



## **UPDATE OF THE IMPLEMENTATION ACTIVITIES FOR THE GLOBAL CLIMATE OBSERVING SYSTEM**

*(Submitted by WMO on behalf of GCOS Secretariat)*

The Global Climate Observing System (GCOS) Programme is continuing to engage actively with the space-based Earth observation community through feedback between its three technical expert panels for atmosphere, oceans and land and the respective space-based climate observation initiatives.

The update of the satellite-based component of the in 2010 updated “Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC”, which was published by the GCOS Secretariat in December 2011, is providing for all space agencies and consortia the basis for implementing activities related to climate observations. The most recent reaction of the Earth observation community to the so-called GCOS “Satellite Supplement” is the CEOS Response, submitted to the 37<sup>th</sup> session of the UNFCCC SBSTA, to be held in conjunction with COP18, December 2012.

GCOS is coordinating its activities mainly with the following groups: CGMS, CEOS, and the CEOS Working Group on Climate, and the WMO Space Programme, and in the past couple of years in particular with the ESA Climate Change Initiative and EUMETSAT activities related to Africa and climate services.

Action/Recommendation proposed:

CGMS members to take note.

## Update of the implementation Activities for the Global Climate Observing System

### 1 INTRODUCTION

The Global Climate Observing System (GCOS) is an internationally coordinated network of observing systems and a programme of activities that support and improve the network. It is designed to meet evolving national and international requirements for climate observations. GCOS was established in 1992 as an outcome of the Second World Climate Conference.

The mission of GCOS is to give all users access to the climate observations, data records and information they require to address pressing climate-related concerns. GCOS users include individuals, national and international organizations, institutions and agencies. The role of GCOS is to work with partners to ensure the sustained provision of reliable physical, chemical and biological observations and data records for the total climate system – across the atmospheric, oceanic and terrestrial domains, including hydrological and carbon cycles and the cryosphere.

GCOS is sponsored by the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP) and the International Council for Science (ICSU).

Many observing systems contribute to the GCOS network of global observing systems for climate. In many cases they also serve other functions, such as weather forecasting or air-quality monitoring. The contributing systems include the climate-observing components of the IOC-led Global Ocean Observation System (GOOS), the Global Terrestrial Observing System (GTOS), led by the United Nations Food and Agriculture Organization (FAO), and the WMO Global Observing System (GOS) and Global Atmosphere Watch (GAW). A number of other research and operational systems provide important contributions. The observations themselves may be ground-based, or from airborne or satellite systems. GCOS is both supported by and supports the international scientific community, and the World Climate Research Programme (WCRP) co-sponsors the expert panels set up by GCOS for the atmospheric, oceanic and terrestrial domains. The composite observing system designated as GCOS serves as the climate-observation component of the Global Earth Observation System of Systems (GEOSS).

In 2004, GCOS published the *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC* and in 2009 reported on its progress of implementation. The 2004 published GCOS implementation plan presented the set of specific actions required to implement and maintain a comprehensive global climate observing system that addressed the commitments and supported the needs of Parties under Articles 4 and 5 of the UNFCCC. The 2004 published GCOS implementation plan was prepared in response to a call by the UNFCCC Subsidiary Body on Scientific and Technological Advice (SBSTA). It was complemented by a supplement that specifically addressed requirements for observations from space.

The Progress Report concluded that implementation of the various observing systems in support of the UNFCCC had progressed significantly over the previous five years, but that it would be difficult to sustain funding for many important systems. There had been only limited progress towards filling the gaps in observing systems in developing countries, and there was still a long way to go before a fully implemented global observing system for climate could be achieved.

An update to the GCOS implementation plan was submitted to the UNFCCC Secretariat in August 2010 for consideration by Parties at the thirty-third session of the UNFCCC SBSTA, held in conjunction with the sixteenth Conference of the Parties (COP 16), in Cancún, Mexico.

The 2010 updated GCOS implementation plan takes into account recent developments in science and technology, the increasing focus on adaptation, the demand to optimize mitigation measures, and other evolving requirements for systematic observation of climate. It recognizes the importance of deriving products and data records of physical variables such as wind speed, sea level and soil moisture from the measurements made by satellites. The up-date of the supplemental details to the satellite-based component of the 2010 updated GCOS implementation plan, the so-called "Satellite Supplement", was published in December 2011. This "Satellite Supplement" document provides additional details related to the generation of these products and the associated datasets. It is intended mainly to assist Parties of the UNFCCC that support Earth observation from space to respond to the requirements of the 2010 updated GCOS Implementation Plan. It also has relevance to all Parties that access satellite data records or use derived products for climate applications. Furthermore, a wide range of Parties can contribute the *in situ* data needed for the calibration of satellite instruments, for the validation of satellite data and derived products, and for incorporation with satellite data in integrated products, such as provided by reanalysis.

