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WORLD METEOROLOGICAL
ORGANIZATION

INTERGOVERNMENTAL
OCEANOGRAPHIC COMMISSION

SUMMARY REPORT OF THE TENTH SESSION OF THE

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

(Farnham, UK, 15 –19 April 2002)

December 2002

GCOS - 75

(WMO/TD No. 1124)

UNITED NATIONS
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INTERNATIONAL COUNCIL FOR
SCIENCE

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SUMMARY OF THE SESSION

The Tenth Session of the Global Climate Observing System (GCOS) Steering Committee (SC) was held at the Farnham Castle International Briefing and Conference Centre in Farnham, UK from Monday 15 April to Friday 19 April, 2002. This summary provides a brief overview of the session. The Consolidated List of Decisions, 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 preparation of an interim report on Parties' activities in support of systematic observation, planning for a Second Report on the Adequacy of the Global Observing System for Climate, and the GCOS Regional Workshop Programme; (2) status and activities of the GCOS science panels; and (3) GCOS linkages and relationships with partners and sponsors.

REPORT OF DIRECTOR, GCOS SECRETARIAT

Dr. Alan Thomas, Director of the GCOS Secretariat, summarized the activities of GCOS, and especially the GCOS Secretariat, since SC-IX in September 2000. These were being guided by the GCOS Implementation Plan approved at SC-IX. In accordance with that plan, significant redirection had occurred from scientific planning to an emphasis, within available resources, on implementation. Details of Dr Thomas' presentation are presented as Annex IV.

REPORT OF CHAIRMAN, GCOS SC

Prof. Mason reviewed his perspectives on activities in the GCOS programme since SC-IX 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 V).

UNFCCC ISSUES

SC-IX had requested the GCOS Secretariat, in consultation with the GCOS science panels and individual SC members, to develop, as a matter of urgency, possible methods which could be used to synthesize and analyse the information on systematic observations which was to be submitted to the UNFCCC Conference of the Parties (COP) by November 2001. It further requested that this process be extended to include other available and relevant information and that a procedure be established for preparing a Second Report on the Adequacy of the Global Observing System for Climate. These requests had been endorsed by SBSTA-15 in Marrakech in November 2001 (see Annex VI). SBSTA-15 had also asked the GCOS Secretariat to prepare, in time for consideration by SBSTA-16 in June 2002, an interim report on the synthesis and analysis of the Parties' information on systematic observation. A draft of this interim report was intensively reviewed by the session and recommendations for presentation to SBSTA-16 were agreed (see Item 6 in the Consolidated List below). The session also reviewed and endorsed the detailed plans for preparing the Second Adequacy Report (Annex VII) and the progress that had been achieved to date. It also reviewed, and reiterated its support for, the GCOS Regional Workshop Programme, of which three of the planned ten workshops had been held to date (Annex VIII). The next workshop, for the Southeast Asia region, was planned for Singapore in September 2002.

NATIONAL REPORTS

Several session participants presented brief summaries of GCOS-related activities in their respective countries, including Australia, China, Germany, Japan, Norway, Russian Federation and the United States. The US presentation included details of a specific initiative dedicated to providing support for the primary atmospheric components of the GCOS networks (GCOS Surface Network, GSN; GCOS Upper-Air Network, GUAN; and the Global Atmosphere Watch, GAW), as outlined in Annex IX.

SCIENCE PANEL REPORTS

AOPC:

Dr Mike Manton, Chairman of the GCOS/WCRP Atmospheric Observations Panel for Climate (AOPC), reviewed the main activities of the AOPC since SC-IX. These included the Seventh Session of the panel, held in Geneva from 30 April to 3 May 2001 (see GCOS-68 for a full report of the meeting). A main focus of the group's activities had been implementation of the GSN and the GUAN, for which an advisory group dedicated to this task had been established. Other activities of the group were reviewed and discussed and led to the conclusions and recommendations in the Consolidated List below.

OOPC:

Dr Neville Smith, Chairman of the GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC), reviewed the main activities of the OOPC since SC-IX. A summary of his presentation is presented as Annex X. Dr Smith also confirmed that he would be stepping down from the OOPC chairmanship after his seven-year tenure in that capacity. The session expressed its thanks to Dr Smith for his dedicated service to the OOPC and GCOS and welcomed Dr Ed Harrison as the new Chairman of the panel.

TOPC:

Dr Alan Belward, recently-appointed Chairman of the GCOS/GTOS Terrestrial Observation Panel for Climate (TOPC), reviewed the main activities of the TOPC since SC-IX. A summary of his presentation is presented as Annex XI. The session welcomed Dr Belward as Chairman of TOPC and expressed its thanks to Dr Josef Cihlar, outgoing Chairman, for his dedicated service to the panel and to GCOS during his tenure.

SUMMARY OF PRIORITIES

The session agreed that the major priorities for GCOS in the next inter-session period should focus on (1) development of the Second Adequacy Report for the UNFCCC; (2) implementation of the GCOS networks; (3) the GCOS Regional Workshop Programme; and (4) maintaining and strengthening links with current and potential new partners in support of the GCOS programme. Other priorities and recommended activities are identified in the Consolidated List below

NEXT MEETING

It was tentatively agreed that the Eleventh Session of the SC would be held from 7-11 April 2003, to allow for completion of a draft of the Second Adequacy Report and its review by the SC prior to its submission to SBSTA-18 in June. The location would be identified and transmitted to the members in due course.

GCOS Steering Committee, Tenth Session

CONSOLIDATED LIST OF DECISIONS, RECOMMENDATIONS AND ACTION ITEMS

1. The SC noted the substantial progress that had been made in carrying out the actions agreed at SC-IX. It expressed its appreciation to the GCOS Secretariat for its efforts in effecting this progress, as well as to the GCOS partners that had provided assistance and the countries and agencies that had contributed resources for carrying out GCOS activities.
2. The SC recognized the growing pressure for, and importance of, implementing GCOS networks and systems to meet user needs, including the UNFCCC, and the scope and complexity of the work required to oversee and coordinate them. It recommended to GCOS sponsors that a dedicated project office for GCOS Baseline Systems be established as soon as possible, focussing initially on the GSN and GUAN and extending eventually to other networks such as GTN-H.

UNFCCC Issues

3. The SC noted with approval the developments in planning for preparation of a Second Report on the Adequacy of the Global Observing System for Climate to the UNFCCC. It endorsed the approach being followed and the accelerated schedule for completing the report by SBSTA-18 (June 2003) as well as the key milestones identified, including the planned meeting of IPCC and GCOS experts in August 2002 to refine the objectives and develop the metrics for the report. The SC recognized the importance of taking an integrated approach to global climate observing systems, as recommended by the SBSTA, and of following a broad-based and open process to maximize the report's credibility among all relevant communities.
4. The SC recognized the valuable contributions that the National Reports submitted by Parties to the UNFCCC will provide in preparation of the Second Adequacy Report and requested that this contribution be clearly acknowledged in the Report.
5. The SC noted the key issues identified by the Chairman for possible attention by the SBSTA, including the requirement for support for specific components of the observing system and the crucial need to ensure the full, open and prompt exchange of data from, and relevant information about, the observing systems. The SC requested the Chairman and the GCOS Secretariat to consolidate these issues with the findings from the analysis of National Reports to the UNFCCC in preparing a final document for submission to SBSTA-16.
6. The SC, having reviewed the draft interim report containing an analysis of the national communications and detailed reports on systematic observation submitted by Parties to the UNFCCC, recommended that:
 - GCOS invite its sponsoring agencies to give greater emphasis and prominence to the terrestrial component of the global observing systems for climate and to enhance the linkage of the terrestrial component with other national activities;

- GCOS invite the FAO, UNEP and WMO, as the organizations with prime responsibility for the terrestrial component of the global observing systems for climate, to investigate and address reported difficulties with terrestrial data exchange;
- TOPC, in light of the substantial uncertainties on the part of almost all Parties regarding which parts of their activities in the terrestrial domain should be part of the global observing system for climate, develop a clear statement of global terrestrial observing requirements;
- AOPC work closely with the WMO Commission for Basic Systems and WMO Members to address the concerns expressed by some of the Parties over the future viability of the GUAN.

7. The SC further recommended that:

- those Parties who have not yet submitted reports on their activities in relation to systematic observation, as requested in Decisions 4/CP.5 and 5/CP.5, be asked to do so as soon as practical in order that their input might be considered in the preparation of the Second Adequacy Report;
- those Parties that have not yet done so be asked to consider creating internal coordination mechanisms for all aspects of the climate observing system, with special emphasis on the terrestrial component, and draw the attention of Parties to the potential benefits accrued by some Parties as a result of developing National Plans for their national climate observing system activities;
- Parties be asked to implement the UNFCCC Climate Monitoring Principles for both satellite and *in situ* observing systems;
- Parties be asked to ensure that their real-time and historical data are reaching the appropriate international data centres.

Furthermore, the SC:

- Noted with appreciation the increasing role being played by the various space agencies in observation of the climate system and encouraged them, in cooperation with the international agencies, to continue to work towards the development of an integrated global observing system for climate;
- Noted that funding of systematic observation in developing countries is one of the most important priorities identified by GCOS in addressing the reported deficiencies in the global observing systems for climate;
- Noted that several ongoing partnerships between Annex I and Non-Annex I Parties have led to successful operation of specific GCOS stations, and that other Annex I Parties might wish to adopt similar cooperative arrangements;
- Noted that success in the GCOS Regional Workshop Programme will depend on the Parties and international funding agencies, including the GEF, giving special consideration to the provision of resources for implementing projects identified in the Regional Action Plans, especially those addressing GCOS priorities for GSN and GUAN;

and requested that these conclusions be brought to the attention of the UNFCCC/SBSTA.

Regional Workshops

8. The SC confirmed its endorsement of the GCOS Regional Workshop Programme (RWP) and expressed satisfaction at the completion of the second and third workshops in the series.
9. The SC recognized the importance attached to the Regional Workshop Programme as an implementing mechanism to support the observational needs of the UNFCCC, and the need for expeditious development of specific project proposals from each workshop which would lead clearly to amelioration of deficiencies in the climate observing systems.
10. The SC welcomed the progress in development of Regional Action Plans (RAPs) from the Regional Workshops, but reiterated its view that those plans are not an end in themselves. It emphasized the need for a strategy for implementation of the RAPs and requested the GCOS Secretariat to facilitate the development of such a strategy.
11. The SC recommended that the GCOS Secretariat aim to continue its involvement in oversight of the Regional Workshops following their completion in order to ensure that the RAPs are adequately developed and implemented, while recognizing that additional resources would be needed to carry out this task. It suggested that such resources could come from national and international or intergovernmental mechanisms, including the GEF.
12. The SC recognized the need for increased involvement of the GCOS Science Panels in the Regional Workshop Programme and requested that the GCOS Secretariat take the necessary action to ensure that this occur.
13. The SC urged Annex I Parties to participate in the Regional Workshops to the extent possible and appropriate with a view to considering the possibilities for provision of support for the implementation activities identified.
14. The SC noted that while the GCOS Regional Workshop Programme was focussed on resolving network deficiencies involving Non-Annex I Parties, there were also many Annex I countries which could benefit from a regional approach to overcoming deficiencies. The SC requested that the GCOS Secretariat take this consideration into account in the planning of future Regional Workshops.

AOPC

15. The SC expressed its appreciation to the AOPC for the significant progress made in implementation of the GSN and GUAN baseline systems and encouraged it to continue its efforts to ensure their satisfactory performance.
16. The SC noted the publication of the most recent GSN Monitoring Report and reiterated its appreciation to the Deutscher Wetterdienst (DWD) and the Japan Meteorological Agency (JMA) for carrying out this activity in their capacity as the GSN Monitoring Centre. It also reiterated its appreciation to the World Data Centre for Meteorology, Asheville (NCDC, USA) for its efforts in establishing and maintaining the archive for GSN and GUAN data.
17. The SC noted the significant progress in the compilation and presentation of monitoring results for the GUAN and expressed its appreciation to the ECMWF and the Hadley Centre of the UKMO in effecting this progress as the GUAN Monitoring and GUAN Analysis Centres, respectively. The SC noted with satisfaction that these results were being made freely available to all interested parties through the web sites of the respective centres and other appropriate means.

