

**G** GLOBAL  
**C** CLIMATE  
**O** OBSERVING  
**S** SYSTEM



WORLD METEOROLOGICAL  
ORGANIZATION

INTERGOVERNMENTAL  
OCEANOGRAPHIC COMMISSION

**SUMMARY REPORT OF THE TWELFTH SESSION OF THE**

**WMO-IOC-UNEP-ICSU  
STEERING COMMITTEE  
FOR GCOS**

**(Geneva, Switzerland, 15-18 March 2004)**

**GCOS - 91**

**(WMO/TD No. 1221)**

UNITED NATIONS  
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SCIENCE

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## **TABLE OF CONTENTS**

<b>SUMMARY OF THE SESSION</b>	<b>1</b>
<b>CONSOLIDATED LIST OF CONCLUSIONS, RECOMMENDATIONS AND ACTION ITEMS</b>	<b>3</b>
<b>ANNEXES:</b>	<b>9</b>
<b>I. LIST OF PARTICIPANTS</b>	
<b>II. AGENDA</b>	
<b>III. LIST OF DOCUMENTS</b>	
<b>IV. REPORT OF THE DIRECTOR, GCOS SECRETARIAT</b>	
<b>V. CONCLUSIONS FROM SBSTA/COP SESSIONS SINCE SC-XI</b>	
<b>VI. REPORT OF THE CHAIRMAN, GCOS STEERING COMMITTEE</b>	
<b>VII. STATUS OF GSN AND GUAN STATION REVITALIZATION ACTIVITIES</b>	
<b>VIII. GCOS-WCRP AGREEMENT REGARDING THE BSRN</b>	
<b>IX. CHAIRMAN'S SUMMARY, OOPC</b>	
<b>X. REPORT OF THE CHAIRMAN, TOPC</b>	
<b>XI. GCOS COOPERATION MECHANISM</b>	
<b>XII. GCOS REGIONAL WORKSHOP PROGRAMME - UPDATE</b>	
<b>GCOS LIST OF ACRONYMS</b>	
<b>GCOS LIST OF PUBLICATIONS</b>	

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## **SUMMARY OF THE SESSION**

The Twelfth Session of the Global Climate Observing System (GCOS) Steering Committee (SC) was held at the Headquarters of the World Meteorological Organization (WMO) in Geneva, Switzerland from 15-18 March 2004. This summary provides a brief overview of the session. The Consolidated List of Conclusions, Recommendations and Action Items agreed at the meeting is presented below. Details from some of the documents presented and discussed at the session, and which led to these conclusions, are presented as Annexes to this report.

The session was held under the chairmanship of Professor Paul Mason, Chairman of the GCOS SC. The list of participants is given as Annex I and the Agenda as Annex II. Annex III is the list of documents for the meeting. Key issues for discussion included: (1) GCOS activities in support of the United Nations Framework Convention on Climate Change (UNFCCC), including review of the draft *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC*; (2) status and activities of the GCOS science panels; (3) establishment of a GCOS funding mechanism; and (4) review of the GCOS Regional Workshop Programme.

### **REPORT OF THE DIRECTOR, GCOS SECRETARIAT**

Dr Alan Thomas, Director of the GCOS Secretariat, summarized the activities of GCOS, and especially the GCOS Secretariat, since SC-XI in April 2003. These focussed on continuing implementation and further planning of the GCOS baseline networks; continuing interactions with the UNFCCC, especially development of the Implementation Plan; and mobilization of resources needed for operating the GCOS Secretariat and for improving the baseline networks. Details of Dr Thomas's presentation are given in Annex IV. Annex V presents the GCOS-relevant decisions taken by the UNFCCC and its bodies since SC-XI.

### **REPORT OF THE CHAIRMAN, GCOS STEERING COMMITTEE**

Professor Mason reviewed his perspectives on activities in the GCOS programme since SC-XI and highlighted a number of the questions and issues on which he would be seeking the views and advice of the committee at this session (Annex VI).

### **GCOS IMPLEMENTATION PLAN**

UNFCCC/COP-9 had endorsed the *Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC* and requested that GCOS lead the development of an implementation plan to address the needs identified in the report. The SC reviewed the latest draft of the Implementation Plan in preparation for its submission to SBSTA-21/COP-10 and endorsed the approach being taken in its development.

### **SCIENCE PANEL REPORTS**

#### **AOPC:**

Dr Mike Manton, Chairman of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), reviewed the main activities of the AOPC since SC-XI. These included the Ninth Session of the Panel, held in Asheville, USA from 23-26 June 2003. A main focus of the group's activities had been implementation issues for the GSN and the GUAN (see Annex VII for a summary of station revitalization activities). An agreement to designate the WCRP/GEWEX Baseline Surface Radiation Network as the 'GCOS global baseline surface radiation network' had been developed and was endorsed by the SC at this session (see

Annex VIII). Efforts had been undertaken to more fully engage the atmospheric composition community in activities of the Panel. Other activities of the AOPC were reviewed and discussed and led to the conclusions and recommendations in the consolidated list below.

#### **OOPC:**

Dr Ed Harrison, Chairman of the GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC), reviewed the main activities of the OOPC since SC-XI, including highlights of the Eighth Session of the Panel held in Ottawa, Canada in September 2003. A brief summary report is presented as Annex IX.

#### **TOPC:**

Dr Alan Belward, Chairman of the GCOS/GTOS Terrestrial Observation Panel for Climate (TOPC), reviewed the main activities of the TOPC since SC-XI, including the results of the Seventh Session of the Panel in Rome, Italy from 16-18 December 2003. A summary report of his presentation is given in Annex X.

#### **GCOS COOPERATION MECHANISM**

In response to requests from the UNFCCC/SBSTA and endorsement by the Steering Committee, investigations had continued into the possible establishment of a GCOS donor fund or similar voluntary funding mechanism which would assist UNFCCC Parties to meet their commitments in respect of systematic observation through national support for the high-priority components of GCOS. A high-level meeting of potential donors, hosted by the US National Oceanic and Atmospheric Administration in Washington, USA in October 2003, had developed the concept of a GCOS Cooperation Mechanism, with Terms of Reference as presented in Annex XI. These were endorsed by the SC at this session.

#### **GCOS REGIONAL WORKSHOP PROGRAMME**

The session reviewed, and reiterated its support for, the GCOS Regional Workshop Programme (see Annex XII for programme update). Six of the planned ten workshops had been held to date, with the next workshop, for Central Asian countries, to be held in Almaty, Kazakhstan in May 2004.

#### **NEXT MEETING**

It was agreed that the Thirteenth Session of the SC should be held in the March-April 2005 time frame, with exact dates and venue to be confirmed as soon as feasible (subsequently agreed as 5-8 October 2005 in St Petersburg, Russian Federation).

**CONSOLIDATED LIST OF CONCLUSIONS,  
RECOMMENDATIONS AND ACTION ITEMS**

**UNFCCC and Implementation Plan**

1. The SC noted with satisfaction the continuing interactions between GCOS and the UNFCCC Conference of the Parties (COP) and its subsidiary bodies. It welcomed the decisions relating to systematic observation that had been taken by COP at its ninth session, noting in particular decision 11/CP.9 on Global observing systems for climate. The SC reiterated its endorsement of the GCOS strategy of engaging the UNFCCC in support of GCOS objectives and **requested** that it be continued.
2. The SC welcomed the progress that had been made in developing a draft of the GCOS Implementation Plan under the leadership of the SC Chairman and with the strong support of the Panels and their chairmen as well as the Secretariat. It **endorsed** the approach currently being followed and looked forward to reviewing a final version of the plan before its submission to the UNFCCC COP at its tenth session in December 2004. The SC emphasized the importance of the Executive Summary for the plan, as well as the statement of conveyance of the full document to COP, and **requested** that initial drafts of these documents be made available to the SC for review by early July.

**GCOS Cooperation Mechanism**

3. The SC **endorsed** the establishment of the GCOS Cooperation Mechanism and Terms of Reference as proposed<sup>1</sup> as an initial step in promoting multi-governmental support for GCOS. It expressed its appreciation to Australia for leading efforts to establish such a mechanism and to the US/NOAA for hosting the 2003 organizing meeting requested by SC-XI, as well as to the UK for its offer to host the inaugural meeting of the GCOS Cooperation Board. The SC **requested** that efforts continue to encourage additional countries to participate in the mechanism for supporting GCOS global activities.

**AOPC**

4. The SC commended the efforts of the *ad-hoc* WCRP-GCOS working group on BSRN in developing a formal agreement defining the terms under which BSRN would be designated as the GCOS global baseline surface radiation network. It noted with satisfaction the state-of-the-art radiation observations being taken and archived through the BSRN programme and the objective of the organizers and participants to continue its operations on a long-term basis. The SC also noted the commitment of the BSRN to adhere to the GCOS Climate Monitoring Principles to the maximum extent possible, and the possibility that some BSRN sites might evolve into GCOS reference sites for co-located measurements of several essential climate variables. The SC **endorsed** the agreement<sup>2</sup> and encouraged the AOPC to maintain appropriate links with BSRN to ensure that GCOS global needs are met.
5. The SC welcomed the progress being achieved in improving the performance of the GCOS Surface and Upper-Air Networks through the directed implementation activities of a Project Officer in the GCOS Secretariat. It expressed its strong appreciation to the USA, through its US National GCOS Programme, for the leadership and support they were providing for this effort, as well as to Australia, New Zealand, the UK, and other GCOS partners who were assisting in the station revitalization process. The SC noted that this progress was very

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<sup>1</sup> See Annex XI of this report.

<sup>2</sup> See Annex VIII of this report.

helpful in demonstrating the benefits of such an approach to other potential supporters and donors. The SC **endorsed** the strategy of GCOS using a project officer to liaise with relevant agencies to ensure the development and maintenance of GCOS networks and systems.

6. The SC expressed its appreciation to DWD, JMA, UK Met Office, ECMWF and NCDC for their continuing support for the GSN and GUAN monitoring and analysis centres. It also thanked JMA and NCDC for further extending their support through their new role as CBS Lead Centres for GCOS Data.
7. The SC noted the value of detailed time series of network performance indicators for GSN and GUAN and thanked NCDC for its commitment to the continuing production of these indicators.
8. The SC noted the continuing lack of historical daily GSN data in the GSN Archive (WDC-Asheville) and **urged** WMO Members to respond to the request from the Secretary General for these data to be provided to the archive.
9. The SC noted with concern the pending change in Vaisala radiosondes which could disrupt the homogeneity of the upper-air climate record, as has happened on past occasions, and welcomed ongoing CBS and CIMO efforts to resolve these potential homogeneity problems.
10. The SC noted the difficulty being encountered by many operators of GUAN stations in reaching the 5-hPa level for routine balloon releases. The SC also noted the recommendation from the Second Adequacy Report that the current very limited network of stations taking high-quality water vapour profiles to high levels be expanded. Recognizing that the length and time scales of variations above the tropopause are greater than those below, the SC **encouraged** the AOPC to continue to investigate the value and feasibility of selecting a subset of GUAN to provide routine high-quality water vapour data and routine observations to 5 hPa.
11. The SC, noting the plans for satellite agencies to implement a sparse global upper-air network to provide calibration data for meteorological satellites, **encouraged** the AOPC to liaise with the relevant agencies to optimise the use of GUAN facilities in support of this activity.
12. The SC noted the initiatives of the AOPC to establish effective links with the activities of the US and other countries toward reconciling the surface and free atmosphere temperature trends, and **encouraged** it to continue these activities.
13. The SC noted the substantial progress on satellite issues being made by AOPC following the designation by satellite agencies of specific satellite experts to the Panel, and expressed its appreciation to those agencies for their support in this regard.
14. The SC noted with satisfaction the progress by AOPC in establishing contact with the science community associated with climate forcing, especially regarding the measurement of atmospheric constituents. It **urged** AOPC to enhance those links in its efforts to identify and consolidate baseline systems relating to atmospheric constituents.
15. The SC noted with satisfaction the initiative of AOPC to liaise with the three global reanalysis centres in Europe, USA and Japan regarding optimization of the overall outcomes from these major undertakings, and **recommended** that AOPC should work closely with WCRP on this task.

16. The SC reiterated the importance of making GCOS baseline observations and products freely available through a World Data Centre or other international data centre as these data become routinely collected for each Essential Climate Variable.

## OOPC

17. The SC commended the progress in the ocean community's capability for monitoring the status of its recommended real-time observing system, and thanked the supporters of JCOMMOPS and other monitoring activities for their efforts in this regard.
18. The SC thanked the WCRP for its partnership in planning the global ocean observing system for climate, noting in particular the decision to send CLIVAR basin panel representatives *ex-officio* to OOPC meetings, as well as the participation of a CliC representative in OOPC-8.
19. The SC reiterated its **endorsement** of the ocean domain 'Next Steps' towards the initial ocean observing system for climate, and agreed to continue its advocacy on behalf of the various components of this ocean community initiative.
20. The SC noted the continuing absence of historical and contemporary tide gauge data at many of the GLOSS Core Network stations and **urged** IOC member states responsible for the designated climate network stations to make these data available to the Permanent Service for Mean Sea Level (PSMSL).
21. The SC welcomed the continuing progress of the Global Ocean Data Assimilation Experiment (GODAE), including its plans to organize a second GODAE Symposium and a GODAE Summer School (as a capacity-building project).
22. The SC noted the continuing work on development of a strategy for evaluating the effectiveness of the current ocean observing system, as well as the evolution of ocean domain recommendations, through indices of the state of the ocean climate. It **encouraged** OOPC and AOPC to continue collaboration on the development of indices for marine surface climate.
23. The SC noted the importance of research community contributions to the ocean observing system through sustained collection of required observations, development of new technology to enhance the effectiveness and comprehensiveness of the system, and identification of scientifically useful indices and products derived from the system.

## TOPC

24. The SC noted the summary of developments and progress in activities of the TOPC and **encouraged** the Panel to continue its current strategies. It welcomed in particular the ongoing cooperation between TOPC and the Coordination Group for Meteorological Satellites (CGMS) in the pilot programme to generate climate-quality global surface albedo maps from geostationary meteorological satellites.
25. The SC reiterated the need to establish a mechanism for developing common guidance materials, standards and procedures for terrestrial observations, recalling the request for such a mechanism from WMO Fourteenth Congress and COP decision 11/CP.9. It welcomed the plans of TOPC to consider the modalities and terms of reference for such a mechanism at its next session. The SC nevertheless recognized the considerable time that would be required to complete the establishment of such a mechanism, and the urgent existing need for terrestrial standards. The SC therefore **requested** the TOPC to consider what standards or structures could be utilized in the interim period and to recommend what actions could be taken to encourage the widespread use of such interim standards.

## GOSIC

26. The SC noted the results of the 2003 review of GOSIC. It recognized the benefits for access to research data sets provided by GOSIC, but saw the description and recognition of the global data and monitoring centres as the priority way forward. The SC **requested** the Secretariat to give high priority to updating the GCOS Web site, including coordination of its links with GOSIC. The SC expressed its appreciation to Howard Diamond for having led the effort to address the GOSIC issue on behalf of GCOS and noted the intention of the US/NOAA to take on responsibility for the operation of GOSIC in the longer term.

