

17 October 2005

ENGLISH ONLY

GTOS SC meeting
25-27 Jan 2006
Document 14
Version 1
Information document

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

Twenty-third session

Montreal, 28 November to 6 December 2005

Item 9 of the provisional agenda

Research and systematic observation

Implementation of the *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC*

Submission from the Global Climate Observing System secretariat

1. The Conference of the Parties (COP), by its decision 5/CP.10, expressed its appreciation to the Global Climate Observing System (GCOS) for preparing the *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC*. By the same decision, the COP requested the secretariat of the GCOS to provide information to the Subsidiary Body for Scientific and Technological Advice (SBSTA) on how the actions identified in the implementation plan are being implemented. The SBSTA, at its twenty-first session (FCCC/SBSTA/2004/13, para. 103), further invited the GCOS secretariat, in conjunction with the GCOS sponsoring agencies, to report to the SBSTA, at its twenty-third session, on how these actions have been incorporated in the plans and actions of the GCOS sponsoring agencies. This document contains a report by the GCOS secretariat to facilitate the consideration of the above-mentioned implementation plan by the SBSTA.
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**Progress with the Implementation Plan for the Global Observing System for
Climate in Support of the United Nations Framework Convention on Climate
Change**

**Report to the 23rd meeting of the Subsidiary Body for Scientific and
Technological Advice**

10 October 2005

Prepared and submitted by the GCOS Secretariat

Progress with the Implementation Plan for the Global Observing System for Climate in Support of the United Nations Framework Convention on Climate Change

Executive Summary.

This document, requested by the Conference of the Parties, reports that almost all of the international agencies identified in the Implementation Plan for the Global Observing System for Climate in Support of the United Nations Framework Convention on Climate Change have either formally or informally acknowledged their roles in the Implementation Plan and are actively engaged in developing and/or refining their specific work plans. This commitment to action represents a significant degree of international consensus and support for the Implementation Plan.

The GCOS Secretariat, in partnership with regional organizations, continues to develop Regional Action Plans to address deficiencies in the regional implementation of the global observing system for climate. In most cases, the regional organizations lack the resources to proceed with their implementation. However, the statement of the G8 following their Gleneagles meeting and the outcome of the recent United Nations World Summit are both encouraging developments.

National implementation by all Parties is absolutely essential for the achievement of the Plan. Specific information on this aspect is currently not available. In this report, the GCOS Steering Committee proposes the preparation, in 2008, of a substantive report on the state of implementation of the global observing system for climate, which will require information from the Parties on their implementation activities. At the same time, an update to the reporting guidelines on systematic observations is required to reflect the introduction of the Essential Climate Variables (ECVs) and the Implementation Plan in future National Communications. Such an update would make national reports on systematic observations after January 2006 fully effective.

1. Introduction.

This report on progress with the *Implementation Plan for the Global Observing System for Climate in Support of the United Nations Framework Convention on Climate Change (UNFCCC)*¹ (subsequently referred to as the Plan or Implementation Plan) has been prepared at the request of the Conference of the Parties (COP)². This first report focuses on the actions of the “Agents for Implementation” identified in the Plan with a special emphasis on the sponsoring agencies as requested³ by the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the COP.

The Implementation Plan, if fully implemented by the Parties both individually and collectively, will provide those global observations of the Essential Climate Variables (ECVs) (Appendix 1) and their associated products, required by the Parties in meeting their responsibilities under Articles 4 and 5 of the UNFCCC. In addition, it will provide many of the essential global-scale systematic observations required

¹ GCOS Document 92 *Implementation Plan for the Global Observing System for Climate in Support of the United Nations Framework Convention on Climate Change (UNFCCC)* submitted to the UNFCCC at its 10th meeting in session, held at Buenos Aires from 6 to 18 December 2004. Called the Implementation Plan in this report.

² Decision 5/CP.10; *Requests* the secretariat of the Global Climate Observing System to provide information to the Subsidiary Body for Scientific and Technological Advice at its twenty-third session (November–December 2005) and, as required, at subsequent sessions, on how the actions identified in the implementation plan are being implemented.

