Update for WDAC-5

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7 April 2016, NCEI

Asheville, NC, USA

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DRIVING THE GLOBAL CLIMATE OBSERVATION AGENDA

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Identify/Review Essential Climate Variables (ECVs) through science panels

Regular review of how these ECV are observed

Develop plans to ensure continuity and improvement of observations

- GCOS follows a 3 phase approach driven by users
- 2015 Status Report started the 3rd assessment cycle with a new Implementation Plan due in 2016 for UNFCCC COP 22

(1st cycle: 1995-1998)

(2nd cycle: 2003-2004-2010)

(3rd cycle: 2015-2016)

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3 SCIENCE PANELS

- 3 Science Panels for Atmosphere, Land and Oceans:
  - Capture requirements for users of climate observations.
  - Identify & review Essential Climate Variables (ECV) and their specification
  - Review adequacy of networks to measure & exchange data
  - Give recommendations for the new Implementation Plan
  - Advocating sustained networks, open data access, and future evolution
  - Coordinate with other observing systems

AOPC Atmospheric Observation Panel for Climate GCOS • WCRP

GCOS • GTOS • WCRP TOPC Terrestrial Observation Panel for Climate

GCOS • GOOS • WCRP OOPC Ocean Observations Panel for Climate

Status Report and Outline for the new GCOS IP submitted to UNFCCC SBSTA43/COP21

- GCOS fulfils the responsibility to review and assess the development and implementation of the component parts of the climate observing system and to report to its sponsors, partners and to UNFCCC.
- A **Report on the "Status of the Global Observing System for Climate"** has been prepared during the period from May to October 2015 with contributions from panels and external experts. It has been submitted to public review during summer of 2015, and has been delivered to SBSTA on 20 October 2015, for presentation at COP21 in Paris.
- **Draft outline for the new GCOS Implementation** has been submitted to COP21. The new plan is due for SBSTA45 / COP22, beginning of November 2016.

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United nations conference on climate change COP21/CMP11

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COP21 / SBSTA43, Paris, December 2015

Conclusion (FCCC/SBSTA/2015/L.18):

- ❑encouraged GCOS to consider the outcomes of COP21 when preparing the new GCOS Implementation Plan.
- ❑invited GCOS to collaborate with relevant partners to continue enhancing access to, and understanding and interpretation of, data products and information to support decision-making on adaptation and mitigation at national, regional and global scales.
- ❑urged Parties to work towards addressing the priorities and gaps identified in the GCOS 2015 Status Report.
- ❑invited Parties and relevant organizations to provide inputs to, and contribute to the review of, the new GCOS implementation plan.