18. The SC noted with appreciation the completion of Version 1.0 of the "Manual on the GCOS Surface and Upper-Air Networks: GSN and GUAN" by the AOPC Advisory Group on GSN and GUAN (AGG), thereby providing a consolidated compendium of the operational guidelines for the GSN and GUAN.
19. The SC expressed appreciation for the increasing support of the WMO Commission for Basic Systems (CBS) and the WMO Secretariat in taking action to address the problems in the reporting of real-time data from the GSN and GUAN. It was pleased to note that the concept of establishing CBS Lead Centres for GCOS data to facilitate communication between GCOS Monitoring Centres and operators of GSN and GUAN sites would be pursued at a planned CBS/GCOS Expert Meeting in Offenbach in May 2002. The SC fully supported this concept and requested that appropriate proposals be presented for endorsement to the CBS and the WMO EC and Congress, as appropriate, at the earliest opportunity.
20. The SC noted the disappointing response from operators of some GSN sites to the request from WMO to provide unrestricted GSN historical data and metadata to the GSN Archive (WDC-Asheville), as had been accepted as a commitment under the agreement for designating GSN stations, as well as under UNFCCC Article 4 relating to data access. The SC, noting the availability of secondary sources of GSN data and recalling the need for GCOS to provide data products to the world community, recommended:
 - that GSN data from all open data sources be prepared and made openly available through the GSN Archive;
 - that the proposed CBS Lead Centres for GCOS data be used to make direct approaches to national meteorological services for access to historical GSN data;
 - that further direct negotiations with site operators be commenced to ensure access to all GSN data.
21. The SC noted with appreciation the development by AOPC and OOPC, in collaboration with WCRP and CCI, of a CBS Statement of Guidance (SOG) on Seasonal-to-Interannual Prediction, and encouraged AOPC to lead the development of complementary SOGs on the detection of climate trends and on monitoring global and regional climate.
22. The SC expressed its appreciation to the NOAA Office of Global Programs for its support of a planning meeting in late April 2002 to finalize the science and implementation plan for AOPC, noting that this plan will be very important as background information for preparation of the Second Adequacy Report.
23. The SC agreed that the objectives of GCOS would be advanced through capacity-building activities aimed at the recovery and analysis of climate data in developing countries, and encouraged further development of this theme through the GCOS Regional Workshop Programme.
24. The SC encouraged the AOPC to document and promote the climate requirements for reanalysis and other composite products.
25. The SC reiterated the importance of reconciling satellite and *in situ* measurements of upper-air parameters and encouraged the AOPC to work with relevant groups towards implementing a mechanism to promote further analysis of upper-air data.

26. The SC encouraged the AOPC to increase its focus on the development and analysis of systems to monitor climate forcing, and in particular to explore the utility of the global surface radiation network as a component of GCOS.
27. The SC endorsed the revised Terms of Reference for the AOPC which had been developed as requested by SC-IX in response to the dissolution of the cross-cutting panels and ongoing developments in GCOS and its implementation strategy.

OOPC

28. The SC expressed its appreciation to the OOPC for its contributions to the substantial progress made in implementation of the ocean observing system for climate. It noted in particular the progress in the GODAE pilot project and its Argo initiative; the definition of a pilot system of global ocean timeseries observatories; and the continuing augmentation of the activities of JCOMM as the formal implementation body for the ocean observing system.
29. The SC expressed its sincere thanks to the outgoing Chairman of the OOPC, Dr. Neville Smith, for his outstanding leadership of the Panel since its establishment and his untiring dedication to the achievement of its goals. It welcomed Dr. Ed Harrison as the new Chairman and confirmed its continuing support for the activities of the Panel.
30. The SC concurred with the suggestion that the OOPC could increase its attention to polar issues and requested that the incoming Chairman take this into account in setting priorities for future activities of the Panel.

TOPC

31. The SC expressed its sincere thanks to the outgoing Chairman of the TOPC, Dr. Josef Cihlar, for his outstanding leadership of the Panel since its establishment and his untiring dedication to the achievement of its goals. It welcomed Dr. Alan Belward as the new Chairman and confirmed its continuing support for the activities of the Panel.
32. The SC requested that the TOPC maintain close collaboration with the other GTOS Science Panels [Global Observation of Forest Cover - Global Observation of Land cover Dynamics (GOFC-GOLD) and Terrestrial Carbon Observations (TCO)] in order to serve as a liaison between the GCOS SC and those panels regarding issues of mutual concern.
33. The SC requested that the TOPC ensure a strong level of hydrological expertise among its membership. It also requested that the TOPC establish and maintain solid links to the global modelling centres to be able to support them in model validation and related activities.
34. The SC requested that the TOPC review its Terms of Reference in light of the many developments in GCOS since the last meeting of the Panel and present a revised version for approval by the SC at its next session.

Satellite Issues

35. The SC reiterated the need to integrate satellite issues with the work of the Panels and was pleased that the alternative process for handling these issues, proposed at SC-IX, had been implemented and was working to the satisfaction of all concerned. It encouraged the Panel Chairs to invite appropriate experts from space and satellite organizations to specific meetings as needed, in addition to ensuring that at least two members of each Panel have expertise on space-based observation in the relevant domain.

36. The SC recognized need for strong executive-level interaction between GCOS and various space agencies and noted the advantages of having space-agency representatives on the SC as one strategy for ensuring such interaction.
37. The SC welcomed the EUMETSAT initiative to establish Satellite Application Facilities (SAFs) that produce climate-related products of benefit to GCOS. It supported the production of such products on a regular and sustained basis and encouraged the development of complementary activities in other parts of the world to generate consistent global products. The SC welcomed the review workshop planned for early 2003 relating specifically to the SAF on Climate Monitoring and recommended that international participation be sought in this activity.
38. The SC recognized the experience and achievements of the Coordination Group for Meteorological Satellites (CGMS) in dealing with the ongoing coordination of a robust, reliable observational satellite system and requested that the GCOS Secretariat investigate the possibility of enhanced interactions between GCOS and CGMS.

Data Management Issues

39. The SC noted the results of the external review of GOSIC carried out in 2001 as had been requested by SC-IX. It welcomed the ongoing review and analysis of the GOSIC user community to identify and ultimately maximize the specific benefits being provided by GOSIC, and looked forward to a presentation of the detailed findings of this review at its next session.
40. The SC requested that the information on data sources and related issues that had been provided through the National Reports from Parties to the UNFCCC be brought to the attention of GOSIC for possible use in their system.
41. The SC recognized the continuing existence of obstacles to the free and open exchange of climate data in some areas and encouraged the GCOS panels to promote open and direct access to data and products from GCOS-related systems to the maximum extent possible.

National and Agency Implementation Initiatives

42. The SC welcomed the possible provision of support to systematic climate observation, especially in developing countries, through the recently-proposed US Climate Change Research Initiative. It expressed appreciation for the efforts that had led to these developments and looked forward to the major benefits to the observing systems that would result should the proposed initiative reach fruition.
43. The SC expressed its appreciation for the offer of direct support made by Japan for carrying out the development of the Second Adequacy Report.
44. The SC welcomed the review of GSN stations being carried out in the Russian Federation and looked forward to the improvements in performance of the network which could be expected to result from this review.

Linkages with Partners and Sponsors

45. The SC reiterated its desire to maintain close interaction with space and satellite agencies through the mechanism of the CEOS Plenary and CEOS Working Groups as well as through contacts with individual agencies. It welcomed the opportunities for such interaction presented through its role as an Associate Member of CEOS as well as through its partnership with CEOS and others in the IGOS Partnership.

46. The SC expressed its satisfaction with the mechanism of 'Themes' in achieving the coordination and integrated observing objectives of the varied partners in the IGOS Partnership. It looked forward to continuing collaboration in this regard and encouraged the Panel Chairs to ensure the involvement of their panels, as appropriate, in the development of the IGOS Themes.
47. The SC recognized the benefits of endorsement of the integrated observing objectives of IGOS Partners by the executive bodies of international and intergovernmental agencies, and encouraged the GCOS Secretariat to continue its support of IGOS through representations as appropriate in climate-related fora such as the IPCC and UNFCCC.
48. The SC noted with satisfaction the close cooperation between GCOS and CBS through the CBS Open Programme Area Groups (OPAGs) on Integrated Observing Systems and Information Systems and Services and the positive results deriving from these linkages. It recognized the essential contributions of CBS activities to the development of GCOS with regard to planning and implementation of operational network components, exchange and management of relevant data sets, development of information systems and relevant standards, and the establishment of system monitoring functions. The SC noted that although CBS activities were focussed primarily on support of the atmospheric component of GCOS, they were also of value for the oceanic and terrestrial components.
49. The SC noted the recent restructuring of the WMO Commission for Climatology (CCI) and looked forward to cooperation with the relevant OPAGs and Expert Teams that had been established in achieving the goals of both GCOS and CCI. It noted in particular the request from the President of CCI for collaboration with GCOS and WCRP in the area of observational requirements for, and development of, global and regional climate observing networks. The SC requested that the AOPC take the lead in pursuing this issue and consider it at its next meeting in May 2002.
50. The SC expressed its satisfaction with the continuing cooperation between GCOS and GTOS in implementing the terrestrial component of GCOS, while acknowledging the distinctive characteristics of the major sponsors of the two systems (WMO and FAO). It suggested that a joint mechanism for implementation of the terrestrial systems might be beneficial to the goals of all sponsors, in a manner similar to the very positive results of the establishment of JCOMM by the WMO and IOC for the ocean observing system. The SC requested that the GCOS Secretariat initiate exploration of the advisability of establishing such a mechanism, in cooperation with the GTOS Secretariat and other relevant partners.
51. The SC reiterated its desire to increase the level of cooperation between GCOS and IGBP, in the first instance through cooperation in the activities of the TOPC. It requested that the new TOPC Chairman explore ways to improve cooperation and coordination between the two entities, perhaps through the specific tasking of a TOPC member to act as a rapporteur or liaison on issues common to TOPC and IGBP.
52. The SC expressed its satisfaction with the constructive relationships established between GCOS and the IPCC and WCRP, noting the complementarity of the roles of the three entities, and reiterated the importance of continuing these important interactions.
53. The SC urged the Chairman and the GCOS Secretariat to interact with the chairman and members of the informal consultation groups on systematic observation usually established at the SBSTA meetings, in order to support the development of appropriate resolutions for presentation to, and eventual adoption by, SBSTA and/or COP.

54. The SC took note of the activities being carried out by the European Climate Forum and encouraged the panels to maintain appropriate contact with this group.
55. The SC agreed that there is a continuing need to strengthen the interaction between GCOS and UNEP and requested that the Chairman and the GCOS Secretariat explore actions to facilitate this interaction, for example through formal participation in appropriate sessions of the UNEP executive bodies.

Other

56. The SC welcomed the modifications to the GCOS Implementation Strategy that had been made in response to the request from SC-IX. It noted that there was now an increasing need to develop a detailed implementation plan which would identify the specific steps through which the strategy would be implemented and requested the GCOS Secretariat and SC Chairman to lead the development of such a plan.
57. The SC requested that the GCOS Secretariat, in collaboration with the current GCOS coordinators, prepare possible Terms of Reference for GCOS National Coordinators and pursue the development of this mechanism as a way to implement GCOS within nations and, where appropriate, regionally.
58. The SC recognized the need for a clear statement of the baseline networks and systems that formally comprise GCOS within the context of an integrated global observing system, and the process for defining these components. It noted that the preparation of the Second Adequacy Report to the UNFCCC would of necessity provide most of the information needed to develop such a statement, and recommended that the GCOS Secretariat and Science Panels review the issue and report on developments at the next session of the SC. In the interim, it agreed that entities that have traditionally been identified as GCOS entities should retain that designation.
59. The SC requested that the Chairman consult with SC members, including the Chairs of the Science Panels, and other appropriate parties to develop advice for the GCOS Secretariat regarding funding mechanisms in support of GCOS.
60. The SC agreed that its Eleventh Session should be held from 7–11 April 2003. It expressed its appreciation to the Australian Bureau of Meteorology for their kind offer to host the meeting in Melbourne, Australia, and agreed to confirm the final selection of the site as soon as feasible.
61. The SC expressed its appreciation to the UK Met Office and the SC Chairman and his staff for their strong support and kind hospitality in hosting the session, and particularly for the excellent facilities and congenial venue provided.

