

## Information on Earth Information Day 2023

### Note by the Chair of the SBSTA

29 November 2023

## I. Introduction

1. The systematic observation community has a vital role in supporting the Convention and the Paris Agreement. Understanding, monitoring and prediction of weather and climate ultimately relies on observations. Systematic observation is therefore the foundation of a climate services value chain that connects observations to decision-making in order to both understand climate change and support decisions on climate change action and sustainable development. Through this value chain, systematic observations provide the data that underpins climate models, forecasts on various timescales, tailored products and services, and early warning systems.

2. We know that systematic observation has not met its full potential. In the Earth Information Day held in 2022,<sup>1</sup> which took place in conjunction with the Sharm El-Sheikh Climate Conference, Parties and members of the systematic observation community underlined a number of key messages, including:

- a) Earth observations, as well as their international exchange and use in modelling frameworks, provide the basis for all current and future mitigation and adaptation action that informs all climate projections and services, including Early Warning Systems;
- b) The Global Climate Observation System (GCOS) sets a standard for global observations and provides a framework, the GCOS Implementation Plan, to enhance them, with the GCOS Essential Climate Variables (ECVs) Requirements detailing what must be monitored to guide global ambition, achieve climate targets and mobilise action;
- c) Persistent observation gaps exist for many parts of the globe, with many ECVs unobserved with some fragile systems among them, such as the ocean and cryosphere;
- d) Parties, the private sector and the observing community must collaborate to target finance and maintain systems needed to provide long-term observations data that support our understanding of the climate system and enable action on climate change;
- e) A global goal for observations would help to ensure adequate global observations coverage, strengthen and improve the resilience of existing observing systems and networks, and enhance support for climate services in line with the United Nation Secretary General's Early Warnings for All initiative.

3. At this same event, a representative from the Intergovernmental Panel on Climate Change (IPCC) Working Group II emphasised, amongst other things, the importance of linking earth observation with statistical data from bottom-up sources in order to enhance understanding of rapid and slow-onset events, exposure to climate hazards over time, and the vulnerability of humans and ecosystems. They also stressed that anthropogenic imbalances can only be addressed through a holistic approach that considers climate variables and the responses of living systems.

4. The benefits of climate observations far exceed their cost. While no complete and comprehensive cost-benefit analysis of the global climate observing system has been conducted, analysis of its component parts demonstrate its extensive benefits. Investing in global climate observations means investing in our future.

5. Earth Information Day 2023 will explore key challenges, solutions and ways forward for Earth observations to support the Convention and the Paris Agreement including: updates on the observation system; and observations to support integrated planning and management of mitigation, adaptation and early warning systems, as well as reporting of mitigation, greenhouse gas (GHG) emissions and adaptation. Especially important at this time are linkages being made to the imminent conclusion of the first global stocktake under the Paris Agreement and the crucial role that systematic observation can have in informing Parties on the best available science when they come to update their nationally determined contributions (NDCs) to increase their level of ambition.

6. This year's event will take place on Sunday, 3 December, in conjunction with the Dubai Climate Change Conference.<sup>2</sup>

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<sup>1</sup> See [EID.SummaryReport\\_2022.pdf \(unfccc.int\)](#).

<sup>2</sup> Please consult the Daily Programme and the CCTV for more up-to-date-information.

7. This note provides an overview of Earth Information Day 2023, including information on its organization and themes (section II), with background information also provided on activities under the Convention (section III) and activities by relevant programmes and organizations (section IV). All information on Earth Information Day 2023, including a detailed programme, is available online.<sup>3</sup>
8. I encourage Parties to carry the key messages from Earth Information Day with them into the informal consultations on Research and Systematic Observation and work together to strengthen the global observing system and its support to implement the Convention and the Paris Agreement.
9. I will prepare an informal summary report of this event, which will be available in advance of SBSTA 60.

## II. Organization and themes

10. Earth Information Day will comprise an in-person, 3-hour dialogue session and a 2-hour World Café session.
11. The dialogue session is scheduled from 10.00 to 13.00 and will kick-off with an opening segment, which I will moderate, followed by three panel discussions with presentations and question and answer (Q&A) sessions, which will be moderated by the SBSTA Vice-Chair.
12. The World Café session will have 12 tables and provides an opportunity for participants to actively engage with members of the systematic observation community on a wide variety of topics and is scheduled to take place from 15.00 to 17.00.
13. Responding to the eight submissions received by the secretariat from Parties and non-Party stakeholders,<sup>4</sup> and in consideration of the mandates, agenda for the session and the wider context of ongoing work under the UNFCCC, such as the first global stocktake, I have identified three themes for this year's Earth Information Day:
  - a) Updates on the state of the climate and the global climate observing system;
  - b) Observations for mitigation;
  - c) Observations for climate risks and resilience.<sup>5</sup>
14. I propose the following guiding questions below, that are intended to help focus presentations, discussions and the World Café:

Overarching question:

  - How can the provision of climate information, based on Earth observations, better inform decision-making under the UNFCCC and the Paris Agreement now, and in the future, to better support understanding and implementation of mitigation and adaptation action and national reporting and aid in the ratcheting-up of the level of ambition?

Panel questions:

  - What are the latest updates on observations and understanding of the climate system, including key uncertainties and challenges?
  - How can the observing system be used and further enhanced to i) support global understanding of the climate system and ii) inform decision-making and national reporting?
  - How can the value chain, from monitoring to climate services be used and enhanced to support national action? What are current and potential approaches, good practices and tools?
15. I invite Parties to come prepared to participate actively in the Earth Information Day dialogue Q&A session, as well as at the World Café session. I also encourage Parties to view the presentations and World Café information available on the website 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 exchange with those programmes and systems that are providing it.
16. 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 Convention and the Paris Agreement.

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<sup>3</sup> See [Earth Information Day 2023 | UNFCCC](#).

<sup>4</sup> Submissions were received from Samoa on behalf of the Alliance of Small Island States; Senegal on behalf of the Least Developed Countries; Japan; Spain and the European Commission on behalf of the European Union and its member states, as well as GCOS, WMO, the University of Leeds and the Global Carbon Project. See: <https://www4.unfccc.int/sites/submissionsstaging/Pages/Home.aspx> (search "earth", see SBSTA 59).

<sup>5</sup> Includes adaptation.

17. An indicative programme for Earth Information Day is shown below. The event will start with opening remarks from myself, followed by keynote speeches from the Chair of the IPCC, the Executive Secretary of the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO) and the Director of the Earth Observation Programmes at the European Space Agency on behalf of the Committee on Earth Observation Satellites (CEOS), a representative from the World Meteorological Organisation (WMO), a Youth representative (YOUNGO), and a UNFCCC Director. The SBSTA Vice-Chair will then moderate the panel discussions, each of which will be followed by a Q&A session.
18. The final agenda will be published on the Earth Information Day 2023 webpage in advance of the event.

<b>Earth Information Day Sunday, 3 December 2023</b>		<i>Full list of speakers, panellists and WC experts/facilitators can be found on the Earth Information Day webpage<sup>6</sup></i>
10.00-13.00	<b>Dialogue</b> <b>Opening speakers</b> <b>Panel 1: Updates on the state of the climate and the global climate observing system</b> <b>Panel 2: Observations for mitigation</b> <b>Panel 3: Observations for climate risks and resilience</b>	<i>Moderator: SBSTA Chair (opening) SBSTA Vice-Chair (Panels) Contributors include representatives from: IPCC, CEOS/CGMS WGClimate, GCOS, GEO, GOOS, IOC-UNESCO, and WMO</i>
15.00-17.00	<b>World Café</b>	<i>12 tables covering various aspects of systematic observation and how stakeholders can improve access and actively engage</i>

### III. Background information

#### A. Update on linked activities under the UNFCCC

19. As highlighted in the introduction above, systematic observation information supports decision-making and processes across the UNFCCC. Some of the latest, relevant activities are provided here.
20. The Adaptation Committee (AC) released its draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication.<sup>7</sup> This supplementary guidance provides an overview of the guidelines for adaptation communications and related arrangements, including those relevant to monitoring and observations, and suggestions for applying the guidelines and for benefiting from the links between these communications and other adaptation-related reporting arrangements under the Convention and the Paris Agreement. Additionally, the AC has embarked on undertaking regional work by conducting a series of regional events to co-create an understanding of the region-wide and transboundary adaptation priorities as well as action and support that regionally operating organizations are providing. Access to observational data, spatial data coverage, including for early warning systems and weather services, and a call for stronger regional collaboration and information-sharing platforms have been some of the common themes across the regions. More information is available in the short overview reports on the regional events.<sup>8</sup>
21. The Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation (GGA) will conclude at the fifth session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA 5), where it is mandated to adopt its framework, initiated at CMA 4. Parties and observers have engaged in four workshops throughout 2023 to develop this framework, where overarching targets/priorities/messages/signals for the framework, as well as targets around the four stages of the iterative adaptation policy cycle have been discussed.<sup>9</sup> Multiple proposals have been made for the inclusion of targets around multi-hazard early warning

<sup>6</sup> See [Earth Information Day 2023 | UNFCCC](#).

<sup>7</sup> See document FCCC/SB/2022/5/Add.1 and FCCC/SB/2022/5/Add.1/Corr.1.

<sup>8</sup> See <https://unfccc.int/AC-boosting-region-wide-coherence-on-adaptation>

<sup>9</sup> See [Workshops under the Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation. Report by the secretariat | UNFCCC](#).

systems, and Parties will continue considering this, and the wider framework during negotiations at the 59<sup>th</sup> session of the subsidiary bodies (SB 59) and CMA 5.

22. Through the national adaptation plans (NAPs) Data Initiative, the Least Developed Countries Expert Group (LEG) has been assisting least developed countries in addressing data gaps related to the formulation and implementation of NAPs. The initiative provides ready datasets using open-source statistical package to produce products that can be directly integrated into NAP documents and project profiles.

23. The important role of Indigenous Peoples and local communities in effective climate action has gained widespread recognition. Given their direct interaction with and reliance on the land, observations of climate and environmental variability are integral to lifestyles of Indigenous Peoples and local communities, if meaningfully engaged, can serve as essential members of the systematic observation community to shape global approach to addressing climate change and restoring the integrity of nature. Work under the Local Communities and Indigenous Peoples Platform (LCIPP) facilitates the exchange of experiences and best practices among Indigenous Peoples, local communities, and Parties. It also facilitates the integration of diverse knowledge systems and values into the broader UNFCCC process. Knowledge holders from all seven United Nations indigenous sociocultural regions participate in various events and forums during the sessions of the SBs and the session of the Conference of the Parties through the LCIPP.

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

24. 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 Earth Information Day.

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

25. In 2022, the Joint CEOS-CGMS Working Group on Climate (WGClimate) published version 4.1 of its web-based Inventory of existing and planned Climate Data Records (CDRs) that address the GCOS ECVs observable from space.<sup>10</sup> The updated Inventory contains information for more than 1,200 CDRs, covering 36 of the 37 ECVs observable from space, including carbon cycle variables, and filling previously identified gaps. WGClimate and member agencies use the Inventory to identify and mitigate potential gaps in future satellite missions and product generation. Many of the CDRs support the Enhanced Transparency Framework and contributed to the first Global Stocktake. Currently WGClimate is evaluating the actions in the 2022 GCOS Implementation Plan and developing an official Space Agencies' Response. WGClimate episodically conducts detailed gap analyses for sets of ECVs in the Inventory to ensure completeness and identify potential new CDR development priorities for the Agencies to meet GCOS goals.

26. Space agencies continue to coordinate annual global observation of the world's forested areas to ensure availability of data needed to support national reporting processes of the Global Forest Observations Initiative (GFOI) and the Global Observation of Forest Cover and Land Dynamics (GOFC-GOLD) effort.<sup>11</sup> GOFC-GOLD and GFOI are providing regional training in coordination with national agencies on the use of these data. In 2019, CEOS began an effort to coordinate the use of multiple satellite missions to derive above ground biomass. It has expanded this effort to begin development of a CEOS Roadmap for Agriculture, Forest and Other Land Use (AFOLU) observations to complement the Greenhouse Gas Roadmap supporting the global stocktake.

27. Going forward, CEOS and CGMS will contribute to the global stocktake process via an integrated approach combining processes documented in the GHG and AFOLU roadmaps. This will include engaging key user communities to understand their observing requirements, building upon the pilot GHG and AFOLU inventory products provided for the first global Stocktake, and using lessons learned from these activities to coordinate the development of a more capable pre-operational GHG monitoring system to support global stocktakes in the future. CEOS and CGMS welcome Parties, and their technical agencies, to engage member agencies in this development to ensure that the space architecture, products and services are fit-for-purpose.

### **Copernicus Earth Observation Programme**

28. The Copernicus Climate Change Service (C3S) and the Copernicus Atmosphere Monitoring Service (CAMS) are provided by the Copernicus Earth Observation Programme<sup>12</sup> of the European Union. Both services

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<sup>10</sup> See <https://climatemonitoring.info/ecvinventory/>.

<sup>11</sup> See <http://www.gofcgold.wur.nl/>.

<sup>12</sup> See <https://www.copernicus.eu/en/about-copernicus>.

are implemented by the European Centre for Medium-Range Weather Forecasts (ECMWF)<sup>13</sup> on behalf of the European Commission (EC). In 2021, 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.

29. C3S publishes annually its European State of the Climate report (ESoTC)<sup>14</sup> and monthly climate bulletins based on ERA5. This monitoring is based on global atmospheric reanalysis that has recently been extended back in time to 1940. The near real time nature of ERA5 re-analysis dataset production allows for a near continuous monitoring of the climate and its evolution. The many records breaking events of 2023 including the warmest month, the warmest summer, the warmest day, and the first exceedance of the 2 degrees threshold, with respect to preindustrial average, were communicated as part of C3S regular climate monitoring.<sup>15</sup> In 2024, C3S will procure, set up and run an operational extreme event attribution service.

30. CAMS is coordinating the development and operational implementation of the new Copernicus anthropogenic CO<sub>2</sub> emissions Monitoring and Verification Support capacity,<sup>16</sup> leveraging existing capabilities as well as scientific developments from a number of EU Horizon 2020 and Horizon Europe research efforts, such as CoCO<sub>2</sub><sup>17</sup> led by ECMWF to develop the prototype systems. As part of CoCO<sub>2</sub>, first results from the prototype systems are being submitted to the UNFCCC in support of the first Global Stocktake. In addition, CAMS is already contributing to the national inventory reporting of some EU member states and in discussion with others to support observation-based emission monitoring plans at national scale.

31. Both C3S and CAMS strongly support and contribute to international coordination activities, such as those under the Group on Earth Observations (GEO), GCOS, CEOS, UNEP, and WMO frameworks.

### **Global Climate Observing System**

32. The 2022 GCOS Implementation Plan (GCOS-IP 2022)<sup>18</sup> was presented at SBSTA 57 and welcomed by the last COP.<sup>19</sup> The GCOS IP addresses existing gaps and provides actions for implementing a global observing system for climate that, if undertaken, will improve the long-term stability of the system and its ability to meet future needs.

33. Over the last year, GCOS has focused on advancing the 2022 GCOS IP, and has started to work closely with stakeholders who will be implementing these actions including the National Meteorological and Hydrological Services (NMHS), the Global Ocean Observing System (GOOS), the Global Terrestrial Networks (GTN) and the Space Agencies, and considerable progress has been achieved:

- a) The Joint CEOS-CGMS) and WGClimate is coordinating an effective response to address the satellite-based actions from the space agencies of the 2022 GCOS IP.
- b) GCOS is leading the development of high quality, networks of reference sites. In particular, GCOS is working with WMO on the establishment of a global surface reference network (GSRN).
- c) GCOS IP includes an action about developing a framework for sustained, internationally coordinated, routine global monitoring of greenhouse gas concentrations and fluxes and, in this frame, is taking part of the Global Greenhouse Gas Watch (GGGW) lead by WMO.
- d) Other areas of progress for GCOS include work on Earth Climate Cycles in a joint effort with the World Climate Research Programme; data rescue in collaboration with Copernicus and WMO; and improving estimates of air-sea and air-land fluxes with many different partners including terrestrial and oceanic networks federated through GTN and GOOS.

34. GCOS presented a Resolution on Improving Climate Observations at the WMO Congress, who endorsed the 2022 GCOS Implementation Plan and urged WMO members to address the relevant actions presented in the Plan. Similarly, the IOC Assembly, confirmed IOC Members' support to GCOS IP, and their commitment to develop the ocean observing system as a vital component of the observing system for climate.

35. Finally, the third GCOS Joint Panel Meeting was held in June 2023, gathering more than 40 GCOS experts and experts from partner organizations discussing how to move the Implementation Plan going forward.

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<sup>13</sup> See <https://www.ecmwf.int>.

<sup>14</sup> See <https://climate.copernicus.eu/esotc/2022>.

<sup>15</sup> See <https://cds.climate.copernicus.eu/cdsapp#!/search?type=application>.

<sup>16</sup> See <https://atmosphere.copernicus.eu/ghg-services>.

<sup>17</sup> See <https://coco2-project.eu/>.

<sup>18</sup> See [https://unfccc.int/documents/620920?gclid=CjwKCAiAsIGrBhAAEiwAEzMIC4veAC16E27IRxRSfWGan4-dVNWdZnrTLQJhshpMiy2iQEOdkAS2XxCfWwQAvD\\_BwE](https://unfccc.int/documents/620920?gclid=CjwKCAiAsIGrBhAAEiwAEzMIC4veAC16E27IRxRSfWGan4-dVNWdZnrTLQJhshpMiy2iQEOdkAS2XxCfWwQAvD_BwE).

<sup>19</sup> See Decision 22/CP.27.



### Group on Earth Observations

36. The annual GEO Week and Ministerial Summit convened in Cape Town, South Africa, between 6-10 November 2023. Leaders of governments reaffirmed the GEO commitment to open and free data exchange, encouraged governments to increase free access to earth observation using public resources, and strongly encouraged flexible, multi-user licensing agreements for non-governmental data. Ministers and ministerial representatives adopted the Group on Earth Observations 2023 Cape Town Ministerial Declaration.<sup>20</sup> The Declaration endorses the GEO Post-2025 Strategy Earth Intelligence for All<sup>21</sup>, charges GEO with developing an implementation plan to guide execution of the strategy and reaffirms the integral role of young people as catalysts for sustainable development, among other statements. As a first step in giving young people a greater role, GEO youth presented the first ever GEO Youth Declaration at the Summit.<sup>22</sup>

37. Two global collaborations were introduced at the GEO Ministerial Summit: The Global Ecosystems Atlas<sup>23</sup> and the Global Heat Resilience Service<sup>24</sup>. These emerging programmes are co-designed by the Earth observation community, including the private sector, to respond to the needs of users. Respectively, they aim to support climate adaptation by: Enabling comprehensive and consistent biodiversity monitoring in the face of climate change in line with the Global Biodiversity Framework (GBF) under the Convention on Biological Diversity (CBD); and providing cities with data on health risks from exposure to extreme heat events, in the context of the Early Warnings for All (EW4All) initiative.<sup>25</sup>

38. The 2023 GEO Highlights Report<sup>26</sup> was published in October 2023. Featuring 35 impactful stories, this report illustrates the profound influence of geospatial innovation and progress across the GEO Work Programme's numerous projects. From environmental conservation to enhancing urbanization monitoring, the report paints a compelling picture of how Earth observation data is being used to reshape our global world. The report encompasses the work of 22 Work Programme activities, nine Cloud Credits programmes and four Regional GEOs in 68 countries. Each of these unique initiatives has positively impacted communities and underlines that genuine progress towards global equity is through Earth Intelligence.

39. GEO is an official supporting implementing partner of the EW4All initiative under two relevant areas: Pillar 1 *Disaster risk knowledge and management* and Pillar 2 *Detection, observation, monitoring analysis and forecasting*. Under Pillar 1, GEO, as a co-lead of the activity on innovation for Risk Knowledge, has embarked on a collaborative partnership with the UNFCCC Technology Executive Committee (TEC) and initiated work on a new knowledge product to highlight technologies and innovation that help improve disaster risk knowledge and information that could assist countries in ramping-up action and support for protecting the most vulnerable and realizing early warnings for all. At the 27<sup>th</sup> meeting of the TEC (19-21 September 2023)<sup>27</sup>, a concept note<sup>28</sup> on the TEC - GEO joint knowledge product was presented and endorsed. The GEO and TEC secretariats are discussing how to receive inputs from the GEO community and ensure collaboration with co-leads and other relevant implementing partners of the initiative such as WMO, the United Nations Office for Disaster Risk Reduction (UNDRR), the Green Climate Fund (GCF), the Adaptation Fund (AF) and the International Federation of the Red Cross (IFRC).

40. GEO joined the 8<sup>th</sup> UNFCCC NAP Expo held in Santiago, Chile, in March 2023, to share and gain insights on how to integrate Earth observation data and solutions into successful climate adaptation planning and implementation, with activities including GEO Blue Planet, GEO Global Agricultural Monitoring Initiative (GEOGLAM), GEO Global Water Sustainability (GEOGloWS), Digital Earth Africa, GEO Mountains, and the regional GEO AmeriGEO. GEO's participation in the NAP Expo and collaboration with the LEG was part of ongoing efforts to increase uptake of Earth observation tools and solutions in the NAP process. To date, use of geospatial information for adaptation has increased, with application in diverse contexts where the impacts of

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<sup>20</sup> See [https://www.earthobservations.org/documents/geoweek2023/ministerial\\_package/Cape%20Town%20Ministerial%20Declaration.pdf](https://www.earthobservations.org/documents/geoweek2023/ministerial_package/Cape%20Town%20Ministerial%20Declaration.pdf).

<sup>21</sup> See [https://www.earthobservations.org/documents/geoweek2023/ministerial\\_package/GEO%20Post%202025%20Strategy%20Full%20Document.pdf](https://www.earthobservations.org/documents/geoweek2023/ministerial_package/GEO%20Post%202025%20Strategy%20Full%20Document.pdf).

<sup>22</sup> See [https://www.earthobservations.org/documents/geoweek2023/ministerial\\_package/Cape%20Town%20Youth%20Declaration.pdf](https://www.earthobservations.org/documents/geoweek2023/ministerial_package/Cape%20Town%20Youth%20Declaration.pdf).

<sup>23</sup> See <https://new.earthobservations.org/organization/working-groups/global-ecosystems-atlas>.

<sup>24</sup> See <https://new.earthobservations.org/solutions/incubators/global-heat-resilience-service>.

<sup>25</sup> See [UN Global Early Warning for Adaptation Initiative](#) and related information document [EC-75/INF. 4\(2\)](#).

<sup>26</sup> See [earthobservations.org/documents/geoweek2023/GEO\\_HIGHLIGHTS\\_report.pdf](https://earthobservations.org/documents/geoweek2023/GEO_HIGHLIGHTS_report.pdf).

<sup>27</sup> See meeting info <https://unfccc.int/ttclear/tec/meetings.html>;  
<https://www.youtube.com/watch?v=AIrZu1Wnbs&list=PLBcZ22cUY9RKxOiJQjTtVqESq0QrEccv&index=4>

<sup>28</sup> See [https://unfccc.int/ttclear/misc/StaticFiles/gnwoerk\\_static/tn\\_meetings/eb13976850e54f8bb2cf14e5a8d67042/89180815478b429e93c308a535766897.pdf](https://unfccc.int/ttclear/misc/StaticFiles/gnwoerk_static/tn_meetings/eb13976850e54f8bb2cf14e5a8d67042/89180815478b429e93c308a535766897.pdf).

climate change are already visible and accelerating, such as in urban areas and in the cryosphere in polar and mountain regions. At the same time, there is interest from LDC governments approaching GEO to obtain support in developing proposals that present innovative Earth observation projects to access climate finance through the GCF.<sup>29</sup>

41. Digital Earth Africa (DE Africa) is a GEO initiative, which uses Earth observation data to deliver decision-ready products and Earth intelligence to all African countries, across multiple sectors. Earth observation datasets, such as those available through the DE Africa platform provide a cost-effective and accurate means of mapping urban extent of cities and monitoring green spaces; by integrating these free and open data with more traditional statistical data, DE Africa provides a powerful platform to inform policy makers in the design of sustainable cities. The Ghana Statistical Service, for example, are using the data to underpin and to strengthen their National Statistical System in order to meet the African Union's Agenda 2063.

### **The Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization and the Global Ocean Observing System**

42. GOOS unites international, regional, and national ocean observing programmes, governments, UN agencies, research organizations and individual scientists to monitor changes in the ocean through the 'eyes' of thousands of ocean observing platforms, that include networks of autonomous profiling floats, underwater gliders, fixed and drifting buoys, commercial and research ships, and even marine mammals. These platforms carry sensors that collect data on physical, biogeochemical and biological ECVs.

43. The recently published 2023 Ocean Observing System Report Card<sup>30</sup> provides an overview of the status of ocean observing networks which are the basis for the vital data society needs for climate decision making by local communities and national governments around mitigation, adaptation, and sustainable development. Observation of ocean ECVs needs strengthened and sustained investment in instrumentation and data management, particularly for the Indian and Southern oceans.

44. GOOS is closely collaborating with the WMO on the GGGW.<sup>31</sup> This initiative cannot reach its potential without sustained and strengthened measurements of carbon dioxide fluxes across the ocean surface and deeper understanding of the carbon processes within the ocean.

45. The GOOS head office is also the Decade Coordination Office (DCO) for Ocean Observations and is leading three programmes at the heart of the Ocean Decade: GOOS Co-Design,<sup>32</sup> CoastPredict<sup>33</sup> and Observing Together.<sup>34</sup> For example, the GOOS co-design programme is setting key tools in place for users to understand the value of observations to advance the maturity and robustness of global ocean observing and forecasting to deliver information effectively and show the cost-benefit. Projects include by Marine Life 2030,<sup>35</sup> which is providing the essential biodiversity data to deliver information and products that can inform policy options for adaptation and marine protection.

46. Ocean Science and Observation are indispensably connected with one informing the other. IOC co-leads several initiatives bridging these two aspects, particularly the Ocean Acidification Research for Sustainability (OARS) and the Global Ocean Oxygen Decade (GOOD) are addressing two ECVs – inorganic carbon and oxygen, highlighting the need for a global goal for observing including ocean variables.

47. IOC is furthermore custodian agency for two SDG indicators of direct relevance for ocean observation and climate change, SDG indicator 14.3.1 'Average marine acidity (pH) measured at agreed suite of representative sampling stations and SDG indicator 14.a.1 'Proportion of total research budget allocated to research in the field of marine technology'. Related data collection and analysis is conducted on annual/biannual basis supporting the measurement of ocean acidification and the awareness for the importance of ocean science and observations globally.

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<sup>29</sup> See [https://earthobservations.org/geo\\_blog\\_obs.php?id=591](https://earthobservations.org/geo_blog_obs.php?id=591).

<sup>30</sup> See <https://www.ocean-ops.org/reportcard2023/reportcard2023.pdf>.

<sup>31</sup> See <https://public.wmo.int/en/our-mandate/focus-areas/environment/greenhouse-gases/global-greenhouse-gas-monitoring-infrastructure>.

<sup>32</sup> See <https://oceandecade.org/actions/ocean-observing-co-design-evolving-ocean-observing-for-a-sustainable-future/>.

<sup>33</sup> See <https://www.coastpredict.org/>.

<sup>34</sup> See <https://oceandecade.org/actions/observing-together-meeting-stakeholder-needs-and-making-every-observation-count/>.

<sup>35</sup> See <https://marinelife2030.org/>.

**World Meteorological Organisation**

48. Following the approval of the Early Warning for All Initiative (EW4All) by COP 27, WMO is spearheading this initiative and, after various consultative meetings, gaps and proposed solutions were developed for each pillar of the multi-hazard early warning (MHEWS) framework and transformed into an action plan for the next five years. WMO, with partners, will monitor progress twice per year and should report to future COP sessions. WMO will organize a UN System side event along with the heads of four pillars (UNDRR, ITU and IFRC) on 01 December 2023 to provide technical information about the action plan and assessment of the capacities of countries for the implementation of early warning systems.

49. The WMO and the broader greenhouse gas community are collaborating to address the need to strengthen information on GHG for decision-making on climate mitigation by developing a framework for sustained, internationally coordinated global greenhouse gas monitoring.<sup>36</sup> This system will leverage synergies within existing frameworks such as the Global Atmospheric Watch (GAW) and the Integrated Global Greenhouse Gas Information System (IG3IS). The sustained routing outputs of the system will feed multiple applications on the scales from global to urban and will serve as a basis for the new generation of mitigation-related services for WMO Members. Within the framework of this infrastructure, WMO will engage and closely collaborate with both the broader scientific community and other United Nations agencies and international coordination entities involved in GHG monitoring activities, in particular with regard to land surface and ocean observation and modelling.

50. The 2023 edition of the WMO State of Climate Services report focuses on health, which highlights the importance of climate services and information in protecting lives and livelihoods.<sup>37</sup> While there are many good examples of how countries are successfully using climate information and services to detect, monitor, predict and manage climate-related health risks, there is huge potential for enhancing the impact of climate science and services for health. This report examines the current state of climate services for health, and presents a series of next steps, recommendations, and case studies.

51. The WMO and GCF are collaborating on the Climate Science Information for Climate Action initiative. This initiative contributes to the UNFCCC UN4NAPs and provides climate science evidence to NAP proposals.

52. A second regional training was organized in Jakarta, Indonesia from 19-23 June 2023 at the Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) Indonesia Headquarters, targeting five South and Southeast Asian countries: Bangladesh, Indonesia, Laos, Myanmar, and Timor-Leste. The Regional Workshops targeted the two following training areas:

- a) Training area 1 - General overview of the WMO-GCF climate science information concept, methods, applications, and available resources.
- b) Training area 2 – Climate science information interpretation and writing skills for GCF Proposals including under the Readiness Programme.

53. Under the WMO-GCF initiative, a Second WMO-GCF Global Forum on Climate Science Information took place from 10 to 12 October 2023 at the National Center of Meteorology (NCM) of the United Arab Emirates (UAE) located in Abu Dhabi. The Forum recognized the need to agree on principles for co-designing climate services and developing study protocols based on local experiences and practices for cataloguing indigenous knowledge to feed into a database and support climate adaptation. A key recommendation was to strengthen the provision of technical guidance and support to enhance the capacity of the global community to access, synthesize, and incorporate relevant climate science information into climate action.

54. The Systematic Observations Financing Facility (SOFF) is a specialized UN climate fund to support countries in closing the Global Basic Observing Network (GBON) weather and climate data gaps, especially in LDCs and Small Island Developing States (SIDS). SOFF creation was spearheaded by WMO and co-created with the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). Closing the GBON data gap will lead to better forecasts and early warnings. Warnings and forecasts are impossible without reliable observations and international data exchange. Upon becoming GBON compliant, countries collect and exchange 10 out of 55 ECVs recognized by GCOS across the atmospheric, oceanic and terrestrial domains.

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<sup>36</sup> See <https://maxidiscount.ch/product/beko-fss57100gw/>.

<sup>37</sup> See [https://library.wmo.int/viewer/68500/download?file=1335\\_WMO-Climate-services-Health\\_en.pdf&type=pdf&navigator=1](https://library.wmo.int/viewer/68500/download?file=1335_WMO-Climate-services-Health_en.pdf&type=pdf&navigator=1).