



International Council for Science

**WORLD METEOROLOGICAL  
ORGANIZATION**

**INTERGOVERNMENTAL  
OCEANOGRAPHIC COMMISSION**

**REPORT OF THE TWENTIETH SESSION OF THE**

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

**(GENEVA, 4-7 September 2012)**

**GCOS – 164**

**UNITED NATIONS  
ENVIRONMENT PROGRAMME**

**INTERNATIONAL COUNCIL  
FOR SCIENCE**

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Chairperson, Publications Board

World Meteorological Organization (WMO)

7 *bis*, avenue de la Paix

P.O. Box No. 2300

CH-1211 Geneva 2, Switzerland

Tel.: +41 (0)22 730 84 03

Fax: +41 (0)22 730 80 40

E-mail: [Publications@wmo.int](mailto:Publications@wmo.int)

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# REPORT OF THE TWENTIETH SESSION OF THE GCOS STEERING COMMITTEE

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# **REPORT OF THE TWENTIETH SESSION OF THE GCOS STEERING COMMITTEE**

## **1. Opening of the Session**

The Twentieth Session (SC-XX) of the Global Climate Observing System (GCOS) Steering Committee (SC) was held at World Meteorological Organization (WMO) headquarters in Geneva, Switzerland from 4-7 September 2012.

This report provides an overview of the presentations and discussion at the session and identifies specific action items flowing from the deliberations of the SC. The list of participants is provided in Appendix 1, the final agenda for the session is given in Appendix 2, the list of the available documents is included as Appendix 3, and a consolidated list of actions is given in Appendix 4.

### **1.1 Opening Remarks by the Chairman**

The Chairman of the GCOS Steering Committee, Dr. Adrian Simmons, formally opened the session at 0900. He warmly welcomed SC Members and other participants and initiated a "tour de table," thus giving all present the opportunity to introduce themselves.

### **1.2 Welcome by the WMO Deputy Secretary-General**

The Deputy Secretary-General of WMO, Mr. Jeremiah Lengoasa, welcomed SC Members and other participants. He noted that GCOS has an important role to play in adaptation and that climate observations will be crucial for the success of both the WMO Integrated Global Observing System (WIGOS) and the Global Framework for Climate Services (GFCS). He highlighted the importance of access to data for the success of the GFCS. In addition to the availability of adequate physical climate data, the GFCS will also need socioeconomic data and information.

Mr. Lengoasa mentioned the review of GCOS that is being planned. Despite the fact that this review has not yet been launched, he assured SC Members that it will now go forward without further delay. He declared that the first meeting of the review team would be held before end of the year and that the final report should be available by the end of 2013. He stated that the review will be a serious and direct look at what will be required to sustain the GCOS Programme but also that it should be seen as an opportunity for the Programme.

Mr. Lengoasa recognized that both the Senior Scientific Officer and the Implementation Manager will retire at the end of year. He expressed his gratitude for their work and also for the SC Members who contribute in-kind support to the GCOS Programme. In particular, he expressed appreciation to the three SC Members present who would be stepping down after the SC-XX, Dr. Alexander Zaitsev, Dr. Abel Afouda, and Mr. Stefan Rösner. He noted that Mr. Rösner will be joining the GCOS staff for a six month period beginning in October 2012.

### **1.3 Approval of Agenda**

The Chairman asked the SC members if they had any questions about the final draft agenda or wished to propose modifications to it. The Committee agreed that the agenda could be adjusted, as necessary, as the session proceeded, and, on this basis, it was approved.

## **1.4 Arrangements for the Session**

Dr William Westermeyer, the GCOS Secretariat officer responsible for the organization of the session, outlined the process of producing the report of the session, noting that the draft session report would be developed from oral comments, PowerPoint slides, and the written documents participants had submitted. He also noted that the complete list of actions would be included in the report, that the draft report would be circulated to SC members and other participants for comment prior to its finalization, and that the final SC-XX Report would be approved by the Chairman in the light of comments received on the draft.

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

### **2.1 A Review of Secretariat Issues**

The Director of the GCOS Secretariat, Dr. Carolin Richter, gave an overview of the activities in which the Secretariat is involved. This part of her presentation was divided into core, recurring, and non-recurring activities. The core activities of the Secretariat include organizing sessions of the GCOS Steering Committee, meetings of the Atmospheric Observation Panel for Climate (AOPC), Ocean Observations Panel for Climate (OOPC), and Terrestrial Observation Panel for Climate (TOPC), and the meeting of the GCOS Cooperation Mechanism (GCM) Board.<sup>1</sup>

Recurring activities include participation of the Secretariat and/or SC Chairman in the ICSU General Assembly, the WMO Executive Council meeting, the Intergovernmental Oceanographic Commission (IOC) Executive Council meeting, the Global Ocean Observing System (GOOS) Steering Committee meeting, the World Climate Research Programme (WCRP) Joint Scientific Committee (JSC), and the Group on Earth Observations (GEO) Plenary session. Additional recurring activities include participation in meetings of the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC), the latest of which was held in Durban, South Africa from 28 Nov–9 Dec 2011, and in the UNFCCC's subsidiary body--the Subsidiary Body for Scientific and Technological Advice (SBSTA)--and participation in Intergovernmental Panel on Climate Change (IPCC) plenary sessions. Also in this category are included the participation of GCOS representatives in the Commission for Basic Systems (CBS) Lead Centres for GCOS, the Implementation and Coordination Meeting of the GCOS Reference Upper-Air Network (GRUAN), the bi-annual meeting of the Baseline Surface Radiation Network (BSRN), the Steering Committee of the Climate for Development in Africa Programme (ClimDev Africa), meetings of the Presidents of WMO Technical Commissions, and several National GCOS Roundtables. Recurring meetings with a focus on satellite observations include those of the Coordination Group for Meteorological Satellites (CGMS), European Space Agency (ESA), Committee on Earth Observation Satellite (CEOS), and relevant meetings of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).

Some non-recurring meetings in which GCOS representatives have participated since the last Steering Committee meeting include the WCRP Open Science Conference, Denver, USA, 24-28 October 2011; the 'Eye on Earth Summit,' Abu Dhabi, United Arab Emirates, 12-15 December 2011; the Commission for Basic Systems (CBS) Expert meeting on GRUAN, Geneva, WMO, 25–27 Jan 2012; the GEO-BON workshop on Essential Biodiversity Variables, Frascati, ESRIN, Italy 27–29 Feb 2012; the GCOS/Centro Internacional de Investigaciones para el Fenómeno El Niño (CIIFEN) Strategy Meeting for the Implementation of GCOS in South America, Guayaquil, Ecuador, 13-15 March 2012; the Esri conference on Geographic Information Systems (GIS) for the United Nations and the

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<sup>1</sup> Beginning in 2013, the GCOS Secretariat will also take over the responsibility of organizing the Oceans Observation Panel for Climate (OOPC) meeting.

International Community, WMO 3–4 April 2012; the WCRP Reanalysis Conference, Washington, D.C. May 7–11, 2012; and the several WMO Executive Council Task Team meetings for the Global Framework for Climate Services (GFCS).

A special activity was this year's celebration of the 20<sup>th</sup> anniversary of the establishment of GCOS on 29 June 2012. The Director provided some highlights of this special event, which included the poster exhibition; the scientific symposium in the main Salle Obasi at WMO Headquarters, in which presentations on GCOS yesterday, today, and tomorrow were given; and the celebratory dinner in the WMO Attique Restaurant.

Finally, the Director gave an overview of GCOS outreach activities, indicating the publication of various reports, brochures, articles, and posters. She noted that new brochures were being planned on observations for adaptation, on the Global Observing Systems Information Center (GOSIC), and on the work of AOPC, OOPC, and TOPC.

Some discussion followed the Director's presentation. The timing and delivery of the next adequacy and progress reports and implementation plan were briefly touched upon, but this issue is covered in more detail in section 16. The IOC representative suggested that it would be good if the GCOS review mentioned in section 1.2 above could be completed before the IOC Assembly and the WMO Executive Committee meetings in June 2013 so that it could be considered at these meetings. The SC was supportive of this idea. One SC Member asked about how GCOS fits into the reorganized World Climate Programme (WCP). He was told that little progress had been made to date on the details of the new WCP. Finally, the two actions below were proposed:

**Action 1. Display of posters.** The GCOS Secretariat is asked to display the 20th Anniversary posters at the Extraordinary Congress, if possible, and at other relevant meetings.

**Action 2. Preparation of standard presentations.** The GCOS Secretariat is asked to accumulate an archive of GCOS presentations, such as the GEOBON one, that may be used or modified for use at future meetings, in particular where participation has been delegated to a GCOS Steering Committee Member or other representative of GCOS.

## 2.2 A Review of Actions from SC-XIX

The Director completed her report by assessing the status of the actions arising from SC-XIX. She noted that the great majority of the 27 actions had been completed. Several of the actions, however, had not been completed, were in progress, were of unknown status, or were no longer relevant. Those not completed were the proposed brochure on the socio-economic benefits of observations, a meeting with Earth Networks, Inc., and SC input to the GCOS review. Additional input was requested of SC members to assist in development of the socioeconomic benefits brochure, and input to the GCOS review will be provided following SC-XX.

The actions “communicating the provenance of ECVs” and “organizing a workshop on observation needs for adaptation” are in progress. Concerning the former, the following action was proposed:

**Action 3. Article on the provenance of ECVs.** The SC Chairman is asked to complete a general article, in cooperation with co-authors, on the provenance of ECVs.

Two actions of unknown status were deemed to be actions to be taken up by the GCOS Panels: “other cryospheric issues” and “land-based networks for flux measurements”.

### 3. Report of the Chairman

The Chairman of the GCOS SC reviewed some fifteen meetings and other activities in which he had been involved since the last SC Session. He drew special attention to the completion of the Satellite Supplement to the 2010 update of the Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (GCOS-IP), which was published as GCOS-154 in December 2011. He also urged Members to identify at this session matters that they consider should be communicated to the sponsors in his next annual letter.

In considering issues facing the GCOS Programme, he noted that he would like to hear a free-ranging discussion of future activities. Some specific current issues that need to be discussed include the status of GTOS and the functioning of OOPC. He suggested that it is timely that SC Members devote particular attention to the future GCOS Programme for two reasons.

First, the sponsor review, introduced by WMO at last year's session, remained ahead of GCOS. It was not possible for the review to proceed as quickly as envisaged this time last year, but it was important for several reasons that the review proceed promptly now. The delay in starting the review gave the Steering Committee the opportunity at this session to discuss and set down the key points to be submitted to the review team. This may cover the strengths and weaknesses of what has been done, what should (or should not) be continued, and what new activities may feasibly be undertaken. It may also cover how things are done, i.e., through the Steering Committee, Panels, working groups, the Secretariat, and/or national contributions, and how they might be done better. The Chairman noted that he would normally be stepping down at the end of 2013. However, he suggested that it would not be desirable for a new Chairman to take over until after the sponsor review was completed, and he was therefore reluctantly prepared to continue as Chairman if the review was delayed further.

Second, following discussions and conclusions from last year's session of the Steering Committee, the SC and Secretariat were about to embark on the production of a new adequacy report and implementation plan, the timetable of which has been communicated to the sponsors and UNFCCC/SBSTA. The forthcoming workshop on Observation Needs for Adaptation to Climate Variability and Change (see agenda item 15) was viewed as the beginning of activity to this end. Thus, SC-XX should confirm the timetable and identify and discuss the issues to be resolved and the activities needed.

In discussion following this presentation, an issue about the proper use of language relating to the specification of requirements for observations and products arose. This resulted in the following action.

**Action 4. Clarifying and standardizing language.** The SC Chairman, assisted as appropriate by Steering Committee or Panel members, is asked to consider use of such language as "accuracy," "stability," and "systematic error," possibly by developing a working paper on the subject with the goal of clarifying and standardizing such language. This should take into account the glossary maintained by WMO.

### 4. GCOS Panel Reports

#### 4.1 Atmospheric Observation Panel for Climate

Following the suggestion made by a Member at SC-XIX that Panel Chairs summarize information on the state of observing systems and the state of the climate in their domain presentations, the Chair of the AOPC, Dr. Adrian Simmons, began his presentation with a review of recent climatic events and observing-system changes. One highlight was a slide illustrating that the extent of Arctic sea ice in September 2012 was at record low levels. This

review was followed by a discussion of satellite launches since SC-XIX. The AOPC Chair's conclusion was that the satellite component of the observing system is largely healthy. ENVISAT had, however, failed recently after operating five years beyond its design life, and there is still no operational funding stream for the GMES Sentinel satellites that will replace much of ENVISAT's functionality. There is also no replacement for the limb-scanning MIPAS instrument aboard ENVISAT. He noted that there are also threats to closures in the Global Atmosphere Watch (GAW) network and also to the radiosonde network. Ascertaining the actual situation can be difficult until a station actually closes down.

The AOPC Chair displayed a slide indicating the status, as determined by monitoring by the Deutscher Wetterdienst and the Japan Meteorological Agency (JMA), of the GCOS Surface Network (GSN). Most regions are doing well, but reporting from Africa, although stable, is still quite poor at only 50 percent. The GCOS Reference Upper Air Network (GRUAN) was briefly reviewed. It was noted that arrangements had been agreed for this network to be covered by WIGOS regulatory material. The DWD will continue to host the Lead Centre for this network. A map of GRUAN stations indicated that sites are needed in Africa and South America. It was noted that a workshop on network expansion had been held recently.

Finally, the AOPC Chair briefed the SC on the status of actions directed to the AOPC by SC-XIX:

- Action 4. Consideration of ECV data in International Data Centres: Arrangements for the cloud-properties ECV require clarification; there should generally be more on line at the Data Centres concerning the data available and data accesses;
- Action 13. Private sector involvement in greenhouse-gas observation: AOPC recommended that the Steering Committee monitor the situation and continue discussion of private-sector involvement in greenhouse-gas monitoring;
- Action 20. Support for International Surface Temperature Initiative (ISTI) and consideration of rationale and potential for establishing a global surface reference network: AOPC continued to monitor progress of the ISTI, which appeared to be good. AOPC was not in a position to judge the value of establishing a global reference network, and stressed the importance of maintaining the baseline GCOS Surface Network in the first place;
- Action 21. Future of OOPC/AOPC working group on SST and Sea Ice: Subject to OOPC agreement, AOPC decided to terminate the joint AOPC/OOPC Working on Group Sea-Surface Temperature (SST) and Sea-Ice, with the understanding that alternative arrangements to cover the two ECVs concerned would be considered by OOPC when it next met;
- Action 22. Consideration of cryospheric issues: AOPC received an update on the progress in establishing the Global Cryosphere Watch, but did not formulate any specific feedback to the Steering Committee

The discussion on these actions gave rise to several updated and/or new actions from SC-XX:

**Action 5. Working with sea ice and SST variables.** The OOPC is asked to devise a new way of working with sea ice and SST variables, assuming it confirms closure of the joint working group. This should be done in cooperation with the Climate and Cryosphere (CliC) Project, the Global Cryosphere Watch (GCW), and the International Ice Chart Working Group (IICWG).

**Action 6. Global Surface Reference Network.** The AOPC is asked to keep under review the question of the need for a global surface reference network.

**Action 7. Measurement of precipitation.** The AOPC is urged to keep under review the measurement of precipitation, in particular by automatic stations, and to liaise with others on this issue.