³ SBSTA 21 invited the GCOS secretariat, in conjunction with the GCOS sponsoring agencies to report to the SBSTA at its twenty-third session (November 2005) and, as required, at subsequent sessions, on how the actions identified in the plan have been incorporated in the agencies’ own plans and actions.

by the Parties for their work on impact assessment and adaptation as well as those observations required by the Intergovernmental Panel on Climate Change and the World Climate Research Programme. The Implementation Plan also notes, where countries have the capacity, the added benefits for impact assessment purposes of additional more spatially detailed regional- and national-scale climate observations.

The Implementation Plan covers observations from all domains – terrestrial, oceanic, and atmospheric – that are then transformed into products and information through analysis and integration in both time and space. Since no single technology or source can provide all the needed observations, the system will involve *in situ* instruments on the ground, on ships, buoys, floats, ocean profilers, balloons, samplers, and aircraft, as well as from all forms of remote sensing including satellites. Meta-data (i.e., information on where and how the observations are taken) are an essential component of the Plan, as are historical and palaeo-climatic records that set the context for the interpretation of current trends and variability. Success in implementation depends critically on national and regional entities that make the actual observations according to standards and protocols established by a variety of international programmes, organizations and agencies. All of these national, regional, and international entities are referred as the ‘Agents for Implementation’. As noted earlier this first report will focus on activities at the international and regional levels in establishing the necessary coordination of activities as well as observational standards and protocols. Subsequent progress reports to the SBSTA will include specific information on improvements prior to a full review of the state of implementation in 2008.

2. International Actions.

2.1. The UNFCCC.

The UNFCCC through its decision 5/CP.10 at Buenos Aires in December 2004 took one of the first steps in implementation of the Plan by encouraging its Parties to: strengthen their efforts to address the priorities identified in the Implementation Plan; implement the priority elements in the regional action plans relating to the global observing systems for climate; enhance their work and collaboration on observation of the essential climate variables, and; develop the climate products needed to support the Convention. This would include participation in the Global Climate Observing System Cooperation Mechanism and invitation of those Parties that support space agencies involved in global observations to request these agencies to provide a coordinated response to the needs expressed in the Implementation Plan. The status of the various responses to this decision will be addressed in subsequent parts of this report.

SBSTA, at its 22nd meeting in June 2005, received two reports on specific aspects of the implementation of the Global Observing System for Climate. Firstly, a report entitled *Progress with the initial ocean climate observing system: A report to the UNFCCC*⁴ prepared in response to decision 11/CP.9⁵. Secondly, the final report on the *Analysis of data exchange in global atmospheric and hydrological networks*⁶. Both of these reports raised a number of issues that are to be discussed at the 23rd meeting of SBSTA.

⁴ Document GCOS 98; FCCC/SBSTA/2005/Misc.5

⁵ COP decision 11/CP.9 invited “the Global Climate Observing System secretariat, in conjunction with the Global Ocean Observing System (GOOS) secretariat, to provide information to the Subsidiary Body on Scientific and Technical Advice, at its twenty-second session, on progress made towards implementing the initial ocean climate observing system.

⁶ GCOS Document 96.

2.2. The GCOS Programme Sponsors.

Three of the four sponsors of the GCOS programme have adopted formal resolutions calling for Member States to fully support and participate in the relevant actions of the Implementation Plan and requested their secretariats and subsidiary bodies to incorporate the relevant portions of the Plan in their own work plans. The governing bodies of the fourth sponsor have not yet had an opportunity to take a formal decision.