ANNEXES

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ANNEX I

LIST OF PARTICIPANTS

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ANNEX II

AGENDA

MONDAY, 15 APRIL

08:30 Registration

09:00 – 12:30

1. Opening of the Session

- 1.1 Welcome and Introductions (Mason)
- 1.2 Approval of Agenda (Mason)
- 1.3 Conduct of the Meeting (Teunissen)
- 1.4 Review of Report of SC-IX and Matters Arising (Teunissen)

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

- 2.1 GCOS Implementation Activities
- 2.2 UNFCCC and Related Issues
 - results from COP-6 and 7
 - status of National Reports to COP
 - Regional Workshop Programme
- 2.3 Overview of Secretariat issues

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

12:30 – 14:00 LUNCH

14:00 – 17:30

4. GCOS Panel Reports

- 4.1 Overview (Thomas)
- 4.2 Report of the GCOS/WCRP Atmospheric Observation Panel for Climate (Manton)
- 4.3 Report of the GCOS/GOOS Ocean Observations Panel for Climate (Smith / Summerhayes)

TUESDAY 16 APRIL

09:00 - 12:30

4. GCOS Panel Reports (continued)

- 4.4 Report of the GCOS/GTOS Terrestrial Observation Panel for Climate

(Belward)

5. Cross-Cutting Issues

- 5.1 Space and Satellite Issues (Mason / Williams)
- 5.2 Data Management Issues (including GOSIC)
- 5.3 National and Agency Implementation Initiatives

12:30 - 14:00 **LUNCH**

14:00 - 17:30

6. Second Adequacy Report to UNFCCC: Strategy and Process

- 6.1 Interim Report to SBSTA 16 (Dawson / Mason / Thomas)
- 6.2 Second Adequacy Report (Mason / Thomas)
- 6.3 Intergovernmental Funding for Climate Observations (Thomas)
- 6.4 Summary of recommendations and proposed actions (Mason)

WEDNESDAY 17 APRIL

09:00 – 12:30

7. GCOS Regional Workshop Programme: Status Report (Westermeyer)

- 7.1 Pacific Islands Workshop
- 7.2 Eastern and Southern Africa Workshop
- 7.3 Central America and the Caribbean Workshop

12:30 - 14:00 **LUNCH**

14:00 *Local Visit*

THURSDAY 18 APRIL

09:30 - 12:30

8. Links with GCOS Partners (Mason)

- 8.1 GCOS Sponsors: WMO, IOC, UNEP, ICSU
- 8.2 Other Programmes/Entities: GOOS, GOS, GTOS, CEOS, IGOS, WCRP, IGBP, IPCC, UNFCCC/SBSTA (Mason)

9. Review of National GCOS Programmes

12:30 – 14:00 **LUNCH**

14:00 – 17:30

10. GCOS Strategy and Implementation (Mason / Thomas)

- 10.1 GCOS Implementation Plan
- 10.2 GCOS MOU, SC Terms of Reference

FRIDAY 19 APRIL

09:00 - 12:00

11. Actions to be undertaken by the GCOS Secretariat

- 11.1 Availability of Resources (Thomas)
- 11.2 GCOS Fundraising (Mason)
- 11.3 Review of Meeting Decisions (Teunissen)
- 11.4 Summary of Priorities (Mason)

12. Other Business

- 12.1 Arrangements for SC-XI
- 12.2 Steering Committee Membership (*In Camera*)

13. 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-IX Action Items
4	2	Report of the Director, GCOS Secretariat
5	3	Report of the Chairman, GCOS SC
6	4.2	Report of the Chairman, AOPC
7	4.3	Report of the Chairman, OOPC
8	4.4	Report of the Chairman, TOPC
9	5.1	Climate Monitoring Principles for Satellites
10	5.2	GOSIC Status
11	6.1	Interim Report to SBSTA-16
12	6.2	Plan for Second Adequacy Report
13	7	GCOS Regional Workshop Programme - Update
14	10.1	GCOS Implementation Strategy
15	10.2	GCOS MOU
16	2.2	GCOS Input and Results from SBSTA/COP Sessions
17	6	Key Issues for SBSTA-16
18	5.3	NOAA Position Paper on US CCRI Proposal

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ANNEX IV

REPORT OF THE DIRECTOR, GCOS SECRETARIAT

1. Introduction

This report to the GCOS Steering Committee summarizes the activities of GCOS and especially the Secretariat, since SC-IX in September 2000. Over this period, the activities of the Secretariat have been guided by the GCOS Implementation Plan approved at SC-IX. In accordance with that plan, significant redirection has occurred, within available resources, from scientific planning to an emphasis on implementation, including active GCOS participation in the WMO Technical Commissions and interaction with the IOC, GOOS, and the IGOS partners.

GCOS has extended its activities in response to the decisions of the UNFCCC Conference of Parties, especially with its Subsidiary Body for Scientific and Technological Advice (SBSTA). In this regard, progress has been made on the GCOS Regional Workshop programme, continuing focus of informing SBSTA on issues related to systematic observation, and in the planning for the second report on the Adequacy of Global Climate Observing Systems.

Resource mobilization continues to be a high priority for the Director. Since the last meeting, GCOS has received approval for two grants under the UNDP/GEF National Communications Support Programme in support of the GCOS Regional Workshop Programme. In addition, significant extra-budgetary resources have been received from national and other sources to supplement the contributions from the GCOS Sponsors, thereby allowing for the continuing employment of limited-term contractors and short term consultants and other basic activities of the Secretariat. We are most appreciative of this support.

2. Implementation of the GCOS networks

Under the leadership of the GCOS Science Panels (AOPC, OOPC, TOPC), significant progress was made in the implementation of the GCOS networks and systems. For example:

- The GCOS Surface Network (GSN) Monitoring Centres at the Japan Meteorological Agency (for temperature) and the Deutscher Wetterdienst (DWD) (for precipitation) are fully operational and have produced semi-annual reports on the availability of GSN data for the last three years. For the GCOS Upper-Air Network (GUAN), the European Centre for Medium-Range Weather Forecasts (ECMWF) provides monitoring data to the Hadley Centre of the UK Met Office, which publishes monthly statistics on the GUAN Web site. The World Data Centre for Meteorology, Asheville (NCDC) acts as the GSN and GUAN Archive and provides access to the historical data from both networks. Establishment of this data management infra structure is allowing performance weaknesses to be identified and ultimately improved, as well as providing access to the data.
- In response to Resolution 3 of WMO EC-LII, GCOS has sought closer ties with the WMO Technical Commissions in implementing the GCOS networks. The Commission on Basic Systems (CBS) at its 12th session requested the existing monitoring centres of CBS and GCOS to take steps to improve the monitoring of CLIMAT and CLIMAT TEMP reports, which are the basis for GSN and GUAN reports. This has led to closer cooperation between the WMO and GCOS. A meeting between the CBS and GCOS monitoring centres as well as members of the AOPC Advisory Group on GSN and GUAN (AGG) is scheduled for 15 -17 May at DWD.

- Cooperation with CBS has included working with the OPAG on Integrated Observing Systems and its Expert Team on Observational Data Requirements and Redesign of the Global Observing System (ET-ODRRGOS). Based on consultations with OOPC and others, Dr. Manton presented a revised statement of guidance (SOG) on seasonal to interannual prediction to the ET-ODRRGOS in January 2001, which was well received by that group.
- Dr. Mason represented GCOS at the 2nd session of the Consultative Meetings on High-Level Policy on Satellite Matters on 18-19 February 2002. He presented an initial overview of the satellite observational requirements (specific evaluations are considered through the CBS Rolling Review of Requirements Process), including the GCOS two-stream strategy of *comprehensive* global networks and *baseline* global networks. The meeting welcomed his proposal on the adoption of GCOS observing principles for climate monitoring for satellite systems as well as *in situ* observations and requested that these principles be presented through CBS for adoption at EC-LIV. The participants felt that a formal WMO endorsement would greatly assist space agencies in obtaining the necessary resources to meet the principles for future satellite systems.
- Solid progress was made in the implementation and operation of the GCOS ocean observation networks (e.g. VOSclim, ASAP, DBCP, the TAO/TRITON array and the Argo initiative), thanks in large part to the strong efforts of the OOPC and the establishment of JCOMM. Dr. Smith will provide specific accomplishments in his presentation. Likewise, he will discuss the progress made on GODAE and the upcoming international Conference on GODAE.
- Further progress was made toward the establishment of a global climate network for hydrology (GTN-H, the Global Terrestrial Network – Hydrology) through planning and implementation meetings led by the TOPC and hosted by DWD in June 2001. A major goal of the GTN-H, for which Canada has agreed to provide the initial co-ordinator, will be to produce global products for key hydrological variables.
- Since the last SC, the chairs of OOPC (Dr. Smith) and TOPC (Dr. Cihlar) announced their decision to step down and two new Chairs have been appointed, Dr. Ed Harrison for OOPC and Dr. Alan Belward for TOPC. We in the Secretariat welcome them to GCOS and look forward to working with them and our partners on the range of observing system challenges.

3. Interactions with the UN Framework Convention on Climate Change (UNFCCC)

On behalf of its sponsors, 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 the 14th and 15th sessions of SBSTA, held in conjunction with COP-6bis and COP-7, respectively. GCOS reported on the status of activities pursuant to Decision 5/CP.5 and recent developments in global observing systems for climate:

- The GCOS Secretariat prepared and submitted to SBSTA-15/COP-7 the report Global Climate Observing System: progress report on developments in the global observing systems and activities related to decision 5/CP.5. This report reviewed deficiencies in GSN and GUAN, developments in the climate components of the Global Ocean Observing System (GOOS) and Global Terrestrial Observing System (GTOS), and the needs for improved continuity and calibration of satellite observations. GCOS also submitted a detailed report to SBSTA-13/COP-6 and a short report to SBSTA-14/COP-6bis.

- The Parties to the UNFCCC were requested in Decisions 4/CP.4 and 5/CP.5 to prepare detailed reports on their programs of systematic observations. SBSTA-15/COP-7 invited the GCOS Secretariat to prepare, for SBSTA-16, an interim report on the synthesis and analysis of national reports from Parties, due in November 2001, in accordance with Decision 5/CP.5. A draft interim report has been provided for your review prior to its transmission to the UNFCCC Secretariat for SBSTA-16.
- In response to Decision 5/CP.5, GCOS has developed a Regional Workshop Programme which seeks to build capacity in 10 regions having recognized deficiencies in global observing systems for climate. This Programme is to assist countries on a regional basis to develop Regional Action Plans and obtain financial support for improving their observing systems for climate. The Programme is a recognized part of the GEF/UNDP National Communications Support Programme and, as such, has received significant support from GEF through UNDP. GCOS is working closely with UNDP to ensure the full involvement of Non-Annex I climate change teams. The two phases of the programme are:

(i) The Pilot Project, completed in 2001, consisted of two Regional Workshops, one for the Pacific Island countries and one for countries in eastern and southern Africa, and was designed to refine workshop methodology. Besides UNDP/GEF support, contributions were received from the UN Environment Program (UNEP), the World Meteorological Organization (WMO), the United States of America, and Australia. The reports from these workshops are available via the GCOS homepage at: <http://www.wmo.ch/web/gcos/gcoshome.html>.

(ii) The Full Project will be implemented from 2002 to 2005. GEF has approved a GCOS proposal for the Full Project, but matching funds will be needed from donor countries and international organizations. The Full Project was launched in March 2002 through a Regional Workshop for the countries of Central America and the Caribbean, with sponsorship by the Organization of American States, WMO, Canada and the United States. Later in 2002, a Regional Workshop will be held in East Asia.

- At its last meeting, the GCOS Steering Committee proposed that a second 'Report on the Adequacy of the Global Climate Observing Systems', following on from the first Adequacy Report submitted to COP-4 in 1998, be prepared using the national reports as one input. The goals of the Adequacy Report will be to:
 - (1) Determine what progress has been made in defining and implementing climate observing networks and systems since the first Adequacy Report prepared for COP4;
 - (2) Determine the degree to which these networks meet with scientific requirements and conform with associated observing principles; and
 - (3) Assess how well the current systems, together with planned improvements, will meet the needs of the Convention.

This report will draw upon international scientific experts and take into account the conclusions of the IPCC Third Assessment Report (TAR). SBSTA-15/COP-7 endorsed this proposal and invited GCOS to submit a final report to SBSTA-18 in mid-2003.

- A plan for the Second Adequacy Report has been prepared by the Secretariat and has been made available to the Committee members. The Report is under the overall direction of the Chair of the GCOS SC, and the Chairs of the Science Panels are responsible for organizing and overseeing teams of lead and contributing authors who will prepare the Report. Two meetings have been scheduled and the third is in the planning stage:

- (1) On 1-3 July 2002, the Panel Chairs will meet in Melbourne to finalise the information base concerning the current and planned observing system and define questions for the joint IPCC-GCOS meeting;
- (2) On 12-14 August, a joint meeting with IPCC to review the information base, to consider the observing system needs as reflected in the TAR and determined by the Convention, and to develop appropriate metrics for adequacy analyses will be held at NCAR in Boulder Colorado;
- (3) In October 2002, GCOS will hold a meeting in Geneva for the authors to organize and draft an initial report.

4. Resource Mobilization and Future Directions

As the SC is aware, GCOS has been faced with serious resource limitations throughout its history. We discussed the current situation at SC-IX. The implied commitments that GCOS has accepted through the focus on implementation and the responses to the UNFCCC decisions, particularly the Regional workshop Programme and the preparation of the Second Adequacy Report (as recommended by the GCOS Steering Committee), has greatly increased the need for resources.

We have been fortunate to receive support under the UNDP/GEF National Communication Support program for over one-half the costs of the Regional Workshop Programme. This, plus the support from WMO, UNDP, OAS, Australia, Canada and the USA, has allowed GCOS to more than match the GEF support for the first 3 Regional Workshops. This overmatch will allow us to use the GEF drawdown to assist in funding the next several workshops.

Contributions from national ministries and agencies and regional and international organizations have allowed us to maintain the limited-term staff to meet the normal requirements, but not to meet the extra cost of preparing the Adequacy Report.

The next year plus will be demanding for the Secretariat with:

- Increased emphasis on implementation through the AGG, in cooperation with the WWW; proposed development of a CBS Lead Centre for GSN, and work with NOAA on improvements to GUAN;
- Support for implementation of GODAE by OOPC and GOOS;
- Support for the TOPC and its new Chair in developing a terrestrial observing strategy for the future. This will include moving forward on GTN-H with the WMO hydrology and water resources department and with GTOS;
- Preparation of the Second Report on the Adequacy of the Global Climate Observing Systems;
- Organization of two more Regional Workshops and the completion of the first two Regional Action Plans (with the third in development) as requested by SBSTA-15;
- Submission of further reports to SBSTA, e.g., the Interim Report to SBSTA-16 on the synthesis and analysis of the detailed reports from Parties.