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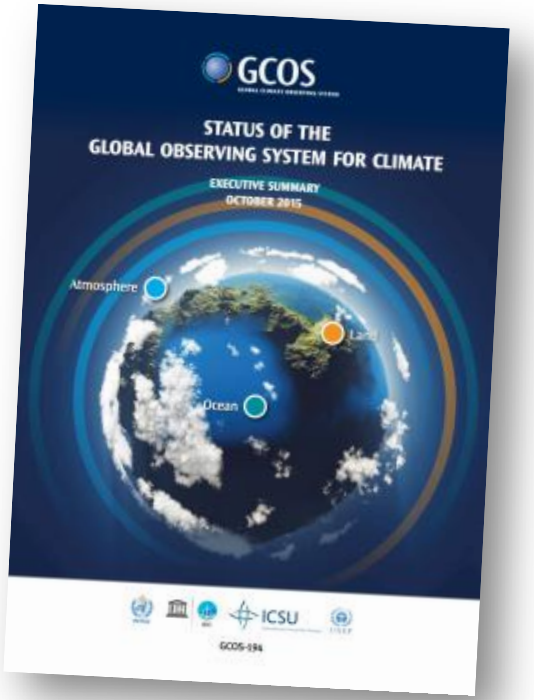
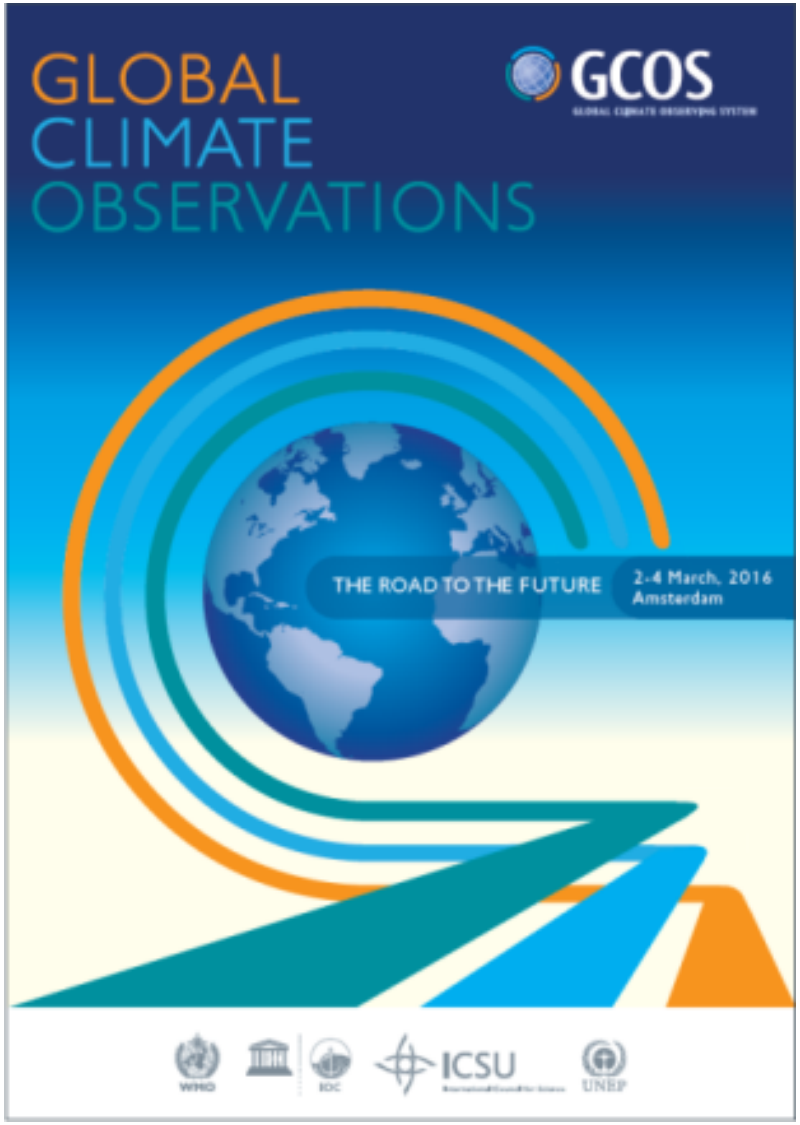
GCOS STATUS REPORT

- GCOS *Status of the Global Observing System for Climate* (GCOS-195) has been published.
- It was submitted to this SBSTA at COP 21 in Paris 2015.
- Describes how well climate is currently being observed, where progress has been made, where progress is lacking or where deterioration has occurred.



- provides a basis for the new GCOS Implementation Plan
- covers matters relevant to the other issues such as biodiversity, desertification, wetlands and sustainable development (SDGs).

GCOS OPEN SCIENCE CONFERENCE



- 2-4 March 2016, Royal Academy of Arts and Sciences, Amsterdam, NL
- 150 participants, from 40 countries
- 100 observers using the video live stream, from 28 countries
- about 150 received abstracts
- 57 invited talks and speakers
- 62 posters being displayed
- dedicated website:

gcos-science.org

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- **Chapter 1: Introduction**

- **Chapter 2: Performance of the current climate observations**

  This chapter assesses the performance of the current global climate observing systems and its current set of ECV.

  Session I: Scope and aims of the conference

  Session II: Successes of the current global observing system

  This session covered keynote and oral presentations from climate in the GCOS domains: ocean, land, cryosphere and atmosphere. We were seeking contributions that highlight the relevance observations to climate science, the trials and tribulations of obtaining them, and exciting science of climate results.

- **Chapter 3 Adequacy of the current global climate observations**

  This chapter discusses how adequate the current ECVs are in terms of science needs; do they help improving the understanding of key aspects of the climate system, and in terms of user needs; do they provide the information an increasing variety of users needs.

  Session III: Relevance of the current ECVs to improved understanding of the global cycles of water, energy and carbon;

  This session covered keynote and oral presentations discussing the possibility of using the current set of ECVs to achieve closure of the three key cycles of the Earth. It also aimed at identifying gaps and missing elements with the aim of possibly amending the GCOS 2016 Plan.