Specifically:

- The Executive Council of the World Meteorological Organization (WMO) adopted a resolution⁷ that urged Members to; “Fully support and participate in the implementation of the relevant actions in the Implementation Plan, including coordination at the national level to ensure balanced development of national observing systems for climate; Work with the WMO Space Programme and CEOS SIT to develop a coordinated response to the needs expressed in the GCOS Implementation Plan. It further requested the Secretary-General to: Incorporate the relevant actions within the Implementation Plan into the programmes of WMO and coordinate with the presidents of technical commissions on their work plans.
- The Assembly of the Intergovernmental Oceanographic Commission (IOC) instructed⁸ its Executive Secretary to set up a regular system of reporting from Member States on the status of their contribution to the Climate Module of GOOS, taking full advantage of the JCOMM system monitoring activities, and considering the reporting needs for all the elements of GOOS; and (ii) urged Member States to: (a) incorporate elements of the GCOS IP, as appropriate and to the extent possible, into their own national ocean-observing plans, and (b) respond to requests from the GOOS Project Office for regular reports on progress in implementing actions identified in the GCOS IP.
- The International Council for Science (ICSU) decided⁹ to; encourage the engagement of the Plan by the activities of its sponsored and cosponsored activities as appropriate and consistent with their objectives; endorse the Plan and especially the need for standards for observations and the associated meta-data; endorse the emphasis that the Plan gives to the effective functioning of the World Data Centres and other related institutional arrangements for data custody and access in the area of climate observations and analysis; and requested the GCOS Secretariat to convey ICSU’s endorsement in the GCOS report to the UNFCCC/SBSTA 23 in December 2005.

These decisions by the governing bodies of the GCOS Sponsors have resulted in positive actions by a number of their key subsidiary bodies in effectively establishing the necessary international framework of standards and coordination for the collection of atmospheric and oceanic ECVs. While significant further work remains to be done in establishing the appropriate standards and coordination mechanisms for the terrestrial ECVs, the Food and Agricultural Agency (FAO) together with the WMO and other relevant international agencies are taking the first steps in responding to the UNFCCC request¹⁰ to provide the necessary framework. A progress report on the creation of the terrestrial mechanism requested by the COP is available as a companion document in FCCC/SBSTA/2005/MISC.16.

⁷ WMO (EC-LVII) Resolution 3 (21 June – 1 July 2005)

⁸ 23rd IOC Assembly (21-30 June 2005)

⁹ ICSU (90th Meeting of Executive Board, 18-20 April 2005)

¹⁰ UNFCCC decision 11/CP.9 invited the sponsoring agencies of the GCOS, and in particular those of the Global Terrestrial Observing System, in consultation with other international or intergovernmental agencies, to develop a framework for the preparation of guidance materials, standards and reporting guidelines for terrestrial observing systems for climate and to submit a progress report on this issue to the COP at its eleventh session.

2.3. Subsidiary Bodies of the GCOS Sponsors.

2.3.1. WMO Consultative Meetings on High-Level Policy On Satellite Matters.

At the last meeting¹¹ between the WMO and satellite operators there was significant discussion on the Implementation Plan as it related to atmospheric and oceanic ECVs. Specifically, the session noted that there were many issues implied by the GCOS Implementation Plan. “First, there was a need for strong space-based research missions with appropriate transitions to operational agencies. The session was of the opinion that sessions of the Consultative Meetings were an appropriate venue for discussions related to such transitions. With regard to GEOSS, the session noted that it was founded on the principle that there should be no duplication and that a consolidated approach for the various participating organizations should be possible. The session agreed that it was important to find the proper coordination role for WMO to be effective while avoiding unnecessary overlaps. The session agreed that it was important to provide guidance in this area and established a task team during the session to provide an appropriate set of recommendations. The task team proposed and the session agreed that with regard to the GCOS Implementation Plan, a single coordinated satellite agencies’ response should be facilitated”.

2.3.2. WMO Commission on Basic Systems (CBS).

The CBS is the key organization in establishing guidelines, standards and reporting on most of the atmospheric ECVs. At its last meeting¹² “The Commission supported the Plan as a major step in the full implementation of the global observing system for climate and agreed to participate fully in implementing the relevant actions and also facilitating access to ECVs by developing countries”. It encouraged Members to support implementation of the Plan and associated regional plans on an individual basis. It requested its Open Area Programme Group for Integrated Observing Systems (OPAG-IOS) to provide advice on how the Commission could best respond to these actions. It also requested the OPAG-IOS to work with GCOS to identify the relationship between elements of the Implementation Plan for the GCOS and elements of the Implementation Plan for Evolution of Space-and Surface-based subsystems of the Global Observing System.”

