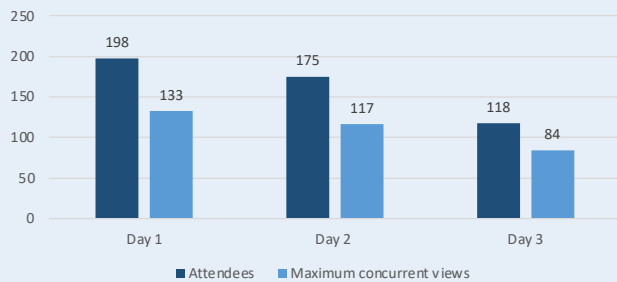
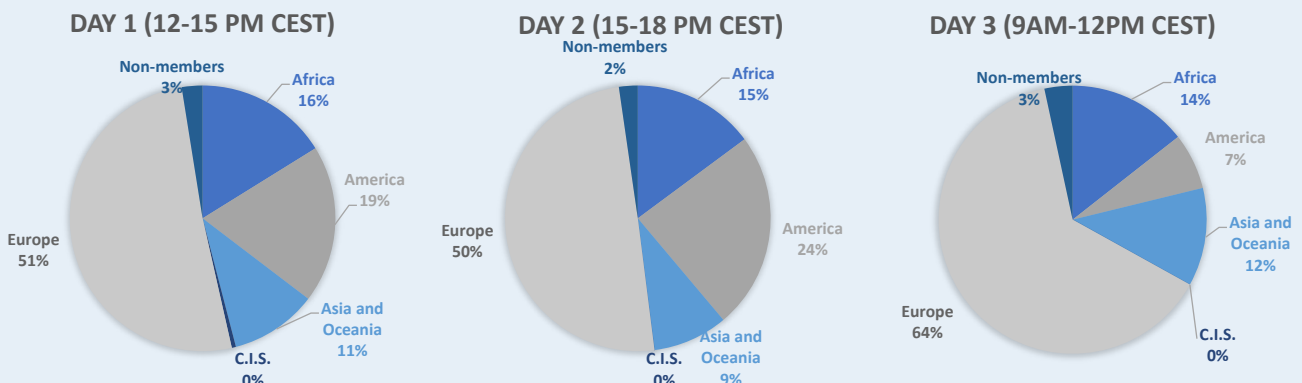
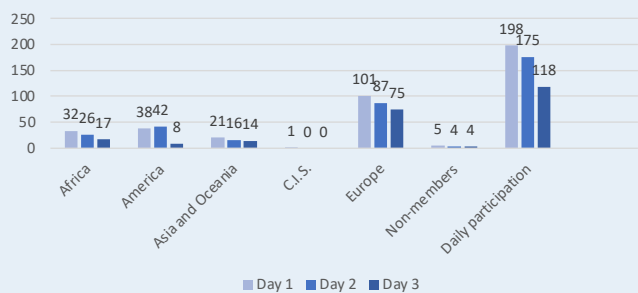


Fig.7 - Workshop participation: regional breakdown



Workshop summary and key takeaways

Day 1: EO for national climate action

The first day was focused on national action, and included keynote presentations by the UNFCCC Secretariat and the Chief Scientific Adviser's Office at UK Department for Environment, Food and Rural Affairs (Defra) for insights on the climate negotiations process involving EO and updates on the upcoming COP26.

These were followed by presentations on EO needs for climate action across the GEO community including views from Least Developed Countries (LDCs), Small Island Developing States (SIDS), Latin America and Caribbean (LAC) countries, mountain nations, and the GEO Indigenous Alliance.

GEO Work Programme leads presented on current efforts to support climate action at the national level including: GEO Global Agricultural Monitoring (GEOGLAM), GEO Global Water Sustainability (GEOGLoWS), GEO Blue Planet, Space Climate Observatory (SCO), and Digital Earth Africa (DEAfrica).



KEY TAKEAWAYS:

- **While varying by region EO data gaps to support climate action are felt especially by LDCs and SIDS, but the need for partnerships and capacity development is shared by all**
- **Adaptation is global due to the different scales of action required to increase resilience, while mitigation is national because countries are bound to reduce emissions according to nationally determined targets under the Paris Agreement**
- **Robust and transferable EO data are critical to provide evidence of climate change and to develop on-the-ground solutions - matching EO supply with the needs is the key issue**
- **GEO Work Programme covers a variety of critical sectors (i.e. agriculture, oceans, forests, wetlands, mountains, biodiversity, urban) for adaptation and mitigation**
- **The most mature GEO Work Programme activities can already provide effective and targeted EO tools, applications and products for climate action**
- **Preliminary result of the GEO Work Programme mapping show that climate adaptation seems to be the key expertise across GEO activities**

Session 1: Countries' EO needs to support climate action

KEY QUESTION

What are the most critical EO needs to support climate action at the national level?

Partnerships across all scales

Clear and robust EO applications for adaptation

Cross-learning and knowledge sharing

Improving National GHG Inventories

Closing EO blind spots in LDCs and SIDS

- EO data serve as critical tools to support climate action: data must be clear, robust and calibrated to be used inclusively, in order to serve policy makers for decisions
- EO data can monitor the impact of climate action, when used before and after an intervention
- There is a need to improve National Greenhouse Gas (GHG) Inventories using EO and out-of-the-box ideas
- Stakeholders have similar challenges and needs with regard to the capabilities of EO applications and services needed to support vulnerability assessments and adaptation solutions
- Frameworks and guidelines are needed to support the transformation and stakeholders involved
- Institutions need to be more flexible and innovative
- on the emerging data needs and work in a more transdisciplinary way
- Integration from like-minded stakeholders needs to be found and linked together through sharing experiences and exchanging lessons learnt, for instance through Community of Practices (CoP) with a focus on needs-based solutions
- Partnerships are key to accessing actionable EO information internationally, across regions, within a region, as well as with marginalized communities and Indigenous peoples
- Close data blind spots for SIDS and LDCs is critical, by acting on systems and services that transform EO data and imagery into actionable information

Session 2: GEO Work Programme activities supporting national climate action

KEY QUESTIONS

How can GEO most effectively support national climate action with EO-based products?

What should be the "GEO niche" in supporting the implementation of the Paris Agreement?

Are there any perceived gaps or synergies in the GEO Work Programme to address national climate action?

If so, how should these be addressed or exploited?

Activating stakeholders within GEO community

Relevance of GEO activities for adaptation at national level

Driving standards and processes for data collection

Scaling up innovative solutions

Turning EO and research into products and services

- GEO sits at the interface between observations and EO applications for climate action
- Preliminary results of the GEO Work Programme mapping show that climate adaptation seems to be the key expertise across GEO activities
- GEO activities currently support the outreach to user bases, for instance in Africa and the Americas, and capacity development on EO on a national and regional level
- There is need for GEO to support the development of data standards of land cover products (aligned with the IPCC Guidelines) to create consistent and comparable data for national climate action
- GEO Work Programme activities aim to strengthen the role and value of EO for national governments across all GEO regions: there is a need for increased awareness for necessary investments in EO products and services to improve national decision making
- Initiatives such as GEOGLAM, GEO Blue Planet and GEOGLoWS are well positioned to support the development of technical guidance on integrating EO into National Adaptation Plans (NAPs) for different sectors
- GEO has a far-reaching and large community at the national level, as well as organizations, and a multidisciplinary work plan. There is an opportunity for integration across GEO communities, as all climate change, Disaster Risk Reduction (DRR) and Sustainable Development Goals (SDGs)-related challenges require integrated responses
- GEO is in a unique position, due to its structure and governance, to drive science-integrated information production to scale up and improve response to challenges
- Mobilising additional resources is a prerequisite for GEO to play a critical role in changing the current paradigm towards integrated solutions

Day 2: EO for collective climate ambition

The second day was focused on how EO can support collective ambition on climate. Ratcheting up ambition to reduce GHG emissions is part of the Global Stocktake process under the Paris Agreement, which is intended as a 5-year cycle of assessments of the progress made jointly by countries on mitigation, adaptation and means of implementation, to be followed by renewed national commitments to meet the Paris Agreement goals.

Keynote presentations by the UNFCCC Secretariat, IPCC, and the Coalition for Rainforest Nations provided the background information on the process and insiders' perspectives on EO needs and gaps.

This was followed by presentations on the technical capabilities of space agencies, commercial satellite companies, and other international initiatives supporting global mitigation efforts.

GEO Work Programme initiatives then presented their possible contribution to the Global Stocktake, including the Global Forest Observations Initiative (GFOI), GEO Blue Planet, Global Wildfire Information System (GWIS), Global Network on Observations and Information in Mountain Environments (GEO Mountains), GEO Biodiversity Observation Network (GEO BON), and GEO Human Planet Initiative (HPI).



KEY TAKEAWAYS:

- **There is need for consistent, accurate and transparent National GHG Inventories where EO can play a critical role**
- **There is an opportunity to integrate space-based EO data into national GHG reporting and the Global Stocktake, including from public and commercial satellites, and partnerships with industry**
- **To enable successful integration of EO, there is a need to build trust across stakeholders and clear frameworks and mechanisms**
- **The topics of "biodiversity" and "ocean" are increasingly important in the climate science and policy domain, where EO can contribute critical indicators to global assessments**

Photo credit:
USGS

Session 1: EO needs towards the Global Stocktake

Session 2: EO requirements for the Global Stocktake

KEY QUESTIONS

How can the broader EO community involving public and private initiatives most effectively support the needs around the Global Stocktake?

Are there any immediate capabilities and how should these be exploited to support the Global Stocktake? What additional capabilities should be developed?

EO to provide critical aggregate data and indicators

National GHG inventories need to be consistent, accurate and transparent

Highlighting the role and efforts of government space agencies

Private sector to play important role to contribute specific EO data

Closer collaboration needed with countries, companies, and other stakeholders

- EO data on climate variables play a critical role for the Global Stocktake as aggregate information is needed for mitigation and adaptation
- Coupling bottom-up and top-down approaches to measure GHG, including activity data and emission factors such as biomass and fires, can lead to more consistent, accurate and transparent GHG inventories and aggregate assessments under the Global Stocktake
- GEO plays a critical role in providing not only the capacity for EO data, but also partnerships and cooperation to support countries
- While the role of government space agencies is key to monitor global GHG emissions, it is important to encourage private sector efforts to be included in the Global Stocktake, as they provide specific, relevant EO data, complementary to public sector contributions
- There is a need for integrated Earth system approach, linking EO and other data of different disciplines, as well as making it user-friendly and solution-oriented
- It is critical to collect and integrate asset-level data from companies generating the bulk of GHG emissions, to provide information and guidance for decision making on mitigation

Session 3: GEO Work Programme activities supporting the Global Stocktake

KEY QUESTIONS

How can GEO support the Global Stocktake with targeted EO-based products?

Are there any perceived gaps or synergies in the GEO Work Programme to address the Global Stocktake? If so, how should these be addressed or exploited?