  Session IV: User needs from diverse areas;

  This session covered keynote and oral presentations to identify user needs from non-UNFCCC areas, such as conventions on biodiversity and desertification, ECVs for adaptation and mitigation and the use of the concept of essential variables in other domains.

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- **Chapter 4 Planning for future global climate observations**

  The final chapter outlines a future programme of climate observations based on improved communication with a variety of stakeholders, technology improvements, and requirements that arise from recent climate negotiations and treaties.

  Session V: Future Observations and Communication of climate science

  This session covered keynote and oral presentations identifying how to best communicate the results of climate science and observations to the general public, policy makers and politicians. It covered the development of key indicators such as ocean heat content or sea level rise.

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Conclusion of Science Committee:

- *(1) Written outcome of the conference: (a) each session had a rapporteur who in collaboration with the session chairs has summarized the main messages of each session. These session reports will be consolidated among the members of the science committee present during the conference days, (b) based on these session reports the GCOS Secretariat will send out a survey to the participants, which will ask for comments and further additions.*

- *(2) Conference Proceeding: The submitted abstracts for posters and oral presentations will be assembled in a digital version of conference proceeding, which will be made available on the web.*

- *(3) Reviewed article about the outcome of the conference, published as soon as possible in e.g. Nature Climate Change.*

2016 GCOS Implementation Plan

Date	Milestone
2013-2015	Preparatory work in 2013 – 2015 (GCOS panel meetings and three workshops with GFCS/UNFCCC/IPCC; Publication of Status Report)
15 November 2015	Draft Table of Contents submitted to COP21
2-4 February 2016	First Writing Team meeting: Detailed outline & writing assignments
2-4 March 2016	Open GCOS Conference: collect community views
April 2016	GCOS panel meetings finalize their draft chapters
24-26 May 2016	2nd Writing Team meeting: completes draft
June 2016	Limited review (including WMO, Technical Commissions and RAs)
July 2016	Public review (6 weeks)
September 2016	Final version approved by GCOS SC-24
October 2016	Final plan submitted to COP22

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Road Map for Plan

2016 2017

Jan | Feb | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec

Development of Implementation Plan & Sat Suppl (Annex)

IOC EC 7-9 June
WMO EC 15-24 June

Public REVIEW 25 July – 26 Aug

Work on Draft

SBSTA45
7 – 18 Nov 2016

COP21

COP22

Writing Team:
2-4 Feb 2016, JRC

CEOS SIT
19-20 April

CGMS44
9-10 June

TOPC
25-27 April

AOPC-OOPC
4-8 April

Intermediate REVIEW of Implement ation Plan

13 June – 8 July

Oct 3-7
SC-24

To: UNFCCC
10 Oct

Finalisation of Plan
(copy edit, Translation in F, ES?)

Writing Team:
24-26 May 2016, JRC

10 days to insert comments into draft

7 Oct
Approval Steering Committee

10 Oct
Submission to UNFCCC, subject to further copy edit

GCOS Science Conference:
The Road to the Future
2 - 4 March 2016, Amsterdam, The Netherlands