## 4.2 Ocean Observations Panel for Climate

Dr. Albert Fischer, the incoming Director of the Global Ocean Observing System (GOOS) Project Office, delivered a presentation on the Ocean Observations Panel for Climate (OOPC) on behalf of Dr. Eric Lindstrom, the outgoing OOPC Chair. The presentation addressed, in turn, the state of the ocean, the state of the ocean observing system, and the state of the OOPC.

In discussing the state of the ocean, Dr. Fischer highlighted the fact that global mean sea level has returned to its long-term trend. Like the AOPC Chair, he observed that sea ice in the Arctic was at record lows during 2012, but he also noted that it was nearly constant in Antarctica. The status of coral reefs was another topic highlighted. Coral reefs are at risk for a variety of reasons, including from fishing, coastal development, and pollution, as well as from climate change and variability, ocean acidification, and rapid sea-level rise. A goal of OOPC is to identify "hotspots" for future stress where local management of local risks is particularly needed. This can be aided by considering the Essential Ocean Variables (EOVs) related to this issue. Dr. Fischer also suggested that coral cover could become an EOVS for describing the ecosystem state. The SC especially appreciated the information provided on coral reefs.

As in previous years, a key slide was shown indicating the state of *in situ* observing systems. Overall, about 62 percent of the proposed system was in place as of August 2012. However, improvements of *in situ* networks have essentially slowed to a stop. In some cases, for example, in the case of the global drifting buoy array, the progress has reversed, and the array is now down from 83 percent to 63 percent of its design density. (Action 8 at the end of this section addresses this concern). Conversely, the Argo network now consists of some 3,500 floats and is considered a great success.

Dr. Fischer next reported on the reformulation of the GOOS governance structure by the IOC. He noted that the GOOS Secretariat has been under pressure because the United States ceased the funding of assessed and voluntary contributions to UNESCO and the IOC when the UNESCO General Conference admitted Palestine as a Member State in October 2011. As a result, UNESCO experienced a 31 percent cut in its overall budget and a 77 percent cut to activity funding for 2012-2013. The Steering Committee noted that it has depended on the Ocean Observations Panel for Climate, co-sponsored by GOOS, GCOS, and WCRP, to represent the global marine community in the preparation of GCOS adequacy reports and implementation plans for the oceanic domain. The SC expressed some concern that the GOOS reorganization has formally ended the GOOS co-sponsorship of OOPC and that OOPC has not been actively engaged recently due to lack of IOC Secretariat support and to concentration by its Chair on the evolution of GOOS and the Framework for Ocean Observing. The SC noted, however, the decision of the GOOS SC at its first meeting (20-22 June 2012) "to negotiate with GCOS and WCRP on the role of the present OOPC in addressing physical Essential Ocean Variables," as well as the proposal that OOPC remain the focal point for the ocean-related issues of GCOS, with the understanding that OOPC would coordinate with other GOOS panels for needed expertise in non-physical variables. The SC recommended quick clarification and formal renewal of this key link between GCOS, WCRP, and GOOS.

The GCOS SC also took note of Dr. Eric Lindstrom's intent to step down as the OOPC Chair and negotiate new leadership following his June 2012 appointment as co-Chair of the GOOS SC. It also noted the plan to recruit a scientific officer in the GCOS secretariat to support

OOPC with US funding that could no longer be transferred to the IOC. In light of the upcoming preparation of a new Adequacy Report, it urged that this transition be implemented as quickly as possible so that OOPC could meet as soon as possible and ensure that the ocean domain issues of GCOS were fully connected to the ocean observing community. The SC thanked Dr. Fischer for his presentation.

**Action 8. Status of drifting buoy network.** The OOPC is asked to report back to AOPC and the Steering Committee on the status of the drifting buoy network, whose numbers have been dropping.

### 4.3 Terrestrial Observation Panel for Climate

Prof. Han Dolman, Chair of the Terrestrial Observation Panel for Climate (TOPC), began his presentation with a review of the status of land ECVs. For lake temperature, he noted considerable warming in lakes in Europe and North America. For permafrost, he noted the uneven distribution of boreholes between Siberia and the rest of the world. He indicated that the active layer is increasing in depth, which is what one would expect with permafrost degradation. Increased awareness of the status of permafrost and a need for monitoring is required. Likewise, glaciers are continuing to retreat. Since results sometimes differ between satellite and *in situ* data, calibration and validation of the satellite data with *in situ* data is needed. Soil moisture measurements were deemed to be taking off well. Runoff stations were still declining, and it was noted that sometimes runoff data are available at the provincial level but not at the national level. Groundwater data has increased as a result of the Gravity Recovery and Climate Experiment (GRACE), and the importance of groundwater as an ECV has increased. FAPAR, albedo, biomass, and biomass burning were also briefly discussed. The Steering Committee expressed its support for co-locating more boreholes with operational weather stations.

In the next portion of the presentation a number of issues for TOPC were introduced. One was the need for an increased emphasis on the value of *in situ* observations in the next GCOS Implementation Plan. A second was a concern over the multiple obligations for reporting on activities to funding organizations and international bodies, a problem that creates difficulties for data centres. The need to increase collaboration with CEOS on calibration and validation was cited as a third. The latter two issues gave rise to actions 9 and 10 below.

A discussion of the World Glacier Monitoring Service (WGMS) view of data and open access followed. Prof. Dolman suggested that a WGMS recommendation to develop clear citation rules for datasets (and their versioning) in cooperation with GT-Net Data Centres (e.g., using Digital Object Identifiers) might encourage data owners to make more data available.

Finally, Prof. Dolman raised the issue of the status of the Global Terrestrial Observing System (GTOS). He noted that GTOS support of TOPC has been steadily declining and that the Director of the GTOS Secretariat has recently stepped down. Hence, a functioning GTOS Secretariat currently did not exist. At the request of the Food and Agriculture Organization (FAO), where GTOS is housed, Prof. Dolman had drafted a document supporting the relevance of GTOS. To date, no feedback has been received on this document. The Chair of GTOS had announced his intention to step down if he did not receive assurances of support from the sponsors of GTOS. It was appreciated that GCOS will continue to support TOPC whatever is eventually decided about GTOS. The discussion of the status of GTOS and its implications for TOPC was continued in item 9.

**Action 9. Reducing the burden of multiple reporting requirements.** The SC Chairman and Secretariat are asked to bring to the attention of sponsors and others the fact that data providers and data centres often face multiple reporting requirements to funders,

international coordinating bodies, parent institutions, and so on, and that reporting formats usually differ in content and timing. Ways need to be found to reduce this burden, through a standardized reporting format, for example.

**Action 10. Increasing collaboration with the CEOS Working Group on Cal/Val.** The TOPC Chair is asked to promote standardization of FAPAR products and to increase collaboration with the CEOS Working Group on Cal/Val. The SC strongly supports the continued attendance of a representative of this CEOS Working Group at TOPC meetings.

**Action 11. Providing lake temperature data to HYDROLARE.** The TOPC is asked to provide a list of producers of lake temperature data to whom the GCOS Secretariat should write to encourage them to provide their data to HYDROLARE.

## **5. GCOS and the World Climate Research Programme**

### **5.1 Fourth WCRP International Conference on Reanalysis**

SC Member Dr. Kazutoshi Onogi attended the Fourth WCRP International Conference on Reanalysis from 7–11 May 2012 in Silver Spring, MD, USA and provided the following report of this meeting. He noted that the conference covered a wide variety of topics, including status and plans for reanalysis, atmospheric reanalysis, integrated reanalysis, ocean reanalysis, land reanalysis, data assimilation, applied climate use of reanalysis, *in situ* and remotely sensed observations, advancing reanalysis, and agency priorities. The agency priorities panel discussion noted that observation is the most critical component of reanalysis. The panel also concluded that reanalysis mostly operates at the margin of operational centres and that there is a general lack of long-term financial commitment. Concern was expressed that funding is not sustained in a dedicated manner, although it is important for climate research.

Dr. Onogi noted that for climate studies, past data are very important because they can be used in reanalyses now rather than waiting for future data. Therefore, data rescue must be emphasized. GCOS should also continue to give priority to promoting reprocessing of past satellite data. The Steering Committee noted the continuing need for data reprocessing and noted that reanalysis is also fundamental for climate services, as it helps to fill gaps.

### **5.2 Establishment and First Meeting of the WCRP Data Advisory Council**

Dr. Michel Rixen of the WCRP Secretariat provided an overview of the new WCRP Data Advisory Council (WDAC). He stated that the WDAC will act as a focal point for all WCRP data, information, and observation activities with its sister programmes and will coordinate their high-level aspects across the WCRP, ensuring cooperation with the main WCRP partners, such as GCOS and other observing programmes. The Terms of Reference for the WDAC are the following:

- To serve as a focal point for observations and data in WCRP;
- To advise the JSC and to coordinate with WCRP Projects and Working Groups on issues pertaining to observations and climate data;
- To promote research using sustained observations and data from process studies across the WCRP;
- To promote assessment of the adequacy of sustained observations and derived products to support climate research;
- To promote assessment of gaps in the global observing system in cooperation with observation programmes;

- To promote coordinated assessment and comparison of climate-data products, including those from reanalyses;
- To promote research for continuing improvement in the processing and reprocessing of climate data;
- To promote development of mechanisms for archival and preservation of data, and access to and analysis of data and associated metadata;
- To promote standards for product generation, including global and regional reanalyses; and
- To promote development of coupled data assimilation and a coordinated approach to reanalysis across all domains.

At the first WDAC meeting, the Council made a number of recommendations. These included:

- Requesting the WCRP Joint Scientific Committee (JSC) to encourage all WCRP projects to engage with operational activities such as the Sustained Coordinated Processing of Environmental Satellite Data for Climate Monitoring (SCOPE-CM), regarding satellite observing data sets;
- Urging harmonization between the GOSIC and the CEOS/CGMS initiatives, i.e., to provide a composite inventory of *in situ* and satellite observations;
- Encouraging WDAC broadening of contributions from the WCRP core projects, CEOS, CGMS, IGBP, SOLAS and the Reanalysis community to Obs4MIPs so as to populate the Earth System Grid Federation (ESGF) and further facilitate model-data comparisons;
- Initiating planning activities for a reanalysis workshop addressing international coordination on input observations (*in situ* and remotely-sensed observations covering the atmosphere, ocean, and land); and
- Placing higher priority on non-physical variables, such as partial pressure of carbon dioxide (pCO<sub>2</sub>) as an Essential Climate Variable (ECV) (e.g., include the SOCAT database in the ECV inventory and in Obs4MIPs).

Dr. Rixen noted that it is intended that the WDAC should have the flexibility and resources to promote action within existing WCRP projects and panels or by appointing limited duration task teams to accomplish its tasks. The Steering Committee expressed some concern as to how this was going to work without substantial resources available for task team activities. Dr. Rixen and the GCOS Chairman clarified that the WDAC is mainly an advisory body and that WCRP core projects and Working Groups are usually responsible for the actual implementation and execution of the various activities within WCRP.

**Action 12. WDAC issues.** The SC expressed its concern at the number of important topics to be considered by the WDAC at its next session, and recommended that the GCOS panel representatives on the WDAC work towards ensuring that key items were adequately covered by WDAC or other WCRP activities, through adequately resourced task teams where appropriate.

### 5.3 Conclusions of the 33rd Session of the WCRP Joint Scientific Committee

Dr. Rixen also reviewed the 33rd Session of the WCRP Joint Scientific Committee. In addition to the WDAC discussed above, Dr. Rixen noted that a Modelling Advisory Council has also been created. He introduced the WCRP Grand Challenges that were discussed at the JSC. These were:

- Skilful regional climate information (mainly a CLIVAR lead);
- Regional Sea-Level (CLIVAR lead, with CliC and GEWEX);

- Cryosphere in a changing climate (CliC lead);
- Cloud and Climate Sensitivity (WGCM lead, with GEWEX and SPARC);
- Changes in water availability (GEWEX lead); and
- Prediction and attribution of extreme events (GEWEX lead).

In considering the GCOS-WCRP relationship, he commented that observations are indispensable in climate research and prediction, and thus WCRP needs the sustained support provided by GCOS for maintenance and improvement of existing networks, addition of new measurements to improve climate predictions and assessment at global and regional scales, and assurance of open and un-restricted access to observations for research. He stated that WCRP looks forward to continued GCOS-WCRP collaboration.

Concerning the issue of open and unrestricted access to observations, SC members wondered how GCOS can ensure this. It would perhaps be better to state that we can “help to ensure” such access. Researchers also have a role to play in helping to ensure that their observations are openly and unrestrictedly available.

#### **5.4 GCOS and Essential Climate Variables: Inventories of ECV Datasets**

Dataset recognition, availability, and usability were the principal topics considered under this agenda item, introduced by the SC Chairman, Dr. Simmons. He observed that GCOS designates international observing networks as GCOS networks but does not formally recognize individual datasets as GCOS datasets. GCOS responded initially to requests for recognition of datasets by developing a “Guideline for the Generation of Datasets and Products Meeting GCOS Requirements” that, if followed, provides a form of self-certification. GCOS is now working with WCRP on further developments, following an initial ESA-hosted workshop in April, 2011 that worked with a sample set of ECVs and to develop a proposed inventory of global climate data products to provide a basis for comparison and informed use of them. GCOS and WCRP are following up by developing and supporting arrangements for hosting the inventory and expect to arrange further workshops covering other ECVs and to continue to promote independent dataset comparisons.

Dr. Simmons pointed out that the US National Climatic Data Center (NCDC) provides the GOSIC Portal (see section 6) for data from global observing systems. This portal has the facility to search for datasets by ECV and is a proposed host for the inventory of global climate data products. The GEO Portal is another possible host for a link to project websites and data. Datasets should also be made available to appropriate international data centres. National reporting to the UNFCCC should document the availability of ECV datasets to the international community.

A joint GCOS/WCRP and US NCDC project proposal developed by the outgoing WOAP Chair and NCDC was introduced in which inventory entries would be included in a new Web Accessible Folder in the ISO 19115-2 format being implemented by NCDC for datasets referenced by the GOSIC. NCDC is developing an online form for dataset producers to supply such metadata. GCOS/WCRP panels would provide the overall assessment of entries. This proposal has been endorsed by the WCRP Data Advisory Council.

The SC recommended that this proposal for a joint project to develop hosting of an ECV inventory by the GOSIC should go ahead, recognizing that it was subject to NCDC securing the funding for this additional activity. The SC endorsed the action of the WDAC to promote harmonization of this activity with the CEOS Working Group on Climate questionnaire related to ECV inventory and follow-on CEOS/CGMS activities for satellite-based products, to promote and cater for inclusion of datasets based on *in situ* measurements, and to link with other initiatives, such as the NCAR Climate Data Guide, obs4MIPs, and reanalysis.org.

**Action 13. Publication of data sets.** The Steering Committee strongly encouraged the publication of climate data sets, noting the emergence of journals dedicated to the purpose and that a DOI could be attached to a version of a dataset. It noted that the proposed inventory of ECV datasets catered for the recording of a journal reference and DOI.

## 6. Global Observing Systems Information Center

Via a remote link, Ms. Christina J. de Groot-Lief, the Programme Manager for the Global Observing Systems Information Center (GOSIC) gave SC Members an update of the status of GOSIC. She commented that GOSIC has been updated to a new Drupal-based platform deployed on 31 August 2012. This will allow for better tool development and access by the global observing systems community. It has also been integrated with the new Drupal-based NCDC Web Site, which was released in September (<http://www.ncdc.noaa.gov>). It will be integrated with the Drupal-based Climate Portal (<http://climate.gov>) to be released in the third quarter of 2012. Further, GOSIC metadata are now available in a Web Accessible Folder, which will facilitate upload of the GOSIC metadata into the GeoPortal.