## Satellite Issues

27. The SC noted the establishment by WMO Congress of a major Space Programme dedicated to supporting the needs of all WMO and WMO-sponsored programmes, including GCOS and WCRP. It also noted the formal institutionalisation of the WMO Consultative Meetings on High-Level Policy on Satellite Matters, noting with satisfaction that the membership of GCOS (and WCRP) on this body would be of additional benefit in coordination and communication with the satellite agencies.
28. The SC noted the efforts that had been undertaken by WCRP to define and prioritise its needs for space-based observations through an *ad-hoc* Working Group on Satellites, and was pleased that GCOS had participated in the activities of the group through representatives of some of its panels. It noted also the transition of this group into a Working Group on Observations and Assimilation under the new WCRP COPE structure and the plans for developing homogeneous climate products that incorporated currently-available satellite data sets. The SC emphasized the importance of the research needed to ensure the long-term quality and consistency of such products and **requested** the panels to maintain liaison with WCRP in these activities.
29. The SC welcomed the continuing cooperation between GCOS and the CGMS through the AOPC and the WMO Space Programme. It noted with appreciation the efforts and plans of the satellite operators to adhere to the GCOS Climate Monitoring Principles, as well as the ongoing activities and intentions of CGMS members towards generating many of the integrated global climate products identified in the Second Adequacy Report.
30. The SC noted the planned meeting, being organized by EUMETSAT and the Satellite Applications Facility (SAF) on Climate Monitoring, to review the SAF activities with a view to improving its ability to meet GCOS needs for integrated global climate products. The SC welcomed the invitation to provide advice on this activity and noted with satisfaction the plans of the organizers to encourage the participation of other space agencies. The SC **requested** the Panels to ensure appropriate representation of GCOS interests and needs at this review.

## Regional Workshop Programme

31. The SC welcomed the progress in the GCOS Regional Workshop Programme (RWP), noting the completion of two additional workshops since SC-XI and progress in developing the associated Regional Action Plans (RAPs) that are a component of the RWP. It noted with concern, however, the difficulties being encountered by regions in implementing projects that had been defined in the various RAPs, due in large part to the problem of securing the needed project funding and also to the difficulty in identifying appropriate lead individuals or agencies in some regions. The SC **recommended** that all possible steps be taken to help regions identify sources of support for the global network components of the RAPs, including through the GCOS Cooperation Mechanism.

32. The SC, noting the anticipated completion of the full series of ten regional workshops in 2005, **requested** that the Secretariat prepare a prospectus for follow-on activities to the RWP for review at its next session.
33. The SC **requested** the Secretariat to ensure that the outcomes of the RWPs and RAPs were adequately taken into account in the development of the GCOS Implementation Plan.
34. The SC welcomed the major progress that was being achieved in implementing the RAP in the Pacific Islands region and expressed its strong appreciation to the regional partners who were contributing to this progress. It **requested** that the GCOS Secretariat, in consultation with the US GCOS National Coordinator, develop a framework or set of best practices that could serve as a template or guideline for other regions in seeking to support GCOS needs.
35. The SC **requested** that the GCOS Web site be updated regularly with the latest status of the RWs and RAPs in each region.

### **Links with Partners, National Activities**

36. The SC noted the review of activities being carried out under the Earth Observation Summit/Group on Earth Observations (GEO) initiative, including the plans for developing a 10-year implementation plan for a Global Earth Observation System of Systems (GEOSS). It also noted that COP decision 11/CP-9 had invited GCOS and GEO to collaborate closely in developing their respective implementation plans. The SC **confirmed** the need for GCOS to be involved in GEO activities. It supported the approach being followed by the SC Chairman and the Secretariat of sharing responsibilities in this regard with representatives of WCRP and WMO through participation in selected GEO sub-groups, as well as in the GEO and Earth Observation Summit sessions.
37. The SC welcomed the presentation by Dr Anver Ghazi on the EC climate change research programme, noting in particular its objective of supporting activities related to systematic observation of the climate system and the valuable contributions being provided through the EC's Joint Research Centre. It **requested** the Secretariat, in cooperation with Dr Johannessen, to explore the possibility of establishing support for the GCOS programme through this mechanism.
38. The SC welcomed progress in the joint EC-ESA Global Monitoring for Environment and Security (GMES) initiative, noting that the planned programme will provide a sound foundation for long-term operational monitoring of many ECVs and associated global climate products, as well as for extending the scope of reanalyses. The SC **requested** the Secretariat to establish appropriate liaison with the new GMES unit in the EC structure.
39. The SC welcomed the review of US/NOAA Climate Programme activities presented by Dr Koblinsky and Mr Diamond, including those which were providing direct and ongoing support for GCOS networks. It also welcomed the resources being provided by the US for establishment of regional maintenance centres in support of observational activities in developing-country regions. The SC reiterated its strong appreciation for this support and looked forward to continuing cooperation in these efforts.
40. The SC noted the updates on national GCOS activities presented by representatives from several countries (Canada, China, Germany, Japan, Norway, Russian Federation) and welcomed the substantial progress being made in many areas. It noted in particular the restructuring and extension of the GSN networks in Canada and the Russian Federation in northern regions. The SC also extended special appreciation to Germany for its support for a Junior Professional Officer in the GCOS Secretariat, noting that this would be of enormous assistance in carrying out increasing demands being placed on the Secretariat.

41. The SC noted that Mr Dennis Tirpak would be retiring from his position in the UNFCCC Secretariat within the coming months. It expressed its sincere appreciation to Mr Tirpak for his strong support for GCOS and GCOS objectives during his tenure.

### **Other**

42. The SC **endorsed** the suggestion that a GCOS international implementation symposium should be held in 2006, following completion and acceptance of the GCOS Implementation Plan. Such a symposium would focus on global observing system implementation issues associated with the Second Adequacy Report, the Implementation Plan and the GCOS Regional Action Plans and would provide a forum for observing system managers from all climate system domains to consolidate their efforts in support of GCOS implementation. The symposium would also target capacity building as one of its main outcomes. The SC **requested** that an *ad-hoc* steering group be established in 2004, including the SC Chairman, the Panel Chairmen and Dr Johannessen, to prepare a prospectus and promote support for such a symposium.
43. The SC reiterated the importance of establishing national coordinators in as many countries as possible to facilitate the coordination of, and communication with, GCOS activities in each country, noting the benefits to both GCOS and the country itself. It **requested** that this need be clearly identified in the Implementation Plan.
44. The SC reviewed the updated draft of the GCOS Memorandum of Understanding (MOU) and **agreed** that it continued to represent the activities intended for the GCOS programme. It furthermore **requested** that the Secretariat continue seeking the agreement of the UN FAO to become a cosponsor of GCOS in the process of completing renewal of the current Memorandum of Understanding.
45. The SC recognized the continuing and urgent need for support in the GCOS Secretariat in order for it to meet the demands now being placed upon it. It **requested** the Secretariat to prepare a clear and simple budget for planned activities which could be used to assist in identifying sources of such support. It also **requested** the Secretariat to pursue the possibility of attracting additional support through the WMO Junior Professional Officer mechanism. The SC further **requested** that all SC members investigate other possible sources of support from within their countries and/or domains of activity.
46. The SC **agreed** that its Thirteenth Session should be held in the March-April 2005 time frame, and welcomed the suggestions from Kenya and the Russian Federation for possibly hosting the session. Confirmation of the venue and exact dates would be provided to Members as soon as feasible.
47. The SC noted that the Director of the GCOS Secretariat would be leaving his position prior to the next session of the committee. The Committee expressed its sincere appreciation to Dr Thomas for his great efforts and valuable contribution to GCOS during his tenure and for the major progress that had been achieved.

## **ANNEXES**

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## ANNEX I

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## ANNEX II

# Agenda

### MONDAY 15 MARCH

09:30 – 12:30

**1. Opening of the Session**

- 1.1 Welcome and Introductions (*WMO/SG, Mason*)
- 1.2 Approval of Agenda (*Mason*)
- 1.3 Conduct of the Meeting (*Secretariat*)
- 1.4 Review of SC-XI Actions and Matters Arising (*Teunissen*)

**2. Report of the Director, GCOS Secretariat (*Thomas*)**

- Overview of Activities since SC-XI
- SBSTA-18, SBSTA-19/COP-9 decisions
- Secretariat issues

**3. Report of the Chairman, GCOS Steering Committee (*Mason*)**

- Overview of issues – Chairman's perspectives
- 2AR Developments, Follow-on
- Key issues for meeting

**4. Implementation Plan for Climate Observing Systems (I) (*Mason*)**

- Overview of draft report

12:30 – 14:00            **LUNCH**

14:00 – 17:30

**5. GCOS Panel Reports**

- 5.1 Report of the Atmospheric Observation Panel for Climate (*Manton*)
  - Overview of panel activities
  - BSRN-GCOS Agreement (*Manton/Teunissen*)
  - Station revitalization activities (*Thigpen*)

**17:30**            **RECEPTION – WMO ATTIQUE**

### TUESDAY 16 MARCH

09:00 - 12:30

**5. GCOS Panel Reports (*continued*)**

- 5.2 Report of the Ocean Observations Panel for Climate (*Harrison*)
  - Overview of panel activities
- 5.3 Report of the Terrestrial Observation Panel for Climate (*Belward*)
  - Overview of panel activities

12:30 - 14:00

**LUNCH**

14:00 - 17:30

**6. Cross-Cutting Issues**

6.1 Space and Satellite Issues

- CEOS (*Mason*)
- Fourth Session of WMO Consultative Meetings on High-Level Policy on Satellite Matters (*Mason*)
- WCRP Satellite Observation Requirements (*Sommeria*)
- Satellite Applications Facility (SAF) on Climate Monitoring (*Williams*)
- WMO Space Programme (*Hinsman*)
- CGMS (*Hinsman*)

6.2 Data Management Issues

- GOSIC (*Diamond*)
- Designation of real-time monitoring, data and product centres
- Integrated Climate Products

**7. Earth Observation Summit/GEOSS Initiative (*Hinsman*)**

**WEDNESDAY 17 MARCH**

09:00 – 12:30

**8. GCOS Cooperation Mechanism (*Thomas/Mason*)**

- October 2003 meeting
- Terms of Reference

**9. GCOS Regional Workshop Programme (*Westermeyer*)**

- Assessment of completed workshops (6)
- Plans for remaining workshops (4)  
(Central Asia, South and Southwest Asia, Eastern and Central Europe, Mediterranean Basin)
- Pacific Islands GCOS Programme (*Diamond*)
- Evolution of programme
- Resource mobilization for implementation

12:30 - 14:00

**LUNCH**

14:00 - 17:30

**4. Implementation Plan for Climate Observing Systems (II) (*Mason*)**

- Conveyance statement from SC

**10. National GCOS Activities**

- National/Regional programmes (e.g. USCCRP, GMES, .....)

**THURSDAY 18 MARCH**

09:00 - 12:30

**11. GCOS Strategy and Implementation (*Secretariat*)**

- GCOS programme implementation
- GCOS Secretariat resources
- GCOS MOU

**12. Links with GCOS Partners**

12.1 GCOS Sponsors: WMO, IOC, UNEP, ICSU

12.2 Other Programmes / Entities

- GOOS, GTOS
- CEOS
- IGOS
- WCRP, IGBP, IPCC
- UNFCCC and SBSTA/SBI

12:30 - 14:00

**LUNCH**

14:00 – 17:00

**13. Actions to be undertaken by the GCOS Secretariat**

13.1 Review of Meeting Decisions (*Mason/Teunissen*)

13.2 Summary of Priorities (*Mason*)

**14. Other Business**

14.1 Arrangements for SC-XIII (suggestions from Members)

14.2 Steering Committee Membership (*In Camera*)

**15. Close of the Session**

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## ANNEX III

### LIST OF DOCUMENTS

Document No.	Agenda Item	Description
1	1.2	Provisional Agenda
2	1.2	Explanatory Memorandum
3	1.4	SC-XI Action Items
4	2	Report of the Director, GCOS Secretariat
5	2	Conclusions from SBSTA/COP Sessions
6	3	Report of the Chairman, GCOS SC
7	4	Draft Implementation Plan
8	5.1	Report of the Chairman, AOPC
9	5.1	GCOS-WCRP Agreement re BSRN
10	5.1	Station Revitalization Activities
11	5.2	Report of the Chairman, OOPC
12	5.3	Report of the Chairman, TOPC
13	6.1	WMO Consultative Meetings on High-Level Policy on Satellite Matters
14	6.1	WCRP Satellite observation Requirements
15	-	N/A
16	6.1	WMO Space Programme
17	6.2	GOSIC
18	7	Earth Observation Summit/GEOSS
19	8	GCOS Cooperation Mechanism
20	9	GCOS Regional Workshop Programme
21	9	Pacific Islands GCOS Programme
22	11	GCOS MOU
23	10	National Activity Report - Japan
24	6.1	CGMS-XXXI

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## ANNEX IV

### **Report of the Director, GCOS Secretariat**

The GCOS Secretariat has continued to move forward on the agreed strategy involving: (1) implementation and further planning of the GCOS Baseline Networks; (2) continued interactions with the United Nations Framework Convention on Climate Change (UNFCCC) and the GCOS Sponsors; and (3) resource mobilisation.

Major milestones during the past year include:

- Completion of the Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC (Second Adequacy Report);
- Adoption by the UNFCCC ninth Conference of the Parties (COP) of decision 11/CP.9 on global observing systems for climate, and continuing productive interaction with the Subsidiary Body on Scientific and Technological Advice (SBSTA) at its 18<sup>th</sup> and 19<sup>th</sup> sessions;
- Endorsement by the Fourteenth WMO Congress of the activities of GCOS as an essential activity in support of Governments, the WCP, the UNFCCC and other climate-related intergovernmental activities (Resolution 10 (Cg-XIV));
- Adoption of the GCOS Climate Monitoring Principles by Fourteenth WMO Congress (Resolution 9 (Cg-XIV) and further endorsement by COP-9 and CEOS;
- Progress in implementing the GCOS baseline networks and systems, especially for GUAN and Argo.
- Completion of Regional Workshops for South America and for Western and Central Africa;
- Initial agreement by a core group of countries on the Terms of Reference for a GCOS Cooperation Mechanism;
- Initiation of an effort to improve the baseline atmospheric networks, initially focusing on GUAN.

The achievement of these milestones owes much to the cooperative efforts of the many individuals who are dedicated to improving climate observing systems and the quality of applications dependent on high quality observations. In particular, I would like to acknowledge the superb efforts of Prof. Mason as Chairman of the Steering Committee and the Chairmen of the three science panels of GCOS - Drs. Manton, Harrison and Belward - for their initiative, dedication and great skill. There are many others, including the dedicated staff of the GCOS Secretariat.

#### **1. Implementation and further planning of the GCOS Baseline Networks**

The Chairs of the GCOS Science Panels will provide detailed discussions of the status of the planning and implementation, though a few highlights will be mentioned here.

GCOS continues to collaborate closely with its partner observing systems and relevant technical commissions, especially:

- the WMO Commission on Basic Systems, World Weather Watch (WWW) and the World Climate Programme (WCP) regarding the GSN and the GUAN;
- the World Climate Research Programme (WCRP) in the co-sponsorship of AOPC and OOPC and on a range issues, such as satellite requirements for climate;

- the WMO Global Atmosphere Watch (GAW) on atmospheric chemistry;
- the Global Terrestrial Observing system (GTOS) and the WMO Hydrology and Water Resources Programme (HWR) in progressing a Global Terrestrial Network for Hydrology (GTN-H);
- the Global Ocean Observing System and the WMO/IOC Joint Commission on Oceanography and Marine Meteorology on ocean networks and systems;
- Committee on Earth Observation Systems (CEOS), CGMS, and the WMO Space Programme regarding the satellite observations needed as part of an integrated global observing system for climate;
- Integrated Global Observing Strategy (IGOS) partners on the contribution of the IGOS themes to the GCOS Integrated Global Climate Products and ECVs.