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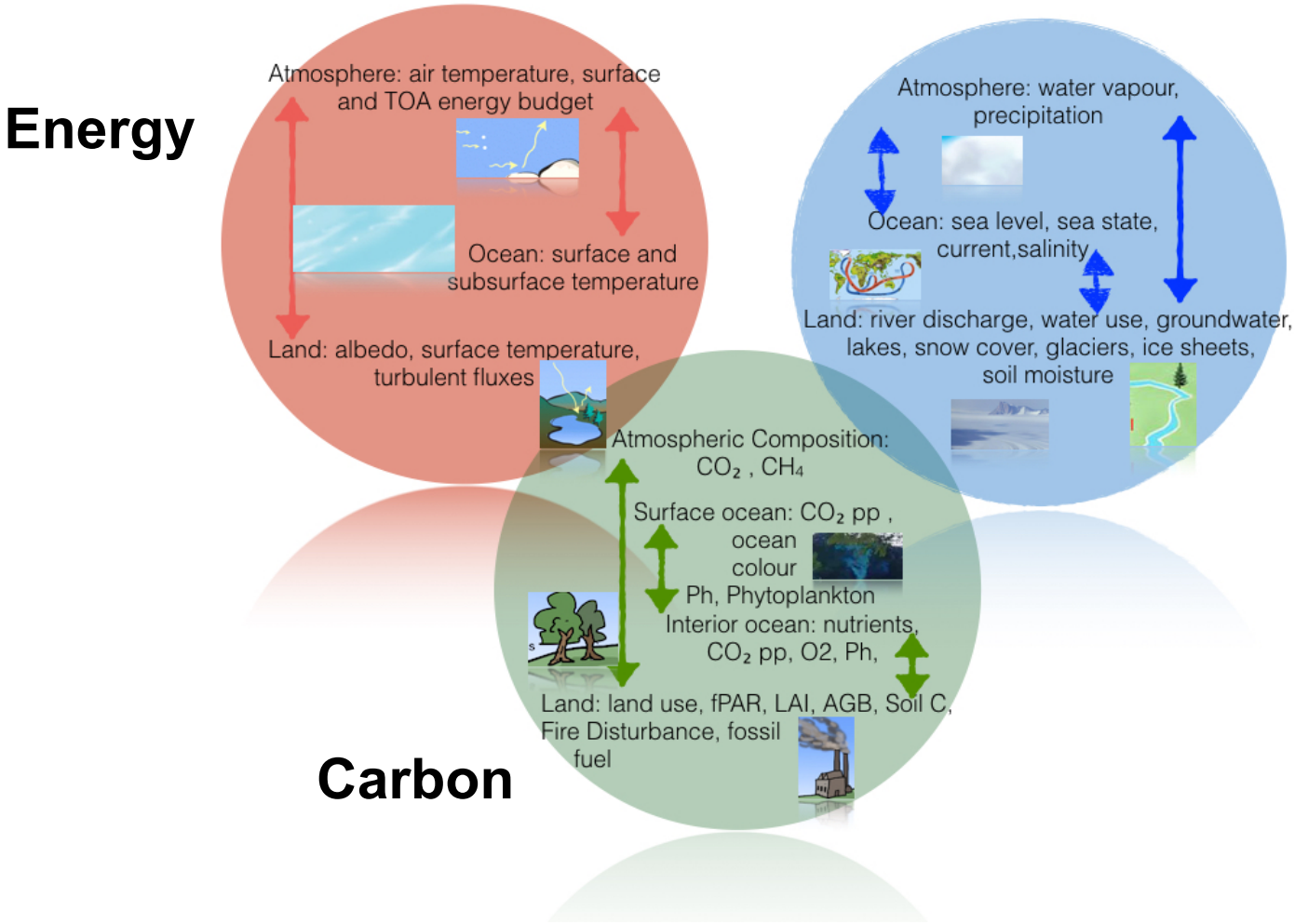
Essential Climate Variables that are both currently feasible for global implementation and have a high impact on UNFCCC requirements

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	**Surface:** Air temperature, Wind speed and direction, Water vapour, Pressure, Precipitation, Surface radiation budget **Upper-air:** Temperature, Wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance and spectral radiance) **Composition:** Carbon dioxide, Methane, and other long-lived greenhouse gases, Ozone, Aerosol, and Precursors
Oceanic	**Physics:** Temperature, Sea Surface Temperature, Salinity, Sea Surface Salinity, Currents, Surface Currents, Sea Level, Sea State, Sea Ice, *Ocean Surface Vector Stress (new), Sensible and Latent Heat fluxes (proposed/emerging?)* **Biogeochemistry:** Ocean Carbon, Nutrients, Oxygen, Tracers, *Non-CO2 Greenhouse Gases (Nitrous Oxide) (proposed/emerging?)* **Biology/Ecosystems:** Ocean Colour, Phytoplankton, (plus additional emerging?)
Terrestrial	**Hydrology:** River discharge, Anthropogenic water use, Groundwater, Lakes Emerging: Lake and River Ice (extended to river properties) **Cryosphere:** Snow cover, Glaciers, Ice sheets and Ice shelves, Permafrost **Ecology:** Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Above-ground biomass, Soil carbon, Fire disturbance, Soil moisture **Physics:** Land Surface Temperature, Land latent and sensible heat flux anthropogenic GHG emissions for new IP: discuss new ECV for "energy fluxes"

Work in progress:
incorporates 2015 GCOS Steering Committee input
will incorporate GCOS Science panel input 2016