Additional developments include ECV satellite dataset identification in cooperation with CEOS, metadata development in cooperation with the NASA Global Change Master Directory (GCMD), and GOSIC-GCOS ECV Media-Wiki page development with the Cooperative Institute for Climate and Satellites (CICS) (<http://www.cicsnc.org/>) and WMO/GCOS.

Ms. de Groot-Lief provided an overview of what is available on the GOSIC site, and SC Members remarked that they were impressed with the user-friendliness of the site. The TOPC Chair commented on the GTOS home page, noting that he is worried because there is currently no direct support from GTOS, and the site has not been updated recently. He proposed that this should be noted on the GOSIC web site, and Ms. de Groot-Lief, noting that the GTOS web site has not been updated for more than two years, agreed to Dr. Dolman's suggestion. The TOPC Chair also noted that the Terrestrial Ecosystem Monitoring Sites (TEMS) link needed to be taken down from the GTOS site, as it is no longer functioning.

The GOOS Project Office Director found that the data flow diagram shown was useful but wondered if it had been vetted with the data teams. He was assured that it had been and that the goal was to create more. He was also concerned that some pages on the GOSIC site unnecessarily duplicate GOOS site content and programme descriptions that can be found elsewhere. His view was that GOSIC should focus on data access. Ms. de Groot-Lief responded by saying that GOSIC tries to be responsive to the users and that its basic goal is to be as user-friendly as possible.

Ms. de Groot-Lief indicated that the GCOS Secretariat and Panel Chairs may be given editing rights to certain pages on the GOSIC web site in order to update information. The SC greatly appreciated this offer.

Following these comments, Ms. Anna Mikalsen of the GCOS Secretariat gave a brief update on GCOS Wiki development. She noted that it has been two years since she had developed a Wiki prototype for ECVs. The problem has been that it has not been possible to provide stable hosting at WMO, as IT support is limited. The Director of the GCOS Secretariat remarked that the GOSIC Programme Manager will not need to reach out to the various communities on each of the ECVs, as she can go through Ms. Mikalsen for ECV information for all domains.

**Action 14. Monitoring the GOSIC web site.** SC Members and Panel Chairs are asked to keep an eye on the content GOSIC web site and the GCOS-GOSIC Wiki pages that may be hosted by CICS and to provide feedback to the GCOS Secretariat, Howard Diamond, or Christina de Groot-Lief as appropriate.

**Action 15. Liaising with the CEOS Working Group on Climate.** The SC asks the GCOS Secretariat to continue to liaise with the CEOS Working Group on Climate to ensure that the information that the Working Group intends to provide is aligned with the planned inventory of ECV datasets proposed by the former WOAP Chairman. (GCOS has the status of an observer to the Working Group on Climate).

## **7. CEOS Responses to Updates of the GCOS-IP and Satellite Supplement and Review of the CEOS Working Group on Climate and CGMS Activities**

Dr. Jean-Louis Fellous, the GCOS Space Rapporteur, reviewed the current status of the CEOS Response to the 2010 update of the GCOS Implementation Plan and the 2011 update of its Satellite Supplement. He also reviewed the main outcomes of the 2<sup>nd</sup> meeting of the CEOS Working Group on Climate, held in Asheville, NC, USA in April 2012, provided information on the SCOPE-CM meeting, held in Germany in late July 2012, and gave an overview of the main agenda items of interest to GCOS at the upcoming 40<sup>th</sup> CGMS meeting in Lugano, Switzerland in November 2012.

The CEOS Response to the 2011 update to the Satellite Supplement to the GCOS-IP, he noted, will reinforce the needs called out by the GCOS Satellite Supplement and provide more detail on the deliverables, coordination, activities, and who within CEOS will lead the effort. The Response, which should be provided to the UNFCCC Secretariat by the end of September 2012 so as to be considered by SBSTA-37 in Doha (26 November-7 December 2012), will provide a view of what can be achieved with current funding and additional funding with respect to some 48 GCOS-IP satellite-related actions. Atmosphere, ocean, and terrestrial domain leads were specified for follow-up. These coordinate with CEOS working groups, CEOS virtual constellations, climate-related external groups (e.g., SCOPE-CM, GSICS, WCRP, CGMS), and experts to develop plans responding to GCOS-IP actions via templates. It is expected that this new CEOS Response will help space agencies plan their climate change programmes.

The CEOS Working Group on Climate was established to facilitate implementation of the CEOS Response to the Satellite Supplement. The second meeting of this Working Group considered five key discussion points, including climate monitoring architecture and ECV inventories, developing a consensus maturity matrix, linkages with the climate modelling community, in-depth ECV analysis, and, revisiting the "Research to Operation" paradigm. On the latter point, it was noted that the old research to operations paradigm is broken but that the WMO SCOPE-CM offers a practical example of a research to operations process that can be used to illustrate the need to change the way to do business now.

SCOPE-CM received additional attention, and it was suggested that a SCOPE-CM representative could be invited to report regularly to either GCOS panel meetings or to the GCOS Steering Committee. The GCOS Space Rapporteur has been added to the mailing list of SCOPE-CM. At the SCOPE-CM Executive Panel meeting, a major meeting agenda item was discussion of a new concept for the SCOPE-CM Phase 2 Implementation Plan. Phase 2 objectives include the establishment of structures for sustainable generation of FCDRs and TCDRs; generation of the first SCOPE-CM products; increased coverage of products in terms of ECVs and time and spatial dimension; and fostering extension of the network.

Dr. Fellous next discussed the upcoming CGMS meeting. The meeting will focus on the discussion of a CGMS High Level Priority Plan (HLPP). The main items of interest to GCOS are considered to be:

- Assessing how CGMS can optimally contribute to the GFCS implementation, including the potential use of the GSICS and SCOPE-CM frameworks;
- Ensuring the data holdings of CGMS members are appropriately reflected in the Architecture for Climate Monitoring from Space (physical view) through their systematic contributions to the ECV inventory questionnaire;
- Establishing an integrated approach for accessing climate-data records produced by CGMS members; and
- Promoting a common approach to the long-term preservation of data through the exchange of information and the establishment of a coordinated consensus on best practices.

In response to a question about a possible changing of focus from CEOS to CGMS, Dr. Fellous indicated that this was not the case. He did observe, however, that the idea of the two institutions eventually merging has been considered but that this may take time. It was noted that EUMETSAT, NOAA, ESA, and NASA all “live in both worlds.” On the issue of virtual constellations, Dr. Fellous pointed out that some are doing well and some are having difficulty. The SC Chairman noted that this issue will be addressed in the next Adequacy Report. A point made that the next phase of space architecture is to begin implementing the plan led to Action 17 below.

**Action 16. Reviewing SCOPE-CM activities.** OOPC and TOPC are asked to review SCOPE-CM activities for the oceanic and terrestrial domains respectively.

**Action 17. Engaging with the development of the architecture for climate from space.** The GCOS Secretariat is asked to ensure that GCOS engages in the next stage in the development of the architecture for climate from space.

## **8. Sponsor Views on Observational Needs and the Contribution of GCOS to Their Activities**

### **8.1 World Meteorological Organization (WMO)**

Dr. Wenjian Zhang, Director of the WMO Observing and Information Systems Department, represented WMO for this agenda item. His presentation focused on the Global Framework for Climate Services (GFCS). He cited outcomes from the most recent WMO Executive Council (EC) meeting, EC-64, which noted the importance of a strengthened GCOS to the successful implementation of the GFCS and urged the GCOS Steering Committee to guide and assist, as appropriate, in the implementation of priority actions and activities identified in the GFCS Implementation Plan. He then mentioned the strong and proactive support and involvement of GCOS in the development of the Observations and Monitoring Annex to the GFCS Implementation Plan, citing in particular the role of Dr. William Westermeyer in managing the drafting and revision of this Annex.

He emphasized that the implementation of the GFCS represents an important opportunity for the further development of GCOS, noting in particular that working with the other GFCS pillars (i.e., the User Interface Platform; Climate Services Information System; Research, Monitoring, and Prediction; and Capacity Building pillars) will provide GCOS with opportunities for wider collaboration with new partners.

Dr. Zhang also remarked that the upcoming review of the GCOS Programme is an opportunity for GCOS. WMO believes that now is the time for the Sponsors to reinvigorate their support for GCOS. This review will allow all the GCOS sponsors to update the GCOS Memorandum of Understanding (MOU), including the governance structure, scope, and functionality of GCOS, in light of a variety of new developments, including the creation of the GFCS and the concept of the “UN System Delivering as One on Climate Knowledge.” In a similar vein, he mentioned that WMO has decided to restructure the World Climate Programme (WCP), which will now consist of the GCOS, the WCRP, and a new World Climate Services Programme (WCSP). This too should provide an additional opportunity for GCOS.

The SC Chairman noted that there is still much that is relevant in the existing MOU and that he hoped that the still valuable parts of this MOU would be retained when it is revised. He noted further that it was important that the Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) and the GCOS-IP continue to be closely aligned.

Finally, Dr. Zhang pointed out that EC-64 had urged Members to enhance their support to the GCOS Secretariat, including through the secondment of experts or through contributions to the Climate Observing System Fund, to enable it to undertake increased coordination responsibilities related to the implementation of the GFCS.

## **8.2 Intergovernmental Oceanographic Commission**

Dr. Albert Fischer, representing the Intergovernmental Oceanographic Commission (IOC), discussed the views of IOC as a sponsor of GCOS in a presentation entitled “Observational Needs and the Contribution of GCOS to IOC-UNESCO and Its Relationship with GOOS.” In it, he noted that IOC has benefited from GCOS sponsorship because GCOS has provided a clear framework for thinking about ECVs, defining adequacy, requirements, implementation, and reporting progress; has promoted integration among atmospheric, oceanic, and terrestrial observations for climate; and has been a strong voice at the UNFCCC. He observed that the IOC has coordinated the growth of ocean observations by providing support to the OOPC, GOOS, and Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

Dr. Fischer highlighted the need for ocean observations for adaptation and for ocean climate services. He noted that despite funding cuts IOC/UNESCO is interested in developing an “Adaptation Forum” that would explore climate adaptation projects in particular regions with UNESCO networks and actors; would engage coastal managers, biosphere reserves, and natural and cultural World Heritage sites; and would link with the GFCS and Regional Climate Outlook Fora (RCOF) activities.

The GEOSS interoperability for Weather, Ocean and Water Programme, or GEOWOW, was cited as an example of how observing networks can benefit from a Group on Earth Observations (GEO) connection. The 2012-2014 Programme, funded by the European Commission in its 7<sup>th</sup> Framework Programme, will receive 1.1 million euros to develop data interoperability infrastructure to serve ocean ecosystems issues and other needs.

Turning to a discussion of the reconstitution of GOOS, Dr. Fischer described the new governance structure. He noted that GOOS is going through a stepwise evolution, not a revolution. It now has a new Steering Committee and several observing system panels, all focused on Essential Ocean Variables. These include physics through OOPC, carbon/biogeochemistry through the International Ocean Carbon Coordination Project (IOCCP), and a new Biology/Ecosystems panel. Also, technical advisory groups, e.g., focusing on data and products, will be formed as needed.

The first meeting of the new GOOS Steering Committee had the following outcomes. Concerning present observations the ambition is to treat sustained research and operational observations together, articulate multiple missions for a single observing system, improve links to model users, and codify the additional role OOPC has played in real-time services. It is also intended that GOOS expand to new variables, serving new requirements by working with the IOCCP as the nucleus of a geochemistry panel and by developing a new Biology/Ecosystems Panel in cooperation with GEOBON, SCOR, and IGBP. Finally, GOOS will identify regional priorities, review capacity development needs, address gaps, and work to improve links with the coastal ocean-forecasting community.

Picking up from the discussion on OOPC in item 4.2, Dr. Fischer noted that although the OOPC staff person is to be transferred to the GCOS Secretariat, the OOPC will function largely as before. That is, it will make recommendations on climate requirements and contribute to the GCOS cycle of assessment of adequacy, implementation plans, and progress reports; provide reviews and evaluation to assist the evolution of the system; and liaise with the ocean observing community and other GOOS panels.

The SC Chairman noted that, owing to the reorganization of GOOS, the OOPC is not currently sponsored by GOOS. Dr. Fischer noted that it will be a sub-panel of the GOOS SC and is targeted for revitalization by the second quarter of 2013. It was also noted that OOPC will be represented on the WDAC. The Chairman thanked Dr. Fischer for his presentation.

**Action 18. Developing new terms of reference for OOPC.** The GOOS SC is requested to develop a specific proposal for the OOPC, with a new title and Terms of Reference as deemed appropriate, for consideration by the next meeting of the WCRP JSC, in May 2013, so that new arrangements for the panel can be endorsed as final by the GCOS SC at its 21st session later in 2013.

### **8.3 United Nations Environment Programme**

Dr. Pascal Peduzzi, on behalf of Dr. Ashbindu Singh, detailed the views of UNEP on its sponsorship of GCOS. UNEP looks to GCOS, he said, to promote the provision of the observations that it needs--in particular the ECVs--to support evidence-based policy making, the rapid and timely delivery of products, identification and communication of emerging issues, and various kinds of scientific assessments, all with a focus on issues and areas where the international community is involved.

Dr. Peduzzi introduced UNEP's new Programme of Research on Climate Change Vulnerability, Impacts, and Adaptation (PROVIA). The objectives of PROVIA are to advance and coordinate research on climate change impacts, vulnerability, and adaptation; to guide investment in research; to communicate scientific information to governments and international agencies; and to build research capacity, especially in developing countries. PROVIA, however, is not yet fully integrated into UNEP. It is intended that it join GCOS, WCRP, and the World Climate Services Programme (WCSP) as the fourth component of the reconstituted World Climate Programme. It is also intended that it become a significant contributor to the GFCS.

Discussion following the presentation centred on the need for GCOS and UNEP to work more closely together. GCOS would like to be more visible to UNEP, and it was noted, in particular, that GCOS does not have an entry point to the UNEP General Assembly as it does with the WMO and IOC governing bodies. Dr. Peduzzi suggested it would be very helpful to UNEP if GCOS could take the lead in coordinating updates of certain indicators, as it makes sense to have a dedicated institution behind UNEP indicators. UNEP understands that GCOS does not deliver monitoring products, but believes it does have a role to play in selecting the best institutions to advise it. The SC Chairman noted that the GCOS Panels

could be involved in this activity. He also suggested that with the GCOS review coming, this is the type of guidance that GCOS might expect. Also on this issue, it was noted that it is not clear who has the authority to present authoritative, up-to-date indices. However, it was suggested that the GFCS could be a one-stop shop for climate indices.

**Action 19. Strengthening involvement with UNEP.** The GCOS Secretariat is asked to seek ways of strengthening the GCOS programme's involvement with UNEP, with a focus on determining how GCOS can be more helpful and visible to UNEP.

#### **8.4 International Council for Science**

The Director of the International Council for Science (ICSU), Dr. Stephen Wilson, discussed ICSU views on GCOS via a remote presentation. His focus was the 10-year Future Earth initiative of the ICSU global environmental change programmes (WCRP, IGBP, IHDP, Diversitas) and UNESCO, UNEP, the Belmont Forum, the International Social Science Council (ISSC), the International Group of Funding Agencies for Global Change Research (IGFA), and the United Nations University. Future Earth is designed to address major challenges, including the need to feed 9 billion people within sustainable planetary boundaries, value and protect nature's services and biodiversity, adapt to a warmer and more urban world, transition to low carbon societies, provide income and innovation opportunities through transformations to global sustainability, reduce disaster risks, and align governance with stewardship.