Under the leadership of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), there has now been formal establishment of CBS Lead Centres for the GCOS Surface Network (Japan Meteorological Agency and the US National Climatic Data Centre - NCDC) and the GCOS Upper-Air Network (NCDC). These centres will work with the GCOS Monitoring and Analysis Centres (JMA, Deutscher Wetterdienst, ECMWF, the UK Met Office Hadley Centre and NCDC) and national focal points nominated by WMO Members to identify and ultimately resolve problems of non-receipt of CLIMAT and CLIMAT TEMP messages.

Several projects were initiated this year based on resources (both financial and in-kind) from several countries:

- Improvements in GUAN stations in developing countries are being undertaken, based on guidance provided by the AOPC Advisory Group on GSN and GUAN and the WWW and on detailed plans developed by a contractor, utilising financial support from the US Climate Change Research Initiative (CCRI) as well as in-kind support from Australia, New Zealand and the UK. Activities include acquisition and installation of hardware at a number of stations in high-priority regions (equatorial areas of Africa, South America and the small island developing states of the Pacific and Indian Oceans) and the bulk purchase of consumables.
- Support has also been provided by the US for aerosol measurements at several existing GAW stations, for establishment of a Dobson calibration and training centre in South America, and for regional data analysis workshops to improve the regional database for climate assessments.

Good progress is being made in establishing an operational ocean observing system for climate under the guidance of the GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC). Examples include the encouraging increase in commitments of Argo floats (over 1000 now deployed), as well as the implementing activities of the Global Ocean Data Assimilation Experiment (GODAE) and the efforts of the OOPC/AOPC Working Groups on Sea-Surface Temperature and on Surface Pressure.

GCOS/GTOS Terrestrial Observation Panel for Climate (TOPC) has progressed its analysis in defining the essential terrestrial climate variables and some key integrated terrestrial climate products. Global products based largely on the analyses of satellite data are being developed for Essential Climate Variables such as albedo, land cover, and fire disturbance.

## **2. Interactions with the UN Framework Convention on Climate Change (UNFCCC)**

The GCOS Secretariat continued its interaction with the UNFCCC/Conference of Parties (COP) and its Subsidiary Body for Scientific and Technological Advice (SBSTA) through participation in, and reporting to, the eighteenth and nineteenth sessions of SBSTA, the latter held in conjunction with COP-9 in Milan, Italy. SBSTA-18 held a pre-session meeting with the Parties to discuss the conclusions and issues arising from the Second Adequacy Report. Prof. Mason reported to the Parties on the findings of the Report and the GCOS Director discussed the adequacy process. The conclusions for SBSTA-18 noted that the Report "provides an opportunity to build momentum among governments to improve the global observing systems for climate". A concise summary of the Report's conclusions is attached at the end of this document.

SBSTA-19 also considered the Second Adequacy Report and the responses of the Parties to the Report, which had been synthesized by the GCOS Secretariat into a report to SBSTA. COP-9 adopted decision 11/CP.9, welcoming the Second Adequacy Report and, *inter alia*, requesting GCOS "to coordinate the development of a phased five- to ten-year implementation plan for the integrated global observing systems for climate, using a mix of high-quality satellite and *in situ* measurements, dedicated infrastructure and targeted capacity-building". The decision also requested that GCOS and the ad hoc Group on Earth Observations (GEO) collaborate closely in developing their respective implementation plans. Work has begun on the development of the GCOS plan and an early draft is being presented to the SC for discussion. COP-9 requested that the implementation plan be completed for submission to COP-10 in December 2004.

GCOS completed the regional workshops, and initiated regional action plans, for Western & Central Africa and for South America during 2003. These were the fifth and sixth of ten planned workshops in the GCOS Regional Workshop Programme (RWP). The Global Environment Facility (GEF) is providing significant support to the RWP as a part of the UNDP-GEF National Communications Support Programme. Additional support is being sought from individual donor countries and international organisations on a workshop-by-workshop basis. During 2004, workshops will be organized for the countries of Central Asia and for those in South and Southwest Asia.

## **3. Resource Mobilization**

SC-XI requested the GCOS Secretariat to facilitate the convening of a high-level meeting of potential donors to develop details of a GCOS Donor Fund and Donor Board and to provide an update of developments to SBSTA-19. Such a meeting was convened in October 2003 and hosted by the US National Oceanic and Atmospheric Administration. The discussions at and leading up to the meeting focused on a "cooperation mechanism", not a "donor centred" mechanism. At the meeting, attended also by representatives of the European Community and the Global Environment Facility (GEF), a core group of countries agreed on an initial Terms of Reference for a GCOS Cooperation Mechanism (GCM) and to establish such a mechanism through their common action.

The GCM is aimed at addressing priority improvements in atmospheric, oceanic and terrestrial observing systems for climate, especially in developing countries. It is intended to complement and work in cooperation with other funding and implementation mechanisms, especially the WMO Voluntary Cooperation Programme (VCP), in order to identify and make the most effective use of resources available for improving global observing systems for climate in developing countries. COP-9 decision 11/CP.9 urged Parties in a position to do so to

contribute to the GCM to support the priority needs identified in the Second Adequacy Report and regional action plans, especially in the least developed countries.

Resources for operation of the GCOS Secretariat are a continuing issue. The good news has been the provision of a Junior Professional Officer (JPO) from Germany to work at the GCOS Secretariat for two years (Dr Stephan Bojinski) who will work, *inter alia*, on issues related to data availability and access and to progressing the GTN-H. Disappointingly, the budget approved by WMO Congress for the years 2004 to 2007 reduced the discretionary financial contribution to GCOS by nearly 50%.

## SECOND REPORT ON THE ADEQUACY OF THE GLOBAL OBSERVING SYSTEMS FOR CLIMATE IN SUPPORT OF THE UNFCCC

### *Summary of Conclusions*

The Second Report on the Adequacy of the Global Observing Systems for Climate was prepared in response to a request from the GCOS Steering Committee and endorsement by the UNFCCC Subsidiary Body on Scientific and Technological Advice (SBSTA) at its 15<sup>th</sup> session in November 2001. The goals of the Report are to:

- Determine what progress has been made in implementing climate observing networks and systems since the First Adequacy Report in 1998;
- Determine the degree to which these systems meet with scientific requirements and conform with associated observing principles; and
- Assess how well the current systems, together with new and emerging methods of observation, will meet the needs of the Convention.

The Report concludes that there have been improvements in implementing the global observing systems for climate, especially in the use of satellite information and in the provision of some ocean observations. However, serious deficiencies remain in their ability to meet the identified needs. For example:

- Atmospheric networks are not operating with the required global coverage and quality;
- Ocean networks lack global coverage and commitment to sustained operation; and
- Global terrestrial networks remain to be fully implemented.

Based on the analysis in the Report, four overarching (and equally high priority) conclusions with accompanying recommendations for action have emerged.

1. **Data Exchange and Standards:** There is a need for intergovernmental and international agencies to sustain and strengthen existing intergovernmental mechanisms relating to climate data and products. In particular, for the terrestrial domain, there is a need to establish a mechanism to prepare guidance materials and develop agreements on standards and regulations for observing systems, data, and products. In all cases, adherence to the principles of free and unrestricted exchange of data should be strongly encouraged, particularly in relation to the designated Essential Climate Variables (see table below), which are both currently feasible for global implementation and have a high impact on UNFCCC requirements. Adherence to the GCOS Climate Monitoring Principles is an essential goal for all climate observations.

Domain	Essential Climate Variables
<b>Atmospheric</b> (over land, sea and ice)	<p><b>Surface:</b> Air temperature, Precipitation, Air pressure, Surface radiation budget, Wind speed and direction, Water vapour.</p> <p><b>Upper-air:</b> Earth radiation budget (including solar irradiance), Upper-air temperature (including MSU radiances), Wind speed and direction, Water vapour, Cloud properties.</p> <p><b>Composition:</b> Carbon dioxide, Methane, Ozone, Other long-lived greenhouse gases<sup>1</sup>, Aerosol properties.</p>
<b>Oceanic</b>	<p><b>Surface:</b> Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Current, Ocean colour (for biological activity), Carbon dioxide partial pressure.</p> <p><b>Sub-surface:</b> Temperature, Salinity, Current, Nutrients, Carbon, Ocean tracers, Phytoplankton.</p>
<b>Terrestrial</b>	River discharge, Water use, Ground water, Lake levels, Snow cover, Glaciers and ice caps, Permafrost and seasonally-frozen ground, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Biomass, Fire disturbance.

<sup>1</sup> Including nitrous oxide (N<sub>2</sub>O), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF<sub>6</sub>), and perfluorocarbons (PFCs).

2. **Integrated Global Climate Products:** Nations, in conjunction with the GCOS Sponsors and other international agencies, should institutionalize appropriate processes for generating and making available, on a sustained basis, a range of integrated climate-quality products relevant to the needs of the Convention, including those largely dependent upon satellite observations (see table below) and/or benefiting from the reanalysis of homogeneous historical data. In doing so, the relevant nations and intergovernmental agencies will need to address identified deficiencies in the underlying data and observing systems.

Domain	Variables largely dependent on satellite observations
<b>Atmospheric</b> (over land, sea and ice)	Precipitation, Earth radiation budget (including solar irradiance), Upper-air temperature (including MSU radiances), Wind speed and direction (especially over the oceans), Water vapour, Cloud properties, Carbon dioxide, Ozone, Aerosol properties.
<b>Oceanic</b>	Sea-surface temperature, Sea level, Sea ice, Ocean colour (for biological activity).
<b>Terrestrial</b>	Snow cover, Glaciers and ice caps, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (FAPAR), Fire disturbance.

3. **National Reporting to the UNFCCC:** SBSTA, in consultation with the GCOS Secretariat, should review the guidelines for national communications on research and systematic observation (Decision 4/CP.5) to include, *inter alia*, a specific requirement to report on the exchange of the Essential Climate Variables and associated products and on the submission of current and historical data and metadata to international data centres. All Parties are strongly urged to submit this information, as part of their national communications.
4. **Capacity-Building and System Improvements:** The full implementation of an integrated global observing system for climate, sustained on the basis of a mix of high-quality satellite and *in situ* measurements, dedicated infrastructure and targeted capacity-building, will require the strong commitment of all Nations. Furthermore, those Nations with the ability to do so are encouraged to contribute to a voluntary (non-UNFCCC) funding mechanism to support high-priority needs relating to global observing systems for climate in developing countries, especially the least developed countries, small island developing states, and some countries with economies in transition.

In addition, there is a continuing need for action on the priorities reflected in previous assessments and decisions, including:

- Full implementation of designated baseline observing systems;
- Rescue of historical data and metadata;
- Free and unrestricted exchange of data and their provision to international data centres;
- Development of national plans for systematic observation;
- Development and implementation of regional action plans for climate observing systems;
- Addressing the special needs of developing countries and some countries with economies in transition, particularly the least developed countries and the small island developing states;
- Use of climate data as input to decision-making processes.

## **ANNEX V**

### **Conclusions from SBSTA/COP Sessions since SC-XI**

This Annex presents the GCOS-relevant conclusions from the three sessions of the UNFCCC/COP and its subsidiaries that have occurred since GCOS SC-XI in April 2003 (i.e. SBSTA-18, SBSTA-19/COP-9 and SBI-19(para. 3)).

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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

Eighteenth session

Bonn, 4–13 June 2003

Agenda item 7

**RESEARCH AND SYSTEMATIC OBSERVATION**

**Draft conclusions proposed by the Chair**

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA) welcomed the *Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC* (second adequacy report)<sup>1</sup> prepared under the guidance of the Global Climate Observing System (GCOS) steering committee, and acknowledged the work of those involved in its preparation.
2. The SBSTA took note of document FCCC/SBSTA/2003/9 and welcomed the oral report of the Chair of the SBSTA on the exchange of views and the presentations given at the pre-sessional consultations organized by the secretariat.
3. The SBSTA noted that the second adequacy report provides an opportunity to build momentum among governments to improve the global observing systems for climate, but that work remains to be done to identify priorities for actions, to remedy deficiencies within the domain-based networks, and to estimate the cost implications. It noted that approaches to establishing these priorities should involve a wide range of user communities, and that the GCOS provides the global-scale context for regional and national activities.
4. The SBSTA noted that the GCOS steering committee report<sup>2</sup> to the SBSTA at its eighteenth session identified four overarching and equally high-priority recommendations relating to observing standards and data exchange, integrated global climate-quality products, capacity-building and systems improvements, and the issue of reporting by Parties, and agreed to consider these recommendations in its further work.
5. The SBSTA noted that there have been improvements and progress in implementing global observing systems for climate, especially in the use of satellite information and in the provision of some ocean observations. Many components of the global terrestrial networks are, however, still not fully implemented, the global ocean networks lack full coverage and commitment to sustained operation, and the global atmospheric networks are not operating with the required global coverage and quality.

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<sup>1</sup> Available as report no. GCOS-82 at <http://www.wmo.ch/web/gcos/gcoshome.html>

<sup>2</sup> "Report to SBSTA 18 from the GCOS steering committee regarding the Second Report on the Adequacy of the Global Observing Systems for Climate", available at <http://www.wmo.ch/web/gcos/gcoshome.html>

6. The SBSTA noted that the generation and exchange of high-quality data and products are essential to meeting the needs of the Convention. It urged Parties to address, as a high priority, the following two types of problem that affect the availability of data, as identified in the second adequacy report:

(a) Many data are not being collected or, if collected at the national level, are not being received by global data centres;

(b) Valuable historical data sets exist, but have not been digitized and quality-controlled.

7. To better understand the barriers to improving the receipt, at global data centres, of data from atmospheric and hydrological networks, the SBSTA invited the GCOS secretariat to prepare, in consultation with the World Meteorological Organization (WMO), an analysis of specific problems and of options to remedy them, for consideration by the SBSTA at its twentieth session. The SBSTA further invited the GCOS secretariat to comment, in its report, on the accessibility of data from global data centres.

8. The SBSTA also noted that the global observing systems for climate are not designed to meet all of the needs of the community concerned with climate change impacts. To address this and related issues, future planning activities by Parties and intergovernmental organizations should examine the potential to enhance links with, or establish, specialized networks in regions vulnerable to climate change.

9. The SBSTA requested Parties to submit, by 15 September 2003, views on the priorities for actions arising from the second adequacy report, with particular reference to the above-mentioned GCOS steering committee report to the SBSTA at its eighteenth session, as a further step towards the development by the GCOS secretariat of an implementation plan for integrated global observations for climate, and requested the secretariat to compile these submissions into a miscellaneous document. The SBSTA also requested the GCOS secretariat to prepare a synthesis of these submissions and to forward this synthesis to the secretariat for consideration by the SBSTA at its nineteenth session.

10. The SBSTA agreed to consider, at its nineteenth session, the draft decision contained in document FCCC/SBSTA/2003/L.4/Add.1, with the aim of forwarding it for adoption by the Conference of the Parties at its ninth session.