We appreciate the strong support that we have received from Dr Paul Mason, Committee Chair. His active engagement and initiative are clearly evident in the accomplishments of GCOS. I continue to benefit from the interest, assistance and sage advice from our past Chair, Dr Kirk Dawson. I look forward to your support for GCOS and ask for your active participation and advice on the future course for GCOS.

ANNEX V

REPORT OF THE CHAIRMAN, GCOS STEERING COMMITTEE

1. Introduction

I am pleased to report to you for the first time as Chairman at this the tenth meeting of the GCOS Steering Committee. This meeting comes 10 years from the establishment of GCOS in 1992. I have formally held the position of Chair for only about 10 months but I was able, as Chair designate, to attend appropriate meetings for the past 12 months. In this report I follow the helpful format of the past Chair, Kirk Dawson, as an aid to continuing in our records.

I particularly valued my attendance at the JSC, OOPC and AOPC as I lacked, and still do, sufficient quotable familiarity with the detailed needs and issues within climate monitoring. I have found that to be effective, the Chair and Director need to be able to respond, as far as possible, to the many questions concerning specific issues. I hope that the Panels will continue to bear with the Chair and Director in meeting the demands that they make to ensure they are well briefed.

Whilst knowledge of the issues is critical, the role of Chair is primarily to further the strategy and engage the implied tactics. I presented the GCOS strategy from our last Steering Committee session to WMO EC, where it was well received and given support. I also formally attended G3OS, IGOS-P, IOC-EC, the resumed COP-6 and SBSTA in July, JCOMM, the margins of IPCC Plenary in London, CEOS, CCI and the WMO High-Level Satellite meeting.

A particular pleasure was an ad-hoc meeting in January at which we thanked Josef Cihlar formally for his long and excellent term as TOPC Chair, and welcomed Alan Belward as new Chair, reviewed past activities of TOPC and discussed future directions. Alan is, of course, attending this SC without the benefit of having held a TOPC or having fully re-established the ongoing membership, but he is no doubt ready and capable of taking up the torch that Josef has passed on to him.

The details of these meetings are covered as needed in the Director's report and I will discuss, as raised, extra details under agenda item 8. I must express my appreciation to Alan Thomas and the Panel Chairs, as well as Kirk Dawson, of course, for their support and advice throughout this period.

After effectively one year as Chair I have a firm view that there is critical need for GCOS, and that this need is fairly consistent with the strategy we assembled at the last SC. My own view is that our mission still requires some refinement, in the need both to match realism with our capabilities and for the community to understand, accept, and work effectively with the GCOS. These issues are before the Steering Committee and are noted in what follows.

2. Resources

Resources remain a grave issue for GCOS. The direct and indirect resources provided by the GCOS sponsors and FAO allow for no more than the Panel meetings and a few of the responsibilities of the single post (i.e. the Director) to be supported.

National contributions (i.e. specific funds provided by individual countries) are usually linked with specific actions and activities and have greatly aided GCOS. The possibility of national contributions sufficient to sustain an expanded central resource needs consideration. The

central resource is, however, so inadequate that it is hard to even respond to such welcome invitations. I am also seeking extra support from our sponsors; I believe that the viability of GCOS in the long run depends on achieving such support. Equally, I am concerned to present GCOS as being effective in providing matching value. That in turn depends on an adequate resource base. Breaking out of our present position is a key issue for us.

The strategy adopted by Alan Thomas and myself continues that followed in the past, in that we are making full use of the resources available to us now and allowing future events and completion of activities such as the adequacy process to be subject to the acquisition of additional resources as we proceed. This is of course a risky strategy, with the chance of some failure and criticism for GCOS. I believe these are risks we have to take to break out from our present resource trap.

Whilst dealing with resources I must give further real thanks and great credit to Alan Thomas, the Panel Chairs, our term contract consultants and many others. All suffer the same issues in putting exceptional personal effort into the programmes in an effort to make up for our missing resources. Together we are all aware of some criticisms on GCOS' failure to engage some things, even new resources at times, when the sole reason for the disappointment is lack of available resources to fully respond.

3. National Implementation Planning and the UNFCCC

My particular concern over resources is linked with the great success which I inherited as Chair in the direction of our interactions with the UNFCCC. This success is, I feel, continuing. The regional workshop programme has advanced to where 60% of the costs of the full programme are being approved by the GEF (albeit conditional on GCOS raising the remaining 40% through matching funds). With the due date for submission of National Reports to the COP being last autumn, we sought a request to go beyond the analysis of these National Reports to a second Adequacy Report based on all available information, including the National Reports. Alan attended the COP meeting in Marrakech and presented a strong document which I had agreed with him. This made good use of the observational concerns and needs expressed in the IPCC Third Assessment Report and further noted that a funding mechanism was needed for developing countries. The response was a most welcome request for the full Adequacy Report and for more urgent advice on key issues, especially as linked to deterioration in current capabilities. The needed response from GCOS forms a major part of this meeting. I believe a useful and well-judged response is essential.

4. Liaison with our Sponsors

Exactly as noted by the Chair at the last Steering Committee, effective links and co-ordination with our sponsors is vital for GCOS to be effective and to engage the support of sponsors. Interactions with WMO and IOC are most direct, but there is an urgent need to strengthen interaction with other sponsors. We are also inviting FAO to join as a sponsor consistent with our interactions with the GTOS. Provided that the UK maintains its support of my Chairmanship, I hope to aid the Director in these interactions. A more sustainable position needs new resources.

5. Actual Effectiveness

This is a difficult issue to engage, as much depends on measures of effectiveness. There are some examples of actual observational improvement (*Argo* is one), although perhaps not as many as we would like. I do, however, judge some pulling together of some of the networks and a very much-increased awareness with agencies and communities of GCOS needs and issues. My own judgement is that we should be encouraged by the response that we as a tiny resource have achieved. For example, I believe that the current US proposal to provide

extra support for climate observations is a clear example of something that links directly or indirectly to our message and interactions.

With signs of success, we need to think hard on how to ensure that our message is capable of practical implementation. This topic clearly leads in the issue of our strategy.

6. Our Implementation Strategy

I am convinced that the establishment of our strategy and its presentation have aided us. The strategy has been well received, but I sense that we need to be more precise in expressing our ambit and in being able to be more specific in our advocacy. I make this judgement very much from the most welcome questions and calls for guidance which come to us.

7. Issues for this Meeting

I have a number of questions which I hope the Steering Committee will consider as we proceed. These are strongly coupled with the issues which the agenda raises for our consideration.

1. Provide guidance on the scope of GCOS in terms of observations, networks and products: I feel that we do not have enough clarity to the separation (if any) between the GCOS needs and, say, wider GOOS, GOS, GTOS and WCRP and total IPCC needs. I judge that GCOS should more clearly adhere to a focus on measurements of global relevance for which measurements of long-term trend is a requirement. GCOS should, however, retain its breadth of interest in establishing the need for such time series and in ensuring that the required development, prior to such measurements being practical, is undertaken. We should remain concerned with both baseline and comprehensive data. Such a focus could, however, lead to parts of GAW and perhaps the Fluxnet no longer being a part of GCOS. The suggested focus would perhaps aid GCOS in implementation, and in establishing a clear and recognized role within the community. It is perhaps shifting more from climate to climate change. The scope of GCOS is critical for the Adequacy Report, but I do not have a problem if that report notes explicitly the wider needs for climate understanding “now” as well as the “long-term-monitoring” needs. We must, however, be clear in the Adequacy Report on the scope of the report and the scope of GCOS.
2. Consider how GCOS can be more effective in giving specific recommendations for action to nations and agencies: This concerns the tactics of implementation. When we draw the communities’ attention to an issue, we tend to use the general format, as is the norm for a UN body. Providing station-specific advice for improvement of GUAN illustrates the alternative approach to the issue.

The following are issues more explicitly noted on the agenda:

3. Consider the priorities which can be accomplished within resources and the priority to be given to fund raising and by what means.
4. Provide advice on the plan to produce the Adequacy Report and of course the scope of its content.
5. Provide advice on the selection of the priorities for most urgent action which are to be raised to SBSTA in June, in particular advice to ensure that GCOS is clear on the response it seeks and judges as practical.

6. Consider any changes to the pattern of the regional workshops and actions needed to derive value from them.
7. Consider the progress of the Panels and their success in being effective in their integration within the wider global observing systems.
8. Consider the effectiveness of the current arrangements for the cross-cutting issues of data management and space observation.
9. Update the strategy so as to ensure it proceeds as a relevant and living document.

ANNEX VI

CONCLUSIONS FROM SBSTA/COP SESSIONS SINCE SC-IX

This Annex presents the GCOS-relevant conclusions from the three sessions of the UNFCCC/SBSTA that have occurred since GCOS SC-IX in September 2000 (i.e. SBSTA-13, SBSTA-14 and SBSTA-15).

FCCC/SBSTA/2000/CRP.12
17 November 2000
ENGLISH ONLY

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

Thirteenth session

The Hague, 13-18 November 2000

Agenda item 12

COOPERATION WITH RELEVANT INTERNATIONAL ORGANIZATIONS

~~Draft~~ conclusions by the Chairman

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA) welcomed the report made by the Director of the Global Climate Observing System (GCOS) Secretariat, on behalf of the agencies participating in the Climate Agenda, on developments in the global observing systems and activities related to decision 5/CP.5. It noted with concern continued degradation in some components of the Global Climate Observing System, and recognized the need for Parties to work actively to reverse that situation.
2. The SBSTA recognized the importance of the Integrated Global Observing Strategy Partnership in developing the global observing systems for the oceans and terrestrial carbon sources and sinks in the global carbon cycle, and in promoting systematic observation.
3. The SBSTA took note of the outcome of the first GCOS regional workshop to identify capacity-building needs in the South Pacific region, held in Samoa in August 2000. The SBSTA expressed appreciation to Australia, the United States of America, the World Meteorological Organization, the United Nations Environment Programme and the South Pacific Regional Environment Programme for providing support for the workshop. It also noted the plans for a second regional workshop in Africa in early 2001.
4. The SBSTA welcomed the information provided by Australia on a supplementary reporting format to the UNFCCC reporting guidelines on global climate observing systems.¹ It encouraged Parties to consider this information in preparing their national communications.
5. The SBSTA noted with appreciation the information contained in a discussion note prepared by the Executive Secretary of the Convention on Biological Diversity (CBD).² It took note of the decisions of the fifth Conference of the Parties to the Convention on Biological Diversity³ relating to forest biodiversity and marine and coastal biodiversity, particularly coral reefs, and their links to the UNFCCC. The SBSTA agreed to consider this matter in more detail at its fourteenth session. It invited Parties to submit their views on the issues identified in the discussion note prepared by the Executive Secretary of the CBD to the UNFCCC secretariat no later than 1 March 2001, to be included in a miscellaneous document.

¹See document FCCC/CP/1999/7, section III.

²The paper is available in three language versions on the CBD web site, www.biodiv.org.

³Decisions V/3, V/4, V/15 and V/24 are available on www.biodiv.org.



SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
Fourteenth session
Bonn, 24-27 July 2001
Agenda item 6

COOPERATION WITH INTERNATIONAL ORGANIZATIONS

Draft conclusions by the Chairman

Cooperation with other conventions

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA) emphasized the need for enhanced cooperation between the UNFCCC and other relevant conventions and stressed the importance of coordination at the national level.
2. The SBSTA noted with appreciation the information on the issues relating to cooperation between the Convention on Biological Diversity (CBD) and the UNFCCC provided by the Chairman of the Subsidiary Body for Scientific, Technological and Technical Advice (SBSTTA) of the CBD. It also took note of the information provided by the secretariat in documents FCCC/SBSTA/2001/INF.3 and FCCC/SBSTA/2001/MISC.3.
3. The SBSTA welcomed the proposal by the SBSTTA of the CBD on potential areas of collaboration and coordinated actions between the CBD and the UNFCCC. It encouraged Parties to promote the involvement of climate change expertise in the CBD pilot assessment of the interlinkages between climate change and biological diversity.
4. The SBSTA endorsed the formation of a joint liaison group between the secretariats of the UNFCCC and the CBD and requested the secretariat of the UNFCCC to invite the secretariat of the United Nations Convention to Combat Desertification to participate in this liaison group in order:
 - (a) To enhance coordination between the three conventions including the exchange of relevant information;
 - (b) To explore options for further cooperation between the three conventions, including a possibility of a joint workplan and/or a workshop.

5. The SBSTA requested the secretariat of the UNFCCC to invite representatives of other relevant instruments and bodies, including IPCC, to participate in meetings of the liaison group, as appropriate. It requested the secretariat to report periodically to the SBSTA on the activities and proposals of the joint liaison group.

6. The SBSTA invited Parties to submit their further views on cooperation between the three conventions as referred to in paragraph 4 (b) above by 15 October 2001 for inclusion in a miscellaneous document.

7. The SBSTA supported the request of the SBSTTA of the CBD to the IPCC to develop a technical paper. It welcomed the scoping paper prepared by the IPCC. The SBSTA invited the IPCC to consider relevant interlinkages between climate change, biodiversity and desertification in developing its technical paper. The SBSTA invited Parties to submit their views on this matter by 1 September 2001 for inclusion in a miscellaneous document and also to forward their comments directly to the IPCC.