A number of proposed integrated research themes were introduced, including:

- The State of the Planet--observing, explaining, projecting Earth and societal system trends, drivers, and processes and their interactions;
- Responses to global environmental change--understanding and evaluating current strategies for governing and managing the global environment across scales and sectors;
- Reducing Risks--anticipating global thresholds, improving resilience, and reducing disaster risks;
- Resources for development and wellbeing--providing the knowledge for sustainable, secure and fair stewardship of food, water, health, energy, materials, and other ecosystem services;
- Pivotal Places--understanding global change in cities, regions, and critical biomes;
- Living with the Sea--oceans, coasts, and blue societies; and
- Transformative Pathways--towards a Sustainable Future Earth.

To advance these themes crosscutting capabilities will be needed, including in observing systems, data systems, Earth system models, theory development, synthesis and assessments, capacity development and education, and communication and the science-policy interface. A transition team has been established flesh out the design of Future Earth.

Dr. Wilson recognized that there is a crucial role for observations, and he noted that the current environment is a challenging one for securing the sustained observations that will be needed. He is keen to work with the GCOS Programme to find ways to strengthen the arguments for funding sustained observations.

**Action 20. Involving GCOS in the co-design of Future Earth.** The Chairman is asked to liaise with ICSU to ensure involvement of GCOS in the co-design of Future Earth.

## 9. Status of GTOS and Implications for TOPC

Continuing a discussion that began under item 4.3, Dr. Han Dolman again took up the issue of the future of the Terrestrial Observations Panel for Climate (TOPC) in light of the fact that the FAO has ceased to support a secretariat for the Global Terrestrial Observing System (GTOS). While this means that there is no functioning GTOS Secretariat, both the Global Observation of Forest and Land Cover Dynamics Panel (GOFC-GOLD) and TOPC continue to operate.

While GOFC-GOLD has funding sources outside its sponsoring organizations, TOPC can continue to be effective with support from GCOS, and GCOS intends to provide this support. However, it would be more effective with a continuing link to FAO through a functioning GTOS and/or with links to UNEP or UNESCO. To this end, the TOPC Chair and the GCOS Secretariat prepared a report for FAO in March 2012 arguing the case for the relevance of GTOS to GCOS and stressing the important role of the TOPC as the climate component of the terrestrial domain for GCOS.

A related issue is how to deal with the expected submission of a progress report to the UNFCCC at SBSTA 37 on the standardization of terrestrial ECVs if the GTOS Secretariat will not do this. As it was considered important that GCOS keep this issue alive within the UNFCCC, several options were considered. One possibility is that GCOS could volunteer to make a statement on terrestrial standardization at the UNFCCC in the name of GTOS. However, it was generally believed that agreement to do this should be sought with the Chairman of GTOS Steering Committee, who, for the moment, remains in place. In any case, SBSTA, which has invited GTOS to provide a progress report, may consider what it receives.

**Action 21. Hosting of the GTOS Secretariat.** The GCOS Secretariat and TOPC Chair are asked to update the material on GTOS prepared in March and early April, and arrange for it to be sent by WMO to FAO at an appropriate level, with copies to the other sponsors of GTOS and to the Chairman of the GTOS Steering Committee. If a satisfactory response is not forthcoming from FAO, the Chairman of the GCOS Steering Committee should inform the sponsors of GCOS of the importance that the Steering Committee attaches to alternative arrangements being made for long-term hosting of the GTOS Secretariat within the UN system.

**Action 22. Deleting link of GTOS TEMS website to GOSIC.** The GCOS Secretariat should, as a matter of urgency, ask FAO to delete the redirection to the GOSIC website imposed on visitors attempting to access the GTOS TEMS website.

**Action 23. Continuing support for TOPC.** The GCOS Secretariat should make every effort to ensure adequate continuing support for TOPC and for terrestrial domain activities associated with preparing the next Adequacy Report and Implementation Plan, pending establishment of long-term arrangements for hosting the GTOS Secretariat.

**Action 24. Submitting material on the standardization of terrestrial variables to SBSTA.** The TOPC Chair is requested to prepare input on the standardization of terrestrial observations suitable for submission to UNFCCC SBSTA for consideration at its session in Doha, 26 November – 1 December 2012. The content should be agreed with the Chairman of the GTOS Steering Committee and submitted to the UNFCCC Secretariat by the GCOS Secretariat in the joint names of the Chairs of the GTOS co-sponsored TOPC and the GTOS Steering Committee.

## 10. The UNFCCC and GCOS

Ms. Rocio Lichte from the UN Framework Convention on Climate Change (UNFCCC) Secretariat reviewed UNFCCC matters related to systematic observation for the GCOS Steering Committee. She informed the Members of some of the highlights of COP17/SBSTA35 held in Durban, South Africa in December 2011. Although SBSTA 35 considered mainly the research part of the Research and Systematic Observation agenda item, Ms. Lichte noted that the Subsidiary Body for Implementation (SBI) considered a report from the Global Environment Facility (GEF) in which it affirmed that its mandate under the Least Developed Countries Fund (LDCF) and Special Climate Change Fund (SCCF) covers certain activities on systematic observations and monitoring networks. She noted that COP adopted Decision 11/CP.17, requesting the GEF to continue to provide financial resources to developing countries for strengthening existing, and establishing national and regional, systematic observation and monitoring networks through these two funds.

SBSTA 36 in Bonn, Germany in May 2012 considered the timing of GCOS contributions to SBSTA and noted the GCOS submission to SBSTA on this matter, including information on the proposed GCOS assessment cycle, satellite supplement, and GCOS regional activities. While SBSTA 36 did not reach a conclusion on this item, the draft text indicates that SBSTA welcomes the GCOS plan to prepare a third Adequacy Report and new Implementation Plan, in principle, according to the timing proposed by GCOS. The draft text also indicated that SBSTA is grateful to the GCOS sponsors for support they have provided to GCOS and that it welcomes the upcoming review of the GCOS Programme.

Consideration of systematic observation will continue at SBSTA 37 in Doha in November-December 2012 on the basis of the draft text from SBSTA 36. In addition, SBSTA will consider a report from CEOS on progress in the coordinated response by space agencies to the updates of the GCOS Implementation Plan and Satellite Supplement (see section 7 above). It is also expected to consider a report from GTOS on developments on standards and methodologies for climate-related terrestrial observations and ECVs if this report is submitted (see section 9 above).

Ms. Lichte highlighted several UNFCCC developments related to adaptation to climate change, including the Nairobi work programme, the work programme on loss and damage, and the process for Least Developed Countries to formulate and implement National Adaptation Plans (NAPs). She noted important areas for supporting adaptation and the NAPs with regard to climate data and its analysis and use in supporting adaptation decisions, such as through enhancing national climate data observational networks; analyzing trends and extremes, including support for tools and indices and access to historical data and rescue/digitization of historical data; standardization of data collection and processing protocols across countries to facilitate regional and global analyses; and training and other capacity-building efforts. She informed the Steering Committee of the development of initial technical guidelines for NAPs and of the invitation of the COP to UN organizations and specialized agencies to support the NAP process and facilitate financial and technical support.

The presentation concluded with an itemization of several emerging issues that GCOS may consider:

- Whether national reports on global climate change observing systems, provided by Annex I Parties in conjunction with the national communications, could be useful as input for the upcoming 3<sup>rd</sup> Adequacy Report and/or new GCOS-IP. (In this context, it was noted that the 6th national communication by Annex I Parties is due on 1

January 2014 and that these too would be valuable, along with any national communications received from non-Annex 1 Parties).

- Submitting views on future work areas under the NWP;
- Promoting or developing indicators/variables/parameters in support of ecosystem-based adaptation (i.e., for monitoring and review) need to be considered;
- Cooperating with GEF as a follow-up from the Durban COP decision;
- Supporting the expert review of the NAP initial technical guidelines being developed;
- Contributing to data issues emerging under the loss and damage work programme; and the
- Addressing some of the emerging adaptation issues of interest to the UNFCCC as part of the GCOS Adaptation Workshop.

**Action 25. Providing up-to-date information for the sixth National Communication.**

The GCOS Secretariat should ensure that PRs to WMO are informed that the information to be provided in the sixth National Communication under the UNFCCC should be as up-to-date and comprehensive as possible, as it will be used in the next assessment of progress and adequacy of the observing system for climate.

## 11. The Group on Earth Observations and GCOS

The new Director of the Group on Earth Observations Secretariat, Ms. Barbara Ryan, focused her comments on the relationship between GEO and GCOS. She suggested several ways in which GEO can help GCOS, noting that GEO can reinforce GCOS goals, objectives, and leadership to a broader community, that it has an opportunity to influence policy on observations at ministerial levels, and that it is a vocal advocate for broad, open, data-sharing policies and practices. In expressing these benefits, she hoped that GEO and GCOS could work more closely together in the future than they have done in the recent past. However, Ms. Ryan also suggested that GCOS needs to provide a consistent message regarding the role that it intends to play in the GEO Work Plan. At the same time, she emphasized that if GCOS wants to be the climate observing part of GEO, then GEO would look to GCOS to provide the leadership.

The Steering Committee reiterated its view that GCOS should be regarded as the climate observing component of the GEOSS. It noted that the GCOS Implementation Plan represented a comprehensive set of actions and agents for implementation, that the GEO 2012-2015 Work Plan activity on “Accelerated Implementation of the Global Climate Observing System” listed only a few contributors, some of whom were unknown to the GCOS Secretariat, and that there were very many other agents working on GCOS implementation whose activities needed to be taken into consideration in the work of the Secretariat and Panels. The Committee recognized that resources would be required for the GCOS Secretariat to lead the Work Plan activity as currently formulated and for a closer involvement in GEO activities in general.

**Action 26. Working with GEO.** The Steering Committee requested that its Chairman identify the need for an improved definition and recognition of the role of GCOS within the GEOSS in his input to the GCOS sponsors and their review panel. It urged that the GCOS Secretariat with the support of the SC Chairman engage with the GEO Secretariat to develop new ways of working together that recognize the full range of GCOS activities in support of GEO’s Climate Societal Benefit Area (SBA) and that help identify and promote the additional activities that are required.

## **12. WMO Technical Commissions: Their Expectations of and Interactions with GCOS**

### **12.1 The Commission for Climatology**

The President of the WMO Commission for Climatology (CCI), Dr. Thomas C. Peterson, focused his presentation on two issues, data exchange policy and the role of both CCI and GCOS in the GFCS.

Dr. Peterson stated his strong belief that the parsimonious data exchange policies of some countries are inadequate to enable the GFCS to succeed. To address this concern, the Presidents of Technical Commissions have proposed revising WMO Resolution 40. To date there has been no resolution of the issue, in part because of concern about reopening the resolution. Some have suggested that it would be preferable to draft a completely new resolution to address data exchange issues related to the GFCS. Dr. Peterson noted that just deciding to discuss data policy is controversial. The WMO Executive Council has set up a large working group, chaired by WMO President David Grimes and including the CCI and other technical commissions, to address it. A report of this group will be given at the next Executive Council meeting, and it is hoped that the WMO Congress could approve a new policy at its next meeting in 2015. Concerning this topic, the SC Chairman noted that while some socioeconomic data is useful only in production of products and therefore doesn't need releasing globally, another class of socioeconomic data, e.g., emissions data, is needed in global models for predictions and forecasts. The SC reiterated its support for the exchange of data.

The GFCS, noted Dr. Peterson, is now upon us. However, it is far from clear as to exactly what this will mean for either the CCI or GCOS. While the CCI is ready, much will depend on funding, country commitments, and user involvement. If the GFCS is to succeed, it will require nurturing from both the CCI and GCOS, and thus it is interest of the CCI and GCOS to do everything possible to make the GFCS a success in all parts of the world.

### **12.2 Commission for Basic Systems**

Dr. Fred Branski, President of the Commission for Basic Systems (CBS), stressed in a remote presentation the need for collaboration. He said that CBS is committed to working with GCOS as a partner and is looking for ways to improve collaboration, working from the concept of a seamless system. In citing GCOS-CBS interaction he noted that the Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) has 82 references to GCOS in it. (The SC Chairman observed that whereas the GCOS-IP was focused on variables, the EGOS-IP is focused more on component observing systems. Thus, the two plans are complementary.) Among other things, Dr Branski noted that:

- Nine CBS Lead Centers for GCOS working with the GCOS Implementation Manager made great improvements in CLIMAT reports received at the GCOS Archive Centre;
- GCOS Surface Network (GSN) reports received increased to over 80 percent globally and GCOS Upper-Air Network (GUAN) stations meeting minimum performance requirements have also increased;
- Implementation of the GCOS Reference Upper-Air Network (GRUAN) has progressed, and GRUAN data has been flowing through NOAA's National Climatic Data Centre (NCDC) to users since the summer of 2011;
- The Commission will nominate an OPAG-IOS representative to the GCOS AOPC Working Group on GRUAN to contribute to its activities as required; and

- The Commission is working to strengthen regional working groups dealing with observing systems to address shortcomings in regional networks and increase observation availability.

Dr. Branski stressed that as we move toward operationalizing climate services and towards seamless predictive and decision support capabilities, interdependencies between traditionally “separate” communities are increasing. He stated that different communities must more and more work together despite differences in requirements, end products, and services in order to realize the maximum return on investment. He cited GCOS as a good example of partners working together. This collective approach needs to be strengthened both within the climate enterprise and in collaboration with weather, water, and related earth system enterprises. He specifically cited the gains to be made by working in closer harmony with WIGOS, GFCS, Future Earth, and PROVIA. Dr. Branski also noted that CBS is beginning to look at how requirements for weather, climate, and other things can be met collectively. While this can’t be done everywhere, it is intended that the manual on the GOS be updated to help us do things better.

**Action 27. Cooperation among GCOS, WIGOS, and WIS.** The Secretariat and Panels are asked to ensure that there is full cooperation between GCOS, WIGOS, and WIS as they develop.

### **13 Global Framework for Climate Services: Update on Developments**

Dr. William Westermeyer of the GCOS Secretariat briefed the Steering Committee on the involvement of GCOS in the preparation of the Implementation Plan for the Global Framework for Climate Services (GFCS-IP) and on arrangements that are being made for the Extraordinary Session of the WMO Congress that will consider this Plan. Dr. Westermeyer managed the development of the Observations and Monitoring Annex to the GFCS-IP. He noted that the Observations and Monitoring Annex was one of five annexes to the Plan and described the common outline that had been used in the preparation of all five annexes. He also noted that a great many people had contributed to the Annex, including representatives of GCOS, AOPC, TOPC, OOPC, the WMO Observations Dept (WIGOS, WIS, and satellite, marine, cryosphere, and data management divisions), the WMO Climate and Water Department, the WMO Research Department (GAW and WCRP), the WMO Disaster Risk Reduction Office, and the GEO Secretariat. Others outside WMO contributed input through two consultation meetings.

Dr. Westermeyer highlighted the initial implementation activities that were identified in the Observations and Monitoring Annex. Only one of the fourteen activities cited (recovering and digitizing data) is highlighted in the main GFCS-IP. Nevertheless, all of these are considered priority activities, and, along with a longer list of activities that appears at the end of the Annex, will be considered for action once the GFCS is operational. Although it is not expected that the Annexes *per se* will receive much attention at the Extraordinary Congress, which will take place from 29-31 October 2012, it is anticipated that they will provide important guidance material for the Intergovernmental Panel once it is established following successful ratification of the GFCS-IP.