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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

Nineteenth session

Milan, 1–9 December 2003

Agenda item 7

RESEARCH AND SYSTEMATIC OBSERVATION

Draft conclusions proposed by the Chair

Addendum

RECOMMENDATION OF THE SUBSIDIARY BODY FOR SCIENTIFIC AND  
TECHNOLOGICAL ADVICE

The Subsidiary Body for Scientific and Technological Advice, at its nineteenth session, decided to forward the following draft decision for adoption by the Conference of the Parties at its ninth session:

**Draft decision -/CP.9 (this became Decision 11/CP.9)**

**Global observing systems for climate**

*The Conference of the Parties,*

*Recalling* Article 4.1(g)–(h) and Article 5 of the Convention,

*Further recalling* its decisions 14/CP.4 and 5/CP.5,

*Having considered* conclusions of the Subsidiary Body for Scientific and Technological Advice at its fifteenth, sixteenth, seventeenth and eighteenth sessions,

*Having considered and noted with appreciation* *The Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC* (second adequacy report),

*Recognizing* the importance of collaboration among the sponsoring agencies of the Global Climate Observing System,

*Recognizing further* the need for a clear definition of the long-term needs of the Convention and of the short-term priorities concerning the support of systematic observation and networks, in particular taking into account the needs of developing countries,

*Recognizing also* the value of indigenous knowledge in supplementing regional and national climate monitoring systems,

*Welcoming* the efforts of the ad hoc Group on Earth Observations to develop a 10-year implementation plan for a comprehensive, coordinated and sustained Earth observing system or systems,

*Welcoming further* the establishment of the Global Climate Observing System Cooperation Mechanism by Members of the sponsoring agencies of the Global Climate Observing System, under the guidance of the Global Climate Observing System steering committee, as well as the flexible approach that has been adopted to participation in the mechanism,

*Noting* that the Global Climate Observing System Cooperation Mechanism will address priority needs for improvements in global observing systems for climate in developing countries,

1. *Requests* Parties to review the second adequacy report within the context of their national capabilities and to consider what actions they can take individually, bilaterally, multilaterally and through coordinated international programmes to address the findings, noting, in particular:

- (a) The importance of maintaining the operation of baseline stations in the long term;
- (b) That homogeneous long-term climate records represent a national heritage and are necessary, inter alia, to improve the basis for climate assessment and adaptation measures;
- (c) The wealth of information that can be provided through the digitization, analysis and exchange of historical information;
- (d) The importance of adhering to applicable adopted principles of free and unrestricted exchange of data and products, especially with respect to the set of Essential Climate Variables as defined in the second adequacy report;
- (e) The value of reporting on such actions in national communications;

2. *Requests* the Global Climate Observing System secretariat, under the guidance of the Global Climate Observing System steering committee, taking into account international and intergovernmental mechanisms, to coordinate the development of a phased 5- to 10-year implementation plan for the integrated global observing systems for climate, using a mix of high-quality satellite and in situ measurements, dedicated infrastructure and targeted capacity-building, such a plan:

- (a) To draw on the second adequacy report and the views of Parties;
- (b) To take into consideration existing global, regional and national plans, programmes and initiatives, such as the Global Monitoring for Environment and Security programme and the Integrated Global Observing Strategy partnership;
- (c) To be based on extensive consultations with a broad and representative range of scientists and data users;
- (d) To include indicators for measuring its implementation;
- (e) To identify implementation priorities, resource requirements and funding options;

3. *Invites* the Global Climate Observing System secretariat and the ad hoc Group on Earth Observations to collaborate closely in developing their respective implementation plans;

4. *Invites* the ad hoc Group on Earth Observations to treat global climate monitoring as a priority and to adopt a balanced approach to the application of in situ and remote-sensing systems for climate monitoring;
5. *Invites* the Global Climate Observing System secretariat to provide a progress report on the development of the implementation plan to the Subsidiary Body for Scientific and Technological Advice, at its twentieth session;
6. *Requests* the Global Climate Observing System secretariat to conduct an open review of the implementation plan before its completion and to submit the final implementation plan to the Subsidiary Body for Scientific and Technological Advice, at its twenty-first session;
7. *Invites* Parties to participate actively in the above-mentioned review process;
8. *Invites* the sponsoring agencies of the Global Climate Observing System, and in particular those of the Global Terrestrial Observing System, in consultation with other international or intergovernmental agencies, as appropriate, to develop a framework for the preparation of guidance materials, standards and reporting guidelines for terrestrial observing systems for climate, and associated data and products, taking into consideration possible models, such as those of the World Meteorological Organization/Intergovernmental Oceanographic Commission Joint Commission for Oceanographic and Marine Meteorology, and to submit a progress report on this issue to the Conference of the Parties at its eleventh session;
9. *Invites* the relevant national entities, in cooperation with the sponsoring agencies of the Global Climate Observing System and other international and intergovernmental agencies, to make available on a sustained basis a range of integrated climate products relevant to the needs of the Convention, as identified in the second adequacy report;
10. *Invites* the Global Climate Observing System secretariat, in conjunction with the Global Ocean Observing System secretariat, to provide information to the Subsidiary Body for Scientific and Technological Advice, at its twenty-second session, on progress made towards implementing the initial ocean climate observing system;
11. *Requests* the Subsidiary Body for Implementation, when next reviewing the guidelines for the preparation of national communications:
  - (a) To incorporate into the guidelines the supplementary reporting format developed by a group of Parties and made available to the Subsidiary Body for Scientific and Technological Advice at its thirteenth session;
  - (b) To replace the “GCOS/GOOS/GTOS Climate Monitoring Principles”, annexed to decision 4/CP.5, with the modified set agreed by the World Meteorological Organization at its Fourteenth Congress and approved by the Committee on Earth Observation Satellites at its seventeenth plenary, to better reflect the needs and capabilities of the in situ and satellite monitoring communities;
12. *Encourages* all Parties to provide reports on systematic observation in accordance with the agreed reporting guidelines, in recognition of the importance of accurate, credible and comprehensive information on global observing systems for climate as a basis for planning and implementing priority improvements;
13. *Urges* Parties in a position to do so, in particular Parties included in Annex I to the Convention, to support, including by contributing to relevant funding mechanisms such as the Global Climate Observing System Cooperation Mechanism, the priority needs, identified in the second adequacy

report and regional action plans, in developing countries, especially the least developed countries and small island developing States, noting that filling the gaps in baseline atmospheric networks is an urgent need that should be met during the next two years;

14. *Requests* the Global Climate Observing System secretariat to include information on the operation of the Global Climate Observing System Cooperation Mechanism in its regular reports to the Conference of the Parties.

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SUBSIDIARY BODY FOR IMPLEMENTATION

Nineteenth session  
Milan, 1–9 December 2003  
Agenda item 4 (c)

FINANCIAL MECHANISM OF THE CONVENTION

ADDITIONAL GUIDANCE TO THE GLOBAL ENVIRONMENT FACILITY

**Recommendation by the Subsidiary Body for Implementation**

The Subsidiary Body for Implementation, at its nineteenth session, decided to recommend the following draft decision for adoption by the Conference of the Parties at its ninth session:

**Draft decision -/CP.9 (this became Decision 4/CP.9)**

**Additional guidance to an operating entity of the financial mechanism**

*The Conference of the Parties,*

*Recalling* Article 3, Article 4, paragraphs 1, 3, 4, 5, 7, 8 and 9, Article 9, paragraph 2 (c), Article 11, paragraphs 1 and 5, and Article 12, paragraphs 3 and 4, of the Convention,

*Recalling also* its decisions 13/CP.1, 7/CP.2, 10/CP.2, 11/CP.2, 12/CP.2, 9/CP.3, 1/CP.4, 2/CP.4, 4/CP.4, 6/CP.4, 8/CP.5, 9/CP.5, 10/CP.5, 2/CP.7, 3/CP.7, 4/CP.7, 6/CP.7, 7/CP.7, 5/CP.8, 7/CP.8, 9/CP.8 and 10/CP.8,

*Recalling further* that in accordance with decision 11/CP.1, the Conference of the Parties is to give guidance on policies, programme priorities and eligibility criteria to an operating entity of the financial mechanism,

1. *Decides* that the Global Environment Facility, as an operating entity of the financial mechanism, should:
  - (a) On matters relating to national communications:
    - (i) Closely monitor the performance of the global project to support the preparation of national communications, including its effectiveness and efficiency, and continue to ensure that implementation of this project is consistent with the guidance provided by the Conference of the Parties;

- (ii) Provide finance in a timely manner for the preparation of national communications by Parties not included in Annex I to the Convention (non-Annex I Parties) whose project activities are not covered by the global project;
  - (b) On matters relating to capacity-building:
    - (i) Continue to provide financial support to non-Annex I Parties, in accordance with decision 6/CP.7, for the implementation of the capacity-building framework annexed to decision 2/CP.7;
    - (ii) Take into account, in its work relating to the development of capacity-building performance indicators for the climate change focal area, the capacity-building framework annexed to decision 2/CP.7, and undertake this work in consultation with the Convention secretariat;
    - (iii) Provide financial support to countries with economies in transition, within its mandate, for the implementation of the capacity-building framework annexed to decision 3/CP.7;
  - (c) On matters relating to transfer of technology, continue to support enabling activities relating to technology needs assessments;
2. *Requests* the Global Environment Facility:
- (a) To continue its support for education, training and public awareness activities relating to climate change;
  - (b) To operationalize the new strategic priority in the climate change focal area (Piloting an operational approach to adaptation) as soon as possible;
  - (c) To include in its report to the Conference of the Parties at its tenth session information on specific steps undertaken to implement this decision;
3. *Invites* the Global Environment Facility to give appropriate consideration to addressing the priority needs identified by non-Annex I Parties in their regional action plans relating to global observing systems for climate, noting the existence of other bilateral and multilateral agencies and mechanisms that support global climate observing systems.

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## ANNEX VI

### **Report of the Chairman, GCOS Steering Committee**

#### Introduction

I am pleased to report to you, for the third time, as Chairman of this twelfth session of the GCOS Steering Committee (SC). I have tried to be as brief as possible in this report and to minimise overlap with the director's report.

Yet again this has been an extraordinarily busy but rewarding year, and both I and Alan Thomas have found it very difficult to fit all the needed activities into our schedules. Interactions with our sponsors and other bodies have involved all of our ongoing activities. We focussed on the completion and presentation the Second Adequacy Report, in particular to SBSTA-18 in June 2003. We reported on National comments in response to the Adequacy Report at SBSTA-19 in December 2003 and now of course are working to present and engage the many actions on GCOS and its sponsors within decision 11/CP9 of COP-9.

During the year I was able to attend AOPC, WMO Executive Council, SBSTA/COP, IOC Executive Council, WCCC 2003 (Moscow), the South America Regional Workshop, CEOS, the meeting to establish the GCOS Cooperation Mechanism, and the WMO Consultative Meeting on High Level Policy on Satellite Matters. I was also able to attend the first EO Summit and two GEO events. In addition I chaired the two meetings held to date to start work on the GCOS Implementation Plan (GIP). Whilst attending the AMS Annual meeting in a separate capacity, I was able to give presentations on the Adequacy Report. I would like to express appreciation for the UK support, which enabled this degree of engagement. More details of most of these meetings are covered in the Director's report and where needed in our agenda.

I would like to express my appreciation to Alan Thomas, the GCOS staff in Geneva, and the Panel Chairs for their equally great efforts during the year. Particular thanks are also due to the USA for their specific financial support of the Adequacy Report preparation and its immediate follow on.

In conclusion I have found this a rewarding year for GCOS. We are now faced with the challenges and opportunities of taking forward a wide range of initiatives.

#### Resources

During the past two years, GCOS, for the first time in many years, has had sufficient resources both to see through the Adequacy Report and immediate follow-on activities, and at the same time to enable core activities to proceed, subject to separate availability of manpower. It has also enabled needed contractor support to be engaged. This most welcome funding position has arisen from the key donations of the USA, UK, Japan, and EUMETSAT. These blocks of funding are coming to an end, however, and the future of GCOS now depends critically on continuation of support.

Separate from the external funding support received last year, the GCOS discretionary funding from WMO has suffered a decrease of nearly 50%. The limited overall funding in WMO inevitably raises a tension between the core requirement of WMO to support the WWW, and the more broadly-based programmes like GCOS. As noted before, to be viable, programmes such as GCOS have to obtain extra-budgetary contributions.

In terms of required resources, the need I raised last year for at least one additional permanent post within the GCOS Secretariat still remains; the Secretariat staffing still reflects its early stage of strategy development, rather than the current one of engagement. I do welcome the contribution from Germany of a Junior Professional Officer, who started in February 2004 for 2 years.

### National Implementation, the UNFCCC, and the EO/GEO

The Regional Workshops are proceeding to schedule and I have been pleased at the increased attention given in recent workshops to giving good advice on the subject of bidding for resources, both within one's own country and with donors and the international bodies such as GEF. In the long run these skills are essential to grow or maintain both national and donor support.

Interactions with the UNFCCC were, as already noted, very substantial and I think effective, within the limits of achievement appropriate to the Convention. I was especially encouraged by the National comments on the Adequacy Report, which were requested by SBSTA-18 and were reported to SBSTA-19.

The advent of the EO Summit, together with its supporting GEO activity towards implementation, provides a mechanism for further engagement at the Ministerial level. GCOS has endeavoured, with UNFCCC encouragement and through links with WCRP, to ensure that climate is given its fair balance of attention and priority within EO/GEO. It is, however, another time-consuming activity, and GCOS has taken the strategy of using the Adequacy Report and the coming GCOS Implementation Plan as its main inputs, and has sought to couple this with plenary-level interaction to ensure that Climate involvement proves effective. We are dependent on friends to aid us at the working group and secretariat level.

### Liaison with our Sponsors

Effective links with our Sponsors are vital for GCOS. I think that links with all the Sponsors have been reasonably maintained. With UNEP we have been able to interact more thanks to improved UNEP representation at other meetings. The issue of plenary level interaction with UNEP and the GTOS Steering Committee remains open.

### Our Implementation Strategy

At the top level I am content that our strategy remains sound. I believe that the Adequacy Report now sets in place detail below this level, and the coming implementation plan will go further in providing the specific actions GCOS needs to engage. I expect that the Implementation Plan will place on GCOS only actions consistent with the GCOS terms of reference (i.e., those of an advisory and advocacy nature). It nevertheless seems likely to set an activity level for GCOS, which will be possible only if GCOS receives improved support.

### Issues for this meeting

I have a number of questions, which I wish the Steering Committee especially to consider as we proceed through this meeting:

- 1. The GCOS Implementation Plan.** The committee is being presented with an implementation plan in an early draft form; it needs refinement and, in a number of places, a more concise presentation. The SC should focus on guidance towards improving the plan as well as the process and timetable for completing the plan. The SC

also should agree on a method for giving its final approval of the completed plan and its further approval of a text for conveying the plan from the SC to the UNFCCC. It is hoped that these later stages may be achieved by preparing a draft at the final review meeting of the Implementation Plan and following this by wider agreement through e-mail correspondence.