8. The SBSTA agreed to consider these issues further at its fifteenth session.

Cooperation with scientific organizations

9. The SBSTA took note of the completion of the Third Assessment Report (TAR) of the Intergovernmental Panel on Climate Change (IPCC) and commended the IPCC on the high quality of its scientific work. It also expressed its appreciation for the special presentations on the findings of the TAR during the resumed session of COP 6. It requested the secretariat to put the TAR and the IPCC synthesis report on the agenda of the fifteenth session of the SBSTA.

10. The SBSTA took note of the report made by the Director of the Global Climate Observing System (GCOS) Secretariat, on behalf of the agencies participating in the Climate Agenda, on activities relating to decision 5/CP.5. It noted that support is needed for GCOS workshops that are planned for the Caribbean and Central American and Asia regions in 2002. The SBSTA took note of the prospectus provided by the GCOS secretariat on a second assessment of the adequacy of the global climate observing system.

Cooperation with United Nations bodies

11. The SBSTA noted with appreciation information provided by the Director of the Forest Product Division of the Food and Agriculture Organization of the United Nations about the decisions taken by its committees on forestry and agriculture regarding activities relating to climate change.



SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
Fifteenth session
Marrakesh, 29 October - 6 November 2001
Agenda item 7

COOPERATION WITH RELEVANT INTERNATIONAL ORGANIZATIONS

Draft conclusions proposed by the Chairman

Cooperation with scientific organizations

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA) welcomed the statement by the Director of the Global Climate Observing System (GCOS) secretariat, on behalf of the agencies participating in the Climate Agenda, on its activities relating to decision 14/CP.4 and 5/CP.5. It further noted the information provided by the GCOS contained in document FCCC/SBSTA/2001/MISC.9.
2. The SBSTA noted with concern the ongoing deterioration of global observation systems for climate, as was also emphasized in the IPCC Third Assessment Report. It encouraged the GCOS to continue to address this problem, working with its sponsors and its partners in global observation systems as well as through capacity-building programmes such as the System for Analysis, Research and Training (START).
3. The SBSTA endorsed the preparation by the GCOS secretariat of a second report on the adequacy of the Global Climate Observing Systems. It noted the necessity for the report to address the needs of the Convention for climate-relevant observations, including those associated with the development of adaptation strategies. The SBSTA invited the GCOS secretariat, in its preparation of the adequacy report, to take into account relevant decisions of the Conference of the Parties on capacity building, technology transfer and adaptation. It also invited the GCOS secretariat to consider in its report an integrated approach to global climate observation systems, including the exploitation of new and emerging methods of observation.
4. The SBSTA noted the need to complete the adequacy report in the shortest possible time in order to provide a framework for further work to improve global monitoring systems. It invited the GCOS secretariat to prepare, in time for consideration by the SBSTA at its sixteenth session, an interim report on the synthesis and analysis of national reports from Parties provided in accordance with decision 5/CP.5. It encouraged the GCOS secretariat to complete the final adequacy report

by the eighteenth session of the SBSTA in order to enable substantive consideration of the report at the ninth session of the Conference of the Parties.

5. The SBSTA also noted the completion of two regional workshops in the South Pacific and Africa to identify priority capacity-building needs of developing countries in relation to their participation in systematic observation. It invited the GCOS secretariat to make the follow-up regional action plans available to the SBSTA for consideration at its sixteenth session, with a view to recommending a draft decision on this matter for consideration by the COP at its eighth session. It encouraged the GCOS secretariat, through continued collaboration with the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF), to expedite the remaining programme of regional workshops.

6. The SBSTA urged Parties to work in collaboration with the GCOS secretariat in formulating project proposals to correct deficiencies in global observing systems for climate, including related data management.

Cooperation with other conventions

7. The SBSTA reaffirmed the need for enhanced cooperation between the UNFCCC, the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (CCD), with the aim of ensuring the environmental integrity of the Conventions and promoting synergies under the common objective of sustainable development, in order to avoid duplication of effort and to use available resources more efficiently.

8. The SBSTA took note of the information provided in documents FCCC/SBSTA/2001/MISC.7 and FCCC/SBSTA/2001/MISC.8 . It welcomed an oral report provided by the secretariat relating to the work of a joint liaison group between the secretariats of the UNFCCC, the CBD and the CCD, and the information provided by the representatives of the CBD and CCD secretariats. The SBSTA also welcomed information on the pilot assessment of the interlinkages between climate change and biological diversity which was launched by the CBD last March, and expressed its interest in learning about how this work is proceeding.

9. The SBSTA noted with appreciation the report provided by the IPCC on the preparations under way to develop a technical paper, at the request of the CBD, on the interlinkages between climate change, biodiversity and desertification. It encouraged the IPCC to make the findings of this report available to the SBSTA at its next session.

10. The SBSTA welcomed the information provided by the representative of the RAMSAR Convention on Wetlands on its activities on issues relating to wetlands and climate change. It welcomed the offer by the Ramsar Convention to make the findings of the report *Climate change and wetlands: Impact, adaptation and management*, developed in collaboration with the IPCC, available to the SBSTA at a future session.

11. The SBSTA noted that enhancing cooperation between the UNFCCC, the CBD, the CCD and other global environmental conventions involves actions at the national level, the level of convention bodies and potentially at other levels. The SBSTA invited Parties to submit further views including suggestions for specific actions towards achieving such cooperation with other relevant intergovernmental bodies, in particular the UNFCCC, the CBD and the CCD, by 15 March 2002, to be compiled into a miscellaneous document.

12. The SBSTA emphasized the role of Parties at a national level in improving coordination and cooperation and in minimizing, whenever possible, counter actions in their activities towards the implementation of the three conventions. It also noted a range of views by Parties on the role of convention bodies and, in particular, of the joint liaison group in improving cooperation and coordination.

13. The SBSTA took note of suggestions by some Parties regarding possible areas for improved cooperation and coordination at a national level, for example through implementation of national action plans, and pilot activities at a local level. The SBSTA also noted views by some Parties regarding possible areas for enhanced cooperation at the level of the conventions, for example in capacity building, exchange of information, technology transfer and reporting.

14. The SBSTA requested the joint liaison group to collect and share information on the work programmes and operations of each convention, including:

- (a) The roles and responsibilities of the secretariats, and any relevant scientific and technical bodies or expert groups;
- (b) The types of activities under each convention;
- (c) Potential areas of cooperation, possible joint activities, and any potential conflicts associated with different mandates.

15. The SBSTA also requested the liaison group to examine the possibility of holding a joint workshop before the eighteenth session of the SBSTA to explore the issues relating to interlinkages between the three conventions and/or to integrate such considerations into the terms of reference for other proposed workshops relating to cooperation between United Nations environmental conventions, taking into consideration the need to avoid duplication and overlap between workshops.

16. The SBSTA agreed to consider these issues further and requested the secretariat to report, at its sixteenth session, on the matters identified in paragraphs 14 and 15 above.

Cooperation with United Nations bodies

17. The SBSTA noted with appreciation the information provided by the World Health Organization (WHO) on its activities relating to climate change, particularly those relating to the development of methods, including a toolkit for assessing the impact of climate change on human health and evaluating adaptation strategies. The SBSTA invited WHO to make additional information on this document, as well as any other relevant information, available at its sixteenth session.

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ANNEX VII

PLAN FOR THE SECOND ADEQUACY REPORT

1 - BACKGROUND

At its ninth session in September 2000, the GCOS Steering Committee (SC) requested the GCOS Secretariat, in consultation with the GCOS science panels and individual SC members, to develop, as a matter of urgency, possible methods which could be used to synthesize and analyse the information on systematic observations which was to be submitted to the UNFCCC/COP by 30 November 2001. It further requested that this process be extended to include other information and that a procedure be established for preparing a Second Report on the Adequacy of the Global Climate Observing Systems.

The GCOS SC indicated that this process should involve international experts in analysing the adequacy of the current global observing systems for climate in light of the stated scientific requirements and observing principles, and take account of national reports¹ and additional relevant data and information. The Adequacy analysis also should consider the conclusions of the Third Assessment Report of the IPCC. The GCOS SC view is that this report will be of significant benefit to the COP and to the process of implementing and maintaining an effective observing system for climate.

Through its decision 5/CP.5, the COP adopted the UNFCCC Reporting Guidelines on Global Climate Observing Systems and invited all Parties to use them in preparing detailed reports on their activities in systematic observation. In addition, pursuant to decision 4/CP.5, Annex I Parties were requested to include these reports in conjunction with their next national communications under the UNFCCC. Decision 5/CP.5 also invited the Convention secretariat, in conjunction with the Global Climate Observing System secretariat, to develop a process for synthesizing and analysing the information submitted in accordance with the guidelines.

At the Fifteenth session of the Subsidiary Body for Scientific and Technological Advice (SBSTA), SBSTA endorsed the preparation by the GCOS secretariat of a second report on the adequacy of Global Climate Observing Systems. It noted the necessity for the report to address the needs of the Convention for climate-relevant observations, including those associated with the development of adaptation strategies. The SBSTA invited the GCOS secretariat, in its preparation of the adequacy report, to take into account relevant decisions of the Conference of the Parties on capacity building, technology transfer and adaptation. It also invited the GCOS secretariat to consider in its report an integrated approach to global climate observing systems, including the exploitation of new and emerging methods of observation. It encouraged the GCOS secretariat to complete the final adequacy report by the eighteenth session of the SBSTA (May 2003) in order to enable substantive consideration of the report at the ninth session of the Conference of the Parties (November 2003).

The SBSTA noted the need to complete the adequacy report in the shortest possible time in order to provide a framework for further work to improve global observing systems for climate. It invited the GCOS secretariat to prepare, in time for consideration by the SBSTA at its sixteenth session (May 2002), an interim report on the synthesis and analysis of national reports from Parties provided in accordance with decision 5/CP.5."

¹ The term "national reports" includes both the summary information provided by Annex I Parties on systematic observation in accordance with the UNFCCC guidelines, as a part of their National Communications, and the detailed reports on systematic observation that were invited from all Parties.

2 - COMPILATION, SYNTHESIS AND ASSESSMENT

2.1 - Synthesis of National Reports

The UNFCCC secretariat will prepare a compilation and synthesis drawing together the basic information from the national reports due by November 2001. This will be prepared as soon as practicable as a UNFCCC document following normal Convention practice. The GCOS secretariat will assist in this process as requested in Decision 5/CP.5.

2.2 - Consultation with IPCC

The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) made specific reference to the importance of high quality, global observations and noted that such observations are critical for quantifying uncertainty and for prediction. Reversing the deterioration of existing networks, e.g. radiosondes that measure vertical profiles of temperature and humidity, is a major recommendation from the IPCC Report.

At a recent IPCC Plenary, it was proposed that the IPCC assist GCOS by jointly sponsoring a workshop in 2002 to refine the objectives and define the metrics for analysis in light of the needs of the Convention. GCOS plans to organize such a joint workshop

2.3 - The Second Adequacy Report

The GCOS Steering Committee, with secretariat support, will be responsible for the guidance and preparation of a second 'Report on the Adequacy of the Global Climate Observing Systems'. The Committee will utilize the GCOS Science Panels and their Chairs to organize the analyses to meet the goals of the report and will draw upon a balanced range of scientific experts to develop the specific analyses. The goals of the Adequacy Report will be to:

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

The Adequacy Report will build on the compilation and synthesis of national reports but will utilise data and information on operational and research observing systems from all available sources, such as national, regional and international organisations. For each of the needed parameters, the Adequacy Report will consider the availability of components for identifying long term trends and also for improving spatial details which are vital for individual regions and countries. The Report will advise on the final quality-controlled data to the Parties and the IPCC science community. Since the climate observing system is not a static entity to simply be maintained, the report will also address new developments and emerging opportunities such as the increasing capabilities shown by satellite systems to provide long-term, calibrated climate observations, and new techniques for integrating global *in situ* and satellite observations.

The Adequacy Report will be a scientific report on the state of the global observing systems for climate, whose preparation will involve an open review mechanism to ensure wide acceptance by all stakeholders including the Parties to the FCCC. It is envisaged that it will be a relatively succinct document, including supporting appendixes as required, totalling about fifty pages including a five-page executive summary.

The Report will be prepared under the overall direction of the Chair of the GCOS Steering Committee (SC). A team of lead and contributing authors will be responsible for the preparation of the report. The Terms of Reference will be to:

Determine what progress has been made in defining and implementing climate observing networks and systems since the first Adequacy Report prepared for COP-4;

- Determine the degree to which these networks meet scientific requirements and conform with associated observing principles, drawing on the goals published in the Plan for the Global Climate Observing System (GCOS-14) and the published plans of the domain-based Panels;
- Assess how well these current systems together with planned improvements will meet the needs of the Convention;
- Produce a draft report meeting the above objectives with the aid of a team of experts from all observing domains and in consultation with members of the GCOS SC and scientists involved in the IPCC. The draft report should consider:
 1. Availability of components for identifying long term trends and for improving spatial details that are vital for individual regions and countries, for each of the needed parameters.
 2. Final quality-controlled data to the Parties and the IPCC science community.
 3. New developments and emerging opportunities such as the increasing capabilities shown by satellite systems to provide long-term, calibrated climate observations and new techniques for integrating global *in situ* and satellite observations.
- Ensure that this report is subject to open review, involving presentation at an international scientific conference and takes account of the balance of views of the wider community and interested Parties prior to submission to the GCOS SC.