2.3.3. Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

The JCOMM is the key organization in establishing guidelines, standards and reporting on most of the oceanic ECVs. At its last meeting¹³ the Commission “supported the Plan as a major step in the full implementation of the global observing system for climate and agreed to participate fully in implementing the relevant actions”. It also encouraged Members to support the implementation of the Plan on an individual basis. At a previous meeting¹⁴ of the JCOMM management group earlier this year the Commission noted that: “The JCOMM Mangement Committee and Obseravations Programme Area Coordination Group have adopted the ocean chapter of the GCOS IP as their work plan” They noted further that t”he first challenge is the fundamental need for achieving global coverage by the *in situ* networks. There is presently significant international momentum for implementation of a composite global observing system consisting of: 1) the *in situ* networks -- moored and drifting buoy arrays, profiling floats, tide gauge stations, and repeat ship lines; 2) continuous satellite missions; 3) data and assimilation subsystems; and 4) system management and product delivery”.

¹¹ CM-SAT 5 (24-25 January 2005)

¹² CBS-XIII 23 (February – 3 March 2005)

¹³ JCOMM-II (19-27 September 2005)

¹⁴ JCOMMM Management Group-IV (9-12 February 2005)

2.3.4. Other WMO Technical Commissions.

The WMO has a number of other Technical Commissions with responsibility for coordination of various activities associated with the ECVs including; the Commission for Atmospheric Sciences responsible for atmospheric commission variables; the Commission for Climatology and; the Commission for Hydrology responsible for many of the hydrological variables. These Technical Commissions have been requested to address the Implementation Plan but, at the time of submission of this report, their governing bodies have yet to meet to take the required decisions.

2.4. Cooperating International Bodies.

There are many other international bodies that are not formally linked to the GCOS programme as sponsors that never-the-less have either already or potentially can play a major role in the Implementation Plan. The response of these bodies is addressed in this section.

2.4.1. Group on Earth Observations (GEO).

The SBSTA has earlier welcomed the progress made by the Group on Earth Observations (GEO) in developing a 10-year implementation plan for a Global Earth Observation System of Systems (GEOSS). It noted that governments and international organizations involved in GEO have recognized the need to give coordinated attention to the needs and capacity of developing countries to access earth observation data and products. The GEO has responded positively to the invitation by SBSTA to cooperate with the GCOS Secretariat and to incorporate the relevant actions in the implementation plan into the GEOSS 10-year implementation plan.

It is extremely encouraging to note that the Implementation Plan has fully adopted as part of its climate component of the GEOSS 10-year Implementation Plan. The 2005 work plans are clearly designed to address important issues within the GCOS Implementation Plan. Specifically for 2005 the GEO Secretariat will be: linking GEOSS to the WMO HWR/GCOS GTN-H coordination meeting (Task 7); Engaging with IGBP in the development of a "paleoclimate community" survey tool (Task 11); Supporting GCOS, IGBP & WCRP in completing an observation systems inventory (Task 17); Preparing climate data archiving letters to GEO Members (Task 19); Preparing letter to CEOS regarding the Global Climate Monitoring Principals (Task 20); Engaging with CEOS to appoint a co-coordinator for the GEO & Climate (Task 22).

It will be very important to ensure that the climate and related aspects of the 2006 and subsequent work plans continue to reflect the priority components of the Implementation Plan.

2.4.2. Committee on Earth Observation Satellites (CEOS).

The Space Agencies worldwide, through the CEOS, collectively agreed to provide multi-decadal climate products wherever they can. The CEOS Strategic Implementation Team (SIT) are in the process¹⁵ of developing a concerted response to the requirements for satellite observations and associated products set out in the Implementation Plan; a progress report on this response should be available at the 23rd meeting of the SBSTA. It is anticipated that their approach will be phased, initially addressing the general requirements specified in the Plan and later responding to the specific requirements. It is clear from their early reactions that one of the major issues that will require substantial involvement of governments is the transition of research missions and activities into long-term operations to meet the requirement of the UNFCCC for on-going observations.

