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PROGRESS REPORTS

GCOS ADEQUACY REPORT

(Submitted by the GCOS Secretariat)

The UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA-15) endorsed the preparation of a Second Adequacy Report at its 15th session in Marrakech in November 2001. The objective of the Adequacy Report is to assess the adequacy of the global observing systems for climate to meet the observational needs in support of the Framework Convention on Climate Change. This progress report has been prepared by GCOS in collaboration with GOOS and GTOS.

SECOND REPORT ON THE ADEQUACY OF THE GLOBAL OBSERVING SYSTEM FOR CLIMATE

Prepared by the GCOS Secretariat for IPCC Plenary (Paris, 17-19 February 2003)

Background: At its third session in Kyoto in 1997, the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) requested that a report be prepared to assess the adequacy of the global observing systems for climate to meet the observational needs in support of the Convention. GCOS, in collaboration with GOOS and GTOS, prepared such a report ('Report on the Adequacy of the Global Climate Observing Systems' - GCOS-48, October 1998). The report was submitted to COP-4 in Buenos Aires in 1998 on behalf of the agencies participating in the Climate Agenda. COP-4 noted the report with appreciation and adopted Decision 14/CP.4 in support of research and systematic observation related to the Convention.

At its fifth session, COP adopted decision 5/CP.5, which, inter alia, invited all Parties to prepare detailed reports on systematic observation in accordance with reporting guidelines developed by GCOS and requested the UNFCCC Secretariat, in conjunction with the GCOS Secretariat, to synthesise and analyse the reports from the Parties. At its ninth session in September 2000, the GCOS Steering Committee (SC) requested the Secretariat to develop a second Adequacy Report, as a response to decision 5/CP.5. This report was to build on the information on systematic observations submitted by Parties in their National Communications to COP as well as other available information on climate observing systems and to involve scientific experts in the analysis.

The UNFCCC Subsidiary Body on Scientific and Technological Advice (SBSTA-15) endorsed the preparation of a Second Adequacy Report at its 15th session in Marrakech in November 2001. SBSTA also noted the need to complete the Second Adequacy Report in the shortest possible time to provide a framework for further work to improve global monitoring systems. It asked for an interim report (www.wmo.ch/web/gcos) on the synthesis and analysis of the national reports from Parties by June 2002 and for the final report by SBSTA-18 (June 2003) in order for it to be considered by COP-9.

OBJECTIVES AND PROCEDURE

The goals of the Second Adequacy Report are to:

- Determine what progress has been made in defining and implementing climate observing networks and systems since the First Adequacy Report prepared for COP-4 in 1998;
- Determine the degree to which these networks meet with scientific requirements and conform with associated observing principles;
- Assess how well current systems, together with planned improvements, will meet the needs of the Convention.

The report will:

- Be based on detailed reports and National Communications by Parties to the UNFCCC Conference of Parties;
- Utilise data and information on operational and research observing systems from all available sources;
- Draw upon a balanced range of scientific experts to develop the specific analyses;

- Take into account relevant COP decisions on capacity building, technology transfer and adaptation (SBSTA request);
- Incorporate an integrated approach to global climate observing systems, including the exploitation of new and emerging methods (SBSTA request).

Preparation of the report is under the overall direction of the GCOS Steering Committee (SC), acting through its Chairman and the Chairs of the GCOS Science Panels are responsible for organising the analyses in the report. Scientific experts, including those engaged in the work of the IPCC, were asked to assist in refining the objectives and defining the metrics for the analyses in light of the needs of the Convention. A draft report is available for open review on the GCOS homepage (www.wmo.ch/web/gcos).

KEY MILESTONES

1-3 July 2002 (Melbourne Australia): GCOS Science Panel chairs to finalise the information base and define critical questions for meeting with IPCC experts.

12-14 August 2002 (Boulder Colorado USA): Meeting with IPCC experts on needs of the Convention for observing systems as in the IPCC Third Assessment Report (TAR) and to develop appropriate metrics for adequacy analyses.

14-18 October 2002 (Farnham U.K): Meeting of authors to review, organise, and assemble initial adequacy analyses.

20 Dec 2002- 7 Mar 2003: Open comment period on the draft report to develop a consensus on the conclusions - e.g., GCOS homepage, presentations at international meetings. Available at www.wmo.ch/web/gcos

12-14 March (Geneva CH): Final review of report and consideration of comments.

April 2003 (Melbourne Australia): Approval of final report and recommendations to SBSTA 18 by GCOS SC.

June 2003 (Bonn Germany): Final report available for SBSTA-18

CONCLUSIONS

The report will contain a set of overall conclusions as well as conclusions for the three domains (Atmospheric, oceanic and terrestrial) and for crosscutting issues, such as satellites, data and reanalysis. Emerging from the conclusions and analyses will be a set of recommendations to the Parties, to the SBSTA and to the international agencies with interests in climate, which will be finalised at the GCOS Steering Committee meeting in early April 2003. A few exemplary conclusions are given below.

Overall Conclusions from the Second Adequacy Report

- Since the First Adequacy Report, significant improvements have occurred in the availability and use of satellite data in all domains.
- Reanalysis offers promise of improving data quality through integrating data from multiple sources.

- In all domains increased attention is needed to sustaining well-benchmarked products into the future with careful provision of overlaps when changes are made to the analysis techniques.
 - Adherence to the GCOS climate monitoring principles for both in-situ and satellite measurements would greatly improve the quality and range of data suitable for long term monitoring
 - The record of nations in exchanging climate data remains a major shortcoming for all domains; improving data exchange is one of the most cost-effective actions.
 - Improved national co-ordination for climate is needed in most countries.
- ⇒ For the terrestrial domain, an improved international infrastructure for developing standards for terrestrial data and products and for implementation is needed.
- Many measurements are supported by research funds, particularly in the oceanic and terrestrial domains.

Atmospheric Conclusions

- The continued decline in many in-situ atmospheric networks has occurred so that many regions do not have adequate data for climate analyses.
- Importance of the baseline surface network (GSN) and the upper air network (GUAN) was reaffirmed.
- Developing countries will need assistance to ensure global coverage of GSN and GUAN and to meet regional data needs for impact and adaptation analyses.
- Impact and vulnerability studies require access to daily and hourly observations.
- Extending the current reference network of detailed atmospheric composition to better determine sources and sinks and combining satellite and *in situ* aerosol measurements into products to monitor consequent radiative forcing are high priority improvements.

Oceanic Conclusions

- There has been significant improvements due to new satellite data, Argo and new international co-ordination (i.e., JCOMM). It has now been demonstrated that we can observe climate changes in the ocean at global scales.
- Despite this significant progress, ocean networks are not yet adequate to meet the needs of the Parties for most variables and in most regions of the planet.
- The overall recommendation will be to implement the internationally agreed initial ocean observing system for those variables that can be routinely and accurately observed at present, and continue R&D, pilot projects and observing system design for other key ocean climate variables that cannot be routinely observed at present.

Terrestrial Conclusions

- The global terrestrial observing system for climate remains the least well developed whilst its significance for science, impact and mitigation increases.
- Progress is being made on Infrastructure to co-ordinate collection of data for key in-situ variables.
- Space agencies now provide observations for some variables on an increasingly routine basis.
- Major deficiencies exist in observations related to the carbon and water cycles, including: observations of carbon storage and fluxes; validation of satellite observations using internationally agreed standards; and adequacy of the Global Terrestrial Networks, e.g., GTN-G (glaciers); GTN-P (permafrost), GTN-H (hydrology).