The Report will be forwarded to SBSTA-18 and be made available to Parties.

2.4 - Interim Report to SBSTA-16

Based on a request from SBSTA-15, the GCOS secretariat will prepare an Interim Report on the synthesis and analysis of national reports from Parties for consideration by the SBSTA at its sixteenth session. The Report will include a summary of the availability of the national reports and observations and tentative conclusions from these national reports. The Interim Report will also summarize the main points from the Regional Action Plans for the Pacific Island countries and the countries of eastern and southern Africa. The complete Action Plans will be available at the time of SBSTA-16.

Since SBSTA noted with concern the ongoing deterioration of global observation systems for climate, as was also emphasized in the IPCC Third Assessment Report, the Interim Report, where possible, will also advise on clearly established specific needs in existing networks, in advance of the second Adequacy Report. The GCOS Science Panels and Steering Committee, in consultation with other experts, will provide this advice on priority deficiencies evident from existing analyses.

3 - SCHEDULE

Adequacy Report

The conclusions of the Adequacy Report will be presented to COP-9 for consideration and action as appropriate. To meet this deadline, the following draft timetable is proposed.

November 2001	Prepare a plan for the second Adequacy Report based on endorsement and milestones from SBSTA-15.
December 2001	GCOS SC and Chairs of Science Panels review and agree on the plan for preparation of the second Adequacy Report.
January-June 2002	Contribute to preparation of the UNFCCC compilation and synthesis of national reports.
January-June 2002	Organise Analysis Teams and compile a status report on the current global climate observing system including information in the national reports as an information base for preparing the Adequacy Report.
July 2002	Panel Chairs to finalise the information base concerning the current and planned observing system and define questions for the joint IPCC-GCOS meeting.
August 2002	Joint meeting with IPCC to review the information base, to consider the observing system needs as reflected in the TAR and determined by the Convention, and to develop appropriate metrics for adequacy analyses.
October 2002	Meeting of lead and contributing authors to organize and draft initial report.
December 2002	Initial draft report openly available on the GCOS Web site and through other means.
Jan/Feb. 2003	International review of the draft Adequacy Report to develop a consensus on the conclusions.
March 2003	Meeting of lead authors to prepare the final Report.
April 2003	GCOS Steering Committee to review the final Report and to advise on the conclusions and recommendations for SBSTA-18.
June 2003	Report conclusions to SBSTA 18.
August 2003	Distribution of the final Report to Parties for information.
November 2003	Final Report available at COP-9.
Early 2004	Publish the second Report on the Adequacy of the Global Climate Observing Systems.

Interim Report

SBSTA-15 requested an Interim Report on the synthesis and analysis of the national reports by SBSTA-16 (June 2002). To meet this deadline, the following draft timetable is proposed.

January 2002	Using the Science Panels, identify key deficiencies and organize analyses to be addressed in Interim Report for SBSTA-16.
January-March 2002	Distil initial conclusions from the national reports and identify issues for the report to SBSTA-16. Prepare the analyses of key deficiencies and recommendations by Science Panels as input to Interim Report
April 2002	Obtain final endorsement by GCOS Steering Committee for priorities in Interim Report to SBSTA-16. Submit Interim Report to UNFCCC Secretariat for forwarding to SBSTA-16.

ANNEX VIII

GCOS REGIONAL WORKSHOP PROGRAMME: SUMMARY AND UPDATE

The mission of the Global Climate Observing System (GCOS) is to ensure the availability and quality of the atmospheric, oceanographic, and terrestrial data critical to a wide variety of climate users and to promote improvements in climate observing systems where needed. Gaps and deficiencies in observing system networks are especially significant in developing countries. Aware of these deficiencies, the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), in its Decision 5/CP.5, invited GCOS, in consultation with relevant regional and international bodies, to launch a regional workshop programme to facilitate improvements in climate observing systems.

GCOS initiated its Regional Workshop Programme in mid-2000 in response to the COP invitation. The first workshop in the Programme was held for Pacific Island countries in Apia, Samoa in August 2000. The second workshop took place in Kisumu, Kenya in October 2001 for the countries of eastern and southern Africa. These two workshops and related follow-up activities constituted the pilot phase of the programme and were funded by the Global Environment Facility (GEF) and by contributions from WMO, UNEP, and several donor countries.

The following highlights the principal activities or events related to the workshop programme that have taken place since the completion of the two pilot phase workshops:

- In October 2001 GCOS submitted a proposal to GEF requesting 60 percent funding for the remaining 8 workshops in the full 10-workshop programme. This proposal was approved by GEF in December. However, funds for the project have not yet been released by GEF. Before this can happen, UNDP must submit the Project Document to GEF, and as of April 2002 this had not yet been done. GCOS asked GEF for \$1.2 million, and the GCOS Secretariat committed itself to raising matching funds totalling about \$US815,000 to complete the full programme and related follow-up activities. In Decision 5/CP.5, the COP urged Parties to actively support and participate in the Regional Workshop Programme.
- At COP7 in Marrakech, Morocco (November 2001), the Parties noted with some concern that global observing systems for climate are continuing to deteriorate. The COP encouraged GCOS to continue to address this problem through its Regional Workshop Programme and by other means. In particular, the COP's Subsidiary Body for Scientific and Technological Advice (SBSTA) invited the GCOS Secretariat to make the follow-up Regional Action Plans available to it for consideration at its sixteenth session, with a view to recommending a draft decision on this matter for consideration at COP8 (October 2002). SBSTA further urged GCOS to expedite the remaining workshops in the programme. An acceleration of the workshop programme is possible, but only if adequate matching funds become available.
- Action Plans for the Pacific Islands and Eastern and Southern Africa have recently been completed by these two regions. These will be introduced at a side meeting GCOS is organizing at the June 2002 SBSTA meeting.
- The third workshop in the programme was held for the countries of Central America and the Caribbean in San Jose, Costa Rica in March 2002. GCOS organized this workshop in collaboration with the WMO Subregional Office in San Jose, and with funding from the

Organization of American States, the United States, Canada, and WMO. Carryover GEF funds from the pilot phase of the programme were also used. Workshop participants agreed to develop an observing system Action Plan for this region, and a small meeting to draft the plan is expected to be held in late May. With sufficient progress, the Caribbean and Central America Action Plan could also be introduced at the SBSTA side meeting.

- Planning for a regional workshop for Southeast Asian countries has recently begun. This workshop is currently scheduled for September 16-18, 2002. GEF funds will be required for this workshop. It is anticipated that the fifth workshop in the programme will be for the countries of South Asia and the Indian Ocean and will be held in March 2003.
- Key regions for future GCOS workshops include Eastern and Central Europe, West Africa, and South America.

ANNEX IX

NOAA POSITION PAPER ON THE U.S. PROPOSAL TO ESTABLISH A PROGRAMME OF SUPPORT FOR CLIMATE OBSERVING AIMED SPECIFICALLY AT DEVELOPING COUNTRIES.

1. Background

In his June 2001 Rose Garden speech, President George W. Bush noted that national and international bodies have "identified the building of a global observing system to monitor climate as being crucial to improving our understanding of the science of climate change. This system must include developing countries that have limited resources to make the necessary measurements." The statement went on further to announce that "the U.S. would provide resources to help build climate observation systems in developing countries throughout the world, and call upon other developed countries to provide matching funds for such an investment."

The Bush Administration is currently assessing the proper structure to manage the climate mission both within NOAA as well as across the U.S. Federal Government. It is clear that NOAA will play a large role in that structure and as such will remain a key player in ensuring that the Global Climate Observing System (GCOS) becomes a robust and sustainable system both domestically as well as internationally.

2. Climate Change Research Initiative (CCRI)

The President's Fiscal Year 2003 Climate Change Research Initiative (CCRI) budget calls for \$4M (US) to be devoted to providing support to the primary atmospheric components of the GCOS networks. It should be noted that the President's budget is a planned budget and we will not have any funds until an actual approved budget is received from the U.S. Congress sometime after October 2002. These funds will be used by NOAA to work, in concert with, other developed countries to begin addressing those most critical needs and deficiencies of the GCOS Surface Network (GSN), the GCOS Upper Air Network (GUAN), and the Global Atmosphere Watch (GAW). These needs include the re-establishment of the benchmark upper-air network with an emphasis on data sparse areas, and the placement of new GAW stations in priority sites to measure pollutant emissions, aerosols, and ozone in specific regions. NOAA will work with the GCOS Secretariat, WMO World Weather Watch, the Atmospheric Observations Panel for Climate (AOPC), as well as receiving input from the various regional GCOS workshops held to date to ensure that the \$4M in the CCRI begins addressing the most critical and urgent needs of the three GCOS atmospheric networks.

3. Beyond CCRI

NOAA is actively seeking, and would very much like to see, additional funding resources for GCOS to address the enhancements and increased effectiveness of the existing GCOS atmospheric networks. We have begun developing some very preliminary plans to begin addressing further improvements in the GCOS atmospheric networks, and as they mature we would be glad to work with the GCOS Secretariat, the AOPC, and any other donor nations that may be interested in contributing towards fulfilling the goals of a more robust and sustainable GCOS system in reviewing these plans. In addition to the hardware required to operate the stations, NOAA recognizes that the effectiveness of these networks must include resources for

near-real time network quality performance monitoring, extensive metadata about station operations, metadata related to the surface conditions in the vicinity of the sites (both the surface and from space), global telecommunications, regular calibration checks, and a data management capability with interfaces to both research and service components. All climate observing networks and stations must adhere to the Ten Principles of Long-Term Climate Monitoring that were recognized by the UNFCCC at the COP-5 meetings in 1999. Global temperatures can be monitored fairly well with only 75 stations, if they are properly calibrated and free of time-dependent biases. This means we can use these to calibrate the remaining sites, much like the current plans in the U.S for the 250 station Climate Reference Network and the 8,000 station modernized cooperative observer network. Temperature and hydrological indicators are key parameters to understanding both the climate itself and the impacts upon it and must be focused on by GCOS in looking at its adequacy for climate observing.

4. GCOS Adequacy

NOAA is committed to supporting the work of the GCOS Secretariat in its request from the Parties to the Framework Convention on Climate Change to revise the first GCOS Adequacy Report written in 1998. Based on the incoming national reports, as well as other sources and experts, this second adequacy report needs to address how the present and future observing capabilities of GCOS will meet the needs of the Convention. GCOS is urged to take an integrated approach to this by including both satellite and *in-situ* observations. We think it is extremely important to carry out the revision of the Adequacy Report in an IPCC-like fashion in order to achieve credibility at the international level. The IPCC is in fact a major customer of the observations from the various GCOS networks, and GCOS must adhere to the IPCC's priorities particularly in addressing uncertainties.

We realize that planning for the adequacy report revision must allow for a broad and inclusive approach that provides for this greater interaction with the IPCC. Therefore, it is very important in carrying out this planning to carefully consider the selection of scientists for writing the various chapters and to be actively involved in non-traditional fora. This is a golden opportunity for GCOS to reach beyond its familiar associates in order to reach experts in fields that we have not yet addressed. For example, this would include observations needed to address adaptation to climate change. GCOS was asked to assess the observing needs of the full UNFCCC Convention, and it must step up to that task. To do so, we must pull in outside experts who are acknowledged and respected in their field. The IPCC has established its value and credibility on the international level, and GCOS should work closely with the IPCC in order to gain the expertise and experience it offers. NOAA offers to be involved in the development of such an adequacy report and to provide some assistance in carrying out that process.

5. Links to the IPCC

As stated earlier, since the IPCC is a major GCOS customer, it is imperative that the goals of the various GCOS atmospheric observation systems are aligned with the goals of the IPCC in order to better aid the scientific understanding of the dynamics of climate change. If GCOS is to better observe climate variability and change, it must be able to examine the overall climate system and aid in answering the following questions:

- How has the climate changed or varied?
- How well do we understand the climate system?
- What are the causes of climate change and variability?
- How can we characterize the impacts of climate change?

Although both the GSN and GUAN have been formally adopted, monitoring of the amount of data actually received indicates that only one-half to two-thirds of the reference stations in both the surface and upper air network ever transmit data. Most of the missing data is in the developing world in much of Africa and South America. The GSN consists of approximately 1000 stations, while the GUAN has 150 stations. These stations were selected as some of the best available, many with long records. Clearly, much of the network in the developing world cannot provide data worthy of a benchmark measurement with calibrated standards, even on those rare occasions when it does report any data at all. The GAW has over 20 stations, six in developing countries supported by the Global Environment Facility. The GAW has developed a calibration as well as quality control protocol based on numerous Calibration Centers and Quality Control Centers. The GUAN and GSN on the other hand do not have such Calibration Centers, and quality control procedures performed at the Deutscher Wetterdienst, the Japan Meteorological Agency, and at the National Climatic Data Center have had little or no impact to date on those operational networks.