¹⁵ Minutes of the 16th meeting of the CEOS-SIT in Geneva on 23rd May 2005.

2.4.3. FAO.

As noted earlier the FAO has been actively engaged with the WMO and others are taking the first steps in establishing the appropriate standards and coordination mechanisms for the terrestrial ECVs. At the same time it continues to support the work of the Terrestrial Observations Panel for Climate and is considering an invitation to become the fifth formal sponsor of the GCOS programme.

3. Regional Actions.

One of the key elements in ensuring full implementation of the GCOS in developing countries with limited resources and capacity has been the sharing of activities at the regional level. This led to the development, by GCOS, of a Regional Workshop Programme that was funded by the GEF as part of its support to the UNFCCC. The Regional Workshop Programme had a number of objectives, including the development of Regional Action Plans (RAPs) that identify specific deficiencies in the climate observing systems at a regional and national level. These objectives are consistent with the Implementation Plan. It had been hoped that regional organizations, with resources and support provided from developed countries and/or the various International Funding Mechanisms, would then work within the regions to take actions to address those deficiencies. Table 1 below provides information on the current status of the Regional Workshop Programme with specific emphasis on the state of the RAPs and their implementation.

Workshop	Date	RAP completed	RAP Implementation Status
Pacific Islands	August 2000	Yes	Good
Eastern & Southern Africa	October 2001	Yes	Elements of some projects proceeding
Central America & the Caribbean	March 2002	Yes	Some projects initiated
East & Southeast Asia	September 2002	Yes	Limited, but improved coordination
Western & Central Africa	March 2003	Yes	Elements of some projects proceeding
South America	October 2003	Yes	Some projects advancing
Central Asia	May 2004	Yes	Some projects advancing
South & Southwest Asia	October 2004	Yes	Initial steps being taken
Eastern & Central Europe	April 2005	Near completion	Not applicable
Mediterranean Basin	Scheduled for November 2005	Expected by mid-2006	Not applicable

A full and more detailed report will be prepared for the SBSTA at the completion of the workshop programme. However, it is informative to note that to date only one region has been able to pursue the actual implementation of more than small elements of a RAP. This has been as a result of the difficulties experienced by regional organizations in mobilizing the resources required to undertake the necessary actions. Clearly additional resources are required to capitalize on the investments already made in developing the RAPs and the GCOS Secretariat does not have the necessary resources.

It is encouraging that World Leaders at their recent summit¹⁶ were “committed to taking further action through practical international cooperation, inter alia; to continue to assist developing countries, in particular small island developing States, least developed countries and African countries, including those that are particularly vulnerable to climate change, in addressing their adaptation needs relating to the adverse effects of climate change.” Such adaptation needs can only be addressed through the development of an effective national observing system for climate. Furthermore, the G8, at their recent meeting in Gleneagles, noted¹⁷ the desire of the G8 to strengthen international cooperation on global Earth observations. It committed the G8 to support efforts to help developing countries and regions obtain full benefit from GEOSS and GCOS, including “placement of observational systems to fill data gaps, developing of in-country and regional capacity for analyzing and interpreting observational data, and development of decision-support systems and tools relevant to local needs”. It also noted that the G8 would specifically work to strengthen the existing climate institutions in Africa through GCOS.

Furthermore the COP in decision 1/CP.10 (Appendix 2) urged developing countries Parties to make use of the strategic priorities on adaptation and capacity-building funded by the Global Environment Facility for amongst other things “the enhancement of systematic observation and monitoring networks in countries with observation stations that feed into the Global Climate Observing System and through increased data sharing between Parties”. The Regional Workshop Advisory Committee recommended seeking resources from the GEF and other potential donors to enable the GCOS Secretariat to sustain progress by assisting regions to refine their action plans so that they are clearly linked to societal needs and can attract national and donor support. Amongst their recommendations is the need to:

- Identify the likely interests of the donor community;
- Provide improved analyses of the relationship between regional systematic observation and national developmental goals and to the needs of the UNFCCC, e.g., to vulnerability and adaptation;
- Develop specific regional improvement projects, e.g. for priority systems like upper air, regional surface networks, and the monitoring of water resources, sea and lake levels.