One of the initial implementation activities, i.e., to “assess the role of observations in adaptation to climate variability and change,” is an activity that the GCOS Secretariat is currently preparing to undertake. It is discussed in more detail under item 15.2.

**Action 28. Assessing the outcome for GCOS of the Extraordinary Congress on GFCS.** The SC Chairman and GCOS Secretariat are requested to assess the implications for GCOS of the outcomes of the User Dialogue and Extraordinary Session of the WMO

Congress on the GFCS that will take place at the end of October 2012. Their assessment should be communicated to members of the Steering Committee.

## 14. Regional Development

### 14.1 South America Workshop

Dr. Westermeyer briefed the GCOS Steering Committee on the regional workshop that was organized by the GCOS Secretariat and the International Research Center on El Niño (CIIFEN) in Guayaquil, Ecuador in March 2012. The workshop was organized with the financial support of the Swiss Government through MétéoSwiss, the Spanish Government through the Spanish Climate Change Office (OECC), and the Spanish Meteorology Agency (AEMET). It was designed and organized to facilitate improvements in the climate observing systems of South America. The workshop convened producers and users of climate information and representatives of international cooperation organizations to discuss priorities for improving climate observing systems and climate services in South America to help meet development goals. The workshop was a logical and timely follow-up to the September 2004 Regional Action Plan for South America that GCOS helped the thirteen countries of the continent develop. Some of the projects to improve observing systems introduced in that Plan have been implemented or partially implemented, but others have received little attention.

The principal focus for the meeting was on observations; however, the goal was not to help South America improve observing systems as an end in itself. The organizers sought to facilitate the integration of atmospheric, terrestrial, and oceanic observations into existing and future risk management and climate change adaptation initiatives so that the countries of South America can derive more benefit from the current and planned national and international funds being expended to address development concerns. This goal is consistent with the aims of the Global Framework for Climate Services (GFCS). The conveners recognized that improving observing systems is of great importance for, among other things, developing climate change scenarios, studying climate change and climate variability, and developing climate services, in particular for the benefit of vulnerable communities. To address these issues, both observing systems and the dissemination of data and information to stakeholders need to be improved. Although international cooperation agencies can help spur these improvements, when national governments understand that their countries will benefit substantially, it is hoped that they will take the lead in sustaining improvements with national resources.

An Action Plan with some 49 actions in 10 Categories was developed by the participants. A key conclusion is that data rescue is a priority for the region. There are also continuing needs for observations with better spatial resolution, for sampling the altitude range, and for measuring a wider range of variables associated with vulnerability, risk, and the provision of services. The complete report of the meeting (GCOS-159) can be downloaded from the publications section of the GCOS website in either English or Spanish. It was suggested later in the session that the GCOS Secretariat send a letter to Dr. Martinez at CIIFEN inquiring about the status of the actions in the Plan.

**Action 29. Letter to the Acting Director of CIIFEN.** The GCOS Secretariat is asked to write to the Acting Director of CIIFEN to query the implementation status of the Action Plan that was developed at the GCOS-CIIFEN South America workshop.

## 14.2 Status of the Climate for Development in Africa Programme

Dr. Westermeyer also reviewed the status of the Climate for Development in Africa (ClimDev Africa) Programme. Since SC-XIX the most important meetings related to this Programme have been the 3rd Climdev Africa Steering Committee Meeting (CDSC-3) in Addis Ababa, Ethiopia on 5 March 2012 and the ClimDev Africa Special Fund Roundtable Meeting in Stockholm, Sweden on 25 April 2012.

Discussions at CDSC-3 focused on several important topics, including consideration of the ClimDev Africa Programme Work Plan and Budget for 2012-2014, preparations for the ClimDev Africa Special Fund Roundtable Meeting, and preparations for the Second Conference on Climate Change and Development in Africa (CCDA-II), to be held in October 2012. The CDSC-3 meeting was attended by both GCOS and WMO representatives.

The ClimDev Africa Special Fund Roundtable Meeting was organized by the African Development Bank and hosted by the Swedish International Development Cooperation Agency (SIDA). Its objective was to raise funds for the ClimDev Africa Special Fund (CDSF). The AfDB had indicated that for the CDSF to become effective and to begin implementing the 2012-2014 Work Plan, approximately 22.4 million euros would be required to be raised. If less than this amount were raised, the fund would not be activated and the Work Plan would not be implemented.

Unfortunately, it does not appear that the Roundtable Meeting was successful in raising the amount specified by the AfDB to initiate the CDSF. It *appears* that most prospective donors were unwilling to contribute to a special fund that would be managed by the AfDB, preferring instead to continue dealing with countries bilaterally. The AfDB has now requested bilateral meetings with prospective donors and is also planning a second roundtable meeting. This second roundtable is expected to take place immediately after the next ClimDev Africa Steering Committee meeting.

The lack of success to date in raising funds for the ClimDev Africa Special Fund is *potentially* a serious blow to the observations component of the ClimDev Africa Programme. The policy element of the Programme, which has been funded separately and which has led to the establishment of the Africa Climate Policy Centre, appears to be healthy. However, Result Area 1, which was included in the Programme specifically to promote improvements in climate observing systems in Africa, is intended to be funded through the CDSF. Since the fund has not been established, no projects related to observations and included in the 2012-2014 Work Plan have been funded. Nevertheless, the key African Partners intend to meet in the near future to consider a strategy for the way forward.

A Steering Committee member volunteered that ICSU is organizing a meeting in Africa on climate change and health and that the organizers would be interested in ClimDev Africa. He also observed that ClimDev Africa is not well enough known in Africa and that an effort should be made to help give it more visibility.

**Action 30. *Liaising with the ICSU Africa Secretariat.*** The GCOS Secretariat is asked to liaise with ICSU Africa Secretariat regarding raising the profile of ClimDev Africa at the ICSU Africa meeting.

**Action 31. *Developing a briefing note for AMCOMET.*** The GCOS Secretariat should develop a briefing note for the WMO participants attending the AMCOMET meeting describing 1) project proposals that it has prepared for the African Development Bank for possible funding through ClimDev Africa and 2) projects in Africa proposed for funding through the GCM.

### 14.3 GCOS Cooperation Mechanism and System Improvement Activities

Mr. Richard Thigpen, the GCOS Implementation Project Manager, provided an overview and status report of recent initiatives to revitalize the GCOS upper air and surface networks and to improve the overall performance of these important baseline networks since last year. These initiatives include direct renovation projects, the activities of the CBS Lead Centres for GCOS, and various training workshops. He also reviewed funding and plans for the next round of renovation projects.

Several renovation projects were completed last year, and several are still on going. In particular, Japan has funded the supply of radiosondes to Rarotonga and the renovation of the two GSN stations in the Cook Islands last year, and this year it agreed to supply Rarotonga again as well as Yerevan, Armenia, and Khartoum, Sudan.

The upgrade of the eight GSN stations in Angola, funded by KNMI, is still not completed. All equipment is in place, but the project has stalled again as the Angolan Met Service cannot afford the travel necessary for the actual installation activities. The UK Met Office has made progress with the project to renovate the 11 stations in Madagascar. A contract has been awarded for the renovation of the telecommunications system in the Democratic Republic of Congo and to renovate two surface stations. Another has been awarded for the renovation of the telecommunications system in Zambia. A survey mission to Cuba was completed, and a contract was awarded to replace most of the instruments at the four GSN stations there. There were some setbacks, however, as Gan in the Maldives and Harare, Zimbabwe remain silent, and Vacoas, Mauritius is expected to go silent soon.

Good progress was made in obtaining CLIMAT reports from the Regional Basic Climatological Network (RBCN) stations. The SC noted that many members of WMO were not preparing and sending CLIMAT reports from all of their listed RBCN stations. Some have even remarked that they might reduce the networks if CLIMAT reports are indeed required. This is clearly against the strong recommendation of Congress that members were encouraged to expand these networks.

This year, only four of the nine Lead Centres for GCOS submitted their yearly progress reports. The Lead Centre from Chile has offered to host next Lead Centre meeting in 2013. Another issue of concern was that many different climate data management systems exist, and this can be both confusing and a waste of resources. This is an issue that could be discussed at the forthcoming CBS meeting.

Mr. Thigpen noted that contributions to the GCOS Cooperation Mechanism have declined as a result of the global financial crisis. However, Japan has recently joined the donor group and has increased its contribution for the coming year. Switzerland, the Netherlands (KNMI), the US, Germany, Spain, Canada, and the UK continue as the primary donors.

**Action 32. Promoting better coordination of bilateral funding support.** The GCOS Secretariat is asked to convey to the GFCS Office the view of the Steering Committee that a significant amount of bilateral funding support is being provided to countries (in particular in Africa) that is not well coordinated, resulting in the suboptimal use of resources to support capacity development. The Steering Committee suggested that the GFCS Office could play a role in improving coordination of funding for capacity development for climate observation and monitoring.

**Action 33. Sending CLIMAT messages for RBCN stations.** The SC requests the GCOS Secretariat to work with the appropriate divisions of WMO to encourage members to prepare and send CLIMAT messages for all RBCN stations, and to remind them that expansion of the networks is needed to support fully the GFCS.

## 15. Adaptation

### 15.1 IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

To help set the stage for a discussion of the role of observations in adaptation and of the workshop that the GCOS Secretariat is planning on this subject, Dr. Roger Pulwarty of the GCOS Steering Committee provided an overview of the IPCC *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. Dr. Pulwarty noted that this was the first IPCC report to focus explicitly on risk management and to have ambitious outreach goals.

The report noted that a changing climate leads to changes in extreme weather and climate events, and it concluded that the increasing exposure of people and assets during these events has been the major cause of changes in disaster losses. For exposed and vulnerable communities, even non-extreme weather and climate events can have extreme impacts. The economic losses from climate-related disasters have increased, with large spatial and interannual variations.

As a result of these findings, Dr. Pulwarty noted that the IPCC must now be concerned with defining the core set of data, information, and information technologies needed to maintain the minimum acceptable level of stewardship in the management of resources, investments, and infrastructure. He suggested that promoting open access to data was one of the most important priorities that needed addressing. The Steering Committee agreed that the availability of case studies demonstrating the benefits of climate observations for adaptation would be useful. As a result, the following Action was proposed.

**Action 34. Case studies showing the benefits of climate observations for adaptation.** Following the adaptation workshop and building on material presented at the workshop, the GCOS Secretariat and Steering Committee Members participating in the workshop are asked to develop a few strong, well developed case studies showing the benefits of climate observations for adaptation.

### 15.2 Adaptation Workshop Planning

Action 19 of SC-XIX asked “the GCOS Secretariat, in consultation with the Chairman and Members of the Steering Committee...to design one or more workshops to consider the observation requirements for adaptation, linking these with potential workshops on observational needs for the GFCS and on preparing for the next Adequacy Report.” The GCOS Secretariat has now begun to plan for this workshop. Dr. William Westermeyer, who has been charged with leading planning for this workshop, briefed the Steering Committee on the status of planning. The workshop would convene about 40 participants, including representatives of the GCOS community and representatives of sectors in which adaptation to climate variability and climate change is, or is likely to become, an important concern. These would include the agriculture, water resources, health, and energy sectors and also the disaster risk reduction community. The goals of the workshop would be to identify observational requirements for adaptation, to review the Essential Climate Variables (ECVs) to determine their adequacy for adaptation, and to develop a plan to address the gaps and deficiencies identified. Thus, the workshop will be closely aligned to the Global Framework for Climate Services, and its results would directly feed into the preparation of the next GCOS Adequacy Report, to be developed in the 2014 timeframe.

Four major outcomes will be sought, including:

- A statement on the general adequacy of observations to support adaptation to climate variability and change and identification of further work on the assessment of adequacy that may be undertaken in preparation of the third GCOS adequacy report during 2013 and 2014 or in support of other programmes represented at the workshop;
- Identification of the requirements for observations and their use in monitoring to support climate services addressing adaptation needs, in particular in the context of the Global Framework for Climate Services (GFCS) and related to a) water resources, b) health c) agriculture, d) coastal zone management, e) energy production, f) disaster risk reduction and g) transport;
- Identification of the requirements for observations to support research into adaptation, such as to be undertaken under the Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA); and
- Advice on steps the GCOS Programme could take in the next few years to address the needs for observations for adaptation to climate variability and change, in particular in the context of its preparation of a new Implementation Plan by 2016.

Some of the required funding for the workshop is being provided by the U.S. Department of State and by UNEP. Additional funding may be needed. The date for the workshop has now been set for 26-28 February 2013. The Deutscher Wetterdienst has offered to host the workshop at its headquarters in Offenbach, Germany.

Dr. Westermeyer introduced the working draft agenda for the meeting, and then asked Steering Committee members for their advice and suggestions. As a result of the discussion that followed, it was decided that the agenda could be restructured, with consideration for inviting development groups such as banks, for ensuring a good mix of users and providers of observations and services, for identifying good session leaders, etc.

**Action 35. Refining the agenda and proposing session leaders.** The GCOS Secretariat, with the assistance of selected Steering Committee Members, is asked to restructure the draft agenda for the adaptation workshop along the lines suggested during the discussion on this topic. Following this restructuring, Steering Committee Members are asked to provide advice and feedback on other aspects of the workshop and to propose potential session leaders and panelists.

## 16. Future Activities

The subtopics shown on the agenda under this item were merged into one discussion during the Steering Committee deliberations. After a quick review of the key points that emerged from the Think Tank Session held at the GCOS 20th Anniversary Celebration, the discussion focused on planning related to the launch of the Third Adequacy Report and updated Implementation Plan.

It was recalled that the February 2013 workshop addressing observations for adaptation would contribute to the preparation of the next Adequacy Report. To take advantage of the fact that key colleagues would be participating in the workshop, it was proposed to hold a brainstorming meeting in Offenbach immediately after the workshop to formally begin planning for the Adequacy Report. It was also noted that a workshop (or workshops) with IPCC Working Groups I and II is being considered for late 2013 and/or in the second quarter of 2014, and that a separate workshop for the key people working on the adequacy report would be organized late in the second quarter of 2014. It was suggested that the Secretariat write to the IPCC proposing one or more workshops, although not all members agreed that such workshops were needed. An SC Member stated that three workshops plus writing

team meetings were required for the previous Adequacy Report, but that since this was an update the same level of intensity may not be required.

A question arose as to who the users of the Adequacy Report will be. The SC Chairman responded that the UNFCCC is clearly a user but that there are just as clearly other users for which the report should be prepared. It was suggested that the real audience of the Adequacy Report is the Agents of Implementation. The Report will give them good arguments for what they need to do to serve users. Generally, it was agreed that the Report should address the issue of what is needed from the GCOS to support climate services.

The SC Chairman observed that the Adequacy Report will have to explain how each ECV is useful for science, applications, services, assessment, and/or policy. This recalled an earlier discussion on ECVs in which the Chair of the TOPC suggested that in the future ECVs should be based more on scientific needs than on just the needs of the UNFCCC. Others noted that there are emerging ECVs to take into account and that concepts such as readiness and maturity need to be considered. It was recalled that the process used to select the ECVs the first time was somewhat arbitrary. The idea then was that “essential means essential,” implying that the list be kept to the minimum required. Land surface temperature was cited as a specific example of a variable that was ruled out as an end user variable in the original ECV list. It is perhaps not as reliable or robust as others but needs to be taken into account. The SC concluded that the concept of ECVs must be developed more broadly for the next Adequacy Report and Implementation Plan. It was also noted that these issues could be flagged for the Review Panel.