6. Conclusions

The elements required for a robust and sustainable GCOS climate observing system are: (1) the implementation of the ten principles for climate monitoring; (2) more comprehensive global observations; (3) improved global telecommunications; (4) better use of data and more products; and (5) a critical need for system monitoring and oversight responsibility. The U.S. support for GCOS will work towards these goals and finally, we will also continue to provide resources and support towards the operation of the GCOS Secretariat, the Global Observing System Information Center, and the conduct of regional GCOS workshops for developing nations.

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ANNEX X

OCEAN OBSERVATIONS PANEL FOR CLIMATE

Report of the Chairman

1. General

The GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC) is the primary scientific body for providing advice on requirements for sustained ocean data for climate and related physical ocean systems. Its principle partner in research is CLIVAR and its Ocean Observations Panel and Basin Panels. The Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) is the principle implementation partner.

This report provides an overview of the main activities. "Observing the Oceans in the 21st Century", a volume based on the 1999 OceanObs Conference was published in December 2001. It is the definitive reference for the rationale and approach to sustained ocean observations. JCOMM formally came into existence in 2001 and meetings of the Management Committee and the 4 Program Areas will be held early in 2002. There is considerable discussion about the future role of specialised centres and on a closer relationship with IODE. For OOPC, success with JCOMM is vital.

2. Pilot Projects

2.1 Argo (<http://www.argo.ucsd.edu/>)

A recent status report for Argo showed 569 floats were targeted for deployment in fiscal year 2001 and 657 were due for deployment in FY 2002 (see Table below, from the most recent meeting of the Argo ST, Hobart, 12-14 March). The project deployments over the next 3 years are estimated to average around 800 per year (825 is currently used as the target rate. For the latest float positions, see <http://w3.jcommops.org/website/ArgoMap>. Based on results from an Argo Implementation Planning meeting held in Paris, July 10-11, 2000, most of the Atlantic will be covered by end of 2003. Based on a similar meeting held in Hyderabad on July 26-27, 2001, the Indian Ocean north of 20 degrees S will be covered by end of 2004.

The Second Argo Data Management Meeting was held in Brest on November 12-14, 2001. The focus was on finalizing all aspects related to real-time data exchange including the format for data sent to the global servers and the automated tests to apply to real-time data. Smaller working groups are handling other discussions related to the overall design. The target is for all profiling floats to report within 24 hours of surfacing. As of Mar, 2001, about 85% meet the target.

Argo, in collaboration with SOPAC, GODAE/OOPC and the JCOMM Service Group, are convening a Workshop on "Potential Applications of Ocean Observations for the Pacific Islands" (Fiji, October 4-7 2002). At least part of this Workshop will focus on climate applications and begin the process of developing some of the ideas put to the Apia GCOS Regional Workshop.

International Commitments for Argo Floats

18 Mar 02

<u>Number of Floats by Country</u>	<u>Argo</u>	<u>Float</u>	<u>Argo</u>	<u>Float</u>	<u>Argo</u>	<u>Float</u>	<u>Argo</u>	<u>Float</u>	<u>Proposed</u>	<u>Prop</u>
	<u>Funded</u>	<u>Equiv's</u>	<u>Funded</u>	<u>Equiv's</u>	<u>Funded</u>	<u>Equiv's</u>	<u>Funded</u>	<u>Equiv's</u>	<u>over next</u>	<u>Float</u>
	<u>FY99</u>	<u>FY99</u>	<u>FY00</u>	<u>FY00</u>	<u>FY01</u>	<u>FY01</u>	<u>FY02</u>	<u>FY02</u>	<u>3 years</u>	<u>over 3 yrs</u>
Australia	10				13		7			93
Canada	10		42		20		25			75
China					10		8			105
Denmark						5				30
European Comm.			10		70					
France		8	3		50		95			160
Germany				18		22		42		115
India							31			119
Japan			24	4	76	8	90			300
New Zealand			2		2		2			6
Republic of Korea					19		15			90
Russia		1		2		2	2	1		6
Spain										30
United Kingdom			13		50	5	45	12		150
<u>U.S.A.</u>	<u>55</u>		<u>132</u>	<u>51</u>	<u>174</u>	<u>43</u>	<u>275</u>	<u>7</u>	<u>1238</u>	<u>75</u>
TOTALS	75	9	226	75	484	85	595	62	2517	115
TOTALS BY YEAR	<u>FY99 = 84</u>		<u>FY00 = 301</u>		<u>FY01 = 569</u>		<u>FY02 = 657</u>		<u>Ave/Yr = 877</u>	

2.2 GODAE (Global Ocean Data Assimilation Experiment; <http://www.bom.gov.au/GODAE/>)

The GODAE Steering Team met in December 2001 and good progress is evident. GODAE has lead responsibility for developing and demonstrating new ocean products and services. Prototype products are available from several groups (see URLs below). An Implementation Plan is due for publication in June 2002. A GODAE Symposium will be held in Biarritz in June 2002. Around 135 papers were submitted for Symposium (~ 110 accepted). There are 24 scheduled invited presentations ranging from the concept through scientific and technical development, through to applications. Several new projects are being initiated including (a) development of a real-time ocean current data and product base; (b) intercomparison and evaluation of North Atlantic products; (c) intercomparison and evaluation of North Pacific products; (d) intercomparison and evaluation of tropical Pacific Ocean analyses; and (e) data and product service for GODAE. Key URLs are:

- Strategic Plan published: http://www.bom.gov.au/GODAE/Strategic_Plan.pdf
- High-Resolution SST Pilot Project: <http://www.bom.gov.au/GODAE/HiResSST/>
 - Draft Implementation Plan: <http://www.bom.gov.au/GODAE/HiResSST/plan.zip>
 - Due to meet in Tokyo, week 13-17 May 2002.
- GODAE Symposium: <http://www.cnes.fr/BIARRITZ2002>
- Prototype products and URLs: http://www.bom.gov.au/GODAE/godae_product_urls.htm

Workshops of quality control and data and product servers will be held in association with the symposium.

2.3 Global Ocean Timeseries Observatory System

This Pilot Project is focused on the development of a global network of multi-disciplinary time series stations, providing high-quality fixed-point data sets for testing and developing models and for monitoring change. The project was initiated on the basis of the OceanObs paper and with the leadership of the Partnership for Observation of the Global Ocean. This project also involves close collaboration with the GOOS Coastal Panel and the research community. The Science Team recently met in Hawaii and good progress is evident. A pilot system (2001-2006) has been defined consisting of all operating sites and those planned to be established within 5 years, subject to evaluation in terms of the qualifying criteria set by the Science Team. The Science Team for the Project is in the process of developing an implementation plan.

3. On-going activities

3.1 The tropical moored buoy network review

A review was conducted of the tropical moored buoy network culminating in a Workshop during September of 2001. With the support of NOAA, a consultant was employed to prepare a background paper that summarized the scientific case for this methodology and presented information on the status of the network. The Workshop discussed issues including sampling strategies, expansion of the network into other basins and high latitudes, and the threats posed by vandalism. Not surprisingly, the Review concluded that the tropical moored buoy approach constituted the most important contribution to monitoring and prediction of ENSO and that, from a scientific perspective, there continued to be a strong case for continuation of the Pacific array in its present form. Some options were considered for different resource scenarios. The PIRATA array in the Atlantic enjoys strong support from its partners. An extension at 16°N has been established in 2001. The array constitutes an important "pilot" contribution to the operational network. Extensions to the Indian Ocean are being discussed. Vandalism poses perhaps the biggest threat to the network, in some cases seemingly reducing the effectiveness beyond a point that makes the approach viable.

3.2 Regional initiatives

For some regions (basins), it seems more effective to approach ocean observations on a broader front, embracing research requirements and/or the broader requirements of GOOS. This enables a broader constituency to be brought to the table, as was done for the initial Indian Ocean Workshop. For the Indian Ocean we are taking a "whole-of-ocean" approach to the science, design, planning and implementation. No one part of GOOS on its own provides sufficient impetus, nor does, it seems, science. Building upon the outcomes of the November 2000 SOCIO meeting in Perth, planning has begun for a second workshop in November 2002, in Mauritius. This meeting will focus on the implementation of an observing system(s) necessary to predict and model the Indian Ocean region.

OOPC agreed to pursue a similar strategy for the South Atlantic, bringing together all those parties from the region with an interest in ocean observations. A Workshop involving GOOS and CLIVAR has tentatively been planned for late 2002/early 2003.

The ocean observing system is also relevant to the GCOS Regional initiatives, in principle. The OOPC participated in the GCOS Pacific regional Workshop in Samoa and, more recently, contributed to the development of the Pacific GCOS Plan. The priorities of OOPC are not always reflected in the action items and we continue to seek ways of contributing constructively to this process.

OOPC has not been involved with any of the other regional workshops.

3.3 Progress with other initiatives

Surface marine fields. Integrated SOOP, ASAP and VOS Programmes are central to the OOPC approach with the belief that the "line mode" of this network complements other elements of the observing system. It is critical that quality is a priority. For VOSCLIM, data transmission procedures are (almost all) in place, a skeleton web site is set up, ships are being recruited, and data should soon start reaching the Data Assembly Centre (NCDC). The data from VOSCLIM lines are seen as potential future reference data sets, integrated where possible with upper atmospheric and subsurface lines. Work has continued on the surface reference site project (joint with WGNE). Intercomparisons are being conducted for

several regions. The AOPC initiated a small working group to look at mean sea level pressure data and the quality of analyzed fields.

SOOP (Ship-of-Opportunity Program). Efforts are being made to extend the SOOP to "new" observations such as pCO₂, using initiatives in Europe and elsewhere to "prove" the approach. From the OOPC perspective, we believe the extension of the SOOP into non-physical measurements is justified and would view the pCO₂ initiative as perhaps the start of a more significant "pilot" activity into measurements related to the carbon cycle. Works continues in the transition of SOOP to "line mode".

The OOPC/AOPC SST Working Group. This group continues to examine the quality and coverage of the SST network in terms of its use in climate. Several studies have been undertaken of problems associated with determination of the sea-ice edge and the interpretation of SST within the vicinity of the ice edge. New analyses that take better account of the way SST data are processed provide more precise assessments of the sampling requirements. The focus is on climate-quality products and there are strong links with the GODAE High-Resolution SST project.

Remote sensing. Remote sensing requirements and implementation were covered in the Oceans Theme paper developed by the IGOS Partners. The Theme paper represents a consensus view, in line with the conclusions of OceanObs. Recently, under the leadership of the AOPC, a revised Statement of Guidance on satellite and other measurements for seasonal-to-interannual prediction was drafted and communicated to the CBS Expert Team on the Redesign of the GOS. To this point, the Ocean Theme process and connections through GODAE have been very effective at representing the ocean needs, including those of the research community. We are considering providing Statements of Guidance in other areas, for example in climate change and ocean services.

4. Other issues

The UNFCCC/GCOS Adequacy Report. The Global Climate Observing System is undertaking a review and assessment of the state of the climate observing system, the so-called Second Adequacy Report on the Global Observing Systems. The goals of the Adequacy Report will be to:

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

This will be a major undertaking for GCOS and OOPC for 2002-2003, involving the IPCC and climate scientists and, if successful, will raise the profile of such assessments to the level enjoyed by IPCC Assessments. A basis for this Report will be, in part, the National Reports on the status of climate observing systems. For the oceanographic assessment, *Argo* is clearly a major boost, but we still have gaps in the global coverage. There is likely a requirement sustained hydrographic and carbon measurements (e.g., the Doney et al paper). We will re-examine the effectiveness of the integrated system, of quality assurance measures, and the likely needed level of sustained investment.

One issue that will have to be addressed immediately is the criteria against which this assessment of adequacy is to be made. This might come in the form of a set of primary questions (on climate and climate change) that require oceanographic information, or in the

form of a set of prescribed outputs. We have some issue with the way the cryosphere is to be handled (the ocean group can certainly look at sea-ice) and on the extent we address the adequacy of the observing system to monitor and predict natural variability.

Data and information management. This is likely to be the next big project, extended GOOS-wide (see http://www.bom.gov.au/OOPC/NVODS_WS/). There has been good progress on some basic elements such as telecommunications, data representation, and data exchange and product servers. The OOPC will work with JCOMM and IODE (and various CBS ETs) on the potential for an XML-based standard. The OOPC view remains that data and information management is one of the highest priority issues facing the community at this time. We have a responsibility to ensure that all data that we collect is available and exploited to the maximum extent and that we make greater efforts to open up the riches of the observing system to developing countries and communities beyond oceanography.

Some actions are being initiated by GODAE while *Argo* has made good progress with its requirements. The present Chair will participate in the next PICES Conference (October, Qingdao, China) and use the opportunity of his invited presentation to explore opportunities for innovative data management and its application.

5. Discussion

In its early years (as the Ocean Observing System Development Panel), OOPC activities were shaped strongly by the views of GCOS. At that point the WCRP was there mostly in name only, and GOOS was struggling with its identity and strategy. As time has passed, GOOS and its Steering Committee have taken an ever more prominent role in the work of the Panel. The WCRP/JSC has also become more strongly involved. At the same time the influence of GCOS has reduced, partly because it was not directly involved in the line of implementation, and partly because the importance of the whole-of-climate oversight role diminished.