## **2 REPORT ON GCOS ACTIVITIES RELATED TO SPACE-BASED OBSERVATIONS FOR CLIMATE SINCE CGMS-39**

The GCOS Secretariat was informed by CEOS on 25 September 2012 that CEOS has responded to the 2010 update of the GCOS Implementation Plan and the 2011 update of its Satellite Supplement. The CEOS Response to the 2011 update to the "Satellite Supplement" to the GCOS Implementation Plan will reinforce the needs called out by the GCOS Satellite Supplement and provide more detail on the deliverables, coordination, activities, and who within CEOS will lead the effort. The Response, which is available as document submitted to the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA) for reporting to its 37<sup>th</sup> session in Doha (26 November-7 December 2012) will provide a view of what can be achieved with current funding and additional funding with respect to the satellite-related actions of the GCOS Implementation Plan. Atmosphere, ocean, and terrestrial domain leads were specified for follow-up. These coordinate with CEOS working groups, CEOS virtual constellations, CGMS initiatives, (i.e., SCOPE-CM, GSICS), and WCRP. It is expected that this new CEOS Response will help space agencies plan their climate observations and climate data related programs.

The CEOS Working Group on Climate met for the second time in Asheville, NC, USA in April 2012. The CEOS Working Group on Climate was established to facilitate implementation of the CEOS Response to the Satellite Supplement. The second meeting of this Working Group considered five key discussion points, including climate monitoring architecture and ECV inventories, developing a consensus maturity matrix, linkages with the climate modelling community, in-depth ECV analysis, and, revisiting the “Research to Operation” paradigm. On the latter point, it was noted that the SCOPE-CM initiative offers a practical example of a research to operations process that can be used to illustrate the need to change the way to do business now. The Chairman of the CEOS Working Group on Climate led the activity in developing a strategy towards architecture for Climate Monitoring from Space. The GCOS Secretariat is asked to ensure that GCOS engages in the next stage in the development of the architecture for climate from space.

The GCOS Steering Committee in its 20<sup>th</sup> session in September 2012 decided that SCOPE-CM should receive additional attention, and it was suggested that a SCOPE-CM representative could be invited to report regularly to either GCOS panel meetings or to the GCOS Steering Committee. At the SCOPE-CM Executive Panel meeting, a major meeting agenda item was discussion of a new concept for the SCOPE-CM Phase 2 Implementation Plan. Phase 2 Objectives include the establishment of structures for sustainable generation of FCDRs and TCDRs; generation of the first SCOPE-CM products; increased coverage of products in terms of ECVs and time and spatial dimension; and fostering extension of the network.

The European Space Agency (ESA) in 2010 launched a Climate Change Initiative (cci) which directly responds to GCOS climate requirements formulated in the “Satellite Supplement” by focussing on 13 Essential Climate Variables, complementary to the ECVs addressed within SCOPE-CM and in line with planning at the CEOS level. The cci also addresses needs of the World Climate Research Programme (WCRP) for past satellite climate data records. The following 13 ECVs are part of the initiative:

Cloud, Ozone, Aerosol, Green House Gases, Sea-Ice, Sea-Level, Sea Surface Temperature, Ocean-Colour, Glaciers, Land Cover, Fire, Soil Moisture, Ice Sheets. The result of the ESA cci will form a major input to the assessment of adequacy of global observing systems for climate and to the report on progress made since 2009, which will have to be conducted by the GCOS Secretariat in the following two years

The GCOS programme was invited by EUMETSAT to engage in the assessment of the potential of African stake holders related to the delivery of climate services. GCOS attended a workshop on climate services in Africa in June 2012 and participated at a special day, dedicated to “Climate”, during the 10<sup>th</sup> assembly of the African User Forum on the exploitation of meteorological satellites, which was jointly organised by the Africa Climate Policy Centre (ACPC) of the UN-Economic Commission for Africa (UN ECA) and EUMETSAT. Various stake holders of climate services of African institutions were invited to represent in which way they will respond to the needs of a once established Global Framework for Climate Services.

The GCOS programme is preparing for a third assessment of the adequacy on global observing systems for climate, scheduled to be published in 2015. An element contributing to the next adequacy report will be a GCOS workshop, supported by WMO, IOC and UNEP, addressing observations for adaptation which will be held from 25 to 27 February 2013, at the premises of the Deutscher Wetterdienst, in Offenbach Germany. This workshop will engage the larger climate observation community focussing on various sectors: risk management, agriculture and forestry, water resources management, health, coastal zone management, energy and transport, modelling and research. The 3<sup>rd</sup> Adequacy Report will contribute eventually to a new GCOS implementation plan, tentatively scheduled to be public available at the end of 2016.

### 3 CONCLUSIONS

All past year's activities and the future plans for a new adequacy report and a new GCOS implementation plan, only stress what is outlined in Annex II of the CGMS High Level Priority Plan (HLPP). The main items of CGMS of interest to GCOS can be summarised as:

- Assessing how CGMS can optimally contribute to the GFCS implementation, including the potential use of the GSICS and SCOPE-CM frameworks;
- Ensuring the data holdings of CGMS members are appropriately reflected in the Architecture for Climate Monitoring from Space (physical view) through their systematic contributions to the ECV Inventory questionnaire;
- Establishing an integrated approach for accessing climate data records produced by CGMS members; and
- Promoting a common approach to the long-term preservation of data through the exchange of information and the establishment of a coordinated consensus on best practices.