The question of what to do about socioeconomic variables was raised. Members wondered if GCOS should partner with some organization that has the relevant expertise or whether it should check with the UN agencies that do collect socioeconomic data. We might urge them to do more if we can identify what is needed. The Framework for Ocean Observations (FOO) concept was introduced, i.e., of serving different users with one observing system. If we are considering new and/or different users, we need to call out the ECVs that are important to that user. Finally, it was emphasized that the Report will have to go beyond the ECVs and do more to provide detailed descriptions of the variables that make up the more general ECVs.

SC Members suggested, alternatively, that Panels should be charged with bringing together relevant material to conduct the adequacy assessment or that a consultant could be hired for this purpose. The question of the availability of resources arose, but the Chairman remarked that if adequate resources were not available, they should be found. The Report should be done right or not at all.

**Action 36. Brainstorming on the scope of the Third Adequacy Report.** The Secretariat is asked to arrange a brief brainstorming meeting immediately after the February Adaptation Workshop to discuss the overall scope of the forthcoming Third Adequacy Report and the workshops and budget that will be needed to prepare it.

**Action 37. Reviewing Second Adequacy Report.** The GCOS Panels are asked to review the Second Adequacy Report and relevant material available since it was published in 2003, and to develop conclusions that Panel Chairs or representatives should present at a workshop on the Adequacy Report, likely to be scheduled for the 4<sup>th</sup> quarter of 2013.

**Action 38. Reviewing the concept of ECVs.** The Steering Committee agreed that the concept of the ECVs should be developed, so that each variable is characterized in terms of its application to assessment, policy, research and services, the consequent application-dependent requirements for observations and data products, the degree of maturity or readiness for application, and so forth. Those developing the next Adequacy Report and

Implementation Plan should draw up a new list of ECVs and the qualifying information associated with each of them.

**Action 39. Informing User Forum participants on the launch of the next Adequacy Report.** The Secretariat and Steering Committee Chairman are asked to take advantage of the User Forum prior to the October 2012 Extraordinary Congress to inform participants that an update of the Adequacy Report is being launched and that GCOS will take user requirements for climate services into account in its review of adequacy. The Steering Committee viewed it to be desirable that the Congress Resolution include a statement *noting* that an update of the Adequacy Report will be prepared.

## 17. Input to the Sponsor Review of GCOS

Two issues were raised during the brief discussion of this agenda item. One concerned what will be done with the Sponsor Review once it is completed. Although one can only speculate, some suggested that it would take considerable time for any recommended actions to be fully implemented.

A second issue concerned the existing GCOS Memorandum of Understanding (MOU). SC Members believed that it is basically functioning well but also deemed that it would be worthwhile to convey any proposed changes to the Review Panel for consideration.

**Action 40. Summarizing GCOS views for the sponsor Review Panel.** Before the end of year the Steering Committee Chairman should prepare a short document for the sponsor review panel that summarizes what GCOS has achieved, aspects of the GCOS work programme, and the GCOS mission statement. At least a half page of this document should address SC views on the current GCOS MOU. The Chairman should also prepare a very short strategy/philosophy document for the GCOS Programme. Drafts of these documents will be circulated to SC members for their review and comment.

## 18. Budget

The Director of the GCOS Secretariat reviewed the GCOS budget for 2012. She observed that the carryover from 2012 to 2013 would be about the same as it was from 2011 to 2012. She also detailed some important contributions in kind, including office space (from WMO), a 6-month secondment of a staff person (from Germany), the salary of the space coordinator (from ESA), and funds for the reception and dinner for the 20<sup>th</sup> anniversary celebration of GCOS (from Switzerland). She noted some expected contributions for staff, including support for a Junior Professional Officer beginning in January 2013 for up to 4 years, funds to support a GCOS Implementation Manager, and funds to support a scientific officer for OOPC, who will be relocated to the GCOS Secretariat from the IOC, for 2 years. She expressed the desire to hire a programme officer at the P3 level, noting that the available and expected funds would allow her to do this but also noting the difficulty of hiring someone on a long-term basis given the uncertainty of future funding.

The Steering Committee expressed its qualified pleasure in the current resources available to the GCOS Secretariat, but regretted that the Secretariat is not currently able to employ people for longer terms.

## 19. Short-Term Work Programme

In like manner to how agenda item 16 was treated, the subtopics shown on the agenda under this item were merged into one discussion. Most of what was discussed referred to arrangements for SC-XXI.

The Director noted that there is a standing invitation from the China Meteorological Administration (CMA) to host the session in China. Other suggestions for the venue were Offenbach, Germany; Lisbon, Portugal; and Geneva, Switzerland. For SC-XXII, it was noted that the Commission for Climatology will have its meeting in Heidelberg, Germany in 2014 and that WCRP has also scheduled its JSC session there back-to-back with the CCI meeting.

**Action 41. Determining the venues for SC-XXI and SC-XXII.** The GCOS Director is asked to discuss with D/WCRP and with the President of CCI the feasibility of holding the 2014 Steering Committee Session in Heidelberg, Germany in parallel with the WCRP and Commission for Climatology meetings. She is also asked to liaise with the China Meteorological Administration to determine if China wishes to confirm its offer to host the SC Session in 2013 and the arrangements that might be made for a meeting scheduled for late September or early October. Offenbach, Germany and Lisbon, Portugal should be kept as alternative venues for the 2013 session.

## **20. Other Business**

### **20.1 General Steering Committee Membership and Related Issues (*In Camera*)**

The Steering Committee met *in camera* for this agenda item so as to discuss proposed new members. Some issues, however, may be reported. In particular, the SC Chairman thanked the Members of the Steering Committee who will be departing for their service. He pointed out, however, that their terms do not expire with the end of the session but rather when they reach their formal anniversary. The Chairman also praised the two members of the GCOS Secretariat for whom this was the last SC session they will attend, Dr. William Westermeyer and Mr. Richard Thigpen.

Also, it may be reported that although there will be nine vacancies on the Steering Committee after this year, it is intended that only five new slots will be filled for the next SC session. Following this, the remaining four members would be selected, with a longer-term goal of replacing on average five new members every two years (assuming rules governing the Steering Committee remain the same following the sponsor review). This will then allow for some staggering of terms so that in the future a large number of SC Members do not all retire at once.

## **21. Close of the Session**

The Chairman closed the session at approximately 1230 on 7 September 2012 with thanks to the Sponsors, the Steering Committee members, invitees, and other participants. He also thanked Dr Richter, Dr Westermeyer, and the other members of the GCOS Secretariat for their work in organizing the session. He wished members of the Steering Committee and other attendees a safe journey home.

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## LIST OF PARTICIPANTS

<b>Members of the GCOS Steering Committee:</b>	
Dr Adrian SIMMONS (Chairman) ECMWF Shinfield Park READING RG2 9AX United Kingdom	Tel: +44 118 949 9700 Fax: +44 118 986 9450 E-mail: <a href="mailto:adrian.simmons@ecmwf.int">adrian.simmons@ecmwf.int</a>
Prof. Abel AFOUDA Faculty of Sciences and Techniques University of Abomey-Calavi Abomey-Calavi B.P. 526 COTONOU Benin	Tel: +229 21361135 +229 67258842 Fax: +229 94062365 E-mail: <a href="mailto:aafouda@yahoo.fr">aafouda@yahoo.fr</a>
Dr Alan BELWARD European Commission Joint Research Centre Institute for Environment and Sustainability 21020 ISPRA, Varese Italy	Tel.: +39 0332 789298 Fax: +39 0332 789073 E-mail: <a href="mailto:alan.belward@jrc.ec.europa.eu">alan.belward@jrc.ec.europa.eu</a>
Dr Barry GOODISON Chemin Briquet 24 1209 GENEVA Switzerland	Tel.: +41 22 733 3442 Mobile: +41 79 268 6241 Fax: + E-mail: <a href="mailto:barrygo@rogers.com">barrygo@rogers.com</a>
Dr D.E. (Ed) HARRISON Pacific Marine Environmental Laboratory NOAA/PMEL/OCRD 7600 Sand Point Way NE SEATTLE, WA 98115 USA	Tel: +1 206 526 6225 Fax: +1 206 526 6744 E-mail: <a href="mailto:d.e.harrison@noaa.gov">d.e.harrison@noaa.gov</a>
Dr Kazutoshi ONOGI Climate Prediction Division Japan Meteorological Agency 1-3-4 Ote-machi, Chiyoda-ku TOKYO 100-8122 Japan	Tel.: +81 3 3212 8341 Fax: +81 3 3211 8406 E-mail: <a href="mailto:konogi@met.kishou.go.jp">konogi@met.kishou.go.jp</a>
Dr Roger PULWARTY National Oceanic and Atmospheric Administration Climate Program Office and Earth Systems Research Laboratory (ESRL) 325 Broadway R/ESRL BOULDER, Colorado 80305 USA	Tel.: +1 303 497 4425 Fax: +1 303 497-7013 E-mail: <a href="mailto:Roger.Pulwarty@noaa.gov">Roger.Pulwarty@noaa.gov</a>

Mr Stefan RÖSNER Deutscher Wetterdienst Frankfurter Str. 135 63067 OFFENBACH Germany	Tel.: +49 69 8062 4306 Mobile: +49 170 9054658 Fax: +49 69 800 863115 E-mail: <a href="mailto:Stefan.roesner@dwd.de">Stefan.roesner@dwd.de</a>
Dr Alexander ZAYTSEV Voeikov Main Geophysical Observatory 7, Karbyshev Str. 194021 ST PETERSBURG Russian Federation	Tel: +7 812 297 4390 Fax: +7 812 297 8661 E-mail: <a href="mailto:a.zaitsev@main.mgo.rssi.ru">a.zaitsev@main.mgo.rssi.ru</a>
<b>Unable to attend</b>	
Dr Anny CAZENAVE Laboratoire d'études en géophysique et océanographie spatiales LEGOS-CNES Observatoire Midi-Pyrénées 18, avenue Édouard Belin F-31401 TOULOUSE CEDEX 09 France	Tel.: +33 561 33 29 22 Fax: +33 561 25 32 05 E-mail: <a href="mailto:anny.cazenave@cnes.fr">anny.cazenave@cnes.fr</a> Preferred e-mail: <a href="mailto:anny.cazenave@legos.obs-mip.fr">anny.cazenave@legos.obs-mip.fr</a>
Dr Juliet HERMES South African Environmental Observation Network (SAEON) Private Bag X2, Roggebaai CAPE TOWN 8012 South Africa	Tel.: +27 21 402 3547 Fax: +27 21 402 3674 E-mail: <a href="mailto:juliet@saeon.ac.za">juliet@saeon.ac.za</a>
Dr Mohammed KADI Secretary General, ACMAD 85, Avenue des Ministères BP 13 184 NIAMEY Niger	Tel.: +227 20 73 49 92 Fax: +227 20 72 36 27 Mobile: +227 96089732 E-mail. <a href="mailto:Mohamed_kadi@acmad.ne">Mohamed_kadi@acmad.ne</a> <a href="mailto:Kadi_metdz@yahoo.com">Kadi_metdz@yahoo.com</a>
Prof. Lucka KAJFEZ-BOGATAJ University of Ljubljana Biotechnical Faculty Jamnikarjeva 101 SI 1000 LJUBLJANA Slovenia	Tel: +386 1 2564 168 Fax: +386 4231088 E-mail: <a href="mailto:lucka.kajfez.bogataj@bf.uni-lj.si">lucka.kajfez.bogataj@bf.uni-lj.si</a>
Dr Thomas R. KARL Director, NOAA's National Climatic Data Center Veach-Valley Federal Building 151 Patton Avenue Asheville NC 28801-5001 USA	Tel.. +1 828 271 4476 Fax: +1 828 271 4246 E-mail. <a href="mailto:Thomas.r.karl@noaa.gov">Thomas.r.karl@noaa.gov</a>
Dr Dileep Kumar MARIPI Chemical Oceanography Division National Institute of Oceanography Dona Paula, GOA 403 004 India	Tel: + 91 832 2450 398 Fax: + 91 832 2450 602 /03 E-mail: <a href="mailto:dileep@nio.org">dileep@nio.org</a>

<p>Dr Eric J. LINDSTROM (Chair, OOPC) Earth Science Division, Room 3D74 Science Mission Directorate NASA Headquarters, Mail Suite 3B74, 300 E Street W WASHINGTON DC 20546 USA</p>	<p>Tel.: +1 202 358 45 40 Fax: +1 202 358 27 70 E-mail: <a href="mailto:eric.j.lindstrom@nasa.gov">eric.j.lindstrom@nasa.gov</a></p>
<p><b>PANEL Chair</b></p>	
<p>Prof. Han DOLMAN (Chair, TOPC) Department of Earth Sciences VU University Amsterdam De Boelelaan 1085, 1081 HV AMSTERDAM The Netherlands</p>	<p>Tel: +31 20 59 87 358 Fax: +31 20 59 89 940 E-mail: : <a href="mailto:han.dolman@vu.nl">han.dolman@vu.nl</a></p>
<p><b>SPONSORS</b></p>	
<p><b>ICSU</b> (by teleconference) Dr Steven WILSON Executive Director International Council for Science (ICSU) 5, rue Auguste Vacquerie 75016 PARIS France</p>	<p>Email: <a href="mailto:steven.wilson@icsu.org">steven.wilson@icsu.org</a></p>
<p><b>IOC/UNESCO</b> <b>(Also representing GOOS)</b> Dr Albert FISCHER Director and Head GOOS Project Office, Ocean Observations and Services Section Intergovernmental Oceanographic Commission of UNESCO 1 rue Miollis - 75732 PARIS Cedex 15 France</p>	<p>Tel: +33 1 45 68 40 40 E-mail: <a href="mailto:a.fischer@unesco.org">a.fischer@unesco.org</a></p>
<p><b>UNEP</b> Dr Pascal PEDUZZI Head of Global Change &amp; Vulnerability Unit UNEP/DEWA/GRID-Geneva 11, Chemin des Anémones CH-1219 Châtelaine</p>	<p>Tel.: +41 22 917 82 37 Fax: +41 22 917 80 29 E-mail: <a href="mailto:pascal.peduzzi@unepgrid.ch">pascal.peduzzi@unepgrid.ch</a> Or <a href="mailto:pascal.peduzzi@unep.org">pascal.peduzzi@unep.org</a></p>
<p><b>WMO</b> Mr Jerry LENGOASA Deputy Secretary-General World Meteorological Organization (WMO) P.O. Box 2300, CH-1211 GENEVA 2 Switzerland</p>	<p>Tel. +41 22 730 8230 Fax: +4122 730 8181 E-mail: <a href="mailto:JLengoasa@wmo.int">JLengoasa@wmo.int</a></p>