For the Ocean Observing System for Climate, the presence of a GCOS scientific view remains important. There are many obvious linkages to the atmospheric and terrestrial components and common dependence on infrastructure. GCOS is also the “operational” counterpart to the WCRP. But perhaps the most important role is that it plays with respect to the Parties to the UNFCCC, most obviously manifested in the upcoming work for the GCOS/UNFCCC Adequacy Report. It is clearly an important task over the coming year though the extent to which this work will empower and strengthen the observing system remains unclear. For the oceans the focus is not so much on the “degradation” of the observing system, as on bringing the existing system up to a point that we believe is adequate for climate change issues, and sustaining it at that level. We also have less issue with keeping time-series going (there aren’t many) and more with establishing sites and approaches that will provide an integrated solution, including time-series information.

The creation of JCOMM was a critical point for OOPC. For GCOS, its creation can be traced back to a resolution of the JSTC in Victoria, Canada, calling for a rationalisation of the implementation mechanisms and the formation of a single implementation body. Just as GOOS is considering the extent to which JCOMM can be used for its implementation, GCOS should be examining ways to streamline and rationalise implementation across its components. Satellite systems have proved a problem in the recent past and GCOS needs to carefully consider how it will take advantage of bodies of WMO that have presumed mandates that embrace most, if not all, of GCOS needs.

Ed Harrison (PMEL) has accepted the position as Chair of the OOPC. We trust the incoming Chair will continue to receive the strong support from GCOS enjoyed by the present Chair.

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ANNEX XI

TERRESTRIAL OBSERVATION PANEL FOR CLIMATE

Report of the Chairman

1. General

The Terrestrial Observations Panel for Climate (TOPC) provides advice to GCOS and GTOS on requirements for long-term observation records of terrestrial properties and attributes which control the physical, biological and chemical processes affecting climate, are themselves affected by climate change or serve as indicators of climate change. TOPC collaborates with two other GTOS science panels; Global Observation of Forest Cover - Global Observation of Land cover Dynamics (GOFC-GOLD) and Terrestrial Carbon Observations (TCO).

This report provides an overview of the main activities and sets out future plans.

2. Activity Report

TOPC has not met since the ninth session of the GCOS Steering Committee. However the Panel has been heavily involved in the Terrestrial Carbon Observations (TCO) initiative. Separate meetings in New Hampshire, USA (October 2000) and Frascati, Italy (June 2001) identified the terrestrial, atmospheric and *in situ* observations required for such a system. The results of these meetings have been published and the Integrated Global Observing Strategy – Partners (IGOS-P), accepted the final TCO report.

Following acceptance by IGOS-P TCO has entered an initial implementation phase as a technical programme of GTOS. The objectives for this period are to demonstrate by 2005 the capability to estimate annual net land-atmosphere carbon fluxes at a sub-continental scale (10^7 km²) with an accuracy of +/- 30% globally, and a regional scale (10^6 km²) over selected campaign areas. By 2008 TCO expects to improve spatial resolution (10^6 km²) and accuracy (+/- 20%). Publications can be found at <http://www.fao.org/GTOS/pubs.html>.

TOPC has also supported the development of GOFC-GOLD through participation in the GOFC-GOLD scientific and technical board meeting held in Frascati, June 2001 and in the Executive Board teleconferences.

GOFC-GOLD has now joined TOPC as a Science Panel of GTOS. The three core themes remain as 1. Land cover characteristics and changes; 2 Fire monitoring and mapping; 3. Biophysical processes. Implementation is through science theme teams and regional networks.

3. Terms of Reference

Decision 35 from the ninth session of the GCOS steering committee requested TOPC to review its terms of reference and to present these for approval at the next session. These are given below. As TOPC has not met in full session since this request was made, and as the Panel Membership is currently under revision TOPC requests that the GCOS SC accepts these as draft and welcomes the SC's views.

TOPC Terms of Reference Draft:

Recognizing the need for specific and technical input concerning terrestrial observations for climate purposes, the sponsoring organizations of GTOS and the GCOS have jointly established TOPC with the following terms of reference.

- To liaise with relevant research and operational communities to identify measurable terrestrial (biosphere, cryosphere, and hydrosphere) properties and attributes which control the physical, biological and chemical processes affecting climate, are themselves affected by climate change or serve as indicators of climate change, and where long-term observation records are essential to provide information concerning the impacts of climate and climate change;
- To assess and monitor the adequacy of terrestrial observing networks and to promote their further development and capacity to exchange climate data and information;
- To assess and monitor the adequacy of Earth observing satellite systems and to promote their further development and capacity to measure terrestrial properties relevant to climate and climate change;
- To identify gaps in present systems and design, promote and periodically revise plans for a long-term systematic observing system that fills these gaps, makes the data available and so better serves the needs of the research and operational communities;
- To facilitate improved access to terrestrial data and information related to climate. In particular through ongoing development and use of the Terrestrial Ecosystem Monitoring Sites (TEMS) data base and the Global Observing System Information Centre (GOSIC).
- To coordinate activities with other global observing system panels and task groups to ensure consistency of requirements with the overall programmes;
- Publish and update GCOS/GTOS studies and planning documents; and
- To carry out agreed assignments from, and to report regularly to, the Steering Committees for GCOS and for GTOS

4. On-going Activities

Although in a transition phase TOPC continues to pursue the general strategy as outlined at the previous GCOS SC; Definition of specific observation requirements; Implementation of surface networks; and pilot projects.

Specific activities include support to the maintenance and expansion of the TEMS (Terrestrial Ecosystem Monitoring Sites) database (www.fao.org/gtos/tems); establishment and development of the GTOS global system of observation networks (GT-Net), especially the World Glacier Monitoring Service <http://www.geo.unizh.ch/wgms/> and Global Land Ice Measurements from Space (GLIMS) project <http://wwwflag.wr.usgs.gov/GLIMS/>.

5. Future Orientations

TOPC's actions from 2002 – 2003 will concentrate on supporting GCOS in the preparation of the Second Adequacy Report on the Global Observing Systems for the UNFCCC. A preliminary panel of authors and consulting scientists has been established.

The sixth session of the TOPC will be held in Ispra (Italy) in June. The final date will be chosen to accommodate the calendar for the preparation of the Adequacy Report.

The draft Terms of Reference introduced earlier in the report will provide a general structure for TOPC work over the next few years. The gaps arising from the dissolution of the cross cutting Panels GOSSP and JDIMP will be addressed and care must be taken to ensure synergy (rather than overlap) with the GTOS technical programme on Terrestrial Carbon and the sister Panel GOFD-GOLD.

TOPC will continue to examine observational issues ranging from in situ to satellite, will strive for increasing harmonization of observation methods, and will aim to provide GCOS with information concerning priorities, structural/institutional issues and areas of concern.

Josef Cihlar (Canada Centre for Remote Sensing), who has chaired the TOPC since 1995, formerly stood down in January 2002. As incoming chair, Alan Belward (European Commission's Joint Research Centre, Italy) acknowledges the considerable contributions Josef made to TOPC and thanks him for all the time and effort he invested.

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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)
- GCOS-8**
(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**
(WMO/TD-No. 643) Report of the GCOS Working Group on Socio-economic Benefits, first session (Washington DC, USA, August 1-3, 1994)
- GCOS-10**
(WMO/TD-No. 666) Summary of the GCOS Plan, Version 1.0, April 1995
- GCOS-11**
(WMO/TD-No. 673) Report of the GCOS Data and Information Management Panel, first session (Washington DC, USA, February 7-10, 1995)
- GCOS-12**
(WMO/TD-No. 674) The Socio-economic Benefits of Climate Forecasts: Literature Review and Recommendations (Report prepared by the GCOS Working Group on Socio-economic Benefits), April 1995
- GCOS-13**
(WMO/TD-No. 677) GCOS Data and Information Management Plan, Version 1.0, April 1995
- GCOS-14**
(WMO/TD-No. 681) Plan for the Global Climate Observing System (GCOS), Version 1.0, May 1995
- GCOS-15**
(WMO/TD-No. 684) GCOS Plan for Space-based Observations, Version 1.0, June 1995
- GCOS-16**
(WMO/TD-No. 685) GCOS Guide to Satellite Instruments for Climate, June 1995
- GCOS-17**
(WMO/TD-No. 696) Report of the GCOS Atmospheric Observation Panel, second session (Tokyo, Japan, March 20-23, 1995)

*GCOS publications may be accessed through the GCOS World Wide Web site at:
<http://www.wmo.ch/web/gcos/gcoshome.html>

- GCOS-18**
(WMO/TD-No. 697)
(UNEP/EAP.MR/95-10) Report of the GCOS/GTOS Terrestrial Observation Panel, second session (London, UK, April 19-21, 1995)
- 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)
- GCOS-23**
(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)
(UNEP/DEIA/MR.97-4) Report of the Global Observing Systems Space Panel, second session (Geneva, Switzerland, October 16-18, 1996)
- 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)
- GCOS-31**
(WMO/TD-No. 803) Proceedings of the fifth meeting of the TAO Implementation Panel (TIP-5) (Goa, India, November 18-21, 1996)

- GCOS-32**
(WMO/TD-No. 796) GCOS/GTOS Plan for Terrestrial Climate-related Observations, version 2.0, June 1997
- GCOS-33**
(WMO/TD-No. 798) GHOST - Global Hierarchical Observing Strategy, March 1997
- GCOS-34**
(WMO/TD-No. 799) Initial Selection of a GCOS Surface Network, February 1997
- GCOS-35**
(WMO/TD-No. 839) Report of the second Joint CCI/CBS Meeting on the GCOS Surface Network (De Bilt, The Netherlands, June 25-27, 1997)
- GCOS-36**
(WMO/TD-No. 844)
(UNESCO/IOC) Report of the Joint GCOS/GOOS/WCRP Ocean Observations Panel for Climate, second session (Cape Town, South Africa, February 11-13, 1997)
- GCOS-37**
(WMO/TD-No. 845)
(GOOS-10) & (GTOS-9) Report of the Global Observing Systems Space Panel, third session (Paris, France, May 27-30, 1997)
- GCOS-38**
(WMO/TD-846)
(GTOS-10) Report of the Meeting of Experts on Ecological Networks (Guernica, Spain, June 17-20, 1997)
- GCOS-39**
(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)
- GCOS-40**
(WMO/TD-No. 848) Report of the GCOS/WCRP Atmospheric Observation Panel for Climate, third session (Reading, UK, August 19-22, 1997)
- GCOS-41**
(WMO/TD-No. 849)
(GOOS-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)
- GCOS-42**
(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)
- GCOS-43a**
(GOOS-36) TAO Implementation Panel, sixth session (Reading, U.K., November 4-6, 1997)
- GCOS-43b**
(GOOS-55) International Sea Level Workshop (Honolulu, Hawaii, USA, June 10-11, 1997)
- GCOS-44**
(GOOS-61) Report of the Joint GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC), third session (Grasse, France, April 6-8, 1998)
- GCOS-45**
(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, 7th Session (Abidjan, Ivory Coast, November 11-13, 1998)
- GCOS-53**
(WMO/TD-No. 958) GCOS Surface Network (GSN) Monitoring Centre Implementation Meeting (Offenbach, Germany, January 19-20, 1999)
- GCOS-54**
(WMO/TD-No. 953) Report of the eighth session of the WMO-IOC-UNEP-ICSU Steering Committee for GCOS (Geneva, Switzerland, February 9-12, 1999)
- 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)
- GCOS-57**
(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 6th 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

- GCOS-61**
(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)
- GCOS-62**
(WMO/TD-No. 1038) Report of the Pacific Islands Regional Implementation Workshop on Improving Global Climate Observing Systems (Apia, Samoa, August 14-15, 2000)
- GCOS-63**
(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)
- GCOS-64**
(GOOS-107) Report of the eighth session of the TAO Implementation Panel (TIP-8) (St. Raphael, France, October 15, 1999)
- GCOS-65**
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(WMO/TD-No. 1055) Report of the sixth session of the GCOS/WCRP Atmospheric Panel for Climate (AOPC) (Geneva, Switzerland, April 10-13, 2000)
- GCOS-66**
(GOOS-108) Report of the ninth session of the TAO Implementation Panel (TIP-9) (Perth, Australia, November 16-17, 2000)
- GCOS-67**
(WMO/TD-No. 1072) GCOS Implementation Strategy: Implementing GCOS in the New Millennium
- GCOS-68**
(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)
- GCOS-69**
(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.
- GCOS-70**
(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
- GCOS-71**
(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
- GCOS-72**
(GOOS-95) Report of the 7th Session of the IOC Group of Experts on the Global Sea Level Observing System (GLOSS), Honolulu, April 26-27, 2001
- GCOS-73**
(WMO/TD-No. 1106) Manual on the GCOS Surface and Upper-Air Networks: GSN and GUAN, April 2002
- GCOS-74**
(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
- GCOS-75**
(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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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
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
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)
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
ENSO	El Niño/Southern Oscillation
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 Environmental Monitoring System
GEWEX	Global Energy and Water Cycle Experiment
GLIMS	Global Land Ice Measurements System
GLOSS	Global Sea Level Observing System
GMDSS	Global Maritime Distress and Safety System
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
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
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)

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