Noting the above point, the committee should in particular advise on issues arising in the report, e.g.: the definition of implementation implicit in the present draft; the emphasis on institutionalising the data and product centre structure; the best approach to costing the proposed actions and how far to go with such costing; the issue of how deal with priorities (a summary of possible variable specific priorities is annexed to this document)

**2. The EO/GEO Activity.** The committee's advice on the noted strategy for working with the EO and its GEO activities would be most welcome.

**3. The Panel Activities.** The committee should be sure to remember the key role played by the Panels and advise them carefully on the issue of expanding their remits towards the full scope of the adequacy report.

**4. The security of funding for GCOS's own activities.** Given the importance of immediate actions it would be easy to neglect attention to raising resources for GCOS's own activity. Success with such support is, however, essential for action to continue and advice would again be appreciated.

**5. The positions of Director and Chairperson.** The contract of the GCOS Director is scheduled to close at the end of 2004. Recruitment action by WMO would be expected well before that time. The SC members may wish to give thought to encouraging suitable people to apply. Furthermore, the term of the current SC Chairman ends in mid-2005. I would welcome advice on names to approach as suitable candidates for my replacement.

The above list is far from complete but forms an essential core of the key issues at this meeting.

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## ANNEX VII

### **Status of GSN and GUAN Station Revitalization Activities**

#### **1. FY 2003 Activities**

In FY 2003, the GCOS Secretariat received funding for improvements to stations in the GCOS Upper Air Network (GUAN). The Secretariat, working with the Technical Cooperation and World Weather Watch Departments of the WMO used those funds as outlined below.

Using initial priorities provided by the AOPC, the stations within the GUAN that were not operating satisfactorily were analyzed to determine the cause of their problems and the cost of correcting them. An iterative process was used in which the station needs, political situation at the stations, actual costs of correction, and the practicality of the corrective action were considered. Projects were defined that maximized the improvement to as many stations as possible. Finally the AOPC, the donor representative, and the GCOS/WMO groups approved the projects.

The first major technical problem identified in the station analyses was that the high cost of GPS radiosondes, primarily those from Vaisala, had caused several stations to simply cease operations. Stations that needed only a new supply of radiosondes in order to resume operations were chosen to receive a year's supply of radiosondes and balloons. These units were purchased by the WMO procurement unit. The balloons were purchased through competitive bids while the Vaisala RS-80 GPS radiosondes were purchased directly from Vaisala. A small quantity was also purchased for storage and distribution by the WMO so that we can be more responsive to problems in the future. The shipping of these radiosondes began on 22 January 2004.

The stations receiving these radiosondes are:

- Galapagos Island (San Cristobal), Ecuador
- Yerevan, Armenia
- Comodoro Rivadavia, Argentina
- Loaog, Philippines
- Juan Santamaria (San Jose), Costa Rica
- Harare, Zimbabwe.

The second major technical problem identified was that of old unreliable hydrogen generators. A consolidated competitive purchase of five units was made by the WMO procurement unit. Small portable units requiring no harsh chemicals were specified and the Proton H40/20 was selected. Three of the units went to replace inoperative generators at Abidjan, Cote d'Ivoire; Nairobi, Kenya; and Galapagos Island, Ecuador. Two additional units were purchased for the activation of new upper air observing stations at Gan, Republic of Maldives; and Dar es Salaam, Tanzania. Shipping of these generators started in February 2004.

Two new stations are being activated. The implementation of the station at Gan is being managed by the UK Met Office. The hydrogen generator was purchased by the WMO and the remaining equipment, a Vaisala DigiCORA and one year's supply of RS-92 GPS radiosondes and balloons are being purchased through the Met Office. The GCOS Secretariat issued a purchase order through the WMO to the UK Met Office for this activity. The UK Met Office conducted the needed site survey and will now purchase the necessary

DigiCORA equipment, oversee the installation, and provide training to the staff at Gan. The hydrogen generator will be installed by Proton.

At Dar es Salaam, a request for tender for a "universal" upper air system capable of working at 1680 MHz in both radio direction finding (RDF) and GPS modes as well as in the 403 MHz GPS mode using several different brands of radiosondes resulted in an award to InterMet. The generator and the upper air equipment will be installed by Proton and InterMet respectfully and training will be provided. A year's supply of radiosondes will be purchased and there is some interest in conducting some comparison testing to demonstrate the viability of the lower priced RDF radiosondes.

Additional projects this year include the overhaul of the Vaisala DigiCORA equipment at Galapagos. The New Zealand MetService has been tasked through a WMO purchase order to conduct the site survey, install the hydrogen generator purchased by the WMO, and then to overhaul the DigiCORA.

The station at Penrhyn, Cook Islands was the recipient of a new hydrogen generator and a refurbished DigiCORA donated by the UK Met Office and equipment overhauls provided by the New Zealand MetService. A small amount of additional funding was provided to repair some of the station's facilities, representing a very good "bargain" for activating a very important station.

The AOPC indicated that a new station somewhere around Luanda, Angola was needed for the GUAN to improve spatial distribution of data. Following analysis of stations in the area, it was determined that Pointe Noire, Congo was nearby, was already operating, and had a good historical record. A modest amount of equipment such as a PC with CD writing capability and a small UPS are to be provided and the station was added to the GUAN at the last AOPC meeting.

All in all, the funds provided to GCOS, along with the contributions and cooperation of met services such as New Zealand and the UK, resulted in the reactivation of 9 GUAN stations and the activation of 2 new stations. In addition Pointe Noire was added as a GUAN station and the Australian Bureau of Meteorology cooperated by replacing the hydrogen generator at Papua New Guinea.

## **2. FY 2004 Planning Proposals**

Planning activities for next year's initiatives have actually been a continuous process. The AOPC Advisory Group on GSN and GUAN (AGG) reviewed initial ideas at the past AOPC meeting and a telephone conference was conducted in the fall. A draft of the specific proposals has been sent to the AGG for review and comment. The general categories of projects for next year are likely to be:

- Software to easily prepare the monthly CLIMAT (monthly summary surface) reports is being developed and will be distributed. Many GSN stations are actually operating but about 40 % do not prepare and send the CLIMAT report.
- Additional radiosondes will be needed by some of the developing countries until they can become self-sufficient. The very popular GPS radiosondes now cost over \$200 each and many countries cannot afford them.
- Additional hydrogen generators will be needed at some critical locations. Many of the currently-used systems are obsolete and replacement parts are almost impossible to find.

- Some GUAN station renovations or possibly activation of a new station will be accomplished. There are still several critical locations where new sources of data are needed and many stations simply need a renovation of some kind.
- Some GSN initiatives are likely this year but are not yet well defined. Additional discussion within the AGG is needed. Potential projects could be some data rescue projects, a cluster of AWS stations, some manual instrument up-grades, or even the addition of new stations.

### **3. Regional GCOS Support Centers**

A small amount of funding has been received for the establishment of GCOS regional technical support centers in the Pacific Islands region, the Caribbean and Central America, and Africa. Work has started in the GCOS Secretariat to determine exactly where and how these centers might be established. Issues that must be resolved include the long-term sustainability of such a center, obtaining the concurrence of the members of the regions, determining how to establish and operate contractually, and determining who would actually operate such a center. The Secretariat is working with the TCO to resolve these issues.

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## ANNEX VIII

### **GCOS-WCRP Agreement Regarding the BSRN**

One of the important climate system variables needed for applications of importance to GCOS and its users is surface radiation budget, which was designated as an Essential Climate Variable in the Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC.

Up to the present, there has been no fully-global, uniformly-distributed network in place that can measure the components of the surface radiation budget to the accuracy needed for GCOS purposes. However, in 1989, in view of the need for such observations in support of climate research, the World Climate Research Programme, under its Global Energy and Water Cycle Experiment, established the Baseline Surface Radiation Network (BSRN). This network has provided state-of-the-art, climate-quality observations of surface radiation at selected sites around the world since 1992. It currently consists of some 35 stations collecting, at a minimum, downwelling solar and thermal IR irradiances.

It is generally agreed that the BSRN, while having been established originally as a research network, has now reached the stage where its continuing operation on an indefinite basis is desirable and is a goal of all concerned. It is clear, therefore, that the BSRN could fulfill most of what is required of a GCOS global baseline network: long-term, climate-quality, globally-distributed measurements of a key climate variable. This would in fact represent an example of the application of one of the basic GCOS Climate Monitoring Principles, namely the carefully planned 'transition' of a research observing system to long-term operations.

In view of these facts, it was proposed in discussions between representatives of GCOS (the Atmospheric Observation Panel for Climate) and the WCRP (BSRN) that the BSRN be formally designated as the GCOS global baseline surface radiation network. The terms of reference for this designation are presented below and were approved by the Joint Scientific Committee of the WCRP at its twenty-fifth session in Moscow from March 1-6, 2004 and by the GCOS Steering Committee at its Twelfth Session in Geneva from March 15-19 2004.

**AGREEMENT BETWEEN**  
**THE GLOBAL CLIMATE OBSERVING SYSTEM**  
**AND THE WORLD CLIMATE RESEARCH PROGRAMME**  
**REGARDING THE BASELINE SURFACE RADIATION NETWORK**

This agreement presents the terms and conditions by which the World Climate Research Programme (WCRP) Baseline Surface Radiation Network (BSRN) proposes to satisfy the requirements for being identified as the Global Climate Observing System (GCOS) global baseline surface radiation network. With mutual agreement to these terms, BSRN will henceforth be designated as the GCOS global baseline surface radiation network.

1. The BSRN will remain institutionally and organizationally as it currently is within the domain of the Global Energy and Water Cycle Experiment (GEWEX) of WCRP and will be identified in all GCOS documentation and distributions as the WCRP/GEWEX BSRN, or spelled out as necessary.
2. Both BSRN and GCOS principals will agree to the items set forth in this document.
3. To avoid potential confusion and dilution of the integrity of the BSRN programme, GCOS will not endorse, sanction, or otherwise identify any other surface radiation measurement programme or effort as part of the GCOS global baseline radiation network.
4. New sites will be accepted into the BSRN programme only as discussed below under Principle #7.
5. BSRN will adhere to the GCOS Climate Monitoring Principles as presented and discussed below. While most of the principles are already being followed in BSRN because of their inherent merit for long-term research-quality observations, BSRN documentation (Operations Manual, or OM) does not specifically address some of the points and will be modified accordingly.

The following describes how BSRN relates to each of the ten basic GCOS Climate Monitoring Principles, the full set of which were adopted by the World Meteorological Organization Congress at its fourteenth session through Resolution 9 (Cg-XIV).

**Principle #1:** The impact of new systems or changes to existing systems should be assessed prior to implementation.

- Such an assessment was completed before BSRN began operations. However, a major goal of BSRN is the improvement of measurement capability. Therefore, as those improvements have been made, they have been implemented *after being assessed as to the merit of, and gain due to, the improvement*. Although this requirement is not explicitly stated in the OM, it has been generally followed to date and a formalization of such a policy will be included in the OM.

Principle #2: A suitable period of overlap for new and old observing systems is required.

- This is inherent in the BSRN mode of operation but is not specifically identified as a requirement in the OM. It is assumed that this principle applies to the exchange of sensors for routine calibration and maintenance as well as the integration of new systems replacing older ones. Overlap in BSRN is achieved by the pre- and post-characterization, calibration, and traceability of instruments and systems prior to deployment and removal from service so as to be consistently inter-compared with the new and old systems or instruments. Traceability may be achieved either in the field or at a suitable characterization and calibration facility. The OM will be modified to reflect this principle but will not significantly change the current mode of operations.

Principle #3: The details and history of local conditions, instruments, operating procedures, data processing algorithms and other factors pertinent to interpreting data (i.e., metadata) should be documented and treated with the same care as the data themselves.

- This is already an integral part of the data reporting and data archival procedures within BSRN. BSRN will review the required metadata currently being acquired to identify any missing information.

Principle #4: The quality and homogeneity of data should be regularly assessed as a part of routine operations.

- This is currently being done in at least two places during BSRN data collection and archival. By basic programme design, BSRN site scientists are responsible for maintaining quality control and data homogeneity at their individual sites before submitting the data to the archive. Also, the central BSRN archive performs data quality flagging as well as data completeness assessments.

Principle #5: Consideration of the needs for environmental and climate-monitoring products and assessments, such as IPCC assessments, should be integrated into national, regional and global observing priorities.

- BSRN's primary goal is to address climate-related research issues. The placement and design of the BSRN is to provide information for climate analysis and research assessment. The complete data product is freely available for applications in additional disciplines.
- The BSRN archive will not necessarily develop any new products to satisfy this principle given that its resources are currently fully committed.

Principle #6: Operation of historically-uninterrupted stations and observing systems should be maintained.

- BSRN was the beginning of the system now recognized as the BSRN surface radiation measurement methodology. It is the intention of the BSRN and most of its participants to operate these programmes indefinitely as long as they can be practically maintained. Predecessor radiation measuring capabilities existed at several of the current and prospective BSRN sites and the BSRN programme extends a subset of those earlier measurements. However, BSRN does not give preference to an existing measurement record at a candidate site based solely on the existence of those records, although long records are one of the goals of BSRN.

BSRN asserts that sites with long BSRN records are of particular value and additional funding consideration should be given to those sites.

Principle #7: High priority for additional observations should be focused on data-poor regions, poorly-observed parameters, regions sensitive to change, and key measurements with inadequate temporal resolution.

- BSRN will continue to pursue additional observations in data-poor and under-represented regions. BSRN will add stations to the network only by its current set of standards which require application to, and review by, BSRN management. This is meant to be exclusive to the extent to assure that the proper measurement capabilities exist and are likely to be maintained, preferably at globally under-represented but regionally representative sites pursuant to this Principle. GCOS and others are encouraged to recommend potential sites with consideration to be given to those sites as outlined above. Co-location with other climate related observations is desirable.
- BSRN will determine if under-sampled or poorly-observed parameters are appropriately represented within the realm of the programme and will address them accordingly. BSRN is currently pursuing some such cases, e.g. aerosol optical depth, UVB, and cloud-base temperature/height.
- Temporal representativeness was given high priority in the design of BSRN. Current measurement programmes meet or exceed all currently known or anticipated needs for this requirement.
- While efforts to extend the representativeness of the BSRN are underway and will continue, it has always been recognized that surface-based radiation observations will never be able to completely represent the climatologically significant variation on the planet. It is only through combined satellite and modeling programmes, such as Surface Radiation Budget (SRB) and various GCMs, can this complete representativeness be obtained.

Principle #8: Long-term requirements, including appropriate sampling frequencies, should be specified to network designers, operators and instrument engineers at the outset of system design and implementation.

- Each BSRN station is intended to be long-term and the data sampling and collection continuous and durable. This was emphasized in the original design of the BSRN as indicated in the letters of invitation that were extended to member nations. In those agreements there was the implicit expectation that the commitment was long-term. While the specific duration of the BSRN is not identified in current institutional documentation, it has always been intended by the participants that it be an indefinitely long programme. Additional emphasis on this aspect of the network will be added to the OM.
- Given the funding realities for scientific exploration and the lack a definitive description from GCOS as to what constitutes adequate institutional structure for adequate longevity, it is felt that BSRN more than adequately fulfills this requirement.

Principle #9: The conversion of research observing systems to long-term operations in a carefully-planned manner should be promoted.