<b>Representatives from Other Organizations or Programmes:</b>	
<p><b>GEO</b></p> <p>Ms Barbara J. RYAN  Director, GEO Secretariat  7 bis, Avenue de la Paix  P.O. Box 2300, 1211 GENEVA 2  Switzerland</p>	<p>Tel: +41 22 730 85 80  E-mail: <a href="mailto:BRyan@geosec.org">BRyan@geosec.org</a></p>
<p>Dr Espen VOLDEN  Climate Expert  GEO Secretariat  7 bis, Avenue de la Paix  P.O. Box 2300, 1211 GENEVA 2  Switzerland</p>	<p>Tel.: +4111 730 8799  E-mail: <a href="mailto:Evolden@geosec.org">Evolden@geosec.org</a></p>
<p><b>UNFCCC</b></p> <p>Ms Rocio LICHTÉ  Programme Officer  Adaptation Programme  Climate Change Secretariat, UNFCCC  Haus Carstanjen, Martin-Luther-King-Strasse 8  P.O. Box 260 124, 53153 BONN  Germany</p>	<p>Tel.: +49 228 815 1619  Fax: +49 228 815 1499  Email: <a href="mailto:RLichte@unfccc.int">RLichte@unfccc.int</a></p>
<p><b>WCRP</b></p> <p>Dr Michel RIXEN  World Climate Research Programme (WCRP)  World Meteorological Organization  P.O. Box 2300, 1211 GENEVA 2  Switzerland</p>	<p>Tel.: +41 22 730 8528  Fax: +41 22 730 8036  E-mail: <a href="mailto:MRixen@wmo.int">MRixen@wmo.int</a></p>
<p><b>WMO Commission for Basic Systems (CBS)</b>  (By teleconference)</p> <p>Mr Fred BRANSKI  President of CBS  NOAA – National Weather Services(W/CIO11)  SSMC2, Room 17456  1325 East West Highway  Silver Spring, MD 20910-3283  USA</p>	<p>Tel.: + 1301 713 3538  Fax: +1 301 713 9450  E-mail: <a href="mailto:Fred-Branski@noaa.gov">Fred-Branski@noaa.gov</a></p>
<p><b>WMO Commission for Climatology (CCI)</b></p> <p>Dr Thomas C. PETERSON  President of CCI  NCDC/NOAA  151 Patton Avenue  ASHEVILLE, NC 28801  USA</p>	<p>Tel: +1 828 271 4287  Fax: +1 828 271 4328  E-mail: <a href="mailto:thomas.c.peterson@noaa.gov">thomas.c.peterson@noaa.gov</a></p>

<b>Other Experts/Observers</b>	
<p>Mr Howard DIAMOND  US GCOS Program Manager  Director, World Data Center for Meteorology,  Asheville  NOAA/National Climatic Data Center  1100 Wayne Avenue, Suite 1202  SILVER SPRING MD 20910-5642  USA</p>	<p>Tel.: +1 301 427 2475  Fax: +1 301 427 0033  Cell: +1 301 801 4855  E-mail: <a href="mailto:howard.diamond@noaa.gov">howard.diamond@noaa.gov</a></p>
<p>(By teleconference)</p> <p>Ms Christina J. DE GROOT-LIEF  Physical Scientist/Program Manager  NOAA/NESDIS/NCDC  Global Observing Systems Information Center  (GOSIC)  151 Patton Avenue  Asheville, NC 28801-5001  USA</p>	<p>Tel.: <a href="tel:+1(828)271.4101">+1 (828) 271.4101</a>  Fax: <a href="tel:+1(828)271.4876">+1 (828) 271.4876</a>  Email: <a href="mailto:Christina.Lief@noaa.gov">Christina.Lief@noaa.gov</a></p>
<p>Dr Gabriela SEIZ  Head of International Affairs Division  Swiss GCOS Office  Federal Office of Meteorology and Climatology  MétéoSwiss  Kraehbuehlstrasse 58  P.O. Box 514, CH-8044 ZURICH  Switzerland</p>	<p>Tel.: +41 44 256 9539  Fax: +41 44 256 9278  E-mail: <a href="mailto:Gabriela.Seiz@meteoswiss.ch">Gabriela.Seiz@meteoswiss.ch</a></p>
<p><b>WMO/OBS Department</b></p> <p>Dr Wenjian ZHANG  Director  Observing and Information Systems Department  World Meteorological Organization  P.O. Box 2300, 1211 GENEVA 2  Switzerland</p>	<p>Tel: +41 22 730 8567  Fax: +41 22 730 8021  E-mail: <a href="mailto:WZhang@wmo.int">WZhang@wmo.int</a></p>

<b>GCOS Secretariat</b> c/o WMO, P.O. Box 2300, CH-1211 GENEVA 2 Switzerland	
Dr Carolin RICHTER Director GCOS Secretariat	Tel.: + 41 22 730 8275 Fax: + 41 22 730 8052 E-mail: <a href="mailto:CRichter@wmo.int">CRichter@wmo.int</a>
Dr William WESTERMEYER Consultant GCOS Secretariat	Tel: +41 22 730 8083 Fax: +41 22 730 8052 E-mail: <a href="mailto:WWestermeyer@wmo.int">WWestermeyer@wmo.int</a>
Mr Richard THIGPEN GCOS Implementation Officer GCOS Secretariat	Tel.. +41 22 730 8068 Fax: +41 22 730 8052 E-mail: <a href="mailto:Rthigpen@wmo.int">Rthigpen@wmo.int</a>
Dr Jean-Louis FELLOUS GCOS Space Rapporteur 18 rue Dohis 94300 Vincennes France	Tel.: +33 6 85 31 50 11 Fax: +33 1 44 76 74 37 E-mail: <a href="mailto:jfellous@noos.fr">jfellous@noos.fr</a>
Ms Anna Christina MIKALSEN Junior Professional Officer GCOS Secretariat	Tel.: +41 22 730 8272 Fax: +41 22 730 8052 E-mail: <a href="mailto:AMikalsen@wmo.int">AMikalsen@wmo.int</a>

## FINAL AGENDA FOR SC-XIX

1. Opening of the Session
  - 1.1 Opening Remarks
  - 1.2 Welcome by WMO on behalf of the Sponsors (DSG)
  - 1.3 Approval of Agenda
  - 1.4 Arrangements for the Session
2. Report of the Director, GCOS Secretariat
  - 2.1 A Review of Secretariat Issues
  - 2.2 A review of actions from SC-XIX
3. Report of the Chairman
  - 3.1 Report on activities since SC-XIX
  - 3.2 Issues facing GCOS and expectations of SC-XX
4. GCOS Panel Reports
  - 4.1 Atmospheric Observation Panel for Climate
  - 4.2 Ocean Observations Panel for Climate
  - 4.3 Terrestrial Observation Panel for Climate
5. GCOS and WCRP
  - 5.1 Fourth WCRP International Conference on Reanalysis
  - 5.2 Establishment and first meeting of WCRP Data Advisory Council
  - 5.3 Conclusions of JSC-33
  - 5.4 Inventories of ECV datasets
6. Status of GOSIC
7. CEOS Responses to updates of GCOS-IP and Satellite Supplement, and review of CEOS Working Group on Climate and CGMS activities
8. Sponsor Views on Observational Needs and the Contribution of GCOS to Their Activities
  - 8.1 WMO
  - 8.2 IOC
  - 8.3 UNEP
  - 8.4 ICSU
9. Status of GTOS and Implications for TOPC
10. UNFCCC and GCOS
11. GEO and GCOS
12. WMO Technical Commissions: Their Expectations of and Interactions with GCOS
  - 12.1 The Commission on Climatology

- 12.2 The Commission on Basic Systems
- 13. Global Framework for Climate Services: Update on Developments
- 14. Regional Development
  - 14.1 South America Workshop
  - 14.2 Status of ClimDev Africa
  - 14.3 GCM and system improvement activities
- 15. Adaptation Workshop
  - 15.1 IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation
  - 15.2 Adaptation Workshop Planning
- 16. Future Activities
  - 16.1 Review of input from sponsors and partners at this session
  - 16.2 Feedback from GCOS 20<sup>th</sup> birthday event
  - 16.3 Conduct of the forthcoming adequacy assessment
  - 16.4 Nature and development of the subsequent new Implementation Plan
  - 16.5 Discussion of general scope, priority and perceived success of GCOS activities
  - 16.6 Needs and opportunities for change
- 17. Input to the Sponsors' Review of GCOS
- 18. Budget
- 19. Short-term Work Programme
  - 19.1 GCOS Work Programme to SC-XXI
  - 19.2 Review of draft Decisions and Actions
  - 19.3 Planning for Panel Sessions during 2013
  - 19.4 Arrangements for SC-XXI (suggestions from Members)
- 20. Other Business
  - 20.1 General Steering Committee Membership and Related Issues (*In Camera*)
- 21. Close of the Session

## AVAILABLE DOCUMENTS (D) AND/OR PRESENTATIONS (P)

Doc. No.	Description	D/P
0.0	Agenda	D
1.4	Arrangements for the Session--Richter & Westermeyer	D
2	Report of the Director, GCOS Secretariat--Richter	P
3	Report of the Chairman, GCOS Steering Committee--Simmons	D,P
4.1	Atmospheric Observation Panel for Climate--Simmons	D,P
4.2	Ocean Observations Panel for Climate--Fischer	P
4.3	Terrestrial Observation Panel for Climate--Dolman	D,P
5.1	Fourth WCRP International Conference on Reanalysis--Onogi	D,P
5.2	Establishment and First Meeting of the WCRP Data Advisory Council--Rixen	D,P
5.3	Conclusions of JSC-33--Rixen	D,P
5.4	Inventories of ECV Datasets	D,P
6	Status of GOSIC--Lief	D,P
7	CEOS Responses to Updates of GCOS-IP and Satellite Supplement; Review of CEOS Working Group on Climate and CGMS Activities--Fellous	D,P
8.1	Sponsor Views: WMO--Zhang	P
8.2	Sponsor Views: IOC--Fischer	P
8.3	Sponsor Views: UNEP--Peduzzi	P
8.4	Sponsor Views: ICSU--Wilson	P
10	UNFCCC and GCOS--Lichte	D,P
11	GEO and GCOS--Ryan	P
12.1	Commission on Climatology--Peterson	P
12.2	Commission on Basic Systems--Branski	P
13	Global Framework for Climate Services: Update on Developments --Westermeyer	P
14.1	South America Workshop--Westermeyer	D,P
14.2	Status of ClimDev Africa--Westermeyer	D,P
14.3	GCM and System Improvement Activities--Thigpen	D,P
15.1	IPCC Special Report on Managing the Risks of Extreme Events and Disasters--Pulwarty	P
15.2	Adaptation Workshop Planning--Westermeyer	D,P
16.2	Feedback from GCOS 20th Birthday Event--the Secretariat	D
19.1	GCOS Work Programme to SC-XXI--Richter	P
INF.1	Provisional List of Participants	D

The available documents and presentations may be found here:

<http://www.wmo.int/pages/prog/gcos/index.php?name=SC-XIX>

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## CONSOLIDATED LIST OF ACTIONS

**Action 1. Display of posters.** The GCOS Secretariat is asked to display the 20th Anniversary posters at the Extraordinary Congress, if possible, and at other relevant meetings.

**Action 2. Preparation of Standard Presentations.** The GCOS Secretariat is asked to accumulate an archive of GCOS presentations, such as the GEOBON one, that may be used or modified for use at future meetings, in particular where participation has been delegated to a GCOS Steering Committee Member or other representative of GCOS.

**Action 3. Article on the provenance of ECVs.** The SC Chairman is asked to complete a general article, in cooperation with co-authors, on the provenance of ECVs.

**Action 4. Clarifying and standardizing language.** The SC Chairman, assisted as appropriate by Steering Committee or Panel members, is asked to consider use of such language as “accuracy,” “stability,” and “systematic error,” possibly by developing a working paper on the subject with the goal of clarifying and standardizing such language. This should take into account the glossary maintained by WMO.

**Action 5. Working with sea ice and SST variables.** The OOPC is asked to devise a new way of working with sea ice and SST variables, assuming it confirms closure of the joint working group. This should be done in cooperation with the Climate and Cryosphere (CliC) Project, the Global Cryosphere Watch (GCW), and the International Ice Chart Working Group (IICWG).

**Action 6. Global Surface Reference Network.** The AOPC is asked to keep under review the question of the need for a global surface reference network.

**Action 7. Measurement of precipitation.** The AOPC is urged to keep under review the measurement of precipitation, in particular by automatic stations, and to liaise with others on this issue.

**Action 8. Status of drifting buoy network.** The OOPC is asked to report back to AOPC and the Steering Committee on the status of the drifting buoy network, whose numbers have been dropping.

**Action 9. Reducing the burden of multiple reporting requirements.** The SC Chairman and Secretariat are asked to bring to the attention of sponsors and others the fact that data providers and data centres often face multiple reporting requirements to funders, international coordinating bodies, parent institutions, and so on, and that reporting formats usually differ in content and timing. Ways need to be found to reduce this burden, through a standardized reporting format, for example.

**Action 10. Increasing collaboration with the CEOS Working Group on Cal/Val.** The TOPC Chair is asked to promote standardization of FAPAR products and to increase collaboration with the CEOS Working Group on Cal/Val. The SC strongly supports the continued attendance of a representative of this CEOS Working Group at TOPC meetings.

**Action 11. Providing lake temperature data to HYDROLARE.** The TOPC is asked to provide a list of producers of lake temperature data to whom the GCOS Secretariat should write to encourage them to provide their data to HYDROLARE.

**Action 12. WDAC issues.** The SC expressed its concern at the number of important topics to be considered by the WDAC at its next session, and recommended that the GCOS panel representatives on the WDAC work towards ensuring that key items were adequately

covered by WDAC or other WCRP activities, through adequately resourced task teams where appropriate.

**Action 13. Publication of data sets.** The Steering Committee strongly encouraged the publication of data sets, noting the emergence of journals dedicated to the purpose and that a DOI could be attached to a version of a dataset. It noted that the proposed inventory of ECV datasets catered for the recording of a journal reference and DOI.

**Action 14. Monitoring the GOSIC web site.** SC Members and Panel Chairs are asked to keep an eye on the content GOSIC web site and the GCOS-GOSIC Wiki pages that may be hosted by CICS and to provide feedback to the GCOS Secretariat, Howard Diamond, or Christina Lief as appropriate.

**Action 15. Liaising with the CEOS Working Group on Climate.** The SC asks the GCOS Secretariat to continue to liaise with the CEOS Working Group on Climate to ensure that the information that the Working Group intends to provide is aligned with the planned inventory of ECV datasets proposed by the former WOAP Chairman. (GCOS has the status of an observer to the Working Group on Climate).

**Action 16. Reviewing SCOPE-CM activities.** OOPC and TOPC are asked to review SCOPE-CM activities for the oceanic and terrestrial domains respectively.

**Action 17. Engaging with the development of the architecture for climate from space.** The GCOS Secretariat is asked to ensure that GCOS engages in the next stage in the development of the architecture for climate from space.

**Action 18. Developing new terms of reference for OOPC.** The GOOS SC is requested to develop a specific proposal for the OOPC, with a new title and Terms of Reference as deemed appropriate, for consideration by the next meeting of the WCRP JSC, in May 2013, so that new arrangements for the panel can be endorsed as final by the GCOS SC at its 21st session later in 2013.

**Action 19. Strengthening involvement with UNEP.** The GCOS Secretariat is asked to seek ways of strengthening the GCOS programme's involvement with UNEP, with a focus on determining how GCOS can be more helpful and visible to UNEP.

**Action 20. Involving GCOS in the co-design of Future Earth.** The Chairman is asked to liaise with ICSU to ensure involvement of GCOS in the co-design of Future Earth.

