

## Systematic Observation at the forty-seventh session of the Subsidiary Body for Scientific and Technological Advice

### Note by the Chair of the SBSTA

29 October 2017

#### A. Introduction

1. This information note aims to support Parties in their work at the forty-seventh session of the Subsidiary Body for Scientific and Technological Advice (SBSTA 47) agenda item 8: research and systematic observation.<sup>1</sup> The session's focus is on systematic observations.<sup>2</sup>
2. The note provides information on the relevant activities undertaken by partners in the Earth observation community providing submissions to the SBSTA and statements at the opening plenary, as well as other relevant information and activities.
3. As requested at SBSTA 45,<sup>3</sup> a number of documents will be available for consideration by Parties:<sup>4</sup>
  - a) The World Meteorological Organization (WMO) submission and statement on the **state of the global climate**;
  - b) The **comprehensive space agency response to the Global Climate Observing System (GCOS) implementation plan** (gcos-200)<sup>5</sup> *The Global Observing System for Climate: Implementation Needs (GCOS IP) and executive summary*, from the Joint Committee on Earth Observation Satellites (CEOS) / Coordination Group for Meteorological Satellites (CGMS) Working Group on Climate (WGClimate);
  - c) The GCOS report on progress made in the implementation of the **GCOS IP**;
  - d) The **summary report of the Earth Information Day** held at COP 22 on 8 November 2016.<sup>6</sup>
4. Further relevant documents include:
  - a) The summary report by the SBSTA Chair of the ninth meeting of the research dialogue;<sup>7</sup>
  - b) The report of the Standing Committee on Finance (SCF), in particular paragraph 82(e), in which the SCF recommends that the COP "...encourage the continuation of the provision of technical and financial support for enhancing hydrometeorological services in developing countries so that better climate data and information services become available to inform the process of infrastructure planning, design, building and evaluation";<sup>8</sup>
  - c) The report of the Adaptation Committee (AC), in particular paragraph 84(d), in which the AC recommends that the CMA invites the SBSTA, on the basis of its consideration of methodologies for assessing adaptation needs, to: "...invite the WMO, through its Global Framework for Climate Services, with a view to facilitating the development and application of methodologies for assessing adaptation needs, to regularly inform the COP, through the SBSTA, about its activities to improve the availability and accessibility of comprehensive climate information, including observational data, and about how it facilitates the provision and dissemination of the most up-to-date climate model predictions and projections".<sup>9</sup>

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<sup>1</sup> <http://unfccc.int/10380>.

<sup>2</sup> See FCCC/SBSTA/2012/5 paragraph 46.

<sup>3</sup> FCCC/SBSTA/2016/4, paragraph 41–43.

<sup>4</sup> See <http://unfccc.int/3462> or the UNFCCC submissions page <http://unfccc.int/7478.php>.

<sup>5</sup> The GCOS IP (gcos-200) is available at <https://gcos.wmo.int>.

<sup>6</sup> <http://unfccc.int/9949>.

<sup>7</sup> See <http://unfccc.int/10154>.

<sup>8</sup> FCCC/CP/2017/9.

<sup>9</sup> FCCC/SB/2017/2.

5. Statements at the SBSTA 47 opening plenary will be given by CEOS, GCOS, the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO-IOC), the World Climate Research Programme (WCRP) and WMO.<sup>10</sup>
6. Two side events at COP23 will also be relevant:
  - a) The UN Science event, Importance of science in supporting adaptation and mitigation under the Paris Agreement, Monday 6<sup>th</sup> November, 13.15–14.45, Meeting Room 10;
  - b) Integrated observations for mitigation and adaptation and practical support to Parties, hosted by GCOS and GEO, Wednesday 8<sup>th</sup> November, 13.15–14.45, Meeting Room 11.

## **B. Goal**

7. The proposed action for SBSTA 47 agenda item 8, as provided in the annotated agenda,<sup>11</sup> is to consider the information provided with a view to determining any further action that it deems appropriate.
8. This note is provided without any prejudice towards the final results of discussions at SBSTA 47. In this context, this note seeks to summarize the information to be considered at the session and clarify possible issues and opportunities for consideration by Parties.

## **C. Background**

9. The Convention calls on Parties to promote and cooperate in research and systematic observation of the climate system, including through support to existing international programmes and networks (Articles 4.1(g) and 5).
10. The Paris Agreement clearly identifies the need for an effective and progressive response to the urgent threat of climate change based on the basis of the best available scientific knowledge. Article 7.7(c) states that Parties should strengthen scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making.
11. The UNFCCC needs to rely on scientific data and information from the UN system that are authoritative, for policy making as well as for supporting the needs of countries for adaptation and mitigation planning and implementation. Information provision and implementation of needs by Parties is supported by international panels, programmes and networks including GCOS, CEOS, WMO, WCRP, IPCC, UNESCO-IOC and other agencies.<sup>12</sup>
12. An **informal compilation of all text and mandates on systematic observation** from the Convention, Paris Agreement, COP decisions and conclusions, and SBSTA and SBI conclusions has been compiled to assist negotiators in referencing relevant material under this agenda item.<sup>13</sup>

## **D. Activities by key partners**

### **1. WMO**

13. The **sixty-ninth session of the WMO Executive Council (EC-69)** was held in Geneva on 10–17 May 2017.<sup>14</sup> A key resolution from EC-69 is on the **WMO Integrated Global Observing System (WIGOS)**,<sup>15</sup> which is being implemented, supported through information provided at the GCOS regional workshops (see paragraph 21).
14. WIGOS is a global framework for integrating all WMO and co-sponsored observing systems under a common regulatory and management umbrella. The component systems of WIGOS are: Global Observing

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<sup>10</sup> See footnote 4 for link to statements.

<sup>11</sup> FCCC/SBSTA/2017/2.

<sup>12</sup> <http://unfccc.int/7539>.

<sup>13</sup> [http://unfccc.int/files/science/workstreams/systematic\\_observation/application/pdf/informationpaper\\_so\\_mandates\\_2017.pdf](http://unfccc.int/files/science/workstreams/systematic_observation/application/pdf/informationpaper_so_mandates_2017.pdf).

<sup>14</sup> [https://library.wmo.int/opac/index.php?lvl=notice\\_display&id=19919#.Wc4n6sYIGUm](https://library.wmo.int/opac/index.php?lvl=notice_display&id=19919#.Wc4n6sYIGUm).

<sup>15</sup> <https://public.wmo.int/en/resources/bulletin/wmo-integrated-global-observing-system-wigos>.

System (WWW/GOS), Observing component of Global Atmospheric Watch (GAW), WMO Hydrological Observations (including WHYCOS) and the observing component of Global Cryosphere Watch (GCW). The purpose of WIGOS is to help WMO Members provide and gain access to more observational data at reduced cost by providing an integrated system accessible to all. Although the system is still under development, it consists of regulatory material and technical systems. It will rely on a strong involvement from members to provide their local data to the OSCAR system,<sup>16</sup> and although this is in the early stages, engagement is beginning to happen. Regional WIGOS centers will be recognised to provide important support functions for Members.

15. Furthermore, at EC-69, a number of decisions were made that directly support the work of the Convention and the implementation of the Paris Agreement. The following decisions are highlighted in the WMO submission to the SBSTA:<sup>17</sup>

- Monitoring Extreme Weather and Climate Events from Space (Decision 6);
- WMO support to implementation of the Paris Agreement (Decision 7);
- Strengthening WMO statement on the state of the global climate (Decision 9);
- Climate Services Information System products to support United Nations system planning and WMO Members on seasonal to inter-annual timescales (Decision 10);
- Support the development of actions based on the Global Climate Observing System Implementation Plan (Decision 14);
- Clarification on the future of PROVIA and WMO participation in the United Nations Environment Programme–PROVIA Country-level Impacts of Climate Change project (Decision 20);
- Development and implementation of the global cryosphere watch (Decision 45);
- Development and Implementation of the Arctic Polar Regional Climate Centre (Decision 46);
- Polar and high mountain priority activity (Decision 48);
- WMO priority actions in hydrology and water resource management (Decision 49);
- The Integrated Global Greenhouse Gas Information System Implementation Plan (Decision 51).

16. Further relevant decisions from EC-69 include:

- Flood forecasting (Decision 5);
- Recognition of WMO long-term observing stations (Decision 8);
- Implementation of the country-focused results-based framework and mechanism for WMO contributions to the Global Framework for Climate Services (Decision 11);
- Response to priority needs for Global Framework for Climate Services implementation (Decision 12);
- Strengthening regional- and global-scale Climate Services Information System operations (Decision 15);
- Deployment of the Climate Services Toolkit (Decision 16);
- National implementation of the Climate Services Information System (Decision 17);
- Sub-seasonal and seasonal forecasting systems (Decision 18);
- International Data-rescue Initiative (Decision 19).

17. Relevant WMO activities referred to at RD8<sup>18</sup> and RD9 include:

- a) The **regional climate centres (RCCs)** to be recognized as part of the **Global Framework for Climate Services Information System (CSIS)** (Decision 10), to provide regional-scale climate functions including data services, training, monitoring, long range forecasting, climate prediction and projection, research and development and coordination of activities within their regions (for further information see RD9, paragraphs 37–42);

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<sup>16</sup> <https://www.wmo-sat.info/oscar>.

<sup>17</sup> See footnote 6 for reference.

<sup>18</sup> <http://unfccc.int/9475>.

- b) The **Climate Risk and Early Warning Systems (CREWS)** initiative which aims to mobilize more than US\$100 million by 2020 to strengthen risk information and early warning systems in least developed countries and small island developing states;<sup>19</sup>
- c) **Regional Climate Outlook Forums (RCOF)** which provide user-relevant climate outlook products in real time.<sup>20</sup> Decision 46 outlines information on new polar RCOFs;
- d) Data rescue and archiving, such as through the **International Data-rescue Initiative (I-DARE)** provides recovery of climate records from paper and obsolete electronic media;<sup>21</sup>
- e) Recognition of **WMO long-term observing stations**: promoting sustainable observational standards and best practices that facilitate the generation of high-quality time series data that is vital for climate observation.<sup>22</sup>

18. In regards to Decision 7 WMO support to implementation of the Paris Agreement, WMO promotes the value and relevance of scientific information and data for supporting the global stocktake and to assist national meteorological and hydrological services (NMHSs) to engage at national level in: the design and implementation of Green Climate Fund proposals, coordination with National Designated Authorities (NDAs), development and implementation of NAPs, and generating relevant climate information and services, particularly through implementation of the Global Framework for Climate Services (GFCS) and Integrated Global Greenhouse Gas Information System Implementation Plan (IG3IS). Parties are invited to, inter alia, support the GCOS IP, establish national level climate services, participate in international meetings and encourage active contributions by scientists to the IPCC Special Report on Global warming of 1.5 °C.

19. The WMO and UNFCCC secretariat are working closely and pursuing opportunities to strengthen their collaboration so as to optimise information sharing and support for the two respective sets of communities served by the WMO and UNFCCC Convention and Paris Agreement and provide information at country level to support adaptation and mitigation.

## 2. GCOS

20. The GCOS IP describes the proposed implementation of the global observing system for climate, building on current actions and taking into consideration the climate monitoring needs of the Convention in the context of the Paris Agreement, sustainable development and other multilateral agreements. It sets out the framework for the science community to provide the data and information to implement the global climate observing system, advance scientific research knowledge and support climate services and the development of climate indicators.<sup>23</sup>

21. As described in the GCOS IP and mandated at SBSTA 45,<sup>24</sup> GCOS in collaboration with relevant partners, has started a series of **regionally focused workshops** to develop an understanding of the observations needed for different regions. The first of these workshops, the GCOS and WIGOS joint workshop for the Pacific Small Island Developing States (SIDS) was held on 9–12 October in Nadi, Fiji, in order to help strengthen the observing networks and accelerate the implementation of GCOS and WIGOS in the region.

22. The workshop outcomes will include a workshop report, to be produced in collaboration with regional experts including Secretariat of the Pacific Regional Environmental Programme (SPREP), the Pacific Islands Communication and Infrastructure Panel (PICI), and Pacific Meteorological Council a regional plan: *Pacific region observing network plan in support of the GCOS Implementation Plan and the Implementation Plan for the Evolution of Global Observing Systems*. The key messages from the workshop are provided in Box 1.

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<sup>19</sup> <https://public.wmo.int/en/media/press-release/climate-risk-and-early-warning-systems-initiative-expands>.

<sup>20</sup> <https://public.wmo.int/en/our-mandate/climate/regional-climate-outlook-products>.

<sup>21</sup> <https://www.idare-portal.org>.

<sup>22</sup> <https://public.wmo.int/en/our-mandate/what-we-do/observations/long-term-observing-stations>. See also poster from RD9 <https://public.wmo.int/en/our-mandate/what-we-do/observations/long-term-observing-stations>.

<sup>23</sup> See footnote 5.

<sup>24</sup> FCCC/SBSTA/2016/4, paragraph 39.

Box 1

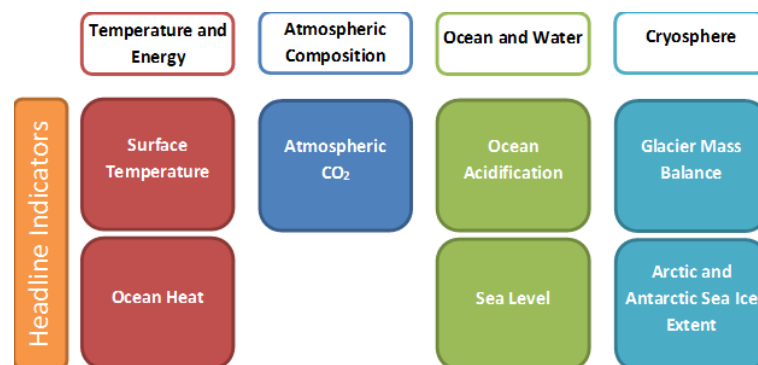
**Key messages from the Joint Global Climate Observing System (GCOS) - WMO Integrated Observing System (WIGOS) Workshop for Pacific SIDS, Nadi, 9–12 October 2017**

- Systematic observation of the Earth’s climate is a global common good that supports the implementation of the Paris Agreement, in the context of sustainable development and efforts to eradicate poverty.
- Many meteorological observations, made at high spatial and temporal density, support local forecasting and warning applications. These observations are a national responsibility contributing to national and regional needs with some additional global value.
- However, systematic upper air observations, made routinely by radiosondes under the WMO World Weather Watch (WWW) Programme, including the GCOS Upper Air Network (GUAN), support numerical weather prediction (NWP) leading to global benefits. These observations are used primarily for forecasting and climate applications at the international level, including climate reanalyses which form the basis of much of our understanding of climate and climate change; and
- Systematic upper air observations in the Pacific region, tend to have the highest measured impact, of all ground-based measurements, on the quality and accuracy of weather and climate analysis and prediction not only locally, but globally. The resulting products underpin weather and climate aspects of early warning systems as well as other climate-related services.
- Both the spatial density and observing frequency of the upper air network over the South Pacific region currently fall short of GCOS and WMO requirements. Due to the unique geography of the region – vast swathes of ocean surface with relative little land mass distributed over some 20 small island states with modest-size populations and correspondingly modest GDPs – systematic observation is particularly challenging in this region.
- The upper air network over the South Pacific therefore needs sustained international support.
- The workshop developed an outline for a *Pacific region observing network plan in support of the GCOS Implementation Plan and the Implementation Plan for the Evolution of Global Observing Systems (EGOS IP)* to:
  - Strengthen regional and national meteorological networks to support adaptation actions and avert loss and damage;
  - Identify capacity building needs to ensure the sustainability of the networks;
  - Be used to support requests for finance from the operating entities of the financial mechanism under the Convention, the GCOS Cooperation Mechanism and other relevant funding sources.
- Support of the observing network in the region should be based on transparent processes and a commitment to free and open data sharing in accordance with WMO Resolutions 40 and 60 and the GCOS Monitoring Principles. The network should be designed to be, efficient, sustainable, it should meet agreed international standards as well as national requirements. Ensuring sustainability is of paramount importance, and the network plan must therefore also include the necessary elements of capacity development.
- The draft plan will be developed by GCOS and WMO in collaboration with Secretariat of the Pacific Regional Environmental Programme (SPREP), the Pacific Islands Communication and Infrastructure Panel (PICI), and Pacific Meteorological Council, and submitted to COP 24.

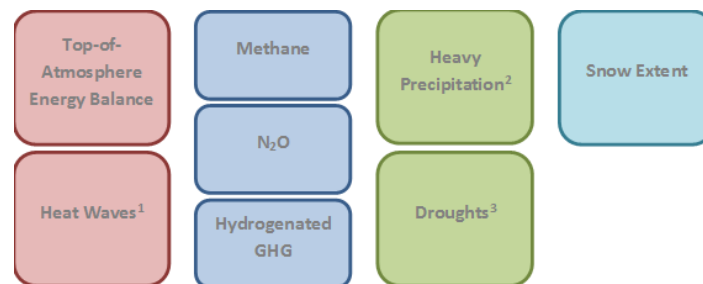
23. WMO and GCOS, as part of the GCOS IP, are leading an effort to identify a core set of climate change indicators to be used as a basis for reporting climate change to users through the WMO annual Statements on the State of the Global Climate in support of the UNFCCC and the global stocktake. This work will inform on the range of climate changes beyond using simply temperature as an indicator, by providing a limited, number of global indicators to demonstrate the range and speed of climate change. This work was explained further at RD9.

24. Two types of indicators are being discussed and developed:
- Headline indicators** – observed metrics to characterise the Earth’s system and its evolution in order to support improved communication and dialogue with policy makers, practitioners and the public;
  - A second set of indicators** - to inform of societal impacts and to guide mitigation and adaptation policy and actions.
25. Following discussions at the twenty-fifth GCOS Steering Committee meeting (GCOS SC-25), Hangzhou, 25–29 September 2017, a set of headline indicators was proposed. The scientific community will discuss further on how it can contribute to global indicators (Figure 1).

Figure 1  
**Set of headline indicators proposed by GCOS**



**Climate Data which will need further discussion on how it can contribute to global indicators:**



Source: Dr Carolin Richter, GCOS

<sup>1</sup> Heat wave magnitude index: -Russo, S.; Dosio, A.; Graversen, R. G.; Sillmann, J.; Carrao, H.; Dunbar, M. B.; Singleton, A.; Montagna, P.; Barbola, P.; Vogt, J. V. (2014) *Magnitude of extreme heat waves in present climate and their projection in a warming world*. J. Geophys. Res. Atmos. 2014, 119, 12,500–12,512. or alternatively see Coumou D. and Robinson A. (2013) *Historic and future increase in the global land area affected by monthly heat extremes*, 2013 Environmental Research Letters, Volume 8, Number 3.

<sup>2</sup> Karl, T.; Nicholls, N.; Ghazi, A. (1999) *Clivar/GCOS/WMO workshop on indices and indicators for climate extremes workshop summary*. Weather Clim. Extrem. 1999. and Albert Klein-Tank; Francis W. Zwiers; Xuebin Zhang (2009) *Guidelines on Analysis of extremes in a changing climate in support of informed decisions for adaptation*. Clim. Data Monit. 2009, 72. And see: <http://www.eea.europa.eu/data-and-maps/indicators/precipitation-extremes-in-europe-3/assessment/#indicator-definition>

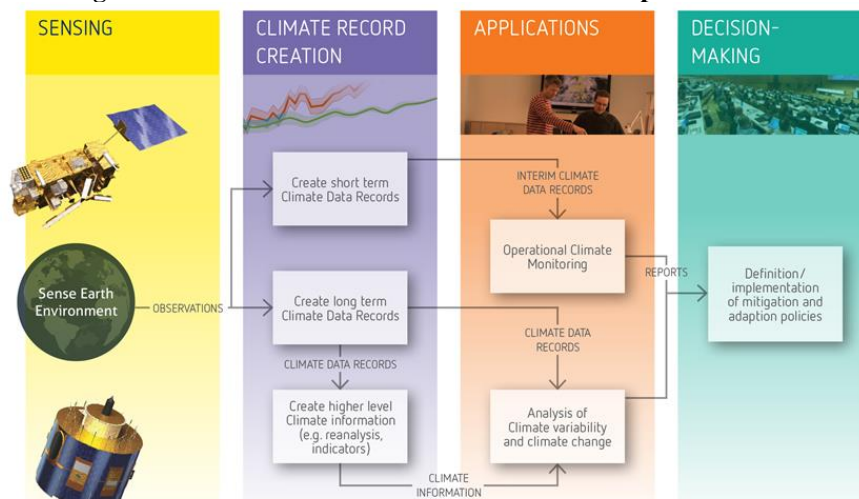
<sup>3</sup> M. Ziese, U. Schneider, A. Meyer-Christoffer, K. Schamm, J. Vido, P. Finger, P. Bissolli, S. Pietzsch, and A. Becker (2014) *The GPCP Drought Index – a new, combined and gridded global drought index*, Earth Syst. Sci. Data, 6, 285–295, 2014 [www.earth-syst-sci-data.net/6/285/2014/](http://www.earth-syst-sci-data.net/6/285/2014/) doi:10.5194/essd-6-285-2014.

### 3. CEOS and CGMS

26. CEOS and CGMS are international organizations of 60 members and associates and 15 members, respectively. The joint CEOS/CGMS Working Group on Climate (WGClimate) have provided a **response to the GCOS IP** reiterating their commitment to the implementation of the global climate observing system and identifying progress, gaps and responses to these gaps by the satellite community for the atmospheric, terrestrial and oceanic domains. An executive summary of the response has also been provided.

27. The **Architecture for Climate Monitoring from Space**, (hereafter referred to as the global Architecture) and published in 2013 (figure 2), is central to the WGClimate response to the GCOS Implementation Plan in both the broad context and detailed implementation actions.

Figure 2  
Schematic of the logical architecture of climate observations from space



Source: Dr Jörg Schulz, WGClimate  
Decomposition of the 4 pillars of the Architecture with a focus on “Climate Record Creation and Preservation” and “Applications”<sup>25</sup>

28. WGClimate focuses on improving the systematic availability of Climate Data Records (CDR) through the coordinated implementation and further development of the global Architecture. Most recently, a substantial advance has been made in the **ECV Inventory** which has been updated and made available online in October 2017.<sup>26</sup> The ECV Inventory provides verified information on CDRs available/planned from CEOS and CGMS satellite missions, or their combination, on a GCOS ECV product basis (figure 3a). Currently there are over 900 CDRs listed, directly responding to the GCOS ECV requirements.

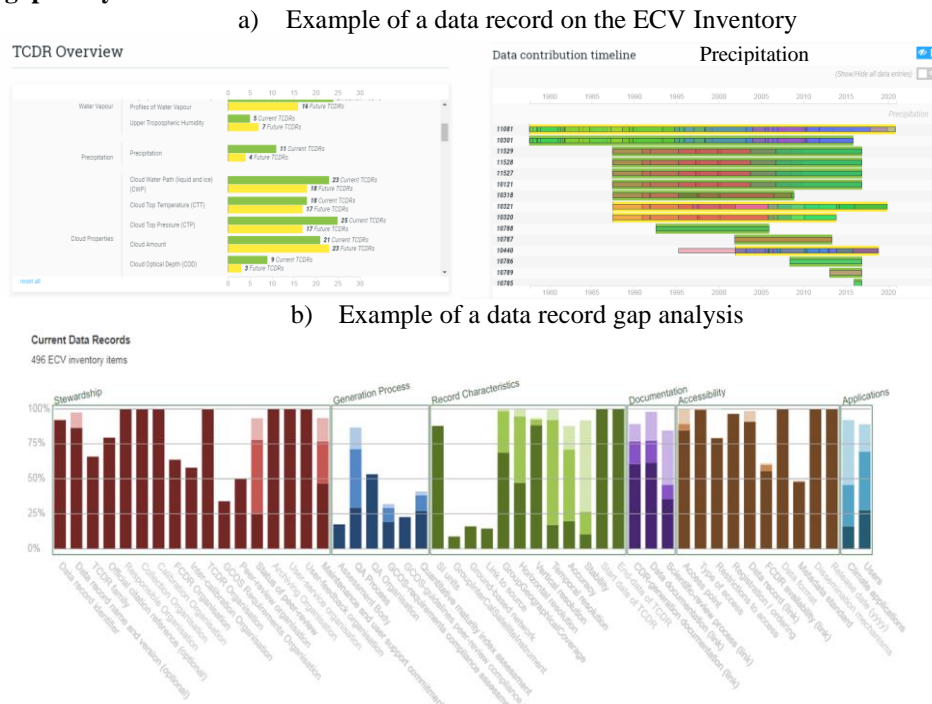
29. WGClimate has also performed a gap analysis on the ECV Inventory and used it to identify all missing ECVs and ECV products, using CEOS mission, instruments and measurements (MIM) database and WMO Observing Systems Capability Analysis and Review (OSCAR) data (figure 3b). The group has analysed the reasons for missing products including addressing the measurements used and needed. They have deployed a tool to identify shortcomings in all individual CDRs with respect to GCOS principles, guidelines and requirements, and performed an analysis on shortcomings with the support of domain expert teams.

30. The first summary findings of this detailed analysis are included in the CEOS response to the GCOS IP. WGClimate is planning to gradually update the ECV Inventory, including the verification of new entries. On an annual basis, the inventory will be baselined with a new version number which will be used for an updated gap analysis and action plan. This process will keep the inventory as up to date as possible and the analysis has the ability to address items of priority to CEOS and CGMS. The older versions of the verified inventory will remain available from the web user interface.

<sup>25</sup> [http://ceos.org/document\\_management/Publications/CEOS\\_Climate-Monitoring\\_Sep2014.pdf](http://ceos.org/document_management/Publications/CEOS_Climate-Monitoring_Sep2014.pdf).

<sup>26</sup> <http://climatemonitoring.info/ecvinventory>.

Figure 3  
**The ECV Inventory provides all relevant information for each climate data record as well as detailed gap analysis**



Source: Dr Jörg Schulz, WGClimate  
 CEOS Strategic Implementation Team (SIT) Technical Workshop Session 4, Item 18, September 13th, 2017  
 Also see ECV Inventory <http://climatemonitoring.info/ecvinventory>.

#### 4. GEO

31. Climate change cuts across all areas of GEO’s work, as highlighted in the GEO Strategic Plan.<sup>27</sup> GEO’s strategic engagement priorities include the Paris Agreement, the UN 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction. Many GEO Work Programme activities and collaborations are relevant for developing an integrated approach to climate adaptation.

32. The GEO Carbon and GHG Initiative (GEO-C) was formally launched in July 2017. It aims to facilitate cooperation among existing carbon and GHG observing organizations, promoting interoperability between data and information systems, and improving integration among atmospheric, terrestrial and ocean networks. The intended result will be a coordinated system of observations for monitoring and evaluating changes in the carbon and related cycles, including GHG emissions as they relate to human activities and their impacts on climate change, and to provide decision makers with timely and reliable policy-relevant information.

33. As reported at RD9, GEO is building regional initiatives, including AfriGEOSS (in Africa), AmeriGEOSS (in the Americas) and AOGEOSS (in Asia-Oceania), to support decision-making and regional sustainable development, and build institutional and individual capacity through engagement of experts, stakeholders and decision makers. For example, AfriGEOSS is leveraging the Africa Data Intensive Research Cloud (ADIRC), to provide researchers in African countries access to high performance computing (HPC) infrastructures, enabling them to take part in big data science projects and to build Earth observation data processing platforms regional initiatives.<sup>28</sup>

34. In 2017, EuroGEOSS emerged as the European component of the Global Earth Observation System of Systems (GEOSS) with a focus on coordinating and increasing user-driven applications being developed in Europe. EuroGEOSS will be a gateway for European Earth observation programmes and projects contributing to GEOSS, with Copernicus as a major element.

<sup>27</sup> [https://www.earthobservations.org/documents/GEO\\_Strategic\\_Plan\\_2016\\_2025\\_Implementing\\_GEOSS.pdf](https://www.earthobservations.org/documents/GEO_Strategic_Plan_2016_2025_Implementing_GEOSS.pdf).

<sup>28</sup> See RD9 summary report paragraph 48.x



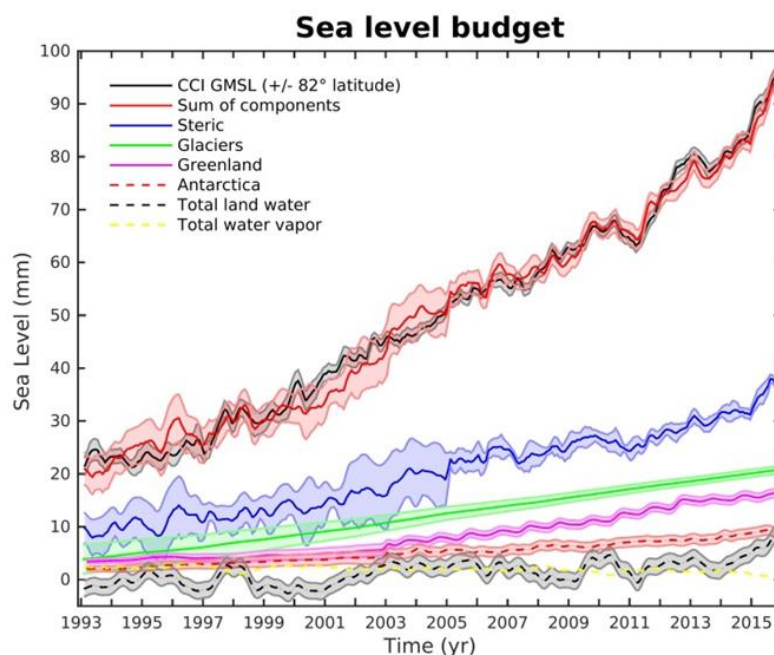
## 5. WCRP

35. The WCRP serves as the primary coordination mechanism for international climate research and provides essential input into both systematic observation and research under the Convention. At the Earth Information Day, detail was provided on ongoing developments on indicators to support adaptation and mitigation, specifically: **sea level budget, carbon budget, methane budget and the energy budget** (see summary report paragraphs 51–61).

36. At RD9, five key scientific issues were detailed that must be considered whilst planning climate change action: warm ocean under cold ice, the Southern Ocean, carbon in permafrost, changes in hemispheric circulation, and urban centres (see RD9 summary report, paragraphs 12–21). Up-to-date information was also provided on the **Coupled Model Intercomparison Project Phase 6 (CMIP6)** (paragraph 58) and on **CORDEX** (paragraphs 43 and 49), which continues to provide coordinated sets of downscaled climate projections at regional and national scale that add value to underlying global climate projections.

37. The **sea level budget** is an ongoing initiative of the WCRP Grand Challenge on Regional sea level changes and coastal impacts,<sup>29</sup> involving the international sea level community, and using observation information from a range of space-based and in-situ observing systems. An assessment has been under way to compare relative contributions – of ocean thermal expansion, glacier and ice sheet mass balance, land water storage change – to sea level rise. Preliminary results (Figure 4) suggest that over the altimetry era (since 1993), the global mean sea level budget is almost closed both in terms of trend and interannual variability (especially since 2005 for the latter)<sup>30</sup>.

Figure 4  
**Sea level budget**



Source: Dr Boram Lee, WCRP

38. In July 2017, the WCRP/IOC Sea Level Conference in New York<sup>31</sup> brought together 350 participants from 42 nations including natural scientists, social scientists, coastal engineers, managers and planners to develop joint strategies and collaborations. The conference statement<sup>32</sup> identified the need for an enhanced and internationally coordinated new sea level change program, including the provision of appropriate sea-level change climate services (including the sea level budget) as part of a wider sea-level rise impact and adaptation effort. This program should be designed in consultation with users to serve the

<sup>29</sup> <https://www.wcrp-climate.org/gc-sea-level>.

<sup>30</sup> Dieng, H. B., A. Cazenave, B. Meyssignac, and M. Ablain (2017), New estimate of the current rate of sea level rise from a sea level budget approach, *Geophys. Res. Lett.*, 44, 3744–3751, doi:10.1002/2017GL073308.

<sup>31</sup> <http://www.sealevel2017.org>.

<sup>32</sup> [http://www.sealevel2017.org/images/Documents/SeaLevel2017\\_Conference\\_Statement\\_Final\\_01Sep2017.pdf](http://www.sealevel2017.org/images/Documents/SeaLevel2017_Conference_Statement_Final_01Sep2017.pdf).

needs of local to national stakeholders, as well as the global community to cope with present and future sea-level change risks. It called for, inter alia:

- a) A commitment to sustained and systematic global and regional sea-level observations, including the different components of sea-level change (cryosphere, ocean heat content and other relevant ocean parameters, land hydrology);
- b) The implementation of new observations where necessary, making use of both remotely-sensed and in-situ observations. Special emphasis should be given to the monitoring of coastal regions worldwide where a variety of climate- and non-climate-related processes interact. These observations can provide early warnings of sea-level rise acceleration.

39. In regards to the **energy budget**, the international scientific perspective under the auspices of WCRP states that the Earth Energy Imbalance (EEI) is the most fundamental metric defining the status of global climate change and expectations for continued global warming. The WCRP continues to lead a concerted international effort to take stock of the EEI, estimated from changes in ocean heat content and radiation measurements from the Top of the Atmosphere (TOA).

40. The latest **carbon and methane budget** reports (for 2016) will be published during COP23 on 13 November 2017.<sup>33</sup>

41. **CORDEX** continues to advance its research and now includes the added value of downscaling, regional human impacts on climate and important regional phenomena such as precipitation processes and local wind systems. This global and regional climate information would be of direct use for decision makers at appropriate timing and time-space scales. The Africa Climate Atlas (see Earth Information Day summary report paragraphs 69–72), currently under development between Africa-CORDEX and other researchers and regional/local decision makers, provides scientifically proven regional analyses to address threshold exceedance in key societal sectors of Africa under different climate change scenarios.

## 6. UNESCO-IOC

42. Within the UN system, the Intergovernmental Oceanographic Commission (IOC) of UNESCO serves as the focal point for **ocean observations, ocean science, ocean services and data exchange**. The UN Convention on the Law of the Sea considers IOC to be the competent international organization for marine science. Presentations on behalf of the IOC at the Earth Information Day (see summary report paragraphs 35–42) highlighted how integral the ocean is for understanding the climate system.

43. Ocean observation is coordinated by the IOC-led **Global Ocean Observing System (GOOS)**. GOOS consists of a multitude of platforms and networks implemented, through coordinated national programmes, to meet the ECV requirements of the GCOS implementation plan and to provide the greatest resilience of the observing system. In an integrated way, GOOS also aims to deliver information for operational services and to sustain ocean health.

44. Attaining and sustaining global coverage is the most significant challenge of the oceanic climate observing system. Substantial progress in implementation, and the common tracking of targets, has been achieved in recent years. However, additional effort is needed to ensure that fragile financial and organizational support for sustained ocean observations are reinforced, and that a growing set of Parties can participate in and benefit from GOOS. This can only be met through national commitments to the global implementation and maintenance effort, with international coordination to support the SDGs, Paris Agreement, the Sendai Framework for Disaster Risk Reduction and the Samoa Pathway.

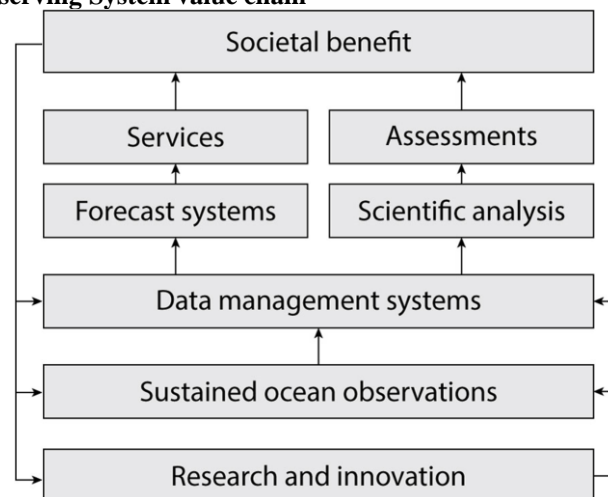
45. GOOS sits inside a value chain with two paths to generating societal benefit – one through more operational systems, and one through scientific research, publications, assessments, and science-policy dialogues and formal interfaces (figure 4). GOOS is engaging with all stakeholders in this value chain in order to ensure the system is fit-for-purpose and delivering maximum value from its observations.

46. GCOS and all partners are being invited to design upcoming Decade of Ocean Science for Sustainable Development, 2021–2030.

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<sup>33</sup> <http://www.globalcarbonproject.org>.

Figure 4  
The Global Ocean Observing System value chain



Source: Dr. Albert Fischer, UNESCO-IOC

## 7. UNHQ

47. The high-level United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development was convened at United Nations Headquarters in New York from 5 to 9 June 2017, coinciding with World Oceans Day, to support the implementation of Sustainable Development Goal 14. The Governments of Fiji and Sweden co-hosted the event which led to the **Our Ocean, Our Future: Call for Action**.<sup>34</sup>

## E. Possible issues for consideration

48. I hope that this note provides delegates with a good overview of the documents and issues for consideration at SBSTA 47 under agenda item 8 on research and systematic observations. I invite you to use it as an entry point for your preparations for the session and further explore the relevant documents that are available on the UNFCCC<sup>35</sup> and observer organizations' web sites using the links and references included in this note. I also invite Parties to reflect on the information provided and consider the guidance that SBSTA could provide for furthering support for current and future action under the UNFCCC.

49. Parties may wish, based on previous practice and mandates from SBSTA, to thank the organizations for their submissions and statements, and welcome the summary report from the Earth Information Day.

50. In regards to WMO, Parties may wish to welcome the outcomes of the sixty-ninth session of the WMO Executive Council and recognize the progress made by WMO in optimising the sharing of climate observation information, including on the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS). Parties may wish to encourage the WMO to continue to support development of climate services and early warning systems and support regional activities, downscaling, long term observation and data rescue and archiving to address the needs of countries for adaptation and mitigation.

51. In regards to GCOS, Parties may wish to welcome the outcomes from the Joint GCOS and WIGOS workshop for the Pacific Small Island Developing States (SIDS), note specific outcomes, urge specific actions by Parties and encourage specific actions by relevant organisations. Parties may also wish to recognise the ongoing work on indicators and its relevance for the UNFCCC process and Paris Agreement, and encourage other relevant action, such as for WMO and GCOS to continue to refine climate change indicators and report on progress.

52. In regards to CEOS and CGMS, Parties may wish to welcome the space agency response to the GCOS IP and invite CEOS and CGMS to continue development of CDRs and the ECV inventory and close gaps between GCOS needs and the CDRs delivered by space agencies, optimise information sharing for

<sup>34</sup> <https://oceanconference.un.org/callforaction>.

<sup>35</sup> <http://unfccc.int/3462>.

users, and report on progress, as appropriate. Furthermore, Parties may wish to urge specific actions by Parties and encourage specific actions by relevant organisations.

53. In regards to the WCRP, Parties may wish to recognise the ongoing activities in regards to climate indicators and CORDEX, and encourage further action by WCRP and other organizations, as well as urge actions by Parties.

54. In regards to the work of UNESCO-IOC and other relevant work on oceans, Parties may wish to recognize the outcomes of the Ocean Conference and the importance of ocean observations and early warning systems to better understand the climate system, support development of ocean-related indicators and increase resilience to extreme events.

55. Parties could also consider the importance of providing opportunities for Parties and regional groups of Parties to apply for funding, under the financial mechanisms of the UNFCCC, to support systematic observation identified in regional plans, such as the *Pacific region observing network plan in support of the GCOS Implementation Plan and the Implementation Plan for the Evolution of Global Observing Systems*.

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