ECVs and Earth System Cycles



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UNFCCC NEEDS FROM PARIS AGREEMENT

UNFCCC	Needs	
Adaptation	Meteorological data e.g. Temp, precipitation, wind, humidity Ecosystem status e.g. Ocean colour, Land cover, soil moisture Coastal zone e.g. Sea level, sea state, topography, subsidence Ocean acidity, Glaciers, Dust, Snow water equivalent…	Also need high resolution local data. Gaps exist in vulnerable areas
Mitigation	Land cover (e.g. forest monitoring to support REDD+) GHG emissions	Many forest monitoring activities exist
Transparency	GHG emissions, Land cover, above ground biomass Atmospheric composition	Validation of emission inventories
Global Stock Taking	GHG emissions, temperature, precipitation Glaciers, Ice Sheets, Sea Ice Land cover/vegetation Ocean heat content, acidity & colour, sea level Atmospheric composition,	Monitoring needs unclear
Public Awareness	Temperature, sea level, ocean heat content, summer arctic sea ice extent, glacier mass balance, snow cover, specific humidity ...	Indicators to be decided
Capacity Building	GCOS Cooperation Mechanism currently focussed on meteorological data	Extend to terrestrial area?

ECV Product Requirements and the Satellite Supplement

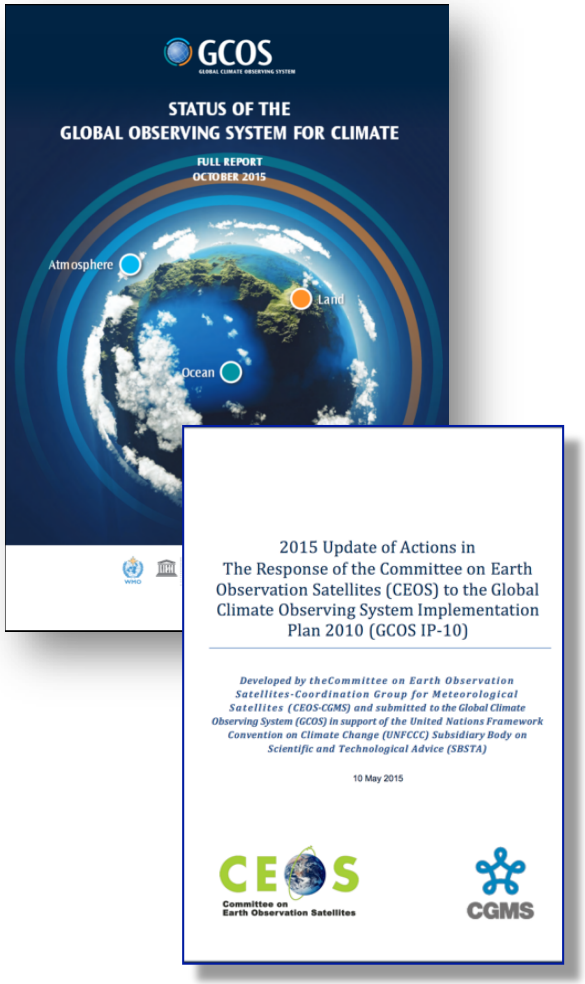
①Maximise GCOS / CEOS / CGMS synergy

②Reduce time-lag between IP and Satellite Supplement release

③Align requested reporting of both GCOS and the Space Agencies to SBSTA

④Provide Satellite Supplement as an Appendix to the New Implementation Plan

⑤Extend ECV product requirements provided in satellite supplement to in-situ data



IP 2016 TABLE OF CONTENT
THE GLOBAL OBSERVING SYSTEM FOR CLIMATE: IMPLEMENTATION NEEDS (TBC)

EXECUTIVE SUMMARY

Part 1:

Part 2:

Annex:

ECV PRODUCT REQUIREMENTS / SATELLITE SUPPLEMENT

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WDAC and GCOS

①Contribute to the review of the new GCOS Implementation Plan; in particular with regard to the cross-cutting sections (water, carbon, energy cycle).

②Strengthen collaboration in ensuring participation at GCOS panel meetings: AOPC (GEWEX, SPARC), OOPC (CLIVAR), TOPC (CLIC).

③Ensure to report on WDAC and GCOS cooperation at WCRP JSC, and vice versa at GCOS SC.

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