- There is no distinction between research and long-term observations relative to BSRN surface radiation observations. The intent of all the BSRN observations is for research applications. An observational method that would be considered developmental would need to be further developed into an operational state before ever being deployed in the BSRN routine system. BSRN will continue to be a research network in that the purpose of the observations is for research applications. BSRN will continue to ensure that newly-developed observational systems will be suitable for long-term, remote deployment before being a required measurement of the programme. This should satisfy the letter and intent of this monitoring principle.
- GCOS confirms that this principle is primarily intended to encourage establishment of strong, continuing institutional support for all aspect of the ongoing network activities.

Principle #10: Data management systems that facilitate access, use and interpretation of data and products should be included as essential elements of climate monitoring systems.

- This is already the case for BSRN. The BSRN archive is an integral part of the network in that it includes personnel intimately familiar with the field collection of the data and its scientific applications. The archive maintains BSRN web site and contributes greatly to the overall management and operation of the network. Organizational investigations are currently underway to ensure the integrity of the archive for the long-term and the eventual turn-over of personnel involved.
- The longevity of the BSRN archive is an important aspect of the network and there are current efforts to insure that the archive will be sustainable indefinitely into the future.

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## ANNEX IX

### **Chairman's Summary, Ocean Observations Panel for Climate**

#### **1. Priority activities since OOPC-7 (5-9 June 2002, Kiel, Germany):**

- \* Completion of the ocean domain contribution to the GCOS Second Report on the Adequacy of the Global Climate Observing System
- \* Advocacy for implementation of the agreed 'Next Steps' toward the initial global ocean climate observing system (satellite and in situ); for improvement of ocean data system; and for ocean analysis, synthesis and forecast efforts.
- \* Development of strategies for evaluation and evolution of the initial system,
- \* Liason with JCOMM implementation subgroups, with other groups interested in global ocean observations and with the GOOS Coastal Ocean Observations Panel.

#### **2. Selected Events with OOPC participation/sponsorship, 2003:**

- \* GODAE Demonstration Period begins; Regional product comparison projects begin.  
<http://www.bom.gov.au/bmrc/ocean/GODAE/>
- \* Ocean Information Technology status report Feb 03  
<http://ioc.unesco.org/goos/gsc6/B18.doc>
- \* GODAE SC-7 Feb 2003  
<http://www.bom.gov.au/GODAE/Meetings/7thIGST/Report.htm>
- \* South Atlantic (SACOS) Workshop, Feb 2003
- \* Second Report on the Adequacy of the Global Climate Observing System (2AR) – ocean domain recommendations endorsed by GCOS SC, GOOS SC, JSC. July 2003  
<http://www.wmo.ch/web/gcos/gcoshome.html>
- \* Ship Operations Team -2 London. July-Aug 2003
- \* 2AR accepted by Subsidiary Body for Science and Technology Affairs (Framework Convention on Climate Change) and Conference of the Parties-9 (UNFCCC).
- \* GODAE High Res. SST Pilot Project. Science Team meeting. Sept 2003.  
<http://www.ghrsst-pp.org/>
- \* OOPC-8 Panel Session, Sept 2003  
<http://ioc.unesco.org/goos/oopc.htm>
- \* GODAE SC-8 Sept 2003
- \* GLOSS-8, October 2003  
<http://www.bom.gov.au/GODAE/Meetings/8thIGST/Report.htm>
- \* Argo First Science Workshop, Nov 2003  
<http://sio-argo.ucsd.edu/gould/Frontpage.html>
- \* CLIMAR-II Conference Nov 2003  
<http://www.cdc.noaa.gov/coads/climar2/>
- \* POGO & 2AR recommendations. Nov 2003  
<http://ocean-partners.org/Meetings/pogo-5main.htm>
- \* 2AR Implementation Plan requested by COP-9 Dec 2003  
<http://unfccc.int/cop9/>
- \* DMACS plan Dec 2003  
[http://dmac.ocean.us/dacsc/imp\\_plan.jsp](http://dmac.ocean.us/dacsc/imp_plan.jsp)

OOPC members provided liaison at >25 meetings.

**3. Ongoing Activities Supported:**

- \* Observing System Status Monitoring
- \* Joint SST working group (w. AOPC)
- \* Joint SLP working group (w. AOPC)
- \* Ocean data system improvement efforts
- \* GODAE
- \* Argo array
- \* Ocean time series reference station network
- \* Surface drifting buoy network
- \* SOOP XBT repeat sections
- \* VOS and VOSclim
- \* Sea level network
- \* Ocean carbon observations, surface and repeat sections
- \* Repeat hydrographic sections

**4. New Activities, post OOPC-8 (3-6 September 2003, Ottawa, Canada):**

- \* Implementation Plan for Second Adequacy Report
- \* Participation in GEO architecture and implementation planning.
- \* Further development of ocean indices and evaluation metrics
- \* Collaboration with new WCRP air-sea flux group
- \* Continue work toward high latitude sustained obs. recommendations
- \* Increased advocacy for recommended ocean satellite missions.

**5. Selected Up-Coming Activities 2004:**

Argo Science Team  
GODAE Steering Team  
GODAE Summer School  
GODAE Second Symposium  
GHRSSST Science Team  
Implementation Plan, Second Adequacy Report  
JCOMM Management Committee  
JCOMM Obs Coordination Subgroup  
OceanOPS 2004

## ANNEX X

### **Report of the Chairman, TOPC**

#### **Activities since GCOS SC-XI**

The seventh session of the Terrestrial Observation Panel for Climate of the Global Climate Observing System and Global Terrestrial Observing System was held at the UN Food and Agriculture Organisation in Rome, 16<sup>th</sup> to 18<sup>th</sup> December 2003. The meeting focused on follow up to the Second Adequacy Report, supporting the preparation of the GCOS Implementation Plan and revising the Panel's strategic direction.

#### **1. The Second Adequacy Report**

The Panel was thanked for the work that went into the Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC. The final report is available at <http://www.wmo.ch/web/gcos>.

The report was presented to the 18<sup>th</sup> session of the UNFCCC's Subsidiary Body on Scientific and Technological Advice (SBSTA-18) in June 2003 and to the 9<sup>th</sup> Conference of the Parties to the UNFCCC in Milan, 1<sup>st</sup> -12<sup>th</sup> December 2003.

The Panel agreed to continue revision of the Parameter Annex.

##### 1.1 COP-9

TOPC noted the COP-9 Decision concerning the work of GCOS and the Second Adequacy Report recommending that Parties review the report within the context of their national capabilities and consider what actions they can take; that COP asks GCOS to coordinate development of a five to ten year implementation plan for the integrated global observing systems for climate, using a mix of high-quality satellite and in-situ measurements, dedicated infrastructure and targeted capacity-building; and that COP-9 asks sponsoring agencies of GCOS and in particular those of the GTOS to develop a framework for the preparation of guidance materials, standards and reporting guidelines for terrestrial observing systems for climate, and associated data and products and report to COP-11 (November 2005). TOPC 7 addressed these COP-9 decisions (details below).

The Subsidiary Body for Implementation Decision invited the Global Environment Facility to consider funding for priority actions in developing countries. TOPC could therefore recommend specific actions to the GCOS Secretariat, who would work with their regional partnerships to build GEF proposals for funding in situ observations to support specific global ECVs.

##### 1.2 Resource mobilisation (and COP-9)

In a separate resource mobilisation action a GCOS Cooperation Mechanism has been established. This consists of a Board and a Fund established by a core group of 6 countries. It aims to identify and make the most effective use of resources available for improving global observing systems for climate in developing countries. The board is ready to examine specific proposals for action in developing countries and TOPC should consider this for targeting specific shortcomings. Although separate from the UNFCCC and the Global Environment Fund (GEF) COP-9 did urge Annex 1 Parties to support, through contributions to the GCOS Cooperation Mechanism and other relevant funding mechanisms, the priority

needs, identified in the Second Adequacy Report and in the regional action plans developed by GCOS, in developing countries, especially the least developed countries and small island States. **Action TOPC will provide detail of networks operating in the developing world and state where the key gaps are, this would then form the basis of a proposal for funding under the terms of the co-operation mechanism.**

## 2. GCOS Implementation plan

In the light of the COP-9 Decision TOPC is contributing to the Implementation Plan and is providing revised input to the CEOS / WMO database for all essential climate variables. The latter is important because the GEO considers this database one of two sources of information for its own implementation plan (the other being the GCOS Implementation Plan). **Action TOPC has revised the database and provided this to the GCOS Secretariat.**

TOPC-7 considered the draft structure for the implementation plan prepared by the GCOS Secretariat and prepared input for the draft completed at the GCOS Secretariat between 19<sup>th</sup> and 22<sup>nd</sup> January 2004.

The value of the detailed annex to the Second Adequacy Report as a complement to any implantation plan was stressed by the Panel members. The completeness of the version currently available from the GCOS web site is being checked and revisions made as appropriate. The revised set should form the core of a new document setting out the broader role of the terrestrial domain. GTOS will sponsor production of this document by providing a technical editor and manage its publication. **Action AB to review status and ask TOPC to revise content where needed by TOPC-8. GTOS have agreed to publish the results.**

The annex to the Second Adequacy Report sets out in detail the philosophy behind and current status of each Essential Climate Variable. A new set of documents has been prepared to support the preparation of the GCOS implementation plan. A one-page sheet setting out the actions needed to address the findings drawn from the Second Adequacy Report and lead to sustained availability of each ECV. Each sheet follows a common structure and includes illustrations. For each finding (usually subdivided by variable) the following 8 points are addressed:

1. Why: emphasises the ECVs' roles as drivers, feedbacks, indicators, and for impact assessments
2. Aim: how will the variable be used in the next five to ten years, e.g. an assimilation scheme is there, waiting for the variable, and it will be used immediately...or the availability of the variable provides a valuable indicator of change ...this will condition the ECV's specifications.
3. What: will provide very specific information on the resolution of the measurements (spatial, temporal etc.), will present the technology used to make the measurements and will highlight what needs to be done to ensure current, historic and future records. Stress the integrated nature of the observations (In-situ and EO)
4. Outcome: what will be produced in information/knowledge terms...not just the variables, but also analysis.
5. Who: where do the responsibilities for measurement, processing and maintenance (archival, standards, benchmarking) lie. What mandate do data centres have to have to be part of the IP (if they exist...and if they don't what should they look like/do?) Who determines fitness for purpose(s), consults with the users, establishes the common language and determines minimum acceptable standards?

6. How: an extension of the who, where suitable institutional structures are identified, e.g. x is responsible for taking observation y, according to standards set by GTN-a, and z will turn them into information. Identifying what is in place already...who is doing what.
7. Indicators: specific measurable factors used to judge progress over the 5 – 10 year period.
8. Timeframe and costs.

The detail from these has already been distilled into the first draft of the Implementation Plan and will help TOPC to establish priorities within the ECV list. It will also provide a framework for TOPC's own work plan.

## 2.1 The Findings

Each of the findings was examined with respect to the 8 questions outlined above and to the ECV table as proposed in the draft Implementation plan.

Finding 1: Many organizations make terrestrial observations for a range of purposes. Different measurement protocols are used, even for the same variable. There is a need to improve co-ordination for terrestrial climate observations especially among the UN agencies and to provide assistance to countries for reporting associated with multilateral environmental agreements. The proposed solution is to establish an intergovernmental technical commission to prepare and issue regulatory and guidance material establishing common standards for terrestrial observations, data management and services. This must take into account existing standards and initiatives. This will result in harmonised terrestrial measurements to agreed standards held in agreed standardised formats with metadata and distributed according to agreed standardised protocols and distributed from recognised global data centres supported with sustained funding. GTOS and GCOS should work with their sponsors, especially ICSU, FAO, UNEP, UNESCO and WMO and the convention secretariats to create an inter-agency working group linking with relevant international science programmes with a view to establishing an inter-governmental technical commission such as the JCOMM model or other suitable mechanism. **Action: The tasks and draft terms of reference will form the main agenda item for TOPC-8.**

The revised findings were submitted to the GIP drafting team meeting 19<sup>th</sup> to 22<sup>nd</sup> January 2004.

To fulfil TOPC co-ordination roles the revised documents were also sent to GTOS and the GTOS Science Panels for comment. Notwithstanding a very tight deadline GOF-GOLD provided extensive comment on the land cover and fire disturbance ECV's. These comments were taken into account and forwarded to the GCOS Secretariat for incorporation into the version of the GIP released to GCOS SC-XII.

## 3. TOPC strategic direction

Panel's terms of reference as approved by the 10<sup>th</sup> meeting of the GCOS Steering Committee in 2002 ensure that TOPC complements the other GCOS and GTOS science panels. The main strategic direction provided by the GCOS and GTOS Secretariats was to extend the terrestrial climate networks (e.g. support the evolution of the FAO's Global Land Cover – Network), to provide guidance on the location, composition and function of reference sites network (e.g. based on FLUXNET and similar) and to drive the evolution of research networks into operation. Good communications are being maintained with the other GTOS science panels.

#### **4. Meetings and membership**

The importance of an annual meeting was stressed by the GCOS and GTOS Secretariats. The next meeting is planned for 6<sup>th</sup> and 7<sup>th</sup> April 2004 in Ispra. All current Panel Members have to reaffirm their interest in membership and to agree to attend the annual meeting. New nominations are needed in the general area of biophysical parameter assimilation and land cover change.

## Annex XI

### **GCOS Cooperation Mechanism**

#### **Background**

GCOS has been the principal agent of the UNFCCC in coordinating the response of Parties and agencies to the needs of the Convention for systematic observation of the climate system, as encapsulated in Articles 4.1 and 5 of the Convention. Decision 14/CP.4 (1998) invited GCOS "to initiate an intergovernmental process for addressing the priorities for action to improve global observing systems for climate in relation to the needs of the Convention ... ". Based on advice at the time, GCOS recommended to SBSTA that no (new) *intergovernmental* mechanism with its associated bureaucracy was required.

Subsequent discussions at SBSTA, and results of recent GCOS activities (e.g., the Second Adequacy Report), have validated the need for a coordinated and transparent *multi-governmental* approach to address the priorities for action to improve global observing systems for climate, including an appropriate funding mechanism.

In its intervention to SBSTA-17 at COP-8 (October 2002), Australia proposed a concept of a voluntary multi-governmental GCOS funding mechanism. An informal discussion paper: "A possible approach to funding priority improvements in global observing systems for climate" was distributed to Parties and has been widely discussed by a number of interested parties. It was particularly timely in light of:

- the Second Adequacy Report and the need to develop ways to implement its recommendations;
- the growing awareness that, beyond some commitments by regional donors, e.g., in the Pacific, regional implementation of global networks was not a funding priority for international funding mechanisms;
- the US announcement that they were providing new resources for improving climate monitoring systems in developing countries as part of their Climate Change Research Initiative and would be seeking 'matching' funds from others;

In response to a request from SBSTA-17, the GCOS Steering Committee considered this proposal at its eleventh session (April 2003) and endorsed the concept. It further emphasized the need for potential donors to have a clear indication of aims and operations of the fund and an adequate level of control of the fund in order to attract the desired range of donors. The SC requested the GCOS Secretariat to facilitate the convening of a high-level meeting of potential donors to develop details of this mechanism and to provide an update of developments to SBSTA-19.

Such a meeting, hosted by the US National Oceanic and Atmospheric Administration, was convened in October 2003 in Washington D.C. The discussions at and leading up to the meeting focused on a "cooperation mechanism" among donors. At the meeting a core group of six countries developed the initial Terms of Reference for a GCOS Cooperation Mechanism (GCM) and agreed to establish the mechanism through their common action, given the endorsement of the GCOS Steering Committee and the agreement of the GCOS Sponsors to implement it under the GCOS Memorandum of Understanding. The United Kingdom offered to host an initial meeting of the Cooperation Board in the UK in mid-2004.

The Terms of Reference are presented below and were endorsed by GCOS SC-XII.

## **Terms of Reference: GCOS Cooperation Mechanism**

The GCOS (Global Climate Observing System) Cooperation Mechanism (GCM) is established through the common action of a number of donor countries with the endorsement of the GCOS Steering Committee and is implemented under the GCOS Memorandum of Understanding.

The purpose of this mechanism is to identify and make the most effective use of resources available for improving global observing systems for climate in developing countries, particularly in order “to enable them to collect, exchange, and utilize data on a continuing basis in pursuance of the UNFCCC”<sup>1</sup>.

This mechanism will address priority improvements in atmospheric, oceanic, and terrestrial observing systems for climate and is intended to complement and work in cooperation with other funding and implementation mechanisms, many of which deal with GCOS-related activities and, particularly, capacity building. The requirement for improved global observations for climate recognizes that capacity building is an essential component but that it does not address the full scope of needs for sustained observations. Accordingly, the GCOS Cooperation Mechanism is established specifically to ensure that this broad spectrum of needs, for system improvement and sustained operations as well as capacity building, in support of global observing systems for climate are addressed as effectively as possible.

The GCOS Cooperation Mechanism provides for a coordinated multi-governmental approach to address the high-priority needs for stable long-term funding for key elements of global observing systems for climate in support of the requirements of the UNFCCC and other GCOS clients, especially those needs in developing countries, taking into account the special needs and situations of least developed countries and small island developing States.

The mechanism is governed by a GCOS Cooperation Board as the primary means to establish and direct improvement projects resourced through voluntary contributions, both in-kind and financial, using a GCOS Cooperation Fund as a means for aggregating voluntary financial contributions from multiple donors into a common trust fund.

The mechanism provides the ability to develop, fund and implement crosscutting approaches relevant to all climate disciplines/regimes, including addressing data management and data exchange.

Participation in the mechanism is open to all donors that support, through financial or in-kind contributions, improvements in global observing systems for climate in developing countries. There is no requirement to move funds from existing mechanisms or to commit new funds through the GCOS Cooperation Fund.

### **A. GCOS Cooperation Board (GCB)**

The GCOS Cooperation Board is established to facilitate the most effective use of voluntary contributions for the improvement of global observing systems for climate in developing countries. The Board will provide advice to potential donors on the high priority funding needs and will direct the operation of the GCOS Cooperation Fund, in light of existing international and national support activities and in accordance with the specific priorities of some donors. Features of the GCOS Cooperation Board include:

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<sup>1</sup> UNFCCC Decision 5/CP.5

- All donors are invited to be Board members, whether their contributions are financial or in-kind;
- Attendance at meetings is self-funded;
- The Board will operate by consensus;
- The Board will elect its Chairperson and convene as agreed, nominally on an annual basis;
- The GCOS Steering Committee, using the resources of the GCOS Science Panels (atmospheric, oceanic, terrestrial), will provide scientific advice to the Board;
- The GCOS Secretariat will provide appropriate secretariat support to the Board.

**The responsibilities of the GCOS Cooperation Board are to:**

- Maintain and review a register of the activities supported by members with the express purpose of improving global observing systems for climate in developing countries;
- Agree on the high priority funding needs for improvements in the global observing systems for climate (including data management elements) in developing countries based on scientific and programmatic advice from the GCOS Steering Committee;
- Assess ways to address these needs through cooperative approaches, building upon existing national activities and the activities of regional and international funding mechanisms, including through the use of the GCOS Cooperation Fund;
- Monitor the implementation of activities and the expenditures from the GCOS Cooperation Fund through a set of agreed guidelines;
- Agree to and monitor appropriate procedures for cooperating with other funding and implementation mechanisms;
- Provide an Annual Report for the GCOS Steering Committee and sponsoring agencies;
- Review and modify, as appropriate, these TOR to match the common objectives of the Board.

**B. GCOS Cooperation Fund (GCF)**

The GCOS Cooperation Fund is established to support the implementation of priority activities as determined by the GCOS Cooperation Board through the aggregated voluntary financial contributions from multiple donors. The fund is configured as a component of the existing Climate Observing System Fund (COSF), with separate accounting.

**The characteristics and operation of the GCOS Cooperation Fund are as follows:**

Contributions to the GCOS Cooperation Fund can be made in several ways:

1. Financial contributions whose specific purpose is unspecified. These funds would be allocated according to the expressed priorities of the Cooperation Board;
2. Financial contributions for specified purposes. These funds would be used consistent with the intent of the donor within the overall priorities identified by the Cooperation Board.

The Fund may be used to support all types of funding requirements for global climate observations in developing countries, including system improvement, sustained operations and capacity building. This would require ongoing investment and replenishment of the fund.

The Fund may be used in concert with, and seek co-financing from, other funding mechanisms, particularly in respect of capacity building.

### **C. In-Kind Contributions**

Donor contributions may also be made via in-kind contributions for projects in developing countries. These contributions may be implemented directly with the recipient country or in coordination with other funding from the GCOS Cooperation Fund to address the priorities for improved global observing systems for climate.

For the purposes of accounting and reporting, in-kind contributions will be treated as equivalent to financial contributions for specified purposes.

### **D. Implementation of the GCOS Cooperation Board**

The GCOS Director will be the responsible officer for managing the fund and for secretariat support to the Cooperation Board.

The GCOS Director will report annually and as required to the Cooperation Board on expenditures from the Cooperation Fund.

Necessary project office support will be agreed and supported by the Cooperation Board.

Functions of the project office will include implementation actions to improve systems and to sustain the operation of key stations and systems.

Existing mechanisms will be utilized for implementing the actions of the Cooperation Board whenever appropriate, including, for example:

- WMO/Voluntary Cooperation Program (VCP) for implementing projects related to GUAN, and GSN stations; IOC for ocean projects, where appropriate;
- Regional approaches – e.g. SPREP or SOPAC for coordination of implementation in the Pacific;
- National agencies – e.g. national meteorological and oceanic services.

Recipients of funds will be asked to agree to the normal requirements of the WMO/VCP for use and operation of any systems supported by the GCOS Cooperation Board. The Board may impose standards and guidelines for the accountability of awarded resources.

Funding will be subject to agreement by the recipient to make all associated data available in a timely fashion to the appropriate world data center.

### **Appendix – List of Initial Participants**

Australia  
Canada  
New Zealand  
Switzerland  
United States of America  
United Kingdom

## ANNEX XII

### **GCOS Regional Workshop Programme - Update**

The Global Climate Observing System (GCOS) initiated a Regional Workshop Programme (RWP) in mid-2000 to facilitate improvements in climate observing systems in developing countries. This programme was developed in response to Decision 5/CP.5 of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). Six of the regional workshops in the 10-workshop programme have been completed as of March 2004, for: 1) the Pacific Islands, 2) Eastern and Southern Africa, 3) Central America and the Caribbean, 4) East and Southeast Asia, 5) Western and Central Africa, and 6) South America. In addition, Regional Action Plans (RAPs) based on the priority needs identified in the workshops have been completed for the first five regions in which workshops have been held. A meeting to develop the RAP for South America will be held in Buenos Aires in April 2004. GCOS is currently planning a workshop for countries of Central Asia, to be held in Almaty, Kazakhstan in May 2004. A workshop for the countries of South and Southwest Asia will be held later in the year, most likely to be hosted by the India Meteorological Department in New Delhi in October.

The COP and its Subsidiary Body for Scientific and Technological Advice (SBSTA) have continued to express their interest in the RWP and in the RAPs initiated at the workshops. GCOS held a well-attended Side Meeting on the RWP at COP-9 in Milan, Italy in December 2003 at which regional representatives reviewed the RAPs for Central America and the Caribbean, East and Southeast Asia, and Western and Central Africa. COP decision 11/CP.9 urges "Parties in a position to do so...to support...the priority needs, identified in the second adequacy report and regional action plans, in developing countries, especially the least developed countries and small island developing States." In addition, COP decision 4/CP.9, in providing guidance to the Global Environment Facility, invites it "to give appropriate consideration to addressing the priority needs identified by non-Annex I Parties in their regional action plans relating to global observing systems for climate..." Whether COP support will result in additional funds for projects contained in RAPs remains to be seen.

The RWP is supported by funds from the Global Environment Facility (60 percent) and, on a workshop-by-workshop basis, from individual donor countries and international organizations (40 percent). The United Nations Development Programme (UNDP) controls a small amount of Programme funds. UNDP intends to use the funds it controls to assist developing countries implement their RAPs. However, UNDP has requested GCOS to provide advice on how best these funds could be used. GCOS intends to propose that at least some of the funds be used to hire a consultant 1) to help one or more regions tailor their RAPs for presentation to potential donors (e.g., the World Bank), and 2) to seek support for specific projects (such as GSN and/or GUAN projects) from specific donors.

GCOS will hold another meeting of its Regional Workshop Advisory Committee sometime during 2004. The date, place, and specific agenda for this meeting have not yet been determined. However, suggestions are welcome.

The RWP has been successful at raising awareness of the status, deficiencies, and needs of climate observing systems in developing countries. As a consequence, and in particular through the development of RAPs, the programme has raised the expectations of developing countries that funds will be found to address high priority needs. However, the implementation of the components of RAPs is beyond the scope of the RWP *per se*. The intent has been to motivate the regions themselves to take the lead in further developing the projects contained in RAPs and in seeking the funds with which to implement them.

The regions to date have not been active in implementing projects (with the exception of the Pacific Islands region), and will require guidance and assistance to move forward with implementing projects within their RAPs. Some regions may perceive that GCOS itself has responsibility for developing projects and obtaining funds, rather than taking steps themselves to implement projects. GCOS is working to mobilize resources for the high priority global needs (e.g., GUAN, etc.), and these resources do address needs identified in the RAPs.

## **GCOS LIST OF ACRONYMS AND ABBREVIATIONS**

AGG	AOPC Advisory Group on GSN and GUAN
AMIP	Atmospheric Model Intercomparison Project
AOPC	Atmospheric Observation Panel for Climate
APN	Asia-Pacific Network
ASAP	Automated Shipboard Aerological Programme
AVHRR	Advanced Very High Resolution Radiometer
BOM	Australian Bureau of Meteorology
BSRN	Baseline Surface Radiation Network
CAS	Commission for Atmospheric Sciences
CBS	Commission for Basic Systems (WMO)
CCD/A	Climate Change Detection and Attribution
CCI	Commission for Climatology (WMO)
CDAS	Climate Data Assimilation System
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
Chy	Commission for Hydrology (WMO)
CLIMAT	Report of monthly means and totals from a WWW land station
CLIVAR	Climate Variability and Predictability (WCRP)
CMA	China Meteorological Administration
CMM	Commission for Marine Meteorology
COP	Conference of the Parties (to UNFCCC)
COPES	Coordinated Observation and Prediction of the Earth System
DAO	Data Assimilation Office
DARE	Data Rescue (WCDMP project)
DBCP	Data Buoy Cooperation Panel
DIM	Data and Information Management
DWD	Deutscher Wetterdienst
EC	European Community
EC	Executive Council (WMO)
ECMWF	European Centre for Medium-Range Weather Forecasts
ECVs	Essential Climate Variables
ENSO	El Niño/Southern Oscillation
ESA	European Space Agency
ET-ODRRGOS	Expert Team on Observational Data Requirements and Redesign of the Global Observing System
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FAO	Food and Agriculture Organization of the United Nations
G3OS	GCOS, GOOS and GTOS
GAW	Global Atmosphere Watch
GCO	Global Carbon Observation
GCOS	Global Climate Observing System
GCMs	Global Climate Models
GDSIDB	Global Digital Sea-Ice Data Bank
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
GEO	Group on Earth Observations
GEOS	Global Earth Observation System of Systems

GEWEX	Global Energy and Water Cycle Experiment
GLIMS	Global Land Ice Measurements from Space
GLOSS	Global Sea Level Observing System
GMDSS	Global Maritime Distress and Safety System
GMES	Global Monitoring for Environment and Security
GODAE	Global Ocean Data Assimilation Experiment
GOFC	Global Observation of Forest Cover
GOOS	Global Ocean Observing System
GOS	Global Observing System
GOSIC	Global Observing Systems Information Center
GOSSP	Global Observing Systems Space Panel
GPCC	Global Precipitation Climatology Centre
GPCP	Global Precipitation Climatology Project
GPS	Global Positioning System
GRDC	Global Runoff Data Centre
GSN	GCOS Surface Network
GSNMC	GSN Monitoring Centre
GTN	Global Terrestrial Network
GTN-E	Ecosystem Monitoring Network
GTN-G	Glacier Monitoring Network
GTN-H	Hydrology Monitoring Network
GTN-P	Permafrost Monitoring Network
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunication System
GUAN	GCOS Upper-Air Network
HALOE	Halogen Occultation Experiment
HOPC	Hydrological Observation Panel for Climate
HWR	Hydrology and Water Resources (Department, WMO)
ICSU	International Council for Science
IGBP	International Geosphere-Biosphere Programme
IGACO	Integrated Global Atmospheric Chemistry Observations (IGOS Theme)
IGOS	Integrated Global Observing Strategy
IGOS-P	Integrated Global Observing Strategy Partnership
IGOSS	Integrated Global Ocean Services System
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange
IOS	Initial Operational System (GCOS); Integrated Observing System (GOOS)
IPCC	Intergovernmental Panel on Climate Change
ISCCP	International Satellite Cloud Climatology Project
JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM Observing Platform Support Centre
JDIMP	Joint Data and Information Management Panel
JMA	Japan Meteorological Agency
MCDW	Monthly Climatic Data of the World
MECE	Monitoring of Extreme Climate Events
MOU	Memorandum of Understanding
MPERSS	Marine Pollution Emergency Response Support System
MSC	Meteorological Service of Canada
MSU	Microwave Sounding Unit

NCAR	National Center for Atmospheric Research
NCDC	National Climatic Data Center
NCEP	National Centers for Environmental Prediction
NGDC	National Geophysical Data Center
NMHS	National Meteorological and Hydrological Service
NOAA	National Oceanic and Atmospheric Administration
NPP	Net Primary Productivity
NWP	Numerical Weather Prediction
OOPC	Ocean Observations Panel for Climate
OPAG	Open Programme Area Group
OSes	Observing System Experiments
OSSEs	Observing System Simulation Experiments
PAGES	Past Global Changes (within IGBP)
PMEL	Pacific Marine Environmental Laboratory
POGO	Partnership for Observation of the Global Oceans
PSMSL	Permanent Service for Mean Sea Level
QC	Quality Control
RAP	Regional Action Plan
RWP	Regional Workshop Programme
SAFs	Satellite Application Facilities
SBI	Subsidiary Body for Implementation (UNFCCC/COP)
SBSTA	Subsidiary Body for Scientific and Technological Advice (UNFCCC/COP)
SC	Steering Committee
SIA	Seasonal-to-Interannual Forecasting
SIP	Seasonal-to-Interannual Climate Prediction
SIT	Strategic Implementation Team (CEOS)
SOG	Statement of Guidance
SOOP	Ships of Opportunity Programme
SPARC	Stratospheric Processes and their Role in Climate
SPREP	South Pacific Regional Environment Programme
SST	Sea-Surface Temperature
START	System for Analysis, Research and Training
SURFA	Surface Flux Analysis Project
TAO	Tropical Atmosphere-Ocean Array
TCO	Terrestrial Carbon Observations
TEMS	Terrestrial Ecosystems Monitoring Sites
TOMS	Total Ozone Mapping Spectrometer
TOPC	Terrestrial Observation Panel for Climate
ToR	Terms of Reference
TOVS	TIROS Operational Vertical Sounder
TRITON	Triangle Trans-Ocean Buoy Network
UKMO	United Kingdom Meteorological Office
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UOP	Upper Ocean Panel (WCRP/CLIVAR)
UTLS	Upper Troposphere Lower Stratosphere
VCP	Voluntary Co-operation Programme
VOS	Voluntary Observing Ship(s)
VOSclim	Voluntary Observing Ships Climatology Programme
WCDMP	World Climate Data and Monitoring Programme

