

Information on Earth Information Day 2021

Note by the Chair of the SBSTA

19 November 2021

I. Introduction

1. The Earth Information Day is a valuable opportunity for exchanging information on the state of the global climate system and developments in systematic observation.¹ Data, services and information on the global climate system are vital for informing decision making under the UNFCCC and the Paris Agreement.
2. Earth Information Day 2021 will take place on Wednesday 3 November 2021, in conjunction with the Glasgow Climate Change Conference.
3. This note provides an overview of the Earth Information Day 2021, including information on its organization and themes (section II), background information on activities under the Convention (section III), and activities by relevant programmes and organizations (section IV). All information on the Earth Information Day 2021, including a detailed programme, will be made available online.²
4. I will prepare an informal summary report which will be available in advance of SBSTA 56.

II. Organization and themes

5. The Earth Information Day will consist of a 3 hour dialogue session and online poster exhibition. The dialogue session will consist of oral presentations and panel discussions and will take place from 10.00–13.00 (CET).
6. Posters will be available online **throughout** the Glasgow Climate Change Conference in the virtual Poster Gallery. Participants will be able to participate in the virtual poster Q&A sessions with poster presenters from 13:15–14:45 (CET) via the virtual conference platform.
7. Responding to the 7 submissions received by the secretariat from Parties and non-Party stakeholders,³ and in consideration of the mandates and the wider context of ongoing work under the UNFCCC, I identified two themes for the Earth Information Day:
 - Theme 1. **Updates on Earth observation of the climate system and climate change.**
 - Theme 2. **Interpreting Earth observations for implementing the Paris Agreement – developments, opportunities and challenges**

8. I propose below the following guiding questions that are intended to help to focus presentations, discussions and posters.

9. Suggested guiding questions are:

- What is the latest knowledge on the state of the global climate system (atmosphere, ocean, land, cryosphere and biosphere) and drivers of climate change?
- What is the status of the global climate observing system across all domains?
- What are the latest developments and directions in Earth observation to support implementation of the Paris Agreement, including in provision of data, tools and climate services particularly for developing countries?
- What are the needs and challenges in regard to the above?

10. I invite Parties to come prepared to participate actively in the Earth Information Day dialogue and poster Q&A. I encourage Parties to view the presentations and posters in advance. It is important that this event be an active dialogue in which Parties and other users of information have an opportunity to express their needs and

¹ FCCC/SBSTA/2019/2 para. 58.

² See <https://unfccc.int/event/earth-information-day-2021>.

³ Submissions were received from the Antigua and Barbuda on behalf of the Alliance of Small Island States, Chile, the European Union, Japan, Peru, the United Republic of Tanzania, and the United States of America. See: <https://www4.unfccc.int/sites/submissionsstaging/Pages/Home.aspx>.

exchange with those programmes and systems that are providing it. I also encourage Parties to use the information in discussions to inform their continued activities on research and systematic observation to support work under the Paris Agreement and Convention.

11. An indicative programme for the Earth information day is shown below (all times shown in GMT).

Earth information day 2021		
10:00-13:00 (GMT)	Dialogue Theme 1: Updates on Earth observation of the climate system and climate change Theme 2: Interpreting Earth observations for implementing the Paris Agreement – developments, opportunities and challenges	<i>Chair: SBSTA Chair</i> <i>Potential contributors include representatives from: IPCC WG I, WMO, GCOS, IOC-UNESCO, GOOS, CEOS/CGMS WGClimate, GEO</i>
13.15-14.45	Poster Q&A between registered participants and poster contributors to take place in the virtual Poster Gallery	<i>Contributors TBC</i>
31 Oct-13 Nov	Poster Gallery displaying all posters for this event <i>Available from the virtual conference webpage</i>	

III. Background information

A. Update on linked activities under the UNFCCC

12. This section provides some of the latest updates on relevant activities being undertaken under the UNFCCC.

13. The second meeting of the Structured Expert Dialogue, under the second periodic review of the long-term global goal and the progress towards achieving it, will take place in conjunction with the Glasgow Climate Change conference on 1–2 November 2021. The first meeting of the structured expert dialogue took place over two parts in November 2020 and June 2021, whilst the third meeting of the SED is now scheduled to take place during the first sessional period in 2022.⁴

14. The Least Developed Countries Expert Group (LEG) published “Gaps and needs related to the process to formulate and implement national adaptation plans (NAPs) as mandated through decision 8/CP.24, para. 17”. The technical brief presents the compilation of gaps and needs of the least developed countries related to the process to formulate and implement national adaptation plans and the needs related to adaptation arising from the Paris Agreement. The brief included gaps related to climate scenarios, science and translation to local context.⁵

15. The Adaptation Committee (AC) hosted a webinar,⁶ 20 June 2021, on adaptation communications to draft supplementary guidance for voluntary use by Parties in communicating adaptation information. The AC solicited input from practitioners, scientific actors, and other experts, heard experiences of Parties in preparing communications, and heard the experience of parties and practitioners who had used UNFCCC guidance materials relevant to adaptation or other workstreams.

16. The Nairobi work programme continues to address knowledge gaps including those related to biodiversity and to the ocean, coastal areas and ecosystems.⁷ Activities under the ocean work includes thematic sessions with the Technology Executive Committee (TEC) and Friends of Ecosystem-based Adaptation as a part of the

⁴ See <https://unfccc.int/topics/science/workstreams/periodic-review>.

⁵ See https://unfccc.int/sites/default/files/resource/LEG-brief_NAP-gaps-and-needs-Mar2021.pdf.

⁶ See <https://unfccc.int/event/AC-webinar-AdComs>.

⁷ See <https://www4.unfccc.int/sites/NWPStaging/Pages/oceans-page.aspx>.

“Technology Day” series of events to promote innovative approaches to deploy, disseminate and scale up adaptation technologies.⁸

B. Brief update of information and activities by UN and other relevant programmes and organizations

17. This section provides brief updates on some of the relevant ongoing activities by the systematic observation community. It is a non-exhaustive list of activities by relevant programmes and organizations presenting at the Earth information day.

Committee on Earth Observation Satellites and Coordination Group for Meteorological Satellites Joint Working Group on Climate (CEOS/CGMS WGClimate)

18. The third version of the web-based Inventory of existing and planned climate data records of GCOS Essential Climate Variables (ECV) observable from space was published in July 2020.⁹ This version covers contributions to 35 of the 37 ECVs for which information is accessible from space. It fills previously identified gaps, as space agencies have started to address data records for lightning, sea-surface salinity, above ground biomass, and permafrost. Version 4 of the inventory is under consolidation.

19. CEOS and CGMS endorsed a Greenhouse Gas Roadmap in 2020 based on a whitepaper noted by SBSTA,¹⁰ to implement an operational atmospheric CO₂ and CH₄ monitoring system. A pilot inventory is based on available space-based assets and could inform the first global stocktake in 2023. CEOS and CGMS welcome Parties, and their technical agencies, to engage with CEOS and CGMS agencies prior to the first Global Stocktake to ensure that the products and services provided are fit-for-purpose.

20. In 2019, CEOS began an effort to coordinate the use of multiple satellite missions to derive above ground biomass. In 2020, this effort was expanded to begin the development of a CEOS Roadmap for Agriculture, Forest and Other Land Use (AFOLU) observations to complement the Greenhouse Gas roadmap. Both this and the GHG roadmap will engage key user communities to understand their requirements and develop pilot GHG and AFOLU inventory products to support the first Global Stocktake and beyond. In 2021, CEOS developed its Strategy to Support the Global Stocktake of the UNFCCC Paris Agreement encompassing all of the above described measures.

Copernicus Programme, EU

21. The Copernicus Climate Change Service (C3S) and the Copernicus Atmosphere Monitoring Service (CAMS) are provided by the Copernicus Earth Observation Programme¹¹ of the European Union. Both services are implemented by the European Centre for Medium-Range Weather Forecasts (ECMWF)¹² on behalf of the European Commission (EC). The EC and ECMWF have signed a Contribution Agreement, ensuring the enhanced continuation of C3S and CAMS services during the 2021–2028 Copernicus 2.0 period. In particular, C3S continues to publish its annual European State of the Climate (ESoTC)¹³ and will extend its ERA5 reanalysis further back in time to 1940 and possibly to 1925. ERA5 data are fundamental for climate model development and verification but also represent an important source of information to support a wide range of practical climate applications.¹⁴ Plans are also underway to operationalize a C3S prototype extreme event attribution service pending confirmation of additional resources. CAMS is coordinating the development and operational implementation of the new anthropogenic CO₂ emissions Monitoring and Verification Support capacity, leveraging a number of EU Horizon 2020 research efforts such as CoCO2¹⁵ led by ECMWF to develop a prototype system and which started in January 2021.

22. The fifth Copernicus Ocean State Report (OSR) covers the state of the ocean, natural variations, and changes due to climate change and draws on the Copernicus Marine Ocean Monitoring Indicator framework. It delves into the value chain of ocean data to ocean governance and examines concrete examples of downstream applications used to support climate mitigation and adaptation.¹⁶

⁸ See https://unfccc.int/ttclear/events/2020/2020_event07.

⁹ See <https://climatemonitoring.info/ecvinventory/>.

¹⁰ FCCC/SBSTA/2019/5 para. 40.

¹¹ See <https://www.copernicus.eu/en/about-copernicus>.

¹² See <https://www.ecmwf.int/>.

¹³ See <https://climate.copernicus.eu/esotc/2020>.

¹⁴ See <https://cds.climate.copernicus.eu/cdsapp#!/search?type=application>.

¹⁵ See <https://coco2-project.eu/>.

¹⁶ See <https://marine.copernicus.eu/access-data/ocean-state-report>.

Global Climate Observing System

23. GCOS has published the GCOS Status Report 2021.¹⁷ This report brings together in situ and satellite observations over all Earth domains: atmosphere, ocean and terrestrial. It highlights that observations of ECVs have generally improved across all the domains. Many of the terrestrial biosphere related ECVs are now observed annually and the resolution of land use and biomass estimates has improved. The upper ocean drifter network (Argo) is operating at its designed capacity.

24. However there continue to remain areas for improvement including: the full implementation of satellite observations and associated methods to validate and assess observation accuracy; satellite coverage of some regions, including the arctic and mountain regions, Southern ocean and parts of Africa; observations in some countries including Africa and the Pacific need support; and data centres must be supported to ensure long-term archives of historic time series. Both for space-based and in-situ measurements, long-term preservation programmes are and remain essential.

Group on Earth Observations

25. On September 21–23, 2021, the Group on Earth Observations (GEO) “Climate Policy and Finance Workshop”¹⁸ highlighted GEO Work Programme¹⁹ activities and GEO partners enabling adaptation and mitigation by providing actionable Earth observation data and information to governments for agriculture, forestry, land use, water, biodiversity, coastal zones, urban areas, and other key sectors. Activities included supplementary technical guidance on integrating Earth observations into National Adaptation Plans (NAPs) for the agriculture sector with the GEO Global Agricultural Monitoring initiative GEO GLAM, and preparations to support the Global Stocktake process through the application of Earth observations.

26. The workshop raised awareness of how Earth observations can strengthen the evidence base for public and private investment decisions on climate action. A new GEO Climate Finance workstream was officially launched, which will be implemented in 2022 with hands-on workshops and targeted engagements.

27. Recent and upcoming GEO events and activities include the GEO and CEOS co-hosted “Engaging Users in Solving Coastal Issues” webinar²⁰ on October 5, 2021; the release of “GHG Monitoring from Space: A mapping of capabilities across public, private and hybrid missions” in November 2021 by GEO, Climate TRACE and the World Geospatial Industry Council (WGIC) as an outcome of the virtual forum “Innovation in Remote Sensing Technologies for accelerated Climate Action” held in December 2020;²¹ and the youth track at GEO Week in late November to develop a Youth Community of Practice in GEO.

28. Through the “Indigenous Hackathon” methodology, which has proven successful in mobilizing Indigenous communities and the collective intelligence of the crowd to co-create culturally relevant and cost-effective ICT tools, the GEO Indigenous Alliance promotes Indigenous-led innovation so that Indigenous communities can play a proactive role in the climate crisis.²²

Intergovernmental Panel on Climate Change (IPCC)

29. The IPCC published the Working Group I contribution to the Sixth Assessment report: The Physical Science Basis in August 2021. The WGI contribution represents the most up-to-date physical science understanding of the climate system and climate change, bringing together the latest advances in climate science, and combining multiple lines of evidence from paleoclimate, observations, process understanding, global and regional climate simulations. It shows how and why climate has changed to date, and the improved understanding of human influence on a wider range of climate characteristics, including extreme events.

30. The Sixth Assessment Report reflects a greater focus on regional information that can be used for climate risk assessments. The contributions of Working Groups II: Impacts, Adaptation and Vulnerability, and III: Mitigation of Climate Change, will be released in early – mid 2022. The IPCC AR6 Synthesis Report is due in late 2022. It will be based on the content of the three Working Groups Assessment Reports as well as the preceding three Special Reports.

¹⁷ See <https://gcoss.wmo.int/en/gcos-status-report-2021>.

¹⁸ See [Outcomes of the GEO Climate Policy and Finance Workshop](#).

¹⁹ See https://www.earthobservations.org/geoss_wp.php.

²⁰ See [Engaging Users : CEOS COAST Product Showcase hosted by GEO](#).

²¹ See [Outcomes of the Forum on Innovation in Remote Sensing Technologies for Accelerated Climate Action, leading to COP26](#).

²² See [The GEO Indigenous Summit Report](#).

IOC-UNESCO and the Global Ocean Observing System

31. The UN Decade of Ocean Science for Sustainable Development²³ (the Ocean Decade), coordinated by IOC-UNESCO, commenced on 1 January 2021. Already 31 global ocean science programmes have been endorsed and are underway as part of the Decade convening hundreds of partners from research institutions, Government, NGOs, industry and philanthropy. A second Call for Decade Actions No. 02/2021 was launched on 15 October and is soliciting major programmes addressing the ocean-climate nexus, marine pollution and ecosystem resilience, as well as projects on a diversity of themes. Interested parties are encouraged to join the Global Stakeholder Forum²⁴ to learn more and collaborate with partners around the world.

32. An overview of the status of the ocean observing system is available in this year's edition of the Global Ocean Observing System (GOOS) Report Card.²⁵ The Report Card highlights the value and need for sustained and integrated met-ocean observations, essential to predict the consequences of ocean and climate change, the role of the ocean in absorbing heat and carbon, design mitigation and guide adaptation. It also highlights the impacts of Covid-19 on ocean observing networks due to quarantine and port restrictions, cancellation of ship expeditions, and limited servicing of equipment, and the work of the ocean observing community to rise to the challenges raised.

33. Launching the Ocean Decade has made the work of GOOS more important than it has ever been. GOOS is leading three programmes at the heart of the Ocean Decade: Ocean Observing Co-Design will transform ocean observing system assessment and design processes. CoastPredict will revolutionise Global Coastal Ocean observing and forecasting. Observing Together will meet stakeholder needs and make every observation count through enhanced support to both new and existing community-scale projects. Designed to meet immediate, urgent needs and accelerate GOOS development, these programmes will integrate with each other and others, and will help support a broader set of climate goals in global prediction and mitigation, local adaptation, and capacity development.

World Meteorological Organisation (WMO)

34. WMO, at its Extraordinary Congress in October 2021, approved a Unified Policy for the International Exchange of Earth System Data. The policy reaffirms the commitment of WMO Members to the free and open exchange of data for weather, climate, water and the oceans. The Congress also approved the Global Basic Observing Network (GBON), which sets out the requirements for WMO Members in terms of the spatial and temporal resolution of surface-based weather and climate observations. WMO, together with UNEP and UNDP is also developing the Systematic Observations Financing Facility to provide sustained funding to Members to achieve the requirements of GBON.

35. The United in Science report,²⁶ brings together the latest climate science related updates from a group of key global partner organizations – WMO, GCP, UNESCO Intergovernmental Oceanographic Commission (UNESCO-IOC), Intergovernmental Panel on Climate Change (IPCC), UNEP and the UK Met Office. The report warns that greenhouse gas concentrations in the atmosphere continued to increase despite slight emissions reductions due to COVID pandemic. The report highlights rising global emissions and the irreversible impacts of climate change that negatively affect the ocean and seas, ecosystems and economies, water resources and human well-being and health.

36. The WMO 2021 State of Climate Services²⁷ report focuses on climate services for the water sector, highlighted in as a top priority for adaptation by Parties in their Nationally Determined Contributions. The report highlights the needs to strengthen drought and flood early warning systems, and the hydromet systems and services that support water resource management decision-making. In October 2021 WMO released the annual Greenhouse Gas Bulletin and the provisional report on the State of the Global Climate 2021. This year WMO and contributing partner organizations also issued a series of regional reports on the State of the Climate in 2020 – for Latin America and the Caribbean, Asia, Africa and the Southwest Pacific (the latter to be launched during COP26).

²³ See <https://www.oceandecade.org/>.

²⁴ See <http://www.forum.oceandecade.org>.

²⁵ See <https://www.ocean-ops.org/reportcard2021/>.

²⁶ See https://public.wmo.int/en/resources/united_in_science.

²⁷ See https://library.wmo.int/index.php?lvl=notice_display&id=21963#.YWfZyYuxXIU.