



# Progress in Implementing the Global Observing System for Climate in Support of the UNFCCC\*



\*submitted to UNFCCC/SBSTA-30

## The Mission of the Global Climate Observing System (GCOS)

GCOS is a joint undertaking of the World Meteorological Organization (WMO), the Inter-governmental 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)<sup>[5]</sup>. Its goal is to provide comprehensive information on the total climate system, involving a multidisciplinary range of physical, chemical and biological properties, and atmospheric, oceanic, hydrological, cryospheric and terrestrial processes. It is built on the WMO Integrated Global Observing System (WIGOS), the IOC-WMO-UNEP-ICSU Global Ocean Observing System (GOOS),

the FAO-UNEP-UNESCO-ICSU Global Terrestrial Observing System (GTOS) and a number of other domain-based and cross-domain research and operational observing systems. It includes both *in situ* and remote sensing components, with its space based components coordinated by the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS). GCOS is intended to meet the full range of national and international requirements for climate and climate related-observations. As a system of climate-relevant observing systems, it constitutes, in aggregate, the climate observing component of the Global Earth Observation System of Systems (GEOSS).



## Why We Need Systematic Global Observations

The achievement of the objectives of the UNFCCC depends on comprehensive understanding, monitoring, modelling, and prediction of the behaviour of the climate system and of the impacts of climate on humans and the natural environment. Systematic observations are needed for decision-making on regional and local scales, as well as to support analyses of the global climate. Climate observations are also of great importance to adaptation and mitigation, and, for example, will be essential to the success of the UNFCCC's Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. Climate observations are equally central to the ultimate goals of other environmental conventions such as the Convention to Combat Desertification. Without good observations, well-informed decision-making is impossible.



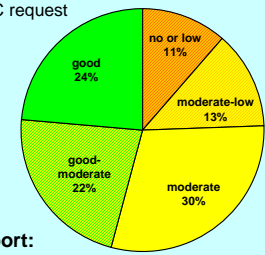
## The Progress Report on the Implementation of the Global Observing System for Climate in Support of the UNFCCC 2004-2008

The Report addresses progress since late 2004 in implementing actions called for in the Implementation Plan, IP-04<sup>[1]</sup>, for maintaining, strengthening, or otherwise facilitating global observations of the climate system.

As sources of information, the Progress Report uses performance reports from GCOS monitoring centres and component observing systems and their technical advisory bodies. It also uses information on national climate observing activities provided by Parties<sup>[2]</sup> in response to a UNFCCC request to Parties to supply such information (Decision 11/CP.13)<sup>[3]</sup>.

### Progress in the Actions of the IP-04

The Progress assessment for all 131 actions in the IP-04 shows that good to moderate progress has been achieved for the majority of actions. Nevertheless, in 11% of the actions, little or no progress could be reported.



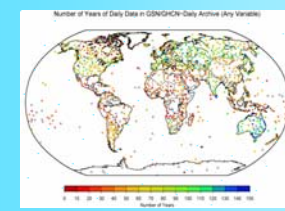
### Principal Findings of the Progress Report:

- ▶ The increasing profile of climate change has reinforced world-wide awareness of the importance of an effective Global Climate Observing System;
- ▶ Developed countries have improved many of their climate observation capabilities, but national reports suggest there has been little progress in ensuring long-term continuity for several important observing systems;
- ▶ Developing countries have made only limited progress in filling gaps in their observing networks, with some evidence of decline in some regions, and capacity building support remains small in relation to needs;
- ▶ Both operational and research networks and systems, established principally for other purposes, are increasingly responsive to climate needs, including data exchange;
- ▶ Satellite agencies have improved both mission continuity and observational capability and are increasingly meeting needs for data reprocessing, product generation, and access;
- ▶ The Global Climate Observing System has progressed significantly over the last five years but still falls short of meeting all the climate information needs of the UNFCCC and broader user communities.

## Components of GCOS

The observing systems which make up GCOS encompass both *in situ* and satellite observations of climate-related atmospheric, oceanic and terrestrial variables. Observations are made by:

- ▶ satellites,
- ▶ surface stations,
- ▶ ships, buoys & floats,
- ▶ aircraft, upper-air balloons,
- ▶ river and lake gauges,
- ▶ permafrost bore holes,
- ▶ glacier surveys
- ▶ and many others.



Length of historical climate time series for GCOS Surface Network (GSN) stations available at the GSN Archive Centre. (Source: US National Climatic Data Center).

## Articles 4 and 5 of the UNFCCC

Parties to the Convention agreed to support and further develop mechanisms for the collection and sharing of climate data and the strengthening of systematic observation, especially in developing countries. The GCOS Secretariat has regularly reported to the Parties on the adequacy of the global observing systems for climate. In 2004, at the request of SBSTA, the GCOS Steering Committee produced an "Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC"<sup>[1]</sup>.

## The 2004 Implementation Plan [IP-04]

- ▶ Specified 131 actions in the atmospheric, oceanic, and terrestrial domains to address the observing system needs of the UNFCCC.
- ▶ Outlined a comprehensive programme to implement these actions by national, regional, and international entities – Agents for Implementation.
- ▶ Focused on needed improvements for observation of 44 Essential Climate Variables (ECVs) for the atmosphere, oceans, and land.

## Climate Monitoring Principles

Global climate change provides a specific challenge for climate monitoring, both through the need for global coverage and because the rate of change of climate variables (such as average temperature and rainfall) tends to be small compared with the background "noise" of natural climate variability. Thus, particular attention to the quality and consistency of observations is needed for monitoring. GCOS has developed a set of 20 Climate Monitoring Principles<sup>[6]</sup> for the collection, archival, and analysis of observations.



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<sup>[1]</sup>GCOS (2004): Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC, GCOS-92, October 2004. "IP-04" refers to this document which is currently being updated, resulting in a 2009 Implementation Plan (IP-09).  
<sup>[2]</sup>Australia, Belgium, Belize, Canada, Denmark, European Commission, Finland, France, Germany, Greece, Ireland, Italy, Japan, Lithuania, Netherlands, Poland, Portugal, Russia, Slovakia, Spain, Sri Lanka, Sweden, Switzerland, United Kingdom, United States  
<sup>[3]</sup>UNFCCC (2008): Report of the Subsidiary Body for Scientific and Technological Advice on its twenty-seventh session, held in Bali from 3 to 11 December 2007 (doc. FCCC/SBSTA/2007/16, para. 36); and UNFCCC (2006): Report of the Subsidiary Body for Scientific and Technological Advice on its twenty-third session, held at Montreal from 28 November to 6 December 2005 (doc. FCCC/SBSTA/2005/10, para. 94).  
<sup>[4]</sup>GCOS (2003): Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC, GCOS-82, April 2003.  
<sup>[5]</sup>GCOS (1995): Plan for the Global Climate Observing System (GCOS), Version 1.0, GCOS-14, May 1995.  
<sup>[6]</sup>http://www.wmo.int/pages/prog/gcos/index.php?name=monitoringprinciples; the ten basic principles (in paraphrased form) were adopted by the Conference of the Parties (COP) to the UNFCCC through decision 5/CP.5 at COP-5 in November 1999. This complete set of principles was adopted by the Congress of the World Meteorological Organization (WMO) through Resolution 9 (Cg-XIV) in May 2003; agreed by the Committee on Earth Observation Satellites (CEOS) at its 17th Plenary in November 2003; and adopted by COP through decision 11/CP.9 at COP-9 in December 2003.