WCP	World Climate Programme
WCRP	World Climate Research Programme
WDC	World Data Centre
WGCCD	Working Group on Climate Change Detection
WGNE	Working Group on Numerical Experimentation
WG-SP	Working Group on Surface Pressure
WHYCOS	World Hydrological Cycle Observing System
WMO	World Meteorological Organization
WRAP	Worldwide Recurring ASAP Project
WWW	World Weather Watch (WMO)

## **LIST OF GCOS PUBLICATIONS\***

- GCOS-1**  
(WMO/TD-No. 493) Report of the first session of the Joint Scientific and Technical Committee for GCOS (Geneva, Switzerland, April 13-15, 1992)
- GCOS-2**  
(WMO/TD-No. 551) Report of the second session of the Joint Scientific and Technical Committee for GCOS (Washington DC, USA, January 11-14, 1993)
- GCOS-3**  
(WMO/TD-No. 590) Report of the third session of the Joint Scientific and Technical Committee for GCOS (Abingdon, UK, November 1-3, 1993)
- GCOS-4**  
(WMO/TD-No. 637) Report of the fourth session of the Joint Scientific and Technical Committee for GCOS (Hamburg, Germany, September 19-22, 1994)
- GCOS-5**  
(WMO/TD-No. 639) Report of the GCOS Data System Task Group (Offenbach, Germany, March 22-25, 1994)
- GCOS-6**  
(WMO/TD-No. 640) Report of the GCOS Atmospheric Observation Panel, first session (Hamburg, Germany, April 25-28, 1994)
- GCOS-7**  
(WMO/TD No. 641) Report of the GCOS Space-based Observation Task Group (Darmstadt, Germany, May 3-6, 1994)
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(WMO/TD No. 642)  
(UNEP/EAP.MR/94-9) Report of the GCOS/GTOS Terrestrial Observation Panel, first session (Arlington, VA, USA, June 28-30, 1994)
- GCOS-9**  
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- GCOS-10**  
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- GCOS-14**  
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- GCOS-16**  
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- GCOS-17**  
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(WMO/TD-No. 697)  
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- GCOS-19**  
(WMO/TD-No. 709) Report of the GCOS Data Centre Implementation/Co-ordination Meeting (Offenbach, Germany, June 27-29, 1995)
- GCOS-20**  
(WMO/TD-No. 720) GCOS Observation Programme for Atmospheric Constituents: Background, Status and Action Plan, September 1995
- GCOS-21**  
(WMO/TD-No. 721)  
(UNEP/EAP.TR/95-07) GCOS/GTOS Plan for Terrestrial Climate-related Observations, version 1.0, November 1995
- GCOS-22**  
(WMO/TD-No. 722) Report of the fifth session of the Joint Scientific and Technical Committee for GCOS (Hakone, Japan, October 16-19, 1995)
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(WMO/TD-No. 754)  
(UNEP/DEIA/MR.96-6)  
(FAO GTOS-1) Report of the GCOS/GTOS Terrestrial Observation Panel for Climate, third session (Cape Town, South Africa, March 19-22, 1996)
- GCOS-24**  
(WMO/TD-No. 768)  
(UNESCO/IOC) Report of the Joint GCOS/GOOS/WCRP Ocean Observations Panel for Climate, first session (Miami, Florida, USA, March 25-27, 1996)
- GCOS-25**  
(WMO/TD-No. 765)  
(UNEP/DEIA/MR.96-5) Report of the GCOS Data and Information Management Panel, second session (Ottawa, Ontario, Canada, May 14-17, 1996)
- GCOS-26**  
(WMO/TD-No. 766) Report of the Joint CCI/CBS Expert Meeting on the GCOS Surface Network (Norwich, UK, March 25-27, 1996)
- GCOS-27**  
(WMO/TD-No. 772)  
(UNEP/DEIA/MR.96-7) Report of the Expert Meeting on Hydrological Data for Global Observing Systems (Geneva, Switzerland, April 29-May 1, 1996)
- GCOS-28**  
(WMO/TD-No. 793)  
(UNEP/DEIA/MR.97-3) *In Situ* Observations for the Global Observing Systems (Geneva, Switzerland, September 10-13, 1996)
- GCOS-29**  
(WMO/TD-No. 794)  
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- GCOS-30**  
(WMO/TD-No. 795) Report of the sixth session of the Joint Scientific and Technical Committee for GCOS (Victoria, British Columbia, Canada, October 28-November 1, 1996)
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(WMO/TD-No. 803) Proceedings of the fifth meeting of the TAO Implementation Panel (TIP-5) (Goa, India, November 18-21, 1996)

<b>GCOS-32</b> (WMO/TD-No. 796)	GCOS/GTOS Plan for Terrestrial Climate-related Observations, version 2.0, June 1997
<b>GCOS-33</b> (WMO/TD-No. 798)	GHOST - Global Hierarchical Observing Strategy, March 1997
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<b>GCOS-37</b> (WMO/TD-No. 845) (GOOS-10) & (GTOS-9)	Report of the Global Observing Systems Space Panel, third session (Paris, France, May 27-30, 1997)
<b>GCOS-38</b> (WMO/TD-846) (GTOS-10)	Report of the Meeting of Experts on Ecological Networks (Guernica, Spain, June 17-20, 1997)
<b>GCOS-39</b> (WMO/TD-No. 847) (GOOS-11) & (GTOS-11) (UNEP/DEIA/MR.97-8)	Report of the GCOS/GOOS/GTOS Joint Data and Information Management Panel, third session (Tokyo, Japan, July 15-18, 1997)
<b>GCOS-40</b> (WMO/TD-No. 848)	Report of the GCOS/WCRP Atmospheric Observation Panel for Climate, third session (Reading, UK, August 19-22, 1997)
<b>GCOS-41</b> (WMO/TD-No. 849) 33)	Report of the Joint GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC) Ocean Climate Time-Series Workshop, (Baltimore, MD, USA, March 18-20, 1997)
<b>GCOS-42</b> (WMO/TD-No. 857)	Report of the seventh session of the Joint Scientific and Technical Committee for GCOS (Eindhoven, The Netherlands, September 22-26, 1997)
<b>GCOS-43a</b> (GOOS-36)	TAO Implementation Panel, sixth session (Reading, U.K., November 4-6, 1997)
<b>GCOS-43b</b> (GOOS-55)	International Sea Level Workshop (Honolulu, Hawaii, USA, June 10-11, 1997)
<b>GCOS-44</b> (GOOS-61)	Report of the Joint GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC), third session (Grasse, France, April 6-8, 1998)
<b>GCOS-45</b> (WMO/TD-No. 922) (GOOS-58) & (GTOS-16) (UNEP/DEIA/MR.98-6)	Report of the Joint Meeting of the GCOS/WCRP Atmospheric Observation Panel for Climate and the GCOS/GOOS/GTOS Joint Data and Information Management Panel, fourth session (Honolulu, Hawaii, USA, April 28-May 1, 1998)

- GCOS-46**  
(GTOS-15) Report of the GCOS/GTOS Terrestrial Observation Panel for Climate, fourth session (Corvallis, USA, May 26-29, 1998)
- GCOS-47**  
(WMO/TD-No. 941)  
(GOOS-67) (GTOS-20) Report of the Global Observing Systems Space Panel, fourth session, (College Park, Maryland, USA, October 22-23, 1998)
- GCOS-48** Report on the Adequacy of the Global Climate Observing Systems (United Nations Framework Convention on Climate Change, November 2-13 1998, Buenos Aires, Argentina)
- GCOS-49**  
(GOOS-64) Implementation of Global Ocean Observations for GOOS/GCOS, first session (Sydney, Australia, March 4-7, 1998)
- GCOS-50**  
(GOOS-65) Implementation of Global Ocean Observations for GOOS/GCOS, second session (Paris, France, November 30, 1998)
- GCOS-51**  
(GOOS-66) Global Ocean Observations for GOOS/GCOS: An Action Plan for Existing Bodies and Mechanisms
- GCOS-52**  
(GOOS-68) TAO Implementation Panel, seventh session (Abidjan, Ivory Coast, November 11-13, 1998)
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- GCOS-54**  
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- GCOS-55** Report of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), fifth session (Silver Spring, MD, USA, April 20-23, 1999)
- GCOS-56**  
(GOOS-75) Special Report of the Joint GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC), fourth session (May 17, 1999); The CLIVAR Upper Ocean Panel (UOP), fourth session (May 21, 1999); A Joint Planning Meeting of the OOPC and the UOP for the OCEANOBS99 Conference (Woods Hole, MA, USA, May 18-20, 1999)
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(WMO/TD-No. 978)  
(GOOS-79) Report of the OOPC/AOPC Workshop on Global Sea Surface Temperature Data Sets (Palisades, N.Y., USA, November 2-4, 1998)
- GCOS-58**  
(GOOS-71) Report of the sixth session of the IOC Group of Experts on the Global Sea Level Climate Observing System (GLOSS)
- GCOS-59**  
(GTOS-22) Report of the GCOS/GTOS Terrestrial Observation Panel for Climate, fifth session (Birmingham, UK, July 27-30, 1999)
- GCOS-60**  
(WMO/TD-No. 1004)  
(GOOS-70) GCOS/GOOS/GTOS Joint Data and Information Management Plan, Version 1.0, May 2000

<b>GCOS-61</b> (WMO/TD-No. 1031)	Report of the ninth session of the WMO-IOC-UNEP-ICSU Steering Committee for GCOS (Beijing, China, September 12-14, 2000)
<b>GCOS-62</b> (WMO/TD-No. 1038)	Report of the Pacific Islands Regional Implementation Workshop on Improving Global Climate Observing Systems (Apia, Samoa, August 14-15, 2000)
<b>GCOS-63</b> (WMO/TD-No. 1047) (GTOS-26)	Establishment of a Global Hydrological Observation Network for Climate. Report of the GCOS/GTOS/HWRP Expert Meeting (Geisenheim, Germany, June 26-30, 2000)
<b>GCOS-64</b> (GOOS-107)	Report of the eighth session of the TAO Implementation Panel (TIP-8) (St. Raphael, France, October 15, 1999)
<b>GCOS-65</b> (WMO/TD-No. 1055)	Report of the sixth session of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC) (Geneva, Switzerland, April 10-13, 2000)
<b>GCOS-66</b> (GOOS-108)	Report of the ninth session of the TAO Implementation Panel (TIP-9) (Perth, Australia, November 16-17, 2000)
<b>GCOS-67</b> (WMO/TD-No. 1072)	GCOS Implementation Strategy: Implementing GCOS in the New Millennium
<b>GCOS-68</b> (WMO/TD-No. 1093)	Report of the seventh session of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC) (Geneva, Switzerland, April 30-3 May, 2001)
<b>GCOS-69</b> (GOOS-98)	Report of the fifth session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Bergen, Norway, June 20-23, 2000.
<b>GCOS-70</b> (GOOS-113)	Report of the sixth session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Melbourne, Australia, May 2-5, 2001
<b>GCOS-71</b> (WMO/TD-No. 1099) (GTOS-29)	Report of the GCOS/GTOS/HWRP Expert Meeting on the Implementation of a Global Terrestrial Network - Hydrology (GTN-H), Koblenz, Germany, June 21-22, 2001
<b>GCOS-72</b> (GOOS-116)	Report of the seventh session of the IOC Group of Experts on the Global Sea Level Observing System (GLOSS), Honolulu, April 26-27, 2001
<b>GCOS-73</b> (WMO/TD-No. 1106)	Manual on the GCOS Surface and Upper-Air Networks: GSN and GUAN, April 2002
<b>GCOS-74</b> (WMO/TD-No. 1109)	Report of the GCOS Regional Workshop for Eastern and Southern Africa on Improving Observing Systems for Climate, Kisumu, Kenya, October 3-5, 2001
<b>GCOS-75</b> (WMO/TD-No. 1124)	Summary Report of the tenth session of the WMO-IOC-UNEP-ICSU Steering Committee for GCOS, Farnham, UK, April 15-19, 2002
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<b>GCOS-79</b> (WMO/TD-No. 1133)	Interim Report to the sixteenth session of the Subsidiary Body for Scientific and Technological Advice of the UNFCCC by the Global Climate Observing System, Bonn, Germany, June 5-14, 2002
<b>GCOS-80</b> (WMO/TD-No.1140)	Report of the GCOS Regional Workshop for East and Southeast Asia on Improving Observing Systems for Climate, Singapore, September 16-18, 2002
<b>GCOS-81</b> (GOOS-124)	Seventh session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Kiel, Germany, June 5-8, 2002
<b>GCOS-82</b> (WMO/TD-No.1143)	Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC
<b>GCOS-82 (ES)</b> (WMO/TD-No.1176)	Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC – Executive Summary
<b>GCOS-83</b> (WMO/TD-No.1155) (GTOS-33)	Report of the Global Terrestrial Network - Hydrology (GTN-H) Coordination Panel Meeting, Toronto, Canada, November 21-22, 2002
<b>GCOS-84</b> (WMO/TD-No.1156) (GTOS-32)	Report of the GCOS/GTOS/HWRP Expert Meeting on Hydrological Data for Global Studies, Toronto, Canada, November 18-20, 2002
<b>GCOS-85</b> (WMO/TD-No.1167)	Report of the GCOS Regional Workshop for Western and Central Africa on Improving Observing Systems for Climate, Niamey, Niger, March 27-29, 2003 (disponible en français)
<b>GCOS-86</b> (WMO/TD-No.1183)	Report of the GCOS Regional Workshop for South America on Improving Observing Systems for Climate, Santiago, Chile, October 14-16, 2003 (disponible también en español)
<b>GCOS-87</b> (WMO/TD-No.1189)	Summary Report of the eleventh session of the WMO-IOC-UNEP-ICSU Steering Committee for GCOS, Melbourne, Australia, April 7-10, 2003
<b>GCOS-88</b> (WMO/TD-No. 1190)	Report of the ninth session of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), Asheville, NC, USA, June 23-27, 2003
<b>GCOS-89</b> (GOOS-140)	Eighth session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Ottawa, Canada, September 3-6, 2003
<b>GCOS-90</b> (GOOS-141)	IOC Group of Experts on the Global Sea Level Observing System (GLOSS), eighth session, October 13 and 16-17, 2003
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