Operational guidelines for big EO data

Global biodiversity and ocean indicators

Focus on EO data hotspots

Increase trust for globally provided data

Link efforts on climate change adaptation and DRR

- There is interest in having operational guidelines on the use big EO data for reporting on GHG emissions, along the lines of the IPCC Guidelines, to increase understanding for stakeholders and wider community
- The topics of "biodiversity" and "ocean" are becoming increasingly important in the context of climate action, where EO can contribute critical indicators to global and national assessments especially on adaptation where they are lacking
- There is an opportunity to link existing efforts by GEO activities under the UN Environment Programme (UNEP) and UN Convention on Biological Diversity (UN CBD) on monitoring global indicators that could also be used for reporting under the UNFCCC
- GEO activities could consider data hotspot and encourage collaboration with neighboring countries to harness and cover potential sources
- Trust needs to be built between governments and data providers to utilize global data products
- GEO is well positioned to connect adaptation and DRR efforts and related activities of the GEO community

Day 3: EO for climate finance decisions

The third day was dedicated to EO and climate finance. An overview of relevant initiatives on public sector finance involving EO was provided by international organisations, including the Green Climate Fund (GCF), the United Nations Satellite Centre of the United Nations Institute for Training and Research (UNOSAT- UNITAR) and the Commonwealth Secretariat, and WMO.

This was followed by presentations on private sector finance involving EO, including the World Bank, UNEP Finance Initiative (UNEP FI), Rabobank, Satellite Applications Catapult, German International Cooperation Organization (GIZ), HKV, Allianz Re, and Willis Towers Watson (WTW).



KEY TAKEAWAYS:

- **There is improved awareness among the GEO community of how EO services and products can inform investment decisions that build resilience to climate change, from both public and private sector entities**
- **EO can serve as a critical tool to unlock public finance, by strengthening the evidence base in project proposals for adaptation and mitigation, and providing critical data for monitoring and evaluation**
- **EO provides a multitude of opportunities to support private investment decisions, asset-level management and risk assessment by corporates and banks, pension funds, collaborations with insurance and other financial service industry products**
- **A dedicated GEO Climate Finance workstream to involve the GEO community in these opportunities in 2022 has been launched**

Photo credit:
NASA

Session 1: EO in support of public climate finance

KEY QUESTIONS

How can EO support better access to climate finance by developing countries?

How can the GEO community contribute to ongoing or new initiatives?

LDCs and SIDS can benefit from EO data to access climate finance

Last mile data gap: robust data can raise trust in decision makers

Robust climate data can improve the business case of climate projects

Climate and risk assessment is a key prerequisite to unlock climate finance

Breaking silos and building new partnerships is critical for success

- EO can support LDCs and SIDS in the application for and monitoring and evaluation of GCF-funded projects for adaptation and mitigation
- Robust climate data can strengthen the overall business case: if a project proposal is not able to prove that the problem is based on or caused by climate change, the project might not be able to access funding
- Many decision makers in climate policy and finance have a limited understanding about the value chain of and opportunities for EO data
- There is need to close the “last mile data gap” by increasing validation of climate EO data, which can improve risk assessments and preparedness, and further unlock climate finance
- The WMO Systematic Observations Financing Facility (SOFF) aims to provide a model to close the data and financing gap for LDCs and SIDS, by providing systematic observation infrastructure which in turn can sustain access to climate finance
- There is a call for GEO to prioritise applications and solutions and connect to end-users
- GEO needs to break through the silos and talk with partners in the climate funding community that it does not usually engage with; this communication needs to be simple, active and consistent, to yield results

Session 2: EO in support of private climate finance

KEY QUESTIONS

How can EO become the next lever in private climate finance?

How can the GEO community contribute to ongoing or new initiatives?

ESG requirements more and more relevant for investment decisions

EO data providers can create actionable tools for policy and industry

Need for standardization and comparability of data

Private sector finance is critical to increase climate action

Convening new stakeholders beyond the EO community

- The private sector is increasingly becoming an anchor partner in EO data use for financial analytics including risk assessments and monitoring systems
- EO providers are more and more aware of Environmental and Social Governance (ESG) requirements, but face integration issues due to the missing the connection to financial impact
- EO data is critical for ESG ratings and the scale of data needed to report on corporate ESG performance
- A strong application between EO data and financial risk assessment is yet to be built: regarding risk assessment under the Task Force on Climate-related Financial Disclosures (TCFD), the finance community has started to look at physical risk increasingly utilizing EO data on a granular, asset-level basis; whereas for the transition risk component, utilizing EO data is still a fairly recent approach, but rapidly evolving, with link to investment
- For the insurance industry, there are challenges to translate EO data into financial impact metrics to guide investment management decisions
- There is a perceived need for standardization and comparability of data: if EO data does not have clear provenance and is open source, it becomes difficult to compare or utilize for finance decisions
- According to users, EO data for finance decisions should highlight similarities and contrasts on exposure (major weak point in financial assessment on asset-level data), vulnerability or hazards, as well as provide consistency
- The approaches in EO data for decision making need to be made applicable for both industry and policy leaders; thus, harmonizing of EO data is needed to remain dynamic
- Initiatives such as the Global Resilience Index will provide a globally consistent model for the assessment of resilience across all sectors and geographies with many potential applications in aggregated risk management worldwide
- GEO is well positioned to convene stakeholders with representation of governments of over 120 countries and critical industry players

OVERVIEW OF PRESENTATIONS

Day 1: EO for national climate action

21 September, 12.00 - 15.00 CEST

INTRODUCTION AND WELCOME BY THE GEO SECRETARIAT



Sara Venturini
Climate Coordinator
GEO Secretariat



Yana Gevorgyan
Director
GEO Secretariat

Sara Venturini and Yana Gevorgyan gave an official welcome and introduction to the workshop, highlighting the importance of the meeting as a policy-oriented follow-up of the first GEO Climate Workshop which took place in 2018. The 2021 workshop aims to look at aspects and contributions of the over 60 GEO Work Programme activities that support climate policy, and how GEO can facilitate the convening of stakeholders and promoting the use of EO for development banks and other partners, as well as, the private sector needed to finance climate action. The outcomes of this workshop are intended to inform GEO's position within the UNFCCC process notably in the lead up to COP26, as well as help shape policy guidance. Relevant outcomes will be highlighted at the virtual GEO Week 2021 in November.

**Session 1:
Countries' EO
needs to support
climate action**

BRIEFING ON THE UPCOMING INTERNATIONAL UN CLIMATE CHANGE CONFERENCE COP26



Ailsa Stroud
Earth Observations Policy Lead
Chief Scientific Adviser's Office
UK Defra

"Partnerships are key to growing our evidence base, as we prepare for COP26 the UK is engaged closely with GEO Secretariat and its members in developing contributions"

"EO is a tool best used in combination with innovative science"

With COP26, global focus is beginning to fall on Glasgow and the hopes of both the UK Presidency, the UNFCCC and the world. We are increasingly seeing the impacts of climate change, making the need for an ambitious, results-driven COP26 ever greater.

The presentation provided an overview of COP26, its schedule, its goals and objectives and the opportunities to draw out the significant role of EO in both informing, but also supporting the development of solutions to the most pressing global challenge.

COP26, spread across the first two weeks of November, brings together world leaders, international, regional and national organisations, researchers and civil society representing all aspects of the climate debate. The scientific evidence that EO brings to this debate will be represented across the Theme Days being organised by the Presidency and in pavilions and showcases across the Blue and Green Zones. The contribution of EO to the Global Stocktake and to National Adaptation Plans and reporting requirements is reaching its crucial moment.

SETTING THE SCENE: IMPORTANCE OF EO FOR NATIONAL CLIMATE ACTION ON ADAPTATION



“You have heard the notion that adaptation is local and mitigation is global. But I will actually say it is the opposite: adaptation is in fact global”

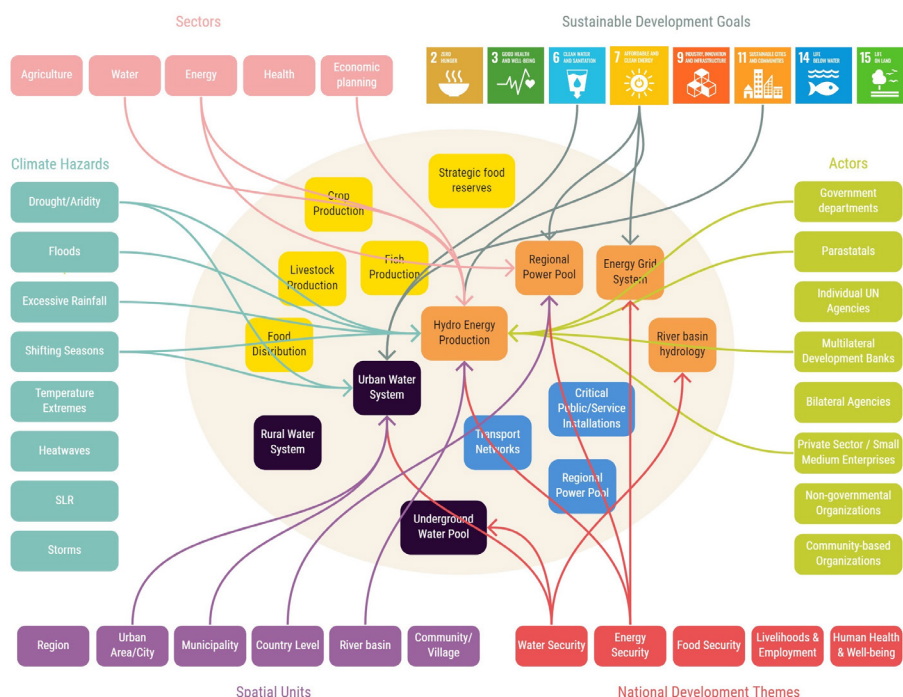
Paul Desanker
 Manager, Adaptation Division
 UNFCCC Secretariat

Developing countries are being supported financially and technically to develop and implement adaptation. The support to the LDCs dates back 20 years with the National Adaptation Programmes of Action (NAPAs). Currently, National Adaptation Plans (NAPs) are being supported by funding through the GCF, and each developing country is able to identify and focus on areas that they prioritize. Technical guidance and assistance is provided by a wide range of organizations and programmes.

Important steps include establishing baselines of vulnerability and risk to climate change, and assessing future risk and identification of effective adaptation solutions. NAPs aggregate subnational and local details, as well as regional aspects of risk. All these steps strive to use the best available data and science. EO is an obvious tool, however, many factors have limited wide application, especially of the latest capabilities and possibilities. Besides improving access to EO data for the LDCs and developing countries in general, there is a need to engage them more actively in developing new solutions to old and new problems. The Open NAP initiative under the UNFCCC facilitates open collaboration and contribution to a country’s adaptation efforts, going beyond the structured technical assistance through the funded projects under the GCF. Needs for EO are unique to the national context and issues being addressed, and build on endogenous capacity and experience.

EO solutions that facilitate active management of climate drivers in real time through monitoring and early warning systems are of particular interest for developing countries, as is data to help establish baselines and evidence of impacts and the need for adaptation in a spatial and temporal manner.