**Action 21. Hosting of the GTOS Secretariat.** The GCOS Secretariat and TOPC Chair are asked to update the material on GTOS prepared in March and early April, and arrange for it to be sent by WMO to FAO at an appropriate level, with copies to the other sponsors of GTOS and to the Chairman of the GTOS Steering Committee. If a satisfactory response is not forthcoming from FAO, the Chairman of the GCOS Steering Committee should inform the sponsors of GCOS of the importance that the Steering Committee attaches to alternative arrangements being made for long-term hosting of the GTOS Secretariat within the UN system.

**Action 22. Deleting link of GTOS TEMS website to GOSIC.** The GCOS Secretariat should, as a matter of urgency, ask FAO to delete the redirection to the GOSIC website imposed on visitors attempting to access the GTOS TEMS website.

**Action 23. Continuing support for TOPC.** The GCOS Secretariat should make every effort to ensure adequate continuing support for TOPC and for terrestrial domain activities associated with preparing the next Adequacy Report and Implementation Plan, pending establishment of long-term arrangements for hosting the GTOS Secretariat.

**Action 24. Submitting material on the standardization of terrestrial variables to SBSTA.** The TOPC Chair is requested to prepare input on the standardization of terrestrial observations suitable for submission to UNFCCC SBSTA for consideration at its session in Doha, 26 November – 1 December 2012. The content should be agreed with the Chairman

of the GTOS Steering Committee and submitted to the UNFCCC Secretariat by the GCOS Secretariat in the joint names of the Chairs of the GTOS co-sponsored TOPC and the GTOS Steering Committee.

**Action 25. Providing up-to-date information for the sixth National Communication.**

The GCOS Secretariat should ensure that PRs to WMO are informed that the information to be provided in the sixth National Communication under the UNFCCC should be as up-to-date and comprehensive as possible, as it will be used in the next assessment of progress and adequacy of the observing system for climate.

**Action 26. Working with GEO.** The Steering Committee requested that its Chairman identify the need for an improved definition and recognition of the role of GCOS within the GEOSS in his input to the GCOS sponsors and their review panel. It urged that the GCOS Secretariat with the support of the SC Chairman engage with the GEO Secretariat to develop new ways of working together that recognize the full range of GCOS activities in support of GEO's Climate Societal Benefit Area (SBA) and that help identify and promote the additional activities that are required.

**Action 27. Cooperation among GCOS, WIGOS, and WIS.** The Secretariat and Panels are asked to ensure that there is full cooperation between GCOS, WIGOS, and WIS as they develop.

**Action 28. Assessing the outcome for GCOS of the Extraordinary Congress on GFCS.**

The SC Chairman and GCOS Secretariat are requested to assess the implications for GCOS of the outcomes of the User Dialogue and Extraordinary Session of the WMO Congress on the GFCS that will take place at the end of October 2012. Their assessment should be communicated to members of the Steering Committee.

**Action 29. Letter to the Acting Director of CIIFEN.** The GCOS Secretariat is asked to write to the Acting Director of CIIFEN to query the implementation status of the Action Plan that was developed at the GCOS-CIIFEN South America workshop.

**Action 30. Liaising with the ICSU Africa Secretariat.** The GCOS Secretariat is asked to liaise with ICSU Africa Secretariat regarding raising the profile of ClimDev Africa at the ICSU Africa meeting.

**Action 31. Developing a briefing note for AMCOMET.** The GCOS Secretariat should develop a briefing note for the WMO participants attending the AMCOMET meeting describing 1) project proposals that it has prepared for the African Development Bank for possible funding through ClimDev Africa and 2) projects in Africa proposed for funding through the GCM.

**Action 32. Promoting better coordination of bilateral funding support.** The GCOS Secretariat is asked to convey to the GFCS Office the view of the Steering Committee that a significant amount of bilateral funding support is being provided to countries (in particular in Africa) that is not well coordinated, resulting in the suboptimal use of resources to support capacity development. The Steering Committee suggested that the GFCS Office could play a role in improving coordination of funding for capacity development for climate observation and monitoring.

**Action 33. Sending CLIMAT messages for RBCN stations.** The SC requests the GCOS Secretariat to work with the appropriate divisions of WMO to encourage members to prepare and send CLIMAT messages for all RBCN stations, and to remind them that expansion of the networks is needed to support fully the GFCS.

**Action 34. Case studies showing the benefits of climate observations for adaptation.**

Following the adaptation workshop and building on material presented at the workshop, the GCOS Secretariat and Steering Committee Members participating in the workshop are asked to develop a few strong, well developed case studies showing the benefits of climate observations for adaptation.

**Action 35. Refining the agenda and proposing session leaders.** The GCOS Secretariat, with the assistance of selected Steering Committee members, is asked to restructure the draft agenda for the adaptation workshop along the lines suggested during the discussion on this topic. Following this restructuring, Steering Committee Members are asked to provide advice and feedback on other aspects of the workshop and to propose potential session leaders and panelists.

**Action 36. Brainstorming on the scope of the Third Adequacy Report.** The Secretariat is asked to arrange a brief brainstorming meeting immediately after the February Adaptation Workshop to discuss the overall scope of the forthcoming Third Adequacy Report and the workshops and budget that will be needed to prepare it.

**Action 37. Reviewing Second Adequacy Report.** The GCOS Panels are asked to review the Second Adequacy Report and relevant material available since it was published in 2003, and to develop conclusions that Panel Chairs or representatives should present at a workshop on the Adequacy Report, likely to be scheduled for the 4<sup>th</sup> quarter of 2013.

**Action 38. Reviewing the concept of ECVs.** The Steering Committee agreed that the concept of the ECVs should be developed, so that each variable is characterized in terms of its application to assessment, policy, research and services, the consequent application-dependent requirements for observations and data products, the degree of maturity or readiness for application, and so forth. Those developing the next Adequacy Report and Implementation Plan should draw up a new list of ECVs and the qualifying information associated with each of them.

**Action 39. Informing User Forum participants on the launch of the next Adequacy Report.** The Secretariat and Steering Committee Chairman are asked to take advantage of the User Forum prior to the October 2012 Extraordinary Congress to inform participants that an update of the Adequacy Report is being launched and that GCOS will take user requirements for climate services into account in its review of adequacy. The Steering Committee viewed it to be desirable that the Congress Resolution include a statement *noting* that an update of the Adequacy Report will be prepared.

**Action 40. Summerizing GCOS views for the sponsor Review Panel.** Before the end of year the Steering Committee Chairman should prepare a short document for the sponsor review panel that summarizes what GCOS has achieved, aspects of the GCOS work programme, and the GCOS mission statement. At least a half page of this document should address SC views on the current GCOS MOU. The Chairman should also prepare a very short strategy/philosophy document for the GCOS Programme. Drafts of these documents will be circulated to SC members for their review and comment.

**Action 41. Determining the venues for SC-XXI and SC-XXII.** The GCOS Director is asked to discuss with D/WCRP and with the President of CCI the feasibility of holding the 2014 Steering Committee Session in Heidelberg, Germany in parallel with the WCRP and Commission for Climatology meetings. She is also asked to liaise with the China Meteorological Administration to determine if China wishes to confirm its offer to host the SC Session in 2013 and the arrangements that might be made for a meeting scheduled for late September or early October. Offenbach, Germany and Lisbon, Portugal should be kept as alternative venues for the 2013 session.

## LIST OF GCOS PUBLICATIONS SINCE SC-XIX

- GCOS-147** Report of the Sixteenth Session of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC-XVI) (WMO-TD No. 1573) (Geneva, 7-11 February 2011)  
(WCRP 27/2011)
- GCOS-148** Report of the Thirteenth Session of the Terrestrial Observation Panel for Climate (TOPC-XIII) (Geneva, 10-11 March 2011)  
(WCRP 28/2011)
- GCOS-149** Report of the Third GCOS Reference Upper Air Network Implementation and Coordination Meeting (GRUAN ICM-3) (WMO-TD No. 1575) (Queensland, New Zealand, 28 February-4 March 2011)
- GCOS-150** OOPC Report (pending draft with Bill)
- GCOS-151** Report of the Seventh GCOS Cooperation Mechanism Board Meeting, (Reading, UK, 19 September 2010)
- GCOS-152** Report of the Nineteenth Session of the WMO-IOC-UNEP-ICSU Steering Committee for GCOS (Reading, UK, 20-23 September 2011)
- GCOS-153** Report of the WCRP Observation and Assimilation Panel (WOAP) Workshop on Evaluation of Satellite-Related Global Climate Datasets (Frascati, Italy, 18-20 April 2011)
- GCOS-154** Systematic Observation Requirements for Satellite-based Data Products for Climate Supplemental details to the satellite-based component of the Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC – 2011 Update, December 2011
- GCOS-155** Report of the WIGOS Pilot Project Meeting on GRUAN Observing Practices and Governance (Geneva, Switzerland, 25-27 February 2012)
- GCOS-156** Report of the Third Coordination Meeting of the CBS Lead Centers for GCOS (Hamburg, Germany, 11-13 October 2011)
- GCOS-157** Summary Report of the Fourteenth Session of the GTOS/GCOS/WCRP Terrestrial Observation Panel for Climate (TOPC-XIV), (Geneva, Switzerland, 1-2 March 2012)
- GCOS-158** Report of the Seventeenth Session of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC-XVII) (Geneva, Switzerland, 30 April-3 May 2012)
- GCOS-159** Report from the Strategy Meeting for the Implementation of the Global Climate Observing System in South America (Guayaquil, Ecuador, 13-15 March, 2012)
- GCOS-160** Assessment of the Status and Needs for Climate Observations in South America 2003-2011, February 2012

- GCOS-161** GRUAN ICM-4 (Tokyo, Japan, March 2012)
- GCOS-162** Global Terrestrial Network – Hydrology (GTN-H), Report of the 5th GTN-H Coordination Panel Meeting (Tokyo, Japan, 12-13 March 2012)
- GCOS-163** Report of the Eighth GCOS Cooperation Mechanism Board Meeting (GCM-VIII) (Geneva, Switzerland, 3 September 2012)

## GCOS LIST OF ACRONYMS AND ABBREVIATIONS

ACMAD	African Centre for Meteorological Applications for Development
ADB	Asian Development Bank
AfDB	African Development Bank
AGG	AOPC Advisory Group on GSN and GUAN
AIACC	Assessments of Impacts and Adaptation to Climate Change
AMIP	Atmospheric Model Intercomparison Project
AMMA	African Monsoon Multidisciplinary Analyses
AOML	Atlantic Oceanographic and Meteorological Laboratory
AOPC	Atmospheric Observation Panel for Climate
APN	Asia-Pacific Network
ASAP	Automated Shipboard Aerological Programme
ARM	Atmospheric Radiation Measurement Program
ASECNA	L'Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar
AVHRR	Advanced Very High Resolution Radiometer
AREP	Atmospheric Research and Environment Programme (WMO)
AU	African Union
BAPMON	Background Air Pollution Monitoring Programme
BOM	Australian Bureau of Meteorology
BSRN	Baseline Surface Radiation Network
CAS	Commission for Atmospheric Sciences
CBD	Convention on Biological Diversity
CBS	Commission for Basic Systems (WMO)
CCCCC	Caribbean Community Climate Change Centre
CCD	Convention to Combat Desertification
CCDA	Climate Change and Development in Africa
CCD/A	Climate Change Detection and Attribution
CCI	Commission for Climatology (WMO)
CDAS	Climate Data Assimilation System
CEOP	Coordinated Enhanced Observing Period
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CHy	Commission for Hydrology (WMO)
CICS	Cooperative Institute for Climate and Satellites
CIIFEN	Centro Internacional de Investigaciones para el Fenómeno El Niño
CLIC	Climate and Cryosphere Project (WCRP)
CLIMAT	Report of monthly means and totals from a WWW land station
ClimDev Africa	Climate for Development in Africa Programme
CLIPS	Climate Information and Prediction Services
CLIVAR	Climate Variability and Predictability (WCRP)
CLW	WMO Climate and Water Department
CMA	China Meteorological Administration
CMM	Commission for Marine Meteorology
COCOS	Coordination of Carbon Observing Systems
CONOPS	WIGOS Concept of Operations
COP	Conference of the Parties (to UNFCCC)
COPEP	Coordinated Observation and Prediction of the Earth System
CSD	Commission on Sustainable Development
DAC	Data Assembly Centre
DAO	Data Assimilation Office

DARE	Data Rescue (WCDMP project)
DBCP	Data Buoy Cooperation Panel
DFID	Department For International Development (UK)
DIM	Data and Information Management
DOI	Digital Object Identifiers
DWD	Deutscher Wetterdienst
EC	European Community
EC	Executive Council (WMO)
ECMWF	European Centre for Medium-Range Weather Forecasts
ECVs	Essential Climate Variables
EEZ	Exclusive Economic Zone
EGOS	Evolution of the Global Observing Systems
ENSO	El Niño/Southern Oscillation
ESA	European Space Agency
ESGF	Earth System Grid Federation
ESSP	Earth System Science Partnership
ET-ODRRGOS	Expert Team on Observational Data Requirements and Redesign of the Global Observing System
ETSI	Expert Team on Sea Ice
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FAO	Food and Agriculture Organization of the United Nations
fAPAR	Fraction of Absorbed Photosynthetically Active Radiation
FCDR	Fundamental Climate Data Record
G3OS	GCOS, GOOS and GTOS
GAW	Global Atmosphere Watch
GAWSIS	GAW Station Information System
GCB	GCOS Cooperation Board
GCO	Global Carbon Observation
GCOS	Global Climate Observing System
GCM	Global Climate Model
GCMD	Global Change Master Directory
GCMPs	GCOS Climate Monitoring Principles
GCW	Global Cryosphere Watch
GDSIDB	Global Digital Sea-Ice Data Bank
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
GEO	Group on Earth Observations
GEO-BON	GEO Biodiversity Observation Network
GEOSS	Global Earth Observation System of Systems
GEWEX	Global Energy and Water Cycle Experiment
GFCs	Global Framework for Climate Services
GIP	GCOS Implementation Plan
GLIMS	Global Land Ice Measurements from Space
GLOSS	Global Sea Level Observing System
GMDSS	Global Maritime Distress and Safety System
GMES	Global Monitoring for Environment and Security
GODAE	Global Ocean Data Assimilation Experiment
GOFC	Global Observation of Forest Cover
GOFC-GOLD	Global Observation of Forest and Land Cover Dynamics
GOOS	Global Ocean Observing System
GOS	Global Observing System
GOSIC	Global Observing Systems Information Center

GPCC	Global Precipitation Climatology Centre
GPCP	Global Precipitation Climatology Project
GPS	Global Positioning System
GRACE	Gravity Recovery and Climate Experiment
GRDC	Global Runoff Data Centre
GRUAN	GCOS Reference Upper Air Network
GSICS	Global Space-Based Inter-Calibration System
GSN	GCOS Surface Network
GSNMC	GSN Monitoring Centre
GSSC	GOOS Scientific Steering Committee
GTN	Global Terrestrial Network
GTN-E	GTN-Ecosystems
GTN-G	GTN-Glaciers
GTN-H	GTN-Hydrology
GTN-L	GTN-Lakes
GTN-P	GTN-Permafrost
GTN-R	GTN-Rivers
GTN-SM	Global Terrestrial Network for Soil Moisture
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)
IAEA	International Atomic Energy Agency
IAOOS	Integrated Arctic Ocean Observing System
ICOS	Integrated Carbon Observation System
ICSU	International Council for Science
ICPAC	IGAD Climate Prediction and Application Centre
ICPC	Interagency Coordinating and Planning Committee for Earth Observations
IOCCP	International Ocean Carbