

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

Note by the Chair of the SBSTA

12 November 2015

A. Introduction

1. This information note aims to support Parties in their work under the research and systematic observation agenda item at the forty-third session of the Subsidiary Body for Scientific and Technological Advice (SBSTA), bearing in mind the short time available for negotiations in Paris (1-4 December).
2. The session's focus is on systematic observations¹ and a number of complex documents have been submitted by observer organizations, as requested by SBSTA,² for consideration at its forty-third session:
 - a) The Global Climate Observing System (GCOS) report on the *Status of the global observing system for climate* (hereafter the GCOS SR 2015),³ as well as an Executive Summary of the report.⁴ This report includes the assessment of the adequacy of the global observing system and the progress made in the implementation of the *GCOS implementation plan for the global observing system for climate in support of the UNFCCC 2010* (GCOS IP 2010);
 - b) The GCOS Draft Outline of a new GCOS Implementation Plan, to be completed in 2016 and expected to be presented at COP 22 (hereafter GCOS IP 2016);⁵
 - c) The GCOS report on the workshop on *Enhancing observations to support preparedness and adaptation in a changing climate – learning from the IPCC 5th Assessment* (hereafter the GCOS workshop) organized in collaboration with Intergovernmental Panel on Climate Change (IPCC) and United Nations Framework Convention on Climate Change (UNFCCC) secretariat;⁶
 - d) The joint report by the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS) on progress made by space agencies providing global observations on their coordinated response to relevant needs of the Convention;⁷
 - e) The World Meteorological Organization (WMO) information on progress made on the implementation of the Global Framework for Climate Services (GFCS).⁸

B. Goal

3. The proposed action for SBSTA 43, as provided for agenda item 8(a) in the annotated agenda,⁹ is to take note of all the information received, consider matters related to systematic observation and determine further action, with the aim of strengthening observations in order to better serve emerging needs under the Convention, which are increasing and changing in support of mitigation and adaptation action. This note is provided without any prejudice towards the final results of discussions at SBSTA 43.

¹ See FCCC/SBSTA/2012/5 paragraph 46.

² FCCC/SBSTA/2012/5, paragraph 37, and FCCC/SBSTA/2014/5, paragraph 39-41.

³ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/541.pdf>. Also available at <<http://www.wmo.int/pages/prog/gcos/>>.

⁴ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/542.pdf>.

⁵ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/546.pdf>.

⁶ <http://www.wmo.int/pages/prog/gcos/Documents/GCOS-IPCC-UNFCCC_WorkshopReport_GCOS_20150506.pdf>.

⁷ FCCC/SBSTA/2014/5, paragraph 40; and

<http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/538.pdf>.

⁸ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/547.pdf>.

⁹ FCCC/SBSTA/2015/3.

4. 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

5. 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). Implementation is supported by international programmes and networks including the IPCC, GCOS, the CEOS, the WMO and other agencies.¹⁰

6. The GCOS Executive Summary of the GCOS SR 2015 describes the cycle of assessment and identification of requirements for systematic observation under the Convention. These ongoing cycles of assessments, reports and guidance are illustrated in figure 1: IPCC assessment reports, composed of the full scientific and technical assessment of climate change and advancement in possible solutions to address climate change, link into the GCOS assessment cycles of the climate observing system, and GCOS implementation plans and status reports, all of which are supported by guidance from the UNFCCC. CEOS contributes to the GCOS implementation plans and provides reports to SBSTA on progress made by space agencies providing global observations. In particular:

- a) In the first cycle, which followed the IPCC Second Assessment Report (SAR 1995), COP asked SBSTA in 1997, in consultation with the IPCC, to provide an **adequacy report on the global observing system on climate**. This was prepared and delivered by GCOS in 1998;
- b) In the second cycle, following the IPCC third assessment report (TAR 2001), GCOS provided its **second adequacy report** in 2003, at which time COP asked GCOS to provide an **implementation plan that identified the actions needed to remedy the reported deficiencies in the climate observing systems** (IP 2004).
- c) In the third cycle, following the IPCC fourth assessment report (AR4 2007), the CEOS response to **IP 2004**,¹¹ leading to the Satellite Supplement 2006,¹² and the **GCOS progress report** to SBSTA 31 (2009) prepared the way for the update of the **GCOS Implementation Plan in 2010** (IP 2010) and its **Satellite Supplement** in 2011;¹³
- d) We are now in the next cycle of this process, with the IPCC fifth assessment report (AR5) being finalised in 2014, GCOS has submitted the **GCOS SR 2015**, which incorporates updates and reviews from CEOS and a large range of other contributors, and will ultimately feed into the new **GCOS IP 2016**, which will be presented at COP 22.

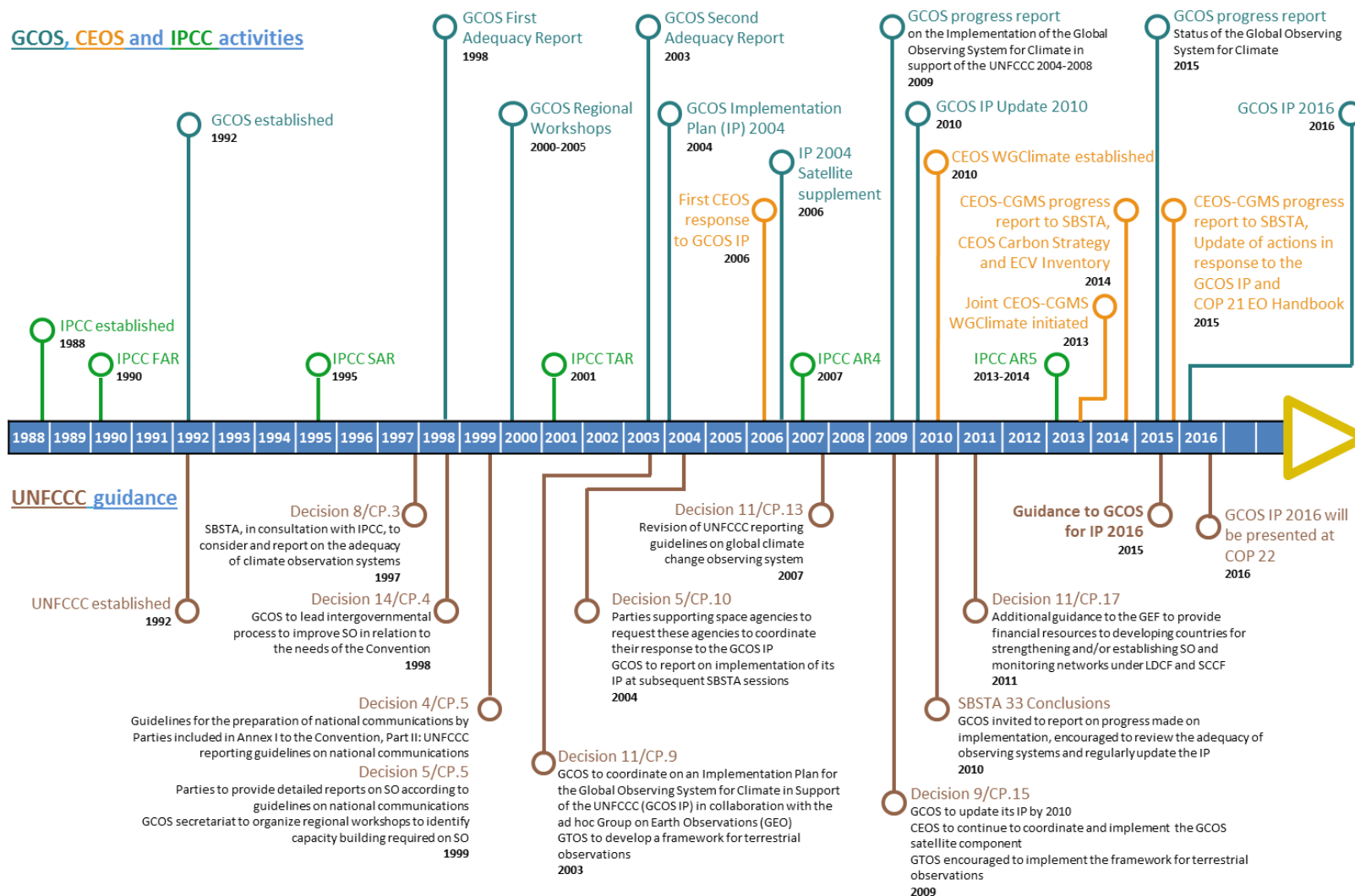
¹⁰ <<http://unfccc.int/7539.php>>.

¹¹ Satellite Observation of the Climate System: The Committee on Earth Observation Satellites (CEOS) Response to the 2004 Global Climate Observing System (GCOS) Implementation Plan (IP).
<<http://www1.ncdc.noaa.gov/pub/data/sds/CEOS-Response-to-the-GCOS-IP.pdf>>.