In related actions, a number of Parties, including Australia, New Zealand, United Kingdom and the United States are supporting system improvements in key networks. The performance of these networks has been improved. We look forward to additional progress as other Parties make bilateral commitments or support cooperative projects, such as those undertaken through the GCOS Cooperation mechanism.

4. National Actions.

4.1. Implementation.

The key to actual implementation of the Plan firmly rests upon national commitment and action, without these there will be no system and no observations. As noted earlier both the COP and its SBSTA have encouraged Parties to incorporate actions supporting the implementation of the implementation plan in their national plans and actions relating to global climate observing systems. Annex 1 Parties are positioned to take the required actions within their national boundaries. Problems remain for Non-Annex 1 Parties and for the global commons¹⁸. One of the mechanisms established in 2004 to assist in this regard was the GCOS Cooperation Mechanism¹⁹. The GCOS Cooperation Mechanism is designed to

¹⁶ Resolution A/60 adopted by the UN General Assembly at its fifty-ninth session following the High-level Plenary Meeting of September 14-16, 2005.

¹⁷ Specifically, paragraph 34 of the G8 Gleneagles Plan of Action, July 2005.

¹⁸ Those parts of the Earth system not under the direct control of any one nation.

¹⁹ Decision 5/CP.10 encouraged Parties to enhance their work and collaboration on observation of the essential climate variables and on development of climate products to support the needs of the Convention, including through participation in the Global Climate Observing System cooperation mechanism.

provide a framework for Annex 1 and other Parties seeking to address the weaknesses with other international and regional funding mechanisms that are not readily able to provide resources to improve and more importantly sustain global observing networks. A meeting of the representatives of Parties interested in participating in the Mechanism is to be held at the time of SBSTA 23/COP 11 to further develop its programs and activities.

As noted in the Implementation Plan, a small Project Implementation office is required with within the GCOS Secretariat to ensure implementation activities are carried forward by cooperating agencies. It is pleasing to note that one officer has been seconded by one of the Parties to the GCOS Secretariat for a two-year period and several Parties have provided additional financial resources over the past two years. These commitments are now coming to an end and require replenishment if the work by GCOS on implementation is to proceed.

4.2. Reporting.

In decision 5/CP.10 the Parties recognised the importance of the GCOS Secretariat providing regular reports on progress with actual implementation of the global observing system for climate, however for many networks formal monitoring through the arrangement with the GCOS Sponsors are not in place. Comprehensive reports such as the GCOS Second Adequacy Report were significantly aided by the submission to the UNFCCC of information on the climate observing activities of the Parties as part of their Third National Communications. More recently, SBSTA 21 invited all Parties to report on their observational activities in their detailed reports on systematic observation. Unfortunately, although reporting according to the current guidelines²⁰ will be very useful it will not provide all the information required by GCOS, as these guidelines do not reflect the specification of the ECVs and the observing system envisaged in the Implementation Plan.

5. Summary and Conclusions.

The Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC has achieved a remarkable degree of international consensus. The Sponsors of GCOS, their subsidiary bodies and most of the international organizations involved with climate have adopted the plan and are incorporating the relevant components within their own planning processes. These decisions have resulted in effectively establishing the necessary international framework for standards and coordination for the collection of atmospheric and oceanic ECVs. Significant further work remains to be done in establishing the appropriate standards and coordination mechanisms for the terrestrial ECVs but is underway. At the same time experts continue to bring the existing climate record under strong criticism thus maintaining the need for urgent action. A number of these issues may be raised in the upcoming IPCC Fourth Assessment Report.

This report raises a number of issues that the GCOS Steering Committee (GCOS SC) recommends to the attention of the Parties.

Specifically the GCOS SC urges:

- a) *The SBSTA to invite the GCOS Secretariat to provide a report to the Parties, in late 2008, on the state of implementation of the global observing system for climate, as part of the regular reporting requested by the COP in decision 5/CP.10. This report will be heavily dependent upon information on national implementation activities. Since the Fourth National Communications are due for submission to the UNFCCC by 1 January 2006, the Parties will have had little time to fully reflect the Implementation Plan for observations*

²⁰ Document FCCC/CP/1999/7 adopted in decision 5/CP.5

within their own planning. The GCOS SC therefore suggests that the SBSTA consider inviting the Parties to update their information by providing a supplementary report to the UNFCCC on observing systems activities by January 2008.

- b) The SBSTA, in cooperation with the SBI, to undertake an update to the reporting guidelines and supplementary reporting format to specifically incorporate the ECVs and the specifications and priorities of the Implementation Plan in time for subsequent National Communications and the supplementary report.*
- c) The Parties to consider the recommendation of the Regional Workshop Advisory Committee to seek resources to enable the GCOS Secretariat to sustain progress by assisting regions to clearly link their action plans to societal benefits, thereby improving prospects for attracting national and donor support.*
- d) Noting that the GEO 10-year plan incorporates the GCOS Implementation Plan as its climate component, encourages the GEO in the development of the subsequent GEOSS multi-year work plans to appropriately and effectively reflect the priority components of the GCOS Implementation Plan.*

Considerations arising from papers submitted to SBSTA-22

Following earlier requests, the reports entitled *Progress with the initial ocean climate observing system: A report to the UNFCCC*, and the final report on the *Analysis of data exchange in global atmospheric and hydrological networks*, were presented to SBSTA-22. Consideration of these reports was deferred to SBSTA-23. These reports raise several outstanding issues.

In particular, the ocean observation paper noted that the responsibility for implementing sustained programmes for ocean observations is not well focused, or is largely absent, in many countries, and depends to a major extent on the oceanic research programmes for budgetary support and operational implementation. It also notes that climate variability and climate change are perhaps the main drivers for the global ocean observing system outside coastal waters.

Noting the special importance of the oceans in many aspects of climate change, including extreme events and the rate and distribution of change, the GCOS SC suggests that the SBSTA request the Parties to urgently address the need for continued and enhanced support by governments and other user groups for the implementation of an adequate global ocean observing system to meet the needs of the Convention.

The report on analysis of data exchange issues identified a number of problems on which GCOS was invited by SBSTA-20 to comment and suggest options for remedial action. The report showed various problems including an unwillingness to exchange data or a lack of awareness by some parties of the failures in the exchange of their data, and that data exchange is more successful when the needs for specific data sets are better defined and articulated. In response, the following recommendations were made by the GCOS Secretariat at SBSTA-22:

- International bodies (e.g., WMO, ICSU, UNFCCC) should provide active support to international data centres in their efforts to obtain permission from countries for the release of the data and the rescue of historical climate records;
- Countries supporting international data archive centres should be requested to ensure that their support to these centres is adequate to meet the data needs of the Convention;
- The SBSTA should request the GCOS Secretariat to work with the IPCC and the climate data users' communities to identify those specific networks and/or parts of networks with a high

priority for global data exchange and to regularly inform the Parties on the availability of those priority climate data sets.

At its October 2005 meeting, the GCOS SC urged the SBSTA to consider the preceding points raised by the GCOS Secretariat in response to the request for advice on improving data exchange.

Finally, the GCOS SC noted that data exchange was fundamental to the needs of the Convention. They also noted the urgent need for capacity building to enable developing countries to make use of climate observations in impact assessment and adaptation thereby demonstrating the vital role played by international data exchange.

APPENDIX 1

The Second Adequacy Report established a list of the Essential Climate Variables (ECVs) (see Table 2) that are both currently feasible for global implementation and have a high impact on the requirements of the UNFCCC. Clearly, there are additional climate variables that are important to a full understanding of the climate system. Many of these are the subjects of current on-going research, but are not currently ready for global implementation on a systematic basis. As our knowledge and capabilities develop, it is expected that some of these variables will be added to the list of ECVs.