Fig.8 - NAP-SDG iFrame: A systems approach in NAPs focuses on essential systems deemed important for a national or local context, and data should align to specifics (source: UNFCCC)



EO ROLE IN CLIMATE ACTION: LDC PERSPECTIVE



“We have a once-in-a-lifetime opportunity and I would say we need to look at how we can actually utilize our data for taking action and making a sustainable society”

Bapon Fakhruddin

Technical Director, DRR and climate resilience
Tonkin + Taylor
Adaptation Research Alliance (ARA) network

Harnessing data is vital for climate and DRR, sustainable development, and urban resilience. EO solutions are continually evolving and provide significantly detailed information in understanding the Earth, its oceans, and the atmosphere. Advancements in technology have led to a dramatic increase in the availability of satellite imagery and the power of geospatial services, which can allow countries to cost-effectively access and utilise data for risk assessment and development plans, and the design and implementation of climate change projects and programmes. Utilising EO solutions would ensure coherence and achieve the goals set out in the UNFCCC, the Paris Agreement, and the 2030 Agenda for Sustainable Development. Despite advances in the availability and quality of EO data and solutions, several gaps and challenges remain in developing countries, including the high-cost of data collection and processing, insufficient human resources and experts to take advantage of innovative technologies, lack of strategic utilisation data, inadequate coordination across institutions, and the lack of infrastructure.

PERSPECTIVE OF SIDS



“If I can leave you with one message, please acquire data over the Pacific so that we can make use of it to deliver Digital Earth Pacific in the future”

Stuart Minchin

Director-General
The Pacific Community (SPC)

The presentation highlighted the relevance of SIDS and their consideration as large ocean states. Small islands hold large responsibilities for oceans and global food supply: they cover 30% of the global exclusive economic zones, and harvest 50% of annual global tuna supplies. Because of climate change, 30% of tuna is expected to move eastwards, into international waters without clear fishing regulations. SIDS experience high dependency on coastal and oceanic resources, combined with high probability of climate disasters.

Further, there is a growing need for EO in the region. At the 5th France-Oceania Summit in July 2021, 9 out of 14 countries expressed the strong need for better observation systems to support climate adaptation. EO is deemed as a critical need but it is underutilized in the region, which is a common challenge for SIDS.

Current efforts are in place to launch Digital Earth Pacific as a platform which aims to drive the use of EO to develop decision-ready tools, to respond to the challenge of turning EO data into actionable decisions. Furthermore, acquisition strategies are still a pressing challenge for SIDS: although satellites such as Landsat and Sentinel-2 are gathering information, the information captured is not detailed or specific enough to be utilized and inform decisions.

COUNTRIES' EO NEEDS TO SUPPORT CLIMATE ACTION IN THE LAC REGION



"Not every country has the same challenges, and not every country has the same capacities in order to address these challenges"

Rafael Monge Vargas

Director, National Center for Geoenvironmental Information (CENIGA)
Ministry of Environment, Energy, and Telecommunications (MINAE)
Costa Rica

EO can be an important factor in increasing climate ambition, especially in the LAC region. However, there are still large gaps that need to be addressed in order for countries to take full advantage of their potential. Although important efforts have been made to move forward together in the region, such as the Joint Action Plan of the Aguascalientes Declaration, inequalities between countries cause the pace of progress to vary.

This presentation analysed the technical and institutional aspects to develop capacities in LAC countries to meet the enhanced transparency requirements of the Paris Agreement, responding to Article 13 and contributing to tackling climate change.

PERSPECTIVE OF MOUNTAIN NATIONS: EO FOR CLIMATE ACTION AND DRR IN THE HINDU KUSH HIMALAYAS



"We live in a multi-hazard society, what happens upstream affects people's lives and livelihoods downstream. Connectivity and access is a real problem that provides opportunities for proper EO, governance and institutional mechanisms"

Mandira Shrestha

Programme Coordinator, Climate Services
Mountain Environment Regional Information System
International Centre for Integrated Mountain Development (ICIMOD)

The Hindu Kush Himalayan region is a hot spot for disasters. There is an increasing trend in the occurrence of floods, flash floods, glacial lake outbursts, landslides and forest fires. Climate change is a primary driver along with other anthropogenic factors for this increased vulnerability. The large degree of poverty, limited accessibility, poor governance and uncertainties involved in understanding high-altitude land surface and climate dynamics poses serious challenges in reducing disaster vulnerability and climate change adaptation. In this context effective development of DRR protocols and mechanisms have been realized as an urgent need. Use of EO and satellite-based monitoring provides an opportunity to fill in the data gaps, have continuous monitoring for reducing risks and increased climate resilience.

A message to COP26 from mountain nations:

- Mountains are very important
- We need to invest in the mountains to enhance resilience
- Its all about regional and international cooperation

PERSPECTIVE OF INDIGENOUS PEOPLES



“Indigenous nations think of Earth in terms of technology and its spirituality. The approach of shared collaborative governance leads to great decision making”

James Rattling Leaf Sr.
Co-founder
GEO Indigenous Alliance

Tribal nations and communities require sound information to inform their governance, ensure the health and welfare of their citizens, and plan for an uncertain future. While this is true of all governments, tribal leaders and managers face particular challenges in gaining access to, interpreting, utilizing, managing, and protecting data. Limited resources, fragmented and stove-piped federal programs supporting narrowly defined activities, lack of well-established and understood policies (tribal and other) to protect the sovereignty of these data, and similar obstacles remain significant issues.

This presentation discussed how Tribal worldviews challenge Western notions of relationality and ownership and how Tribes have been subject to the long history of extraction and exploitation. Also, the presentation discussed how Indigenous data sovereignty derives from the inherent right of Native nations to govern their peoples, lands, and resources, which is acknowledged in treaties and other legal mechanisms negotiated on a nation-to-nation basis with settler-colonial governments.



GEO WORK PROGRAMME MAPPING - INITIAL RESULTS



Virginia Burkett
Chief Scientist for Climate
and Land Use Change
United States Geological Survey (USGS)
CC-WG Co-chair



Rui Kotani
DRR Coordinator
GEO Secretariat



Allison Craddock
Director, Central Bureau
International GNSS Service
Capacity Development WG Co-chair

The three GEO Working Groups (WG) on Climate Change, DRR, and Capacity Development were tasked to conduct a mapping of the GEO Work Programme activities.

The mapping is aimed to identify gaps and potential opportunities for synergy among the current GEO Work Programme activities to meet policy needs.

This has been undertaken as a cross-WG effort since the end of 2020. WG members designed the content, which was then turned into an agile mapping interface and result dashboard thanks to the technical support by Esri and AmeriGEO.

The mapping was officially launched on 31 August 2021 through invitations to GEO Work Programme leads. 46 GEO activities out of 64 have responded so far (73%).

Preliminary findings:

- **Climate Change:** it appears that while most activities are focused on climate action generally, the link between the GEO Work Programme and the policy process can be improved. Only few activities state that they actually provide input to the UNFCCC or Paris Agreement. However, many activities actually do provide EO data, information or products that are relevant to numerous workstreams under the UNFCCC and Paris Agreement. The main focus of the current Work Programme seems to be climate adaptation.
- **DRR:** from the initial results, it appears that DRR-related activities have strong alignment with Sendai Framework but need assistance establishing connections with DRR users. This assistance may include increased connections with DRR practitioners and encouraging the users to reflect activity efforts in policies and their operations. The DRR-WG is developing the EO Risk Toolkit to address this point.
- **Capacity Development:** the mapping showed that there is a substantial amount of capacity development resources already in the GEO community, it is now key to ensure to make them findable and accessible before investing (often limited) funds/resources in developing new tools. The collaboration among GEO activities could be increased and Communities of Practices (CoP) could bridge gaps in capacity building within the Work Programme.

This mapping has established a baseline to track progress through time of the GEO Work Programme, in order to identify gaps and synergies and ultimately link EO to policy better. The mapping will continue until early 2022 and results will be made available to the GEO community. This will also provide input to the next GEO Work Programme 2023-2025.

APPLYING MODERN DATA COLLECTION AND ANALYSIS TECHNIQUES



“Many thanks to students who built their capacity, Esri who configured the dashboard, and the GEO Working Groups who contributed to the design of the mapping”

Patricia Cummins

Director of Government Strategy and Policy Solutions
Esri

GEO is using modern approaches to conduct the GEO Work Programme mapping, with easy to use survey tools, which collect data in an analysis ready way. Allowing for immediate analysis and data visualizations to drill in and understand results and trends and patterns, these tools (Survey123 and ArcGIS Dashboards) enable interactive explorations of the data and easy communications tools to convey the finding. All completely configurable to GEO needs and themes in a consistent experience.

MONITORING AGRICULTURE FOR CLIMATE RESPONSE



“We are developing technical guidance to serve as a blueprint for countries to understand how to use EO for national adaptation planning in agriculture”

Ian Jarvis

Director
GEOGLAM Secretariat

GEOGLAM was initially launched in 2011 by the G20 Agriculture Ministers with a policy mandate to use EO to improve information to commodity markets, as an independent and timely source of information to reduce market volatility. In 2013 the crop monitor for the Agricultural Market Information System (AMIS) was launched, and near real time global crop condition reports have been produced monthly ever since. While originally the focus was on major producing nations, since 2011 the policy mandate has expanded to include a greater focus on food insecure nations.

The Crop Monitor for Early Warning (CM4EW) is produced monthly for almost all regions of the world. Partners include the international food security community, and several national food security ministries. The resulting reports and maps are based on EO data, agro-climate and the assessment of regional experts. The process looks at all information and comes up with a consensus product. This consensus is essential to its acceptance as an authoritative source of information. Over time the information going into the reports has expanded beyond just EO. It now includes conflict reports, locust updates from the Food and Agriculture Organization (FAO), and as seasonal forecasts improve they are being used more and more to improve the outlooks.

GEOGLAM provides an excellent example of how to work with end users to co-create a trusted space-enabled decision support service. GEOGLAM experts have worked with the government of Uganda to predict drought and monitor crop failure. Early information triggered a disaster risk financing facility and a public works programme to offset agricultural losses which saved millions of funds and many households from food insecurity in 2017. Based on the success of the crop monitoring, EO-based monitoring is now an operational part of the Ugandan National Early Warning Bulletin.

GEOGLAM is now building on their co-development experience to develop supplemental guidance for the NAP process within the UNFCCC. As well as knowledge packages available through the GEO Knowledge hub, to provide technical resources to use knowledge and apply to systems.

REAL-TIME DECISIONS DURING HURRICANES ETA AND IOTA GEOGLOWS-ECMWF, HONDURAS



“Losses and damages from hurricane Eta and Iota in Honduras in 2020 were about 40% lower than those from hurricane Mitch in 1998, also thanks to the GEOGLOWS-ECMWF Streamflow Forecast”

Angelica Gutierrez

Lead Scientist
National Oceanic and Atmospheric Administration (NOAA)
GEOGLOWS Co-Chair

The GEOGLOWS Initiative brought together experts from around the world to create a global streamflow forecast that is freely available, providing actionable information, as a service, to places where little or none exist, and filling gaps that can complement and strengthen national, regional, and local efforts.

The GEOGLOWS-ECMWF Streamflow Forecast service is a worldwide application of the European Centre for Medium-range Weather Forecasts (ECMWF) that transforms storm runoff into river discharge forecasts for every river of the world.

During the emergency caused by hurricanes Eta and Iota in their passage through Honduras in November 2020, the priority of the National Electric Energy Company (ENEE) was to safeguard the life of about 23% of the country's population and to minimize the potential economic losses in the Sula Valley which generates 65% of Honduras's GDP.

The GEOGLOWS-ECMWF Streamflow Forecast service was used by ENEE to establish a series of low flow releases through the massive hydroelectric dam before the second hurricane hit. Thanks to a 15-day discharge forecast provided directly from the web, national authorities were able to efficiently manage the reservoir during the storms and helped to prevent potentially huge losses and damages in the Sula Valley, one of the most populated and productive areas in Honduras. In situ data was used to determine the accuracy and skill of the streamflow forecast.



Photo credit:
Roundnews

GEO BLUE PLANET - DYNAMIC COAST: SUPPORTING CLIMATE CHANGE ADAPTATION OF THE COAST



“Knowing where the coastline is and how it is changing is crucial for coastal adaptation planning and implementation. EO has allowed us to develop a useful tool that is supplying change intelligence of intertidal extent and coastal change”

Dr James Fitton

Senior Postdoctoral Researcher
MaREI Centre
University College Cork
GEO Blue Planet

The international concern over increases in coastal erosion is focused on the risk to coastal assets, but there is also increased recognition of the impact on intertidal ecosystem services that may accompany increased erosion.

Accurate time series mapping of the intertidal zone is key to understanding the risks posed by erosion yet, due to high cost and logistical complexities, the intertidal zone remains a difficult environment to regularly survey and map at national scales.

Coast X-Ray is a new approach to map the intertidal zone by measuring water occurrence frequencies using tidally calibrated satellite imagery (Sentinel-2), processed within Google Earth Engine. Using the UK and the Republic of Ireland as a test case, the resulting output compares favourably with the outputs from high-resolution digital elevation models.

Due to the increasing societal importance of the impact of climate change and rising sea level on the coast, it is imperative that the intertidal zone is mapped regularly and accurately. Methods such as Coast X-Ray offer a rapid and cost-effective complementary approach to support traditional aerial or ground surveying to the longstanding logistical complexities and economic costs associated with national mapping of such a dynamic environment.

SUPPORTING CLIMATE ACTION AT THE NATIONAL LEVEL: HINTS FROM THE SCO



“The SCO aims to provide operational EO-based tools and studies to help decision makers build resilience to climate change at local scales”

Frédéric Bretar

Head of Space Climate Observatory (SCO)
Centre National D'Etudes Spatiales (CNES)

The SCO is an international Alliance of space agencies and UN bodies such as the United Nations Office for Outer Space Affairs (UNOOSA), United Nations Development Programme (UNDP), and UNEP, with local implementations (France, China etc.). The SCO is also a GEO Community activity. It aims to provide operational tools and studies to help decision makers to adapt to climate change, especially at local scales, using satellite-based EO tools in combination with field data and models.

Among the existing 43 projects, some concrete solutions were presented. These included: tools for monitoring the loss of biodiversity; a study on urban heat islands and heat losses through the development of a thermography analysis tool based on satellite imagery; and a project aimed to map deforested areas in near-real time with Sentinel-1 images.

DIGITAL EARTH AFRICA: A PLATFORM TO SUPPORT CLIMATE ACTION IN AFRICA



“DE Africa is operational and is a unique capability to support climate action across the continent, moreover it is African-owned and led”

Shanti Reddy

Senior Partnership and Implementation Manager
Digital Earth Africa (DE Africa)

DE Africa provides reliable, operational EO data to deliver decision-ready products and services to address social, environmental and economic changes in Africa. Analysis-ready Landsat, Sentinel-1 and Sentinel-2, including historic datasets, are hosted on Amazon Web Services (AWS) in Cape Town.

Further, DE Africa provides free access to cloud computing platform (Sandbox), open source Jupyter notebooks and algorithms, and online training, which makes it an ideal platform to deliver projects in support of climate action in Africa. DE Africa is linked to an Esri portal, which reduces the cost of using EO by about 40% to 80%, and makes it several times faster to implement programmes.

The platform is operational and offers cost-effective solutions for countries interested in setting up national inventory systems for biennial reporting, mitigation and adaptation projects as part of their Nationally Determined Contributions (NDCs) under the Paris Agreement.

DE Africa 2020 Annual Report provides a detailed list of achievements to date. The 2021 Annual Work Plan provides current activities.

DE Africa's work programme is delivered by six regional implementing partners coordinated by the Programme Management Office based in Pretoria, South Africa. Together, our partners reach more than 40 countries in Africa. Our partners have the required capability and capacity to support projects to assist countries to rapidly deploy national systems.

This is a good time for new investors and collaborators to take advantage of the existing investment and infrastructure to build additional tools and services.

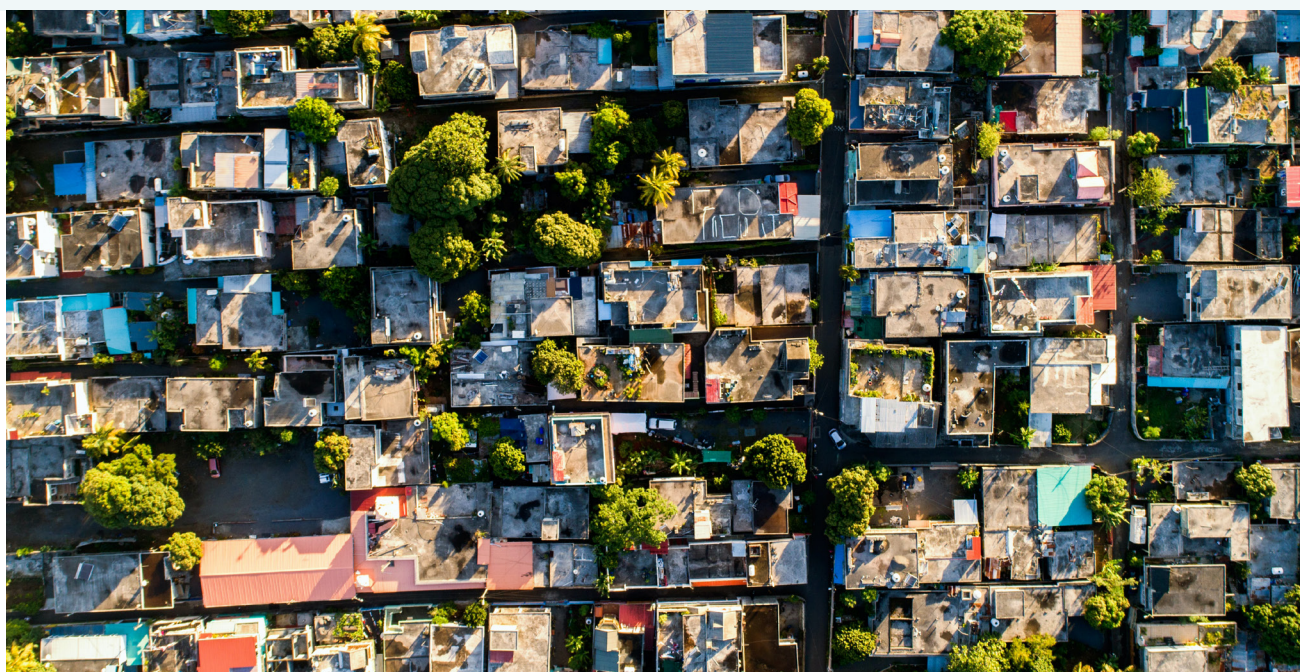


Photo credit:
Cyrus Pellet

Day 2: EO for collective ambition on climate

22 September, 15.00 - 18.00 CEST

Session 1: EO
needs towards
the Global
Stocktake

SETTING THE SCENE: ROLE OF EO TO SUPPORT THE ASSESSMENT UNDER THE GLOBAL STOCKTAKE



“EO is the foundation for action of the Paris Agreement and is extremely important to inform the Global Stocktake going forward”

Joanna Post

Programme Management Officer
UNFCCC Secretariat

The Global Stocktake process represents the “ambition mechanism” under the Paris Agreement adopted in 2015. It aims to take stock of the implementation of the Paris agreement every 5 years, starting in 2023. The outcome involves recommendations that shall inform Parties in updating and enhancing NDCs and international cooperation for climate action.

The themes addressed by the Global Stocktake include progress in terms of mitigation, adaptation, finance flows and means of implementation and support (including technology, capacity building), and other cross-cutting issues (including impact of response measures, loss and damage, and equity).

EO is the foundation for action on the Paris Agreement. EO can provide input to the Global Stocktake themes with a pledge-and-review approach in five year cycles. Notably on:

- Mitigation: EO data on GHG and temperature trends and projections, as well as support to Parties for their GHG monitoring and reporting
- Adaptation: EO data on observed and projected impacts and risks, as well as information and indicators for and on adaptation to measure progress
- Means of implementation: information on the state of progress to support developing countries with EO-based knowledge, tools and products
- Cross-cutting issues: information on the support to NDCs/NAPs, as well as information on loss and damage (managing risk) with EO-based knowledge, tools and products

The EO community should prepare aggregated information for a coordinated input to the Global Stocktake. It can act on two levels:

- Party-level: improve accuracy, detail of reporting, and identification of how many Parties are applying EO, and who is doing what
- Global level: support understanding of where we are and what is possible in the future with EO

The deadline for inputs to the Global Stocktake is February 2022.

Fig.9 - The Global Stocktake process under the Paris Agreement (source: UNFCCC [Global Stocktake](https://www.unfccc.org/global-stocktake) | UNFCCC)

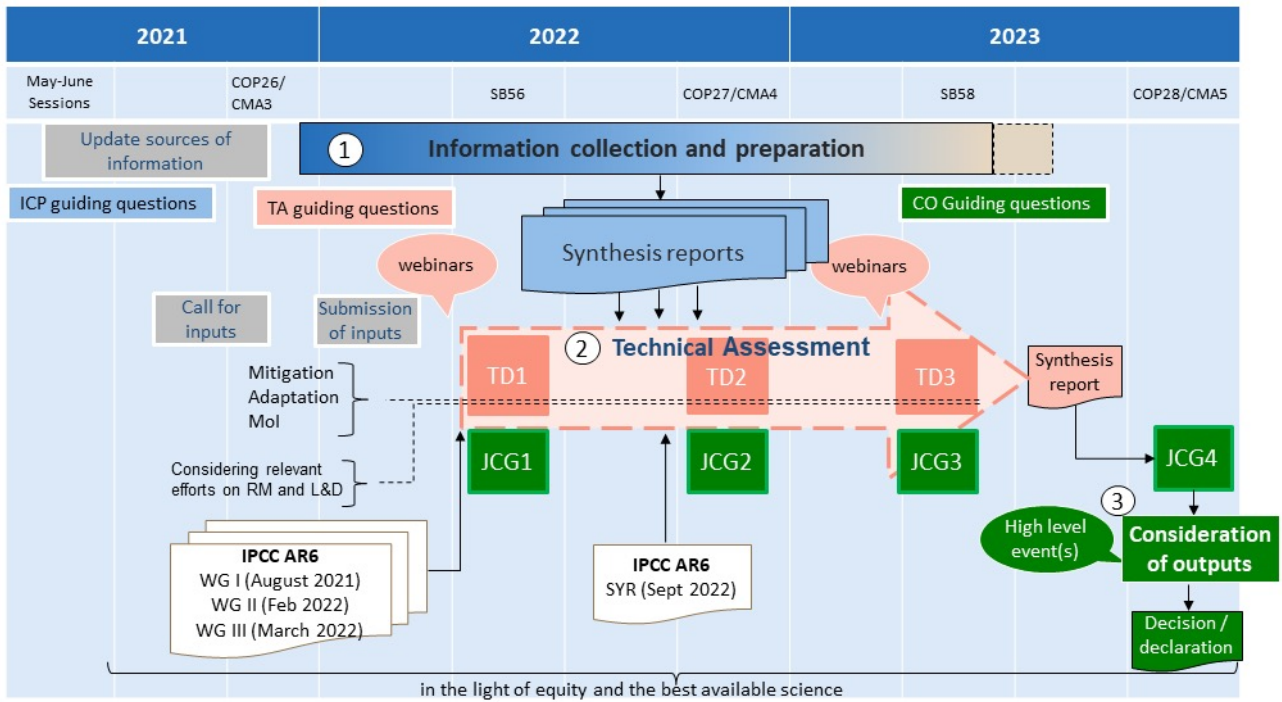


Photo credit:
Daniel Olah

IPCC ASSESSMENTS AND EO GAPS AND NEEDS IN VIEW OF THE GLOBAL STOCKTAKE



“We need GHG inventories that are accurate, consistent, and transparent. Land use change projected data need to be linked with past satellite observations: this takes time and investments, and should be a priority”

Thelma Krug

IPCC Vice-Chair

Terrestrial Observation Panel for Climate (TOPC) Chair

Global Climate Observing System (GCOS)

The IPCC approved and released the contribution of the IPCC WG I, the group that focuses on the physical science of climate change. The assertive information contained in the IPCC WG I report can be potentially relevant to the 2023 Global Stocktake and the next 5 years.

The information concerning the remaining carbon emission budget that is provided by the IPCC for a range of global warming levels, which can be reference for the evaluation of the global efforts to mitigate climate change and adapt to climate change, include:

- How much warming has been observed in global surface Earth temperatures, where the answer to this can be very helpful to qualify the remaining “distance” to meet the Paris Agreement long-term goals.
- How much the atmospheric concentration of carbon dioxide and other GHGs has increased, where the answer to this is also crucial to assess the pathway of GHG emissions compatible with the Paris Agreement long-term goals.

Progressive climate science acknowledges the quality and quantity of EO from a range of platforms and satellites.

DEVELOPING COUNTRIES’ NEEDS FOR COLLECTIVE AMBITION WITHIN THE REDD+ MECHANISM



“The climate emergency requires nothing short of an emissions nose-dive. We have the global REDD+ mechanism which could provide necessary reduction at scale if capitalized. But the data needs to be transparent and accurate, that is where EO comes in”

Federica Bietta

Managing Director

Coalition for Rainforest Nations

About 90% of the world's rainforest is covered by the global REDD+ mechanism under the Paris Agreement. Over 60 countries are actively engaged in developing national commitments for GHG emissions reduction from deforestation and forest degradation, and submitting strategies and updates to the UNFCCC. The REDD+ mechanism has already reduced deforestation at scale in developing countries. From 2010 until today, 9 billion tons of carbon emissions were reduced by rainforest nations.

It is critical to avoid further increases in global temperatures, which means reducing between 65-90% of the current emissions by 2050. However, the REDD+ mechanism is not capitalized: of the 9 billion tons of carbon credits issued, only 4-6% has been purchased and retired. This mechanism could provide necessary reduction at scale if capitalized.

The Global Stocktake must be informed by reliable data. Countries must have transparent, reliable, consistent and as accurate as possible estimates of their emissions and removals. However, the systematic collection of field data to validate satellite information is time-consuming and costly, and so is the enormous amount of data to be stored for many years to allow comparability. International cooperation and capacity building are key. GEO and the whole EO community can help to fill some of the gaps especially with regard to capacity building which is one of the key elements to really move forward.

MAPPING OF GHG MONITORING CAPABILITIES FROM SPACE



Veronika Neumeier

Consultant
GEO Secretariat



Aaron Davitt

Principal Analyst, Remote Sensing
WattTime / Climate TRACE



Barbara Ryan

Executive Director
World Geospatial Industry Council
(WGIC)

“These processes take time. We have to continue finding mechanisms that encourage the partnership between the public sector and the private sector to develop an integrated Earth system”

The report “GHG monitoring from space” is a joint effort by GEO, Climate TRACE, and WGIC.

The report is an outcome of the “Forum on Innovation in Remote Sensing Technologies for Accelerated Climate Action” held on 14th December 2020, sponsored by the UK High-Level Climate Action Champion Nigel Topping, and former US Vice President Albert Gore, and his Climate TRACE Initiative. More than 100 diplomats, CEOs, government officials, not-for-profit organizations, scientists, and financiers were brought together to discuss innovations in remote sensing technologies for accelerated climate action.

The report represents the first systematic effort to compile current and upcoming satellite missions from public, private, and not-for-profit sectors.

It describes how space-based monitoring of GHGs is being used around the world; lays the groundwork for enhanced contributions to the Global Stocktake effort under the Paris Agreement; and includes a comprehensive database of missions.

While observations from the ground will continue to play an essential role in climate studies, space-based observations will increasingly become more available to support climate action efforts.

The report is open to contributions from the EO community, and it is meant to be officially launched at COP26 in November 2021.

LINKING EO AND THE GLOBAL EFFORTS ON EMISSION REDUCTION AND CLIMATE AMBITION



“The main objective of these pilot top-down GHG products is to start an important conversation with stakeholders and users, which will lead to a more complete and accurate Global Stocktake”

David Crisp

Greenhouse Gas Lead for the CEOS Atmospheric Composition Virtual Constellation
National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory

Parties to the Paris Agreement are compiling GHG inventories to support the 2023 Global Stocktake. These inventories use bottom-up methods to estimate annual emissions and removals of GHGs from the sectors specified in the 2006 IPCC Guidelines for National GHG Inventories. GHG emissions and removals can also be estimated from spatially- and temporally-resolved measurements of their atmospheric concentrations using inverse models. These top-down inventories are not as process-specific as bottom-up inventories, but complement those methods by providing an integrated constraint on fluxes from all processes across a wide range of spatial scales. They also track emission changes in the natural biosphere and ocean due to human activities and climate change. To demonstrate these advances, the Joint Working Group on Climate Greenhouse Gas Task Team by CEOS and the Coordination Group for Meteorological Satellites (CGMS) is working with the inverse modeling community to compile pilot top-down inventories of carbon dioxide and methane emissions and sinks for the 2023 Global Stocktake. The primary objective of this activity is to start a conversation with stakeholders and users to establish the utility and best practices for combining bottom-up and top-down methods to enable a more complete and accurate Global Stocktake.

THE RELEVANCE OF HIGH-FREQUENCY, GLOBAL COVERAGE FOR EO



“The velocity of our conversations does not meet the urgency of our moment. Private sector can complement public sector EO investments and leverage other opportunities”

Andrew Zolli

Vice President
Sustainability and Global Impact
Planet

Planet’s data is transforming the way companies and governments use satellite imagery data, delivering insights at the daily pace of change on Earth. This differentiated data set powers decision making in a myriad of industries including agriculture, forestry, and government. With a fleet of nearly 200 Earth imaging satellites, Planet provides high-cadence, global coverage and efficient delivery with an open, accessible platform.

Currently, Planet is working on a number of projects to support the Global Stocktake. Many of the instruments currently used aim to support higher precision in GHG monitoring, through high-quality radiometric calibration at lower spatial and temporal resolution. Planet follows a specific principle, whereby the data is not held at Planet, but is distributed to users in order to transform private assets into public goods.

ACCELERATING METHANE MITIGATION FROM THE ENERGY SECTOR THROUGH INTEGRATION OF DATA AND BEYOND



“Satellite observations are a game changer for tackling global methane emissions. IMEO will only be successful if we manage to connect the different elements of the ecosystem that the data represent”

Manfredi Caltagirone

Acting Head

International Methane Emissions Observatory (IMEO)

UNEP

The IPCC Sixth Assessment Report highlights the importance of methane mitigation for avoiding the worst effects of climate change. The fossil fuel sector is a major contributor of methane emissions and readily available mitigation measures could dramatically reduce emissions from both the oil and gas sector and the coal sector by 68% and 61% respectively by 2030. One key issue preventing targeted action on fossil fuel methane emissions is the lack of reliable and granular data about where and how much methane is emitted.

To address this problem, UNEP's IMEO will integrate data from various sources to produce a global public dataset of empirically verified methane emissions at an increasingly accurate and granular level.

Satellite remote sensing data will be a key part of IMEO's data integration platform which - in conjunction with the company data from the Oil and Gas Methane Partnership (OGMP) 2.0, emission measurements from science studies, and inventory data - will provide a full characterization of methane emissions from global fossil fuel infrastructure.



Photo credit:
Denys Nevozhai

GEO BLUE PLANET: EUTROPHICATION INDICATORS AND TOOL



“EO can inform NAPs on issues related to coastal erosion, saltwater intrusion, changes in species distributions, ocean acidification, storm surge risk and other coastal issues. As well as support the mapping of Blue Carbon ecosystems to set NDC targets”

Emily Smail

Senior Faculty Specialist

NOAA-University of Maryland Cooperative Institute for Satellite Earth System Studies

The SDGs include a goal (SDG 14: Life Below Water) to conserve and sustainably use the oceans, seas and marine resources for sustainable development. SDG 14 Target 14.1 "by 2025, prevent and significantly reduce marine pollution of all kinds (...)" provides a deadline for progress on reducing marine litter which is informed by SDG indicator 14.1.1a, "Index of Coastal Eutrophication". Many UN member countries do not have in water data available to report yearly on eutrophication along their coasts. In order to provide indicators that could be reported on a yearly basis on a global scale, the GEO Blue Planet initiative worked with UNEP and space agencies to develop satellite-based indicators for eutrophication. GEO Blue Planet is now planning to work with member countries to co-develop visualizations and tools to increase the utility of the indicators and to further develop more in depth regional and national indicators. We are aiming to use this as a model for engaging with UNFCCC, including for mitigation and adaptation efforts and the Global Stocktake.



Photo credit:
PME

AN UPDATE FROM GFOI LEAD PARTNER CEOS ON THE DELIVERY OF GLOBAL AFOLU PRODUCTS TO SUPPORT FOR THE GLOBAL STOCKTAKE



“Intercomparison, validation and harmonization of EO products are critical to increase product improvement and uptake”

Osamu Ochiai

CEOS Lead to GFOI
Senior Engineer
Satellite Applications and Operation Center
Japan Aerospace Exploration Agency (JAXA)

Space-based remote-sensing is expected to contribute largely to the Paris Agreement with regard to monitoring and evaluation methodologies. Space agencies have started to coordinate to identify the needs, to collect and to harmonize data already in place, and to plan a long-term roadmap to sustainably support climate change monitoring. In doing so, international cooperation is important to realize the challenge. CEOS is a key mechanism to drive the effort. Through CEOS, space agencies are working together to consolidate space-based assets to support the Paris Agreement. A first major milestone is to focus on what data and information will be useful to support the Global Stocktake process. EO satellites have been acquiring global data on the state and dynamics of the global landscape for over 40 years and their role has been increasingly recognised. The recent update of the IPCC Guidelines for the Agriculture Forestry and Other Land Use (AFOLU) sector referred to the significant advancement of the use of EO data for monitoring land use and land change. This introduces existing and planned space-based capabilities and products particularly on land area and the plan for harmonizing them.



Photo credit:
Olena Sergienko

IMPORTANCE OF COUNTRY ENGAGEMENT



“A better collective understanding of the forest-related information is needed to assess progress toward delivering on the goals of the Paris Agreement, as well as potential improvement in country reporting”

María José Sanz Sanchez

GFOI’s Methods and Guidance Documentation (MGD) Advisory Group Chair
 Scientific Director
 Basque Centre for Climate Change (BC3)

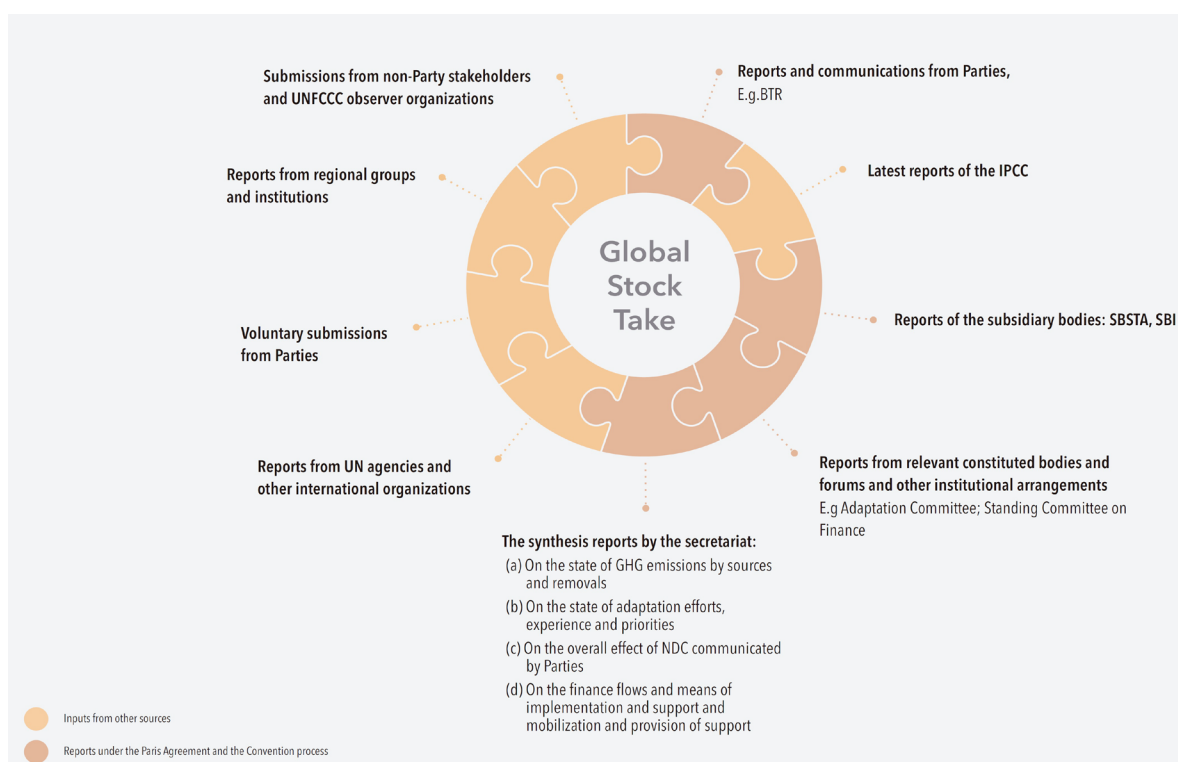
Space-based remote sensing is expected to contribute largely to the Paris Agreement in two ways: at global scales to support better estimates in global studies, and at national (and sub-national) level through improvements (including cost effectiveness) of GHG inventories.

The GFOI’s MGD component develops and disseminates IPCC-compliant methods and guidance materials for REDD+ Measurement, Reporting, and Verification (MRV).

The MGD component was fundamental to introduce space-based and remote sensing data into REDD+ and forest estimations. The recent update of the IPCC Guidelines on AFOLU, known as the 2019 Refinement, referred to the significant advancement of the use of EO data for monitoring land use and land change largely based on the progress made through iterations of the MGD that allowed the EO community to engage in the production of the guidance. For the MGD authors the interaction with country experts is fundamental to understanding the emerging need for guidance while they were building their National Forest Monitoring Systems and improving forest estimates in the GHG inventories.

It is now fundamental to ensure that both the top-down (global, more scientific estimates) are consistent and comparable to the bottom-up estimates by GHG inventories at national level. It is also key to ensure discrepancies are well understood and can be reconciled as far as possible, leading to constructive and transparent Global Stocktake discussions.

Fig.10 - Possible inputs to the Global Stocktake (source: BC3, FAO, The World Bank/Program on Forests (PROFOR) 2019: [Mapping Katowice decisions related to NDCs](#)).



GWIS - PROVIDING EO DATA ON WILDFIRES FOR EARLY WARNING SYSTEMS AT THE REGIONAL AND GLOBAL SCALE



“GWIS aims to establish a common base of information on wildfires and support data harmonization for cooperation. Ultimately, DRR and climate-related activities are linked within GEO”

Jesús San-Miguel Ayanz

GWIS Chair

Senior Researcher

European Commission Joint Research Centre (JRC)

GWIS is a joint initiative in the GEO and Copernicus work programmes. GWIS aims at bringing together existing information sources at regional and national level in order to provide a comprehensive view and evaluation of fire regimes and fire effects at global level and to provide tools to support operational wildfire management from national to global scales.

GWIS provides historical analysis of the wildfire regimes and impact, such as the analysis of the burnt areas, numbers of fires, fire size, seasonality, fire emission, damage to protected areas, land cover damages. For instance, it was able to contribute to reducing the impact of wildfires in the Amazon region and neighboring countries. Further, GWIS establishes a common base of information on wildfires using its own, and supports data harmonization in regions for cooperation with fire management services in the countries and organizations operating in the region.



Photo credit:
Ryan Arnst

GEO MOUNTAINS: CONTRIBUTING TO GLOBAL CLIMATE IMPACT ASSESSMENTS IN MOUNTAIN AREAS



“Consistent with the GEO Open EO Data statement, it is important to support open and reproducible research that follow FAIR principles (Findable, Accessible, Interoperable, and Reusable), and that allow for understanding, verification, and reuse by others in new contexts. The same applies for important inputs that are to be compiled to inform the Global Stocktake”

Carolina Adler

GEO Mountains Co-Lead
Executive Director
Mountain Research Initiative (MRI)

Mountains are globally distributed environments which provide significant resources and benefits to ecosystems and people, both locally and in adjacent and lowland areas. However, multiple and simultaneous processes of global change are seriously threatening these environments e.g. climate change, environmental pollution, large-scale political and socio-economic transformations, unsustainable management of land-use and natural resources, with major gaps in fundamental system understanding to address these impacts. Despite numerous focused research efforts over the years, links between mountain researchers in different disciplines, the availability, accuracy, and spatial representativeness of high-elevation environmental observations, and models capable of generating reliable future predictions and projections all remain somewhat limited. This situation is hindering assessment-relevant reporting and decision making that numerous policy contexts require.

Since its foundation in 2016, GEO Mountains has been working to connect a global community and jointly work towards addressing these limitations in our ability to provide policy and society-relevant data and information on the state of mountains, globally.

The presentation outlined some of the key objectives that GEO Mountains pursues, with specific reference to recent experiences in supporting the knowledge needs of the IPCC Lead Authors who are working to deliver their assessment findings on mountains for the Sixth Assessment Report. The presentation concluded with some brief reflections on EO needs that need prioritizing for specific EO products in view of the UNFCCC Global Stocktake, including:

- Focus not only on the products as ends in themselves, but also on the key processes and ‘facilitators’ that help bring about those products.
- Credibility in the substance. Assessment-relevant inputs need to be based on data, information, and analyses that are transparent and reproducible in their methods, including data disaggregated or aggregated at the relevant scales.

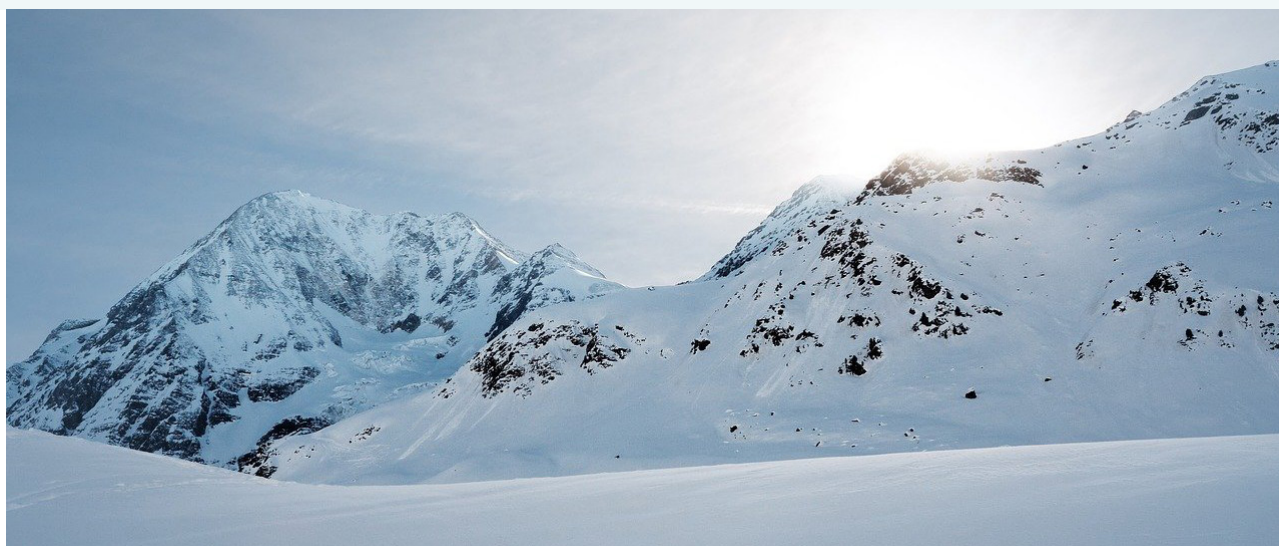


Photo credit:
Pexels

GEO BON: ESSENTIAL BIODIVERSITY VARIABLES



“There is a need to improve the acquisition, coordination and delivery of biodiversity observations and related services, for decision makers and the scientific community. A key component will be how to present the structure and information, in a way that is consistent and compatible with each other”

Gary Geller

GEO BON Member
Senior Science System Engineer
NASA JPL

GEO BON began in 2008 with the goal of improving the acquisition, coordination and delivery of biodiversity observations and related services to decision makers and the scientific community. GEO BON focuses on two areas: Essential Biodiversity Variables (EBVs) and their derived products, and Biodiversity Observation Networks. It is a collaboration where most of the work is performed by participating organizations and volunteers.

EBVs are state variables that capture key dimensions of biodiversity and that are sensitive to change. Their focus is on biological status and they do not include threats and drivers of biodiversity change, which also require monitoring; these are under discussion so change can be attributed to its causes and a response determined. EBVs are now defined and implementation is in progress; note that while some EBVs are also indicators, in many cases indicators are a derived product from one or more EBV or other dataset.

Adaptation of ecosystems and the biodiversity they support may fall into two main areas:

- Increasingly active ecosystem management, which can take many forms but is a complex issue
- Reduction of other stressors such as land conversion, invasive species, resource extraction, or pollution.

There is a potential to utilize EBVs to inform NAPs and global progress on adaptation under the Global Stocktake.

GEO HUMAN PLANET: ESSENTIAL SOCIETAL VARIABLES CONTRIBUTING TO THE GLOBAL ASSESSMENT OF ADAPTATION



“Future climates will impact future populations. We feel the information on population and society, including spatial growth of cities, are essential for taking stock of the implementation of the Paris Agreement”

Daniele Ehrlich

GEO HPI Co-Lead
Project Officer
European Commission JRC

HPI generates datasets, knowledge and indicators used by practitioners, decision makers and scientists. HPI focuses on generating Essential Societal Variables (ESVs) including population and settlements, often combined with essential variables on climate, biodiversity, land, to provide an integrated understanding of planet Earth. Practitioners use ESVs to monitor urbanization, disaster risk, progress towards the SDGs, and to design adaptation strategies for climate change. ESVs are relevant to the Global Stocktake. Practitioners use ESVs to enumerate and size cities and settlements of the world, that is where most of the Earth's resources are consumed. ESVs are available at five years intervals dating back to 1975 and used to assess human presence and impact for the past and to generate scenarios for population and settlement growth. HPI data and projections are used in assessing climate warming impact, in modeling Socio Economic Pathways, and for estimating population in mountains, in the Arctic, and in low elevated coastal areas that are vulnerable to a changing climate and environment. Scientists and practitioners also use ESV data to assess past and current emissions, to estimate energy demands and the potential of renewable energy production for climate mitigation.

Day 3: EO for climate finance decisions

23 September, 09.00 - 12.00 CEST

GEO SECRETARIAT'S VISION ON EO AND CLIMATE FINANCE



“Today, we are laying the cornerstone for a new pillar of climate finance in the GEO portfolio, envisioned by the GEO CC-WG and the GEO Secretariat. The role of GEO is to convene the strategic partners to augment and amplify the work that is already taking place in the field of EO and climate finance”

Yana Gevorgyan

Director
GEO Secretariat

GEO was envisioned back in 2003 with a clear goal that decisions for the benefit of humankind be informed by EO through systematic measurement of vitals of the Earth. EO provides objective and systematic assessment to promote transparency for governance and policy. GEO is invested in EO evidence that is policy relevant, and aims to lay a cornerstone to bridge that gap between scientists, researchers and financiers.

There is a clear need not only in the policy, but also in the public discourse, to provide finance for climate change adaptation and mitigation efforts.

GEO's role will be to convene strategic partners to augment and amplify already existing work on financing climate action with strengthened EO-based information.

GEO acknowledges that its original audience has expanded to include cooperation with socially conscious stakeholders, the non-public sector becoming eager consumers of EO products and services.

The results and outcomes of this session will feed into GEO's position for COP26 and also build into GEO Week 2021.

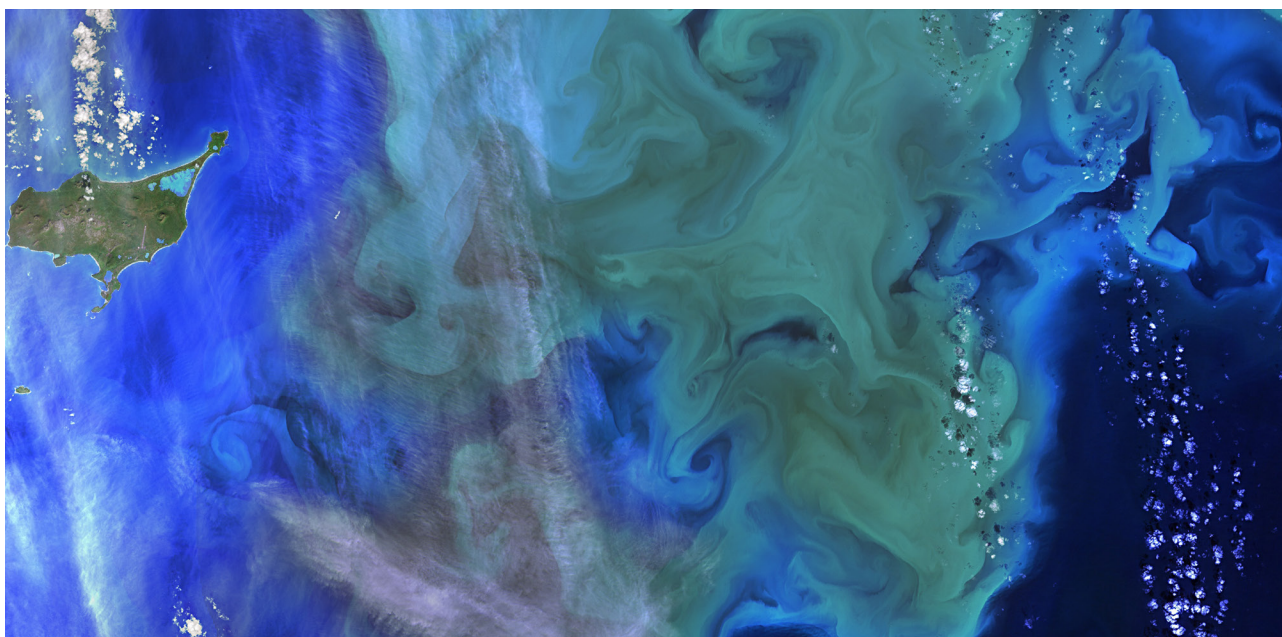


Photo credit:
USGS

HOW EO CAN STRENGTHEN FUNDING PROPOSALS FOR CLIMATE ACTION PROJECTS UNDER THE GREEN CLIMATE FUND



“Climate science informs country programming for GCF and EO-related innovations underpin project design and implementation”

Dr Joseph Intsiful

Senior Climate Information and Early Warning Systems Specialist
GCF

GCF uses relevant science-based information to inform its investments. In view of the nature of the climate change problem and existing barriers, robust climate information is key to developing paradigm-shifting solutions for climate action. GCF has relevant policies that mandate the use of robust climate science and data as the foundation for GCF’s investment criteria.

The GCF investments portfolio includes a total of USD 7.2 billion in climate projects across 117 countries, and USD 276 million in Readiness projects across 138 countries. The GCF portfolio composition includes adaptation (48%) and mitigation (52%) projects, funded by public (67%) and private (33%) sectors, with flexibility in the deployment of financial instruments. To date, GCF funding committed to projects on climate information and early warning systems (creation of climate information and impact-based forecasts) exceeds USD 1.8 billion, with co-financing of over USD 2.2 billion. The distribution varies across regions and country groupings: Asia Pacific (44%), Africa (34%), LAC (20%), Eastern Europe (2%). International entities continue to dominate the portfolio of projects on climate information and early warning systems, receiving about 94% of total GCF resources. 21% of projects focus on modernization of hydromet services and 79% focus on sector applications. The GCF envisages 3 paradigm-shifting pathways for climate information and early warning services as well as 4 drivers for the pathways.

A case study on a project on safeguarding rural communities and their physical assets from climate-induced disasters in Timor Leste was presented.

SYSTEMATIC OBSERVATIONS FINANCING FACILITY: INNOVATING FINANCE TO SUPPORT SUSTAINED INTERNATIONAL EXCHANGE OF FOUNDATIONAL WEATHER AND CLIMATE OBSERVATIONS



“The EO community knows the importance of service observation, anchoring, calibration and validation of satellite data. Both the EO community and the climate community need to create a mechanism that can systematize their way of working together”

Markus Replik

Director of Development Partnerships
WMO

The Systematic Observations Financing Facility (SOFF) addresses the perennial problem of missing basic weather and climate observations from the most vulnerable countries, SIDS and LDCs.

SOFF is designed as an innovative financing mechanism which values the global public good nature of these observations and will provide long-term technical and financial assistance. The objective of SOFF is to strengthen the upstream part of the meteorological value chain, which requires a global approach, in order to maximise the outcomes of the downstream activities at the local level, such as the delivery of weather and climate services as well as providing a robust basis for effective decision making and action. By improving the quality of weather forecasts, early warning systems and climate information services, the implementation of SOFF will contribute to strengthening climate adaptation and resilient development across the globe.

SOFF will also enhance the effectiveness of climate finance by providing a global approach to guide investments in observations and by strengthening the data foundations on which investment decisions are made.

The creation of SOFF is planned to be announced at COP26 in November 2021 and become operational in June 2022. GEO was invited to participate in the SOFF advisory board.



Photo credit:
Kofi Nuamah Barden

SUPPORTING IMPROVED ACCESS TO CLIMATE FINANCE IN PACIFIC SIDS: COMMONSENSING APPROACH



Einar Bjørge
Director of UNOSAT
UNITAR



Unnikrishnan Nair
Head of Climate Change
The Commonwealth Secretariat

“The CommonSensing approach stems from the realization that for EO solutions to work, providers of EO data need to go to countries and learn about the specific context in order to adopt the best approach. Common challenges we face are scattered information, high cost of EO tools, high-resolution imagery not readily available, and the limited capacity in terms of public expertise”

CommonSensing, led by UNOSAT, provides an insight on how space technology and EO data can support countries in special situations in making evidence-based decisions for sustainable, climate-resilient and inclusive development.

SIDS are on the frontline of the devastating impacts of climate change. With nearly a third of the population living on land less than 5m above sea level, they are vulnerable to the threat of rising sea levels, degrading coastlines, communities and livelihoods. Extreme weather events also often significantly affect the economic and social development of these low-lying island countries.

To address climate challenges, SIDS have the growing need of climate finance to accelerate the implementation of their national plans for adaptation and mitigation. Quality and unbiased satellite data can help improve access to global climate funds by providing sufficient evidence, justification and climate rationale for proposed interventions.

Scaled-up international development cooperation remains critical to enhance climate resilience and capacity for disaster risk management in SIDS. The Commonwealth Secretariat is assisting the Pacific SIDS, namely Fiji, Solomon Islands and Vanuatu to develop and institutionalise capacity to produce bankable climate finance proposals with the use of geospatial-based CommonSensing tools and data.



Photo credit:
Josaia Cakacaka

EO FOR CLIMATE RISK FINANCE



“We cannot have the EO community work in silos, we need to make sure they understand our language, our clients’ language”

Antoine Bavandi

Senior risk finance specialist
Crisis and Disaster Risk Finance team
The World Bank

The World Bank Crisis and Disaster Risk Finance team at the Finance, Competitiveness and Innovation Global Practice (FCI) leverages innovative analytics to produce a comprehensive assessment of financial risks for emerging markets and developing economies. This includes leveraging optical and radar satellite data to develop new insights into complex risks, such as those faced by the financial sector in developing countries in the context of climate change. Such climate physical risk assessment supports decision-makers with new understanding of future climate risks and their potential impact on the resilience of populations, financial markets and entire sectors of their economies.

Since 2019, the joint partnership between the World Bank/FCI and the European Space Research Institute (ESRIN) of the European Space Agency (ESA) has developed innovative analytics for new, more reliable risk information to a broader range of climate and crisis risks. Examples of concrete solutions were presented, including the Next Generation Drought Index project in Senegal, which makes use of Copernicus soil moisture data to improve current estimates of drought affected populations. The financial mapping of exposures in Tunisia also benefited from the processing of EO data to produce a comprehensive database of commune-level assets for the entire country.



Photo credit:
The Guardian

MOBILIZING THE FINANCIAL SECTOR TO CONFRONT CLIMATE RISK



David Carlin
Climate Risk Lead
UNEP FI

“Many of the climate finance issues are interdisciplinary, therefore we need to have this all-hands-on-deck approach, across science, the financial sector, business and policy, to see how we develop, repurpose and leverage different tools”

The presentation discussed the role of climate-related risks in the financial sector and the work that UNEP FI is doing to help give financial institutions the tools to manage them. UNEP FI has run TCFD pilots since 2017 and has helped dozens of financial institutions to implement the TCFD’s recommendations. The initiative was developed after the TCFD, to understand market instrument’s role in managing climate risk.

The focus of UNEP FI’s programmes is threefold:

- Climate scenarios
- Data and methodology
- Reporting and governance

UNEP FI has recently released several reports that provide actionable guidance on climate risk topics for practitioners to advance industry good practices.

ACORN: UNLOCKING THE VOLUNTARY CARBON MARKETS WITH REMOTE SENSING



Jelmer van de Mortel
Head of ACORN
Rabobank



Mila Luleva
Head of Remote sensing ACORN
Rabobank

“The project establishes the concept of carbon removal units, which involves high-quality satellite imagery to ensure validation of data. The carbon removal units can thus be validated by external partners, and sold internationally on voluntary carbon markets to companies”

Acorn (Agroforestry CRUs for the Organic Restoration of Nature) unlocks the international voluntary carbon market for smallholder farmers in developing countries. Acorn’s mission is to combat climate change, land degradation and food insecurity while improving the livelihoods of smallholder farmers. Its solution balances competing land use demands in a way that benefits both human well-being and the environment.

Acorn enables the sale of ex post, nature-based carbon removal units (CRUs) to corporations. The carbon sequestration behind these units is managed and made transparent through remote sensing technology and scalable certification according to the Acorn Framework and Methodology. As such, Acorn is a game-changer in the currently opaque, yet growing voluntary carbon market.

First results of carbon removal units are being generated in Uganda, Tanzania and Ivory Coast. The project goal is to create impact for and reach over 15 million smallholder farmers.

ASSET-LEVEL INSIGHTS FOR PRIVATE CLIMATE FINANCE



“Both asset-level and dynamic data collected give commercial institutions more granular information to advise their investment decisions and assess their operations”

Christophe Christiaen

Sustainable Finance Lead
Satellite Applications Catapult

EO has an inherent value proposition for financial institutions and can play an important role in addressing climate and sustainability data issues. Geospatial data, when combined asset-level data on location and ownership of physical assets, can offer insights on climate and environmental risks, opportunities and impacts from the physical asset level onwards. Which investors can be aggregated at the company-, portfolio- or country-level to support numerous use cases such as valuation, risk management, reporting or investor engagement.

A key enabler for EO data to support private climate finance is access to accurate and trusted global datasets of physical assets in every major sector of the global economy. We need to know where assets are, their characteristics, and who owns them. In a manner that is analogous to the Human Genome Project, it is now possible to sequence or decode the real economy from space using EO, geospatial and AI techniques, to create universally trusted, transparent and verifiable asset-level datasets covering every major sector of the global economy. The Spatial Finance Initiative's GeoAsset Project has started to do this for the cement and steel industries and is looking for partners to expand into other sectors.



Photo credit:
Mattia Spotti

SAGABI PROJECT: PILOT PUBLIC ASSET INSURANCE – CLIMATE FINANCE MECHANISM WITH CITIES IN GHANA



Matthias Range

Head of Unit, Disaster Risk Finance and Insurance
GIZ



Job Udo

Senior Consultant, Flood Risk Management
HKV



Dominik Aulehner

Senior Cat & Business Development Analyst
Allianz Re

“To develop an insurance product, it is essential that the risk can actually be quantified. For our project, EO data was used to develop a forecasting flood risk model, validated with ground truth data and calibrated against a past catastrophic flood event. The results from this model were used to create a tailor-made, affordable and adequate insurance cover for the city of Accra”

Risk transfer mechanisms like insurance are an important part of a holistic risk management concept. For rare, very heavy national catastrophic events, major financial impact will not be avoided, even when risk prevention and adaptation measures have been properly implemented.

Insurance solutions become essential to enable fast recovery and sustainable financing. However, affordable and adequate insurance is not possible without the assessment and quantification of the underlying risk.

The lack of proper risk quantification is one of the reasons for the insurance protection gap in many regions of the global South, for instance in Accra.

In a public-private partnership, GIZ, Allianz Re and HKV Consulting have pioneered a holistic risk management concept for three different municipalities in Accra, the capital of Ghana, that integrates an innovative and data driven insurance solution. As a cornerstone, HKV developed a flood risk model of Accra, which was later used by Allianz to develop pilot insurance products in a scarce environment.



Photo credit:
Efo Dela

THE GLOBAL RESILIENCE INDEX INITIATIVE - A PUBLIC PRIVATE COLLABORATION TO BUILD A COMMON LANGUAGE OF RISK



Matthew Foote
Senior Director, Analytics
Climate and Resilience Hub
WTW

“While metrics related to assessing organizations’ decarbonization strategies are increasingly well defined and progress towards net zero and alignment with the Paris Agreement, the physical risk assessment is actually not yet as well represented. This particularly limits the ability of organizations, regulators and the wider stakeholder community to continue to assess the potential benefits that can be made from increased investment in resilience, across all communities and sectors including humanitarian, infrastructure, green finance and international development”

The Global Resilience Index Initiative is a multi-partner task force which will provide a globally consistent model for the assessment of resilience across all sectors and geographies. It will be a curated, open-source resource offering high-level metrics across the built environment, infrastructure, agriculture and societal exposures with many potential applications in aggregated risk management worldwide.

This collaborative body aims to solve the data emergency faced by leaders globally, and in turn, support them in their efforts to overcome the climate crisis. By making quality data more accessible and easily available, institutions and decision makers will be able to quantify the value of building resilience and the economic risk that may arise from a lack of action. This innovative initiative draws upon the experience of cross-sector modelling through collaboration with governments, academia, insurance and engineering.

The Global Resilience Index Initiative will be officially launched at COP26 in November 2021, with further development and operational applications foreseen by the summer of 2022. The launch of the full open repository and indices is expected to take place at COP27 in November 2022.

WORKSHOP CHAIR AND MODERATORS

The Workshop was chaired and moderated by members of the GEO CC-WG and the GEO Secretariat.



Sara Venturini
Climate Coordinator
GEO Secretariat



Steven Ramage
Head of External Relations
GEO Secretariat



Virginia Burkett
Chief Scientist for Climate and
Land Use Change, USGS
CC-WG Co-chair



Mark Dowell
Senior Scientific Officer
Project Leader
European Commission JRC
CC-WG Co-chair



John Firth
Senior Director
WTW
CC-WG Member

LINKS TO WORKSHOP MATERIALS

All workshop materials can be accessed publicly via the links provided below.

Day 1: EO for national climate action

- [Recordings](#)
- [Slides](#)

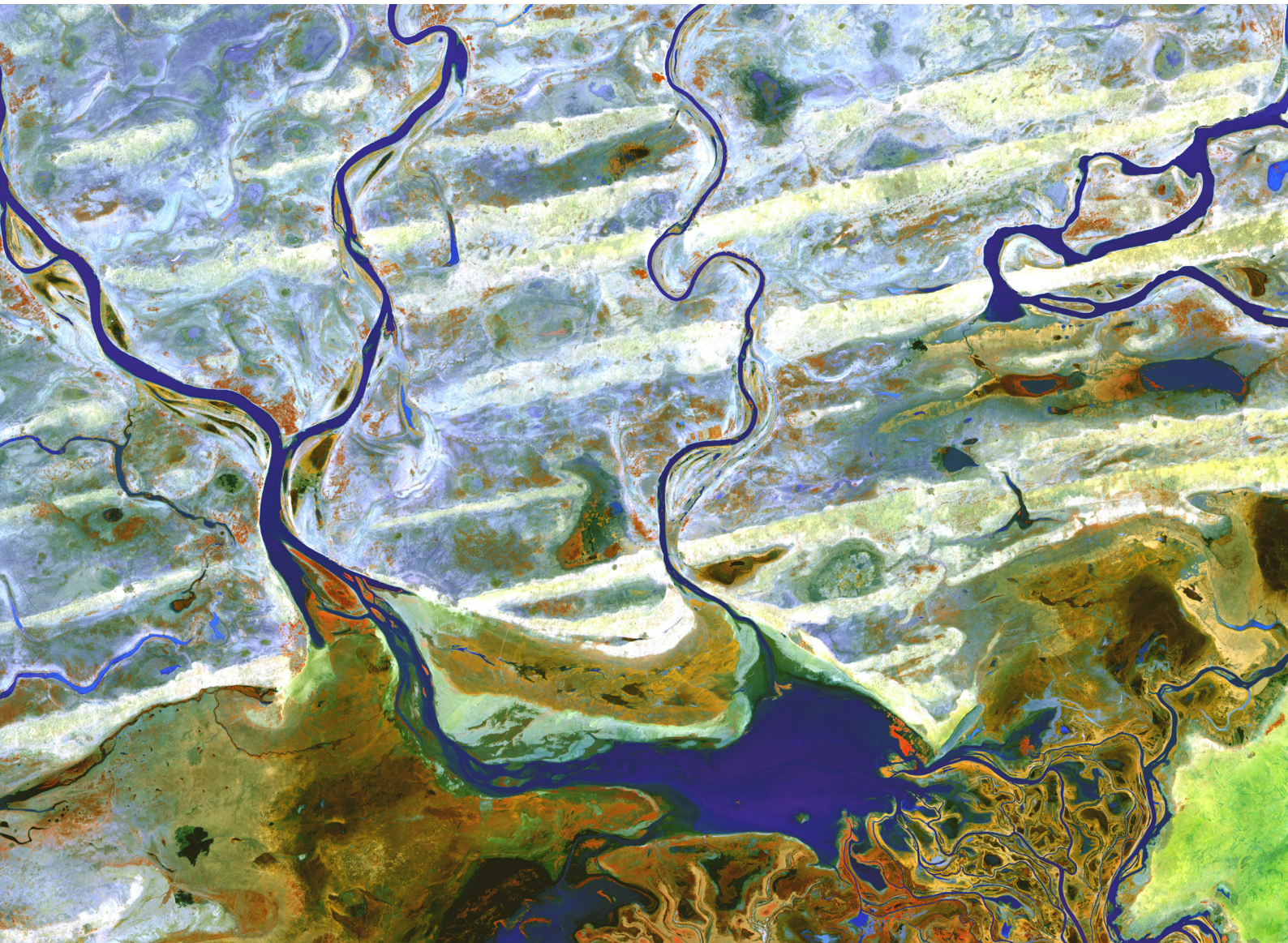
Day 2: EO for collective ambition for climate

- [Recordings](#)
- [Slides](#)

Day 3: EO for climate finance decisions

- [Recordings](#)
- [Slides](#)

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ESA, Deforestation in Rio Branco, Brazil



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