¹² <<https://www.wmo.int/pages/prog/gcos/Publications/gcos-107.pdf>>.

¹³ <<https://www.wmo.int/pages/prog/gcos/Publications/gcos-154.pdf>>.

Figure 1
 The ongoing cycles of assessments, reports and guidance in regards to systematic observation under the Convention



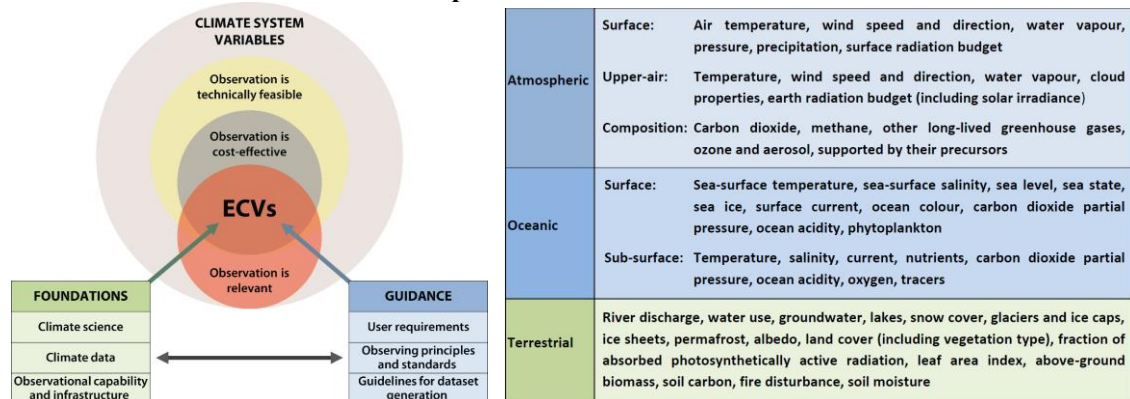
Abbreviations: CEOS = Committee on Earth Observation Satellites; CGMS = Coordination Group for Meteorological Satellites (CGMS); COP = Conference of the Parties; EO = Earth Observation; GCOS = Global Climate Observing System; GEO = Group on Earth Observations; GTOS = Global Terrestrial Observing System; IP = Implementation Plan; IPCC = Intergovernmental Panel on Climate Change; IPCC FAR = IPCC First Assessment Report; IPCC SAR = IPCC Second Assessment Report; IPCC TAR = IPCC Third Assessment Report; IPCC AR4 = IPCC Fourth Assessment Report; IPCC AR5 = Fifth Assessment Report; SBSTA = Subsidiary Body for Scientific and Technological Advice; SO = Systematic Observation; WGClimate = CEOS-CGMS Working Group on Climate

7. Systematic observation of the climate system is a key prerequisite for advancing scientific knowledge on climate change and advising informed policy making. The 50 Essential Climate Variables (ECVs) developed under the GCOS for a range of applications provide the empirical evidence needed to: understand and predict the evolution of climate; guide mitigation and adaptation measures; assess climate risks and enable attribution of climatic events to underlying causes; and underpin climate services.

An ECV is a physical, chemical or biological variable or a group of variables that critically contributes to characterization of Earth’s climate. The original list of ECVs provided the organizational basis for the GCOS IP 2004 and satellite supplement. A minor revision to the set, including a few changes in terminology, was made in IP 2010 and remains the current list in use (figure 2).

Figure 2

The Essential Climate Variables – concept and variables.



Source: Global Observing System for Climate (GCOS) Status Report 2015, figure 1 and table 1. The figure shows, on the left, the Essential Climate Variable (ECV) concept in schematic form: knowing existing climate-relevant observing capabilities, climate datasets, and the level of scientific understanding of the climate system are the foundations (lower-left box) necessary for selecting the ECVs from a pool of climate system variables. In addition, guidance is needed to make practical use of the ECVs (lower-right box): user requirements capture the data quality needs of science, services, and policy; climate-specific principles guide the operation of observing systems and infrastructure; and guidelines facilitate the transparent generation of ECV data records. The latter address the availability of metadata, provisions for data curation and distribution, and the need for quality assessment and peer review. The figure shows, on the right, the current list of 50 ECVs, as identified in the 2010 update to the Implementation Plan (IP) for the GCOS in support of the UNFCCC.

8. All Parties report on the steps they are taking to implement the Convention (Articles 4.1 and 12) including via their national communications (NCs).¹⁴ Annex I Parties submitted their latest, sixth NCs in 2013-2014, identifying advances in improving the availability of climate data, ECVs and further development of infrastructure for global observation systems including through cooperation with GCOS, CEOS and the Global Earth Observation System of Systems (GEOSS) of the Group on Earth Observations (GEO). In this context, the UK and other countries reported on using high-frequency and precision measurements of atmospheric gas concentrations to estimate greenhouse gas (GHG) emissions as an important cross-check for their GHG inventories.¹⁵

9. Parties identified increased focus on the importance of climate services. An example is the establishment of the European Copernicus Climate Change Service (C3S), which will provide ECVs, climate analyses, projections and indicators at temporal and spatial scales relevant to adaptation and mitigation strategies for various sectoral and societal benefit areas.¹⁶

10. Updating of reporting guidelines for the next NCs is being considered by the Subsidiary Body for Implementation (SBI) at its forty-third session under its agenda item on Reporting from and review of Parties included in Annex I to the Convention: revision of the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”.¹⁷

¹⁴ <<http://unfccc.int/1095.php>>.

¹⁵ See The UK’s Sixth National Communication and First Biennial Report under the UNFCCC available at <[http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/uk_6nc_and_br1_2013_fi nal_web-access\[1\].pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/uk_6nc_and_br1_2013_fi nal_web-access[1].pdf)>, pages 66 and 225.

¹⁶ <<http://www.copernicus.eu/main/climate-change>>.

¹⁷ <<http://unfccc.int/resource/docs/cop5/06a01.pdf#page=8>>.

D. Main findings on systematic observation for consideration by SBSTA 43

11. This section provides an overview of the submissions (see paragraph 2), reports and other activities by partner organizations, grouped so as to help identify considerations for action by SBSTA.

1. GCOS submission on the Status of the Global Observing System for Climate

12. The GCOS SR 2015 assesses the progress made against the 138 actions set out in the GCOS IP 2010 for the 50 ECVs across the atmospheric, terrestrial and oceanic domains. The report also provides a generic assessment of the overall adequacy of the global observing system for climate. The GCOS SR 2015 provides the factual basis on which the GCOS programme is building the GCOS IP 2016. Attention is paid particularly to observational uncertainties rather than to what is known with confidence from observations.

13. The GCOS SR 2015 provides an overview of the needs for and nature of observations, the role of various implementing agencies and international coordination, observing networks and constellations, the concept of ECVs and climate system cycles. The report is an extensive account of how well climate is being observed, where progress has been made, and where progress is lacking or where deterioration has occurred for:

- a) **Overarching and cross-cutting elements** including satellite observation, data products, reanalysis, recovery of instrumental data, proxy reconstructions of past climates, data management and climate impacts. For example, there are concerns about completeness of, and comparison between, online lists of data, user accessibility and understanding;
- b) **Atmospheric observation** (meteorological surface and upper air networks, networks for atmospheric composition, and composition variables). In general, the atmospheric observation is best developed, and refinement is on-going (e.g. increasing spatial coverage and complexity);
- c) **Oceanic observation** (networks and surface and sub-surface variables). The ocean observation has developed quickly and the overall structure is in place (e.g., the Argo network which continues to expand and is adding novel sensors that measure biogeochemical variables and offers the prospect of profiling to greater depths);
- d) **Terrestrial observation** (cross-ECV issues and variables). Although terrestrial observation still suffers from different standards and methods in use, progress has been made with space based observations and global networks for glaciers and permafrost;
- e) Progress made by actions in the GCOS IP 2010. From the 138 actions contained in GCOS IP 2010, **11 per cent registered very good progress, 32 per cent good progress, 35 per cent moderate progress. Seven per cent registered little or no progress.**

14. The key findings of GCOS SR 2015 are contained in its chapter 7. While the report does not provide recommendations, which will be provided in the GCOS IP 2016, it does provide the basis for identifying those recommendations and actions required to reduce knowledge gaps, improve monitoring and prediction to support mitigation, and improve support for risk assessment and adaptation.

15. The executive summary: clarifies the scope and context of the report; presents the key concepts of the global observing system for climate and the cycles for its assessments and identification of needs; and clarifies the basis and limitations of the report. It also provides a summary of main findings for: in situ and other non-space-based components; space-based components; data centre holdings; global reanalysis of comprehensive sets of observations; and international organization of observing systems.

16. At the seventh meeting of the research dialogue in June 2015,¹⁸ GCOS provided messages from the preparation of the GCOS SR 2015 that highlight considerations for knowledge and capacity building.¹⁹

17. In general, the GCOS report identifies that there have been improvements in many areas over recent years, but also makes it clear that much work remains to be done as identified in the conclusions (chapter 7).

¹⁸ <<http://unfccc.int/6793.php>>.

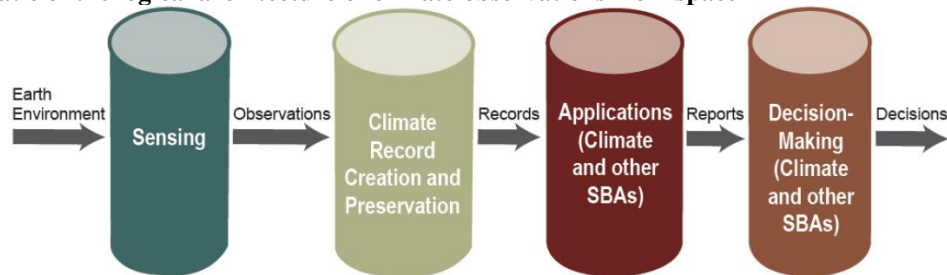
¹⁹ Summary report on the seventh meeting of the research dialogue, Bonn, Germany, 4 June 2015. <<http://unfccc.int/files/adaptation/application/pdf/researchdialogue.2015.2.summaryreport.pdf>>.

2. CEOS-CGMS submission on progress made by Space Agencies in providing global observations relevant to the Convention

18. The CEOS-CGMS submission on progress made by space agencies in providing global observations relevant to the Convention²⁰ is submitted to SBSTA 43 as a follow up to the progress report presented at SBSTA 41.²¹ The goal of the CEOS/CGMS work is to improve the systematic availability of Climate Data Records through the coordinated implementation and further development of the architecture for climate monitoring from space. This work is accomplished through the Joint Working Group on Climate (WGClimate).²²

Figure 3

Schematic of the logical architecture of climate observations from space



Source: CEOS submission, figure 1. Schematic of the logical architecture of climate observations from space representing the four pillars (main structural elements). The logical view could be considered as the “target” for a climate monitoring system and, in the sense that it is applicable to all ECVs, this representation is generic.

19. The submission describes the significant progress in observing the Earth’s climate system from space on a routine and sustained basis matched against the four criteria identified in the WGClimate Strategy for Climate Monitoring from Space (figure 3).²³ CEOS/CGMS updates since the last report include:

- a) **Sensing:** data from the CEOS Mission, Instruments and Measurement database is updated annually and provides details on instruments relevant for GCOS ECVs and the CEOS inventory of ECVs. The ECV inventory has been analysed to provide information complimentary to existing CEOS databases;
- b) **Climate record creation and preservation:** significant progress has been made in assessment and gap analysis of the ECV inventory,²⁴ including a quantitative assessment of compliance of GCOS ECVs using GCOS guidelines for data set preparation, that will help the production of ECVs that are better documented, transparently generated and with data sets that are accessible to the climate community to help users judge the utility of the data set for their application. The development of a coordinated action plan is still in progress;
- c) **Applications** (climate and other societal benefit areas): CEOS and CGMS provided GCOS with the 2015 update on Space Agency actions carried out in 2011-2015 in response to IP 2010,²⁵ used as input into the GCOS SR 2015;
- d) **Decision support** (climate and other societal benefit areas): CEOS and CGMS collaborated with WMO and the European Union Joint Research Centre on identifying case studies for climate services.²⁶
- e) Further relevant work includes the response by WGClimate to the GEO carbon²⁷ and water cycle strategies, the latter report is expected to be available by COP 21.

²⁰ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/538.pdf>.

²¹ <<http://unfccc.int/resource/docs/2014/smsn/igo/173.pdf>>.

²² <<http://ceos.org/ourwork/workinggroups/climate/>>.

²³ <http://ceos.org/document_management/Working_Groups/WGClimate/WGClimate_Strategy-Towards-An-Architecture-For-Climate-Monitoring-From-Space_2013.pdf>.

²⁴ <<http://ecv-inventory.com/ecv2/>>.

²⁵ <http://ceos.org/document_management/Working_Groups/WGClimate/WGClimate_The-CEOS-CGMS-Response-to-the-GCOS-2010-IP_Jun2015.pdf>.

²⁶ Satellites for climate services: Case studies for establishing an architecture for climate monitoring from space.

<http://library.wmo.int/pmb_ged/wmo_1162_en.pdf>.

²⁷ <<http://www.globalcarbonproject.org/misc/JournalSummaryGEO.htm>>.

20. To support the work of the Convention, CEOS produced a special edition for COP 21 of its Earth Observations Handbook in support of Climate Information Challenges.²⁸ This report details:

- a) The role of Earth observation in supporting climate information challenges in the assembly of the evidence of climate changes and future monitoring of key climate change indicators;
- b) A number key activities in space-based climate observations in regards to GCOS, European Space Agency's Climate Change Initiative,²⁹ Global forest observations for forest carbon tracking,³⁰ tracking human perturbation of the carbon cycle, including planned space missions by CEOS agencies to support this work with a view to enhance the assessment of the effectiveness of mitigation action and improve early warning on emissions of GHGs,³¹ and indicators of climate change (also mentioned by GCOS to be considered in the GCOS IP 2016, see paragraph 23 below);
- c) Case studies where satellites make a unique contribution in support of climate information. Information that could not otherwise be obtained on precision sea level monitoring, groundwater measurements, global atmospheric chemistry monitoring, glaciers and ice sheets and extreme events.

3. GCOS draft outline of a new GCOS Implementation Plan

21. GCOS submissions to SBSTA (paragraph 2) include a draft outline of the GCOS IP 2016.³² The new IP envisages broadening its scope to global Earth's environmental cycles (energy, carbon, water) and taking into account, inter alia, the Sustainable Development Goals (SDGs), climate services, climate indicators and relevant outcomes from COP 21.

22. As stated in paragraph 13, the GCOS SR 2015 provides the factual basis upon which the GCOS programme is building the GCOS IP 2016. It will advise on new requirements for measures needed for adaptation and mitigation. The broad outline is:

- a) Strategic approach to implementation;
- b) Growing demands for climate observations;
- c) Overarching and cross-cutting actions;
- d) Atmospheric observation;
- e) Oceanic observation;
- f) Terrestrial observation;
- g) Summary of main actions and recommendations.

4. WMO and GFCS submission

23. The WMO submission to SBSTA 43 identifies outcomes of the seventeenth session of the World Meteorological Congress, held in Geneva, Switzerland, from 25 May to 12 June 2015, and progress made in regards to the implementation of the GFCS.³³

24. The relevant outcomes identified by WMO from the Congress include:³⁴

- a) Identifiers for cataloguing extreme weather, water and climate events, to support work under loss and damage (Resolution 9);
- b) Reconstituting the World Climate Programme (WCP) to include GCOS, the World Climate Research Programme, the World Climate Service Programme, and the Global Programme on Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA) (Resolution 15) to better support climate services;

²⁸ <<http://www.eohandbook.com/cop21>>.

²⁹ <<http://cci.esa.int>>.

³⁰ <<http://www.gfoi.org>>.

³¹ <<http://www.globalcarbonproject.org>>.

³² <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/546.pdf>.

³³ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/547.pdf>.

³⁴ <<http://cg-17.wmo.int/>>.

- c) Strengthening and continuing the GCOS as regulated by a new memorandum of understanding agreed by its sponsors (Resolution 39);
- d) Encouraging members to support the development, improvement and modernization of networks for high quality in situ and satellite observations of GHG and co-emitted species to identify sources and sinks and the distribution of fluxes in each region at policy-relevant scales. The WMO started the implementation of the Integrated Global Greenhouse Gas Information System (IG³IS) to enable informing policy with observations and modelling under this system, and further ensuring the policy relevance of climate observations under GCOS (Resolution 46);
- e) Supporting the GFCS and climate services further through the WMO policy for the international exchange of climate data and products, to provide, strengthen and enhance the free and unrestricted exchange of GFCS relevant data and products, including through the WMO Information System (Resolution 60);
- f) Recognising energy as the fifth priority area of the GFCS, in addition to agriculture and food production, disaster risk reduction, health, water and energy (Resolution 63);
- g) Establishing a WMO cross-cutting urban focus in recognition of the relevance of weather and climate services for urban resilience, sustainable development, and disaster risk reduction (Resolution 68).

25. In regards to the implementation of the GFCS, WMO and GFCS are preparing an Annex to the *Technical Guidelines for National Adaptation Plan Process on "Climate Services for Supporting Climate Change Adaptation"* providing details on scientific and technical information on the role of data analysis, climate monitoring and prediction in adaptation planning and practices. It will provide an overview of the weather and climate data, information products and services that are available from national meteorological and hydrological stations (NMHSs) and can be used by countries when developing their National Adaptation Plans (NAPs) for the five GFCS priority areas.

5. GCOS submission on the workshop on enhancing observations to support preparedness and adaptation in a changing climate – learning from the IPCC 5th assessment report

26. The GCOS submitted the report from the workshop on *Enhancing observations to support preparedness and adaptation in a changing climate – learning from the IPCC 5th assessment report*, which took place in Bonn, Germany, from 10-12 February 2015.³⁵ The workshop was carried out by GCOS in collaboration with the IPCC and UNFCCC.³⁶

27. The GCOS workshop, attended by over 70 participants including Parties, considered observational and research needs that could enhance systematic observation and related capacity for adaptation, particularly in developing countries. Outcomes include:

- a) Articulation of the observations needed for adaptation and clear descriptions of the complete chain of observations-data-information-adaptation;
- b) Identification of the respective roles of GCOS and other partners to evaluate and deliver the best methods for developing adaptation strategies, supported by well described case studies;
- c) Coordination among observation systems at different scales from subnational to global to inform adaptation, particularly through relevant focal points, national coordinators, WMO regional climate centres and alliances.

28. This workshop followed an earlier workshop on Observations for adaptation to climate variability and change, which took place in Offenbach, Germany, from 26–28 February 2013,³⁷ At which, there was recognition of a need to clarify responsibilities, define focal points for specific topics, build synergies, and generally strengthen cooperation among UN programmes, as well as to consider how GCOS can use its reporting systems through the WMO, UNFCCC, the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization, and others to reach out to different communities.

³⁵ <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/543.pdf>.

³⁶ <<http://unfccc.int/8764.php>>.

³⁷ <<http://www.wmo.int/pages/prog/gcos/Publications/gcos-166.pdf>>.

29. A further relevant workshop on Observations for climate change mitigation, held in Geneva, Switzerland, from 5-7 May 2014, identified four actions by GCOS and the observation community to support mitigation.³⁸

6. Other findings

30. The SBSTA recognises the importance of: GEO, including its implementation plan for GEOSS; collaboration between GEO and GCOS;³⁹ and of capacity building on systematic observation,⁴⁰ inter alia, to enable developing countries to apply climate observations for impact assessment and preparation for adaptation. The new GEO Strategic Plan 2016-2025 establishes three Strategic Objectives – Advocate, Engage, Deliver – and emphasises climate change and its impacts as a cross-cutting area, and strengthens the societal benefit areas making them more focused on the needs of society to support processes under the UNFCCC, the UN Sendai Framework for Disaster Risk Reduction, the SDGs and other UN agencies.

31. The importance of satellite data in sustainable development, climate change and disaster risk reduction was emphasized in the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) International Conference on Earth Observation – Global solutions for the challenges of sustainable development in societies at risk, which was held on 26-28 June 2015, in Bonn, Germany. The Conference brought together experts from a variety of sectors of development, decision makers from government agencies, researchers and stakeholders, to discuss ways in which Earth observation can be used to contribute and assess the effectiveness of the processes to be launched in the coming years under the UNFCCC, the UN Sendai Framework for Disaster Risk Reduction and the SDGs, as a way to reach the goals and targets included in these three global agreements.⁴¹

E. Possible issues for consideration

32. I hope that this note provides delegates with a good overview of the documents and issues for consideration at SBSTA 43 under agenda item 8(a) 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 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.

33. Parties may wish, based on previous practice and mandates from SBSTA, to thank GCOS for their submissions. SBSTA may invite GCOS to identify action on all findings identified in the GCOS SR 2015⁴² in the new GCOS IP 2016,⁴³ including addressing uncertainties and gaps for overarching and cross-cutting elements, atmospheric, terrestrial and oceanic observations, and identifying the costs involved in implementing the activities identified.

34. Most importantly, Parties may wish to invite GCOS to consider the evolving and new needs of the UNFCCC in the GCOS IP 2016, bearing in mind the possible outcomes of the Paris Conference, including in:

- a) Areas of monitoring and assessing fluxes of GHG emissions and the effectiveness of mitigation action at the sub-regional and local scale, taking into account new developments in observations of the climate system cycles and GHG information systems. While this is still an area under development, Parties may wish to invite GCOS to explore the potential of new information systems, such as the IG³IS⁴⁴ and others, and to oversee such activities in the systematic observation community;

³⁸ <<http://www.wmo.int/pages/prog/gcos/Publications/gcos-185.pdf>>.

³⁹ FCCC/SBSTA/2004/13, paragraph 108.

⁴⁰ FCCC/SBSTA/2005/10, paragraph 96.

⁴¹ <<http://www.un-spider.org/post2015>>. Conference report <http://www.un-spider.org/sites/default/files/UN_Germany_International_Conference%20Report%20final.pdf>.

⁴² Full report available here:

<http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/541.pdf>.

⁴³ Draft outline available here:

<http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/546.pdf>.

⁴⁴ WMO Resolution 46 (Cg-17). <<http://cg-17.wmo.int/>>.

- b) Broadening its scope to consider Earth's environmental cycles (energy, carbon, water) and perturbation of these cycles;⁴⁵
 - c) Providing the foundation for climate services and indicators for communication of ECVs to the broader audience, supporting linkages between suppliers of data and decision makers;⁴⁶
35. Parties may wish to recognize the work of CEOS, as well as the information provided in the COP 21 EO Handbook, and invite CEOS to support implementation of the GCOS IP 2016 and the ongoing and new work of the UNFCCC, including through:
- a) Continuing to improve and update the ECV inventory for all satellite-related ECVs and any new ECVs identified in IP 2016;⁴⁷
 - b) Providing updates on implementation according to the four pillars of the WGClimate Strategy for Climate Monitoring from Space (see figure 3 above);⁴⁸
 - c) Coordinating efforts in the satellite community to monitor GHGs and co-emitted species.⁴⁹
36. Parties may wish to recognize the relevant outcomes of the WMO congress (see paragraph 24).⁵⁰
37. Parties may wish to recognize the GFCS support for the NAP process and encourage the GFCS to continue to support action under the Convention under all priority areas, including under the new energy priority area.⁵¹
38. Parties may wish to consider this information note as the start of an opportunity to further advance understanding of the different types of systematic observation data products available, including those supplied by GCOS, CEOS, GEO and UN-SPIDER, and invite the secretariat to:
- a) Collaborate closely with observer organizations to improve access to, identification and understanding of, relevant scientific and climate data products and information in support of the NAP process and loss and damage, and to link suppliers of data with decision makers;
 - b) Work with partner observer organizations to identify case studies of best practices so as to inform adaptation and mitigation under the Convention and make them available on the UNFCCC website.
39. Parties may wish to reflect on the outcomes of the GCOS workshop on systematic observation in collaboration with the IPCC and UNFCCC,⁵² as well as previous relevant workshops.⁵³ The GCOS workshop provided an opportunity for pooling expertise and providing a more cost-efficient event and greater engagement between Parties and observer organizations to enable more effective outcomes. It emphasised the importance of a science-based, systematic approach to adaptation planning. Parties may wish to consider:
- a) Encouraging GCOS and other observer organizations to build capacity for users to access and use data at regional scales to support adaptation action, including through appropriate guidelines, regional workshops and identification of case studies.
 - b) Encourage GCOS and GFCS and other observer organizations to support regional workshops to strengthen synergies and capacity building in different sectors, and to coordinate data-sharing and identification of case studies in collaboration with UNFCCC.

⁴⁵ As already indicated in the draft outline of the GCOS IP 2016.

⁴⁶ See WMO Resolution 60 (Cg-17) available at <<http://cg-17.wmo.int/>> and the GCOS workshop report available at <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/543.pdf>.

⁴⁷ <<http://ecv-inventory.com/ecv2/>>.

⁴⁸ See CEOS submission available at <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/538.pdf>.

⁴⁹ WMO Resolution 46 (Cg-17) <<http://cg-17.wmo.int/>>.

⁵⁰ <<http://cg-17.wmo.int/>>.

⁵¹ See WMO submission available at <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/547.pdf>.

⁵² See GCOS workshop report available at <http://unfccc.int/files/documentation/submissions_from_observers/application/pdf/543.pdf>.

⁵³ See GCOS workshop reports on Observations for adaptation to climate variability and change available at <<http://www.wmo.int/pages/prog/gcos/Publications/gcos-166.pdf>> and Observations for climate change mitigation available at <<http://www.wmo.int/pages/prog/gcos/Publications/gcos-185.pdf>>.