Table 2. Essential Climate Variables that are both currently feasible for global implementation and have a high impact on UNFCCC requirements.

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	<p>Surface: Air temperature, Precipitation, Air pressure, Surface radiation budget, Wind speed and direction, Water vapour.</p> <p>Upper-air: Earth radiation budget (including solar irradiance), Upper-air temperature (including MSU radiances), Wind speed and direction, Water vapour, Cloud properties.</p> <p>Composition: Carbon dioxide, Methane, Ozone, Other long-lived greenhouse gases²¹, Aerosol properties.</p>
Oceanic	<p>Surface: Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Current, Ocean colour (for biological activity), Carbon dioxide partial pressure.</p> <p>Sub-surface: Temperature, Salinity, Current, Nutrients, Carbon, Ocean tracers, Phytoplankton.</p>
Terrestrial ²²	<p>River discharge, Water use, Ground water, Lake levels, Snow cover, Glaciers and ice caps, Permafrost and seasonally-frozen ground, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (fAPAR), Leaf area index (LAI), Biomass, Fire disturbance.</p>

²¹ Including nitrous oxide (N₂O), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF₆), and perfluorocarbons (PFCs).

²² Includes runoff (m³ s⁻¹), ground water extraction rates (m³ yr⁻¹) and location, snow cover extent (km²) and duration, snow depth (cm), glacier/ice cap inventory and mass balance (kg m⁻² yr⁻¹), glacier length (m), ice sheet mass balance (kg m⁻² yr⁻¹) and extent (km²), permafrost extent (km²), temperature profiles and active layer thickness, above ground biomass (t/ha), burnt area (ha), date and location of active fire, burn efficiency (% vegetation burned/unit area).

APPENDIX 2

Decision 1/CP.10 *Invites* developing country Parties to make use of the strategic priorities on adaptation and capacity-building funded by the Global Environment Facility, in response to existing guidance from the Conference of the Parties, and of the funding recently pledged to the Special Climate Change Fund; *Insists* that action relating to adaptation follow an assessment and evaluation process, based on national communications and/or other relevant information, so as to prevent maladaptation and to ensure that adaptation actions are environmentally sound and will produce real benefits in support of sustainable development; *Decides* to further the implementation of actions under decision 5/CP.7, paragraph 7, including through:

(a) **Information and methodologies**

(i) Improving data collection and information gathering, and the analysis, interpretation and dissemination of such data and information to end-users, under decision 5/CP.7, paragraph 7 (a) (i), within and by Parties not included in Annex I to the Convention (non-Annex I Parties) which are vulnerable to the adverse effects of climate change, including through the enhancement of systematic observation and monitoring networks in countries with observation stations that feed into the Global Climate Observing System and through increased data sharing between Parties, particularly among Parties included in Annex I to the Convention (Annex I Parties) and among non-Annex I Parties;(ii) Strengthening in-country capacity-building for generating, managing, processing and analysing data sets, for improving the quality of analytical tools, and for disseminating the results of these efforts in sectors that can contribute to climate change impact analysis, including through the development and strengthening of in-country modelling tools to assess the adverse effects of climate change and drivers of regional climate trends; (iii) Providing additional training in each specialized field relevant to adaptation identified in decision 5/CP.7, paragraph 7 (a) (iii), in order to create and sustain in-country capacity, including through overseas training, scholarship programmes and workshops, according to needs identified by Parties; (iv) Improving the availability of General Circulation Models, including their outputs and results, and providing training and financial and technical assistance to non-Annex I Parties for the development and application of downscaling tools at regional and national levels; (v) Strengthening institutions and centres through targeted research programmes under decision 5/CP.7, paragraph 7 (a) (v) and (vi), to address the adverse effects of climate change in vulnerable sectors; (vi) Supporting education and training in, and public awareness of, issues relating to climate change under decision 5/CP.7, paragraph 7 (a) (vii), as well as stakeholder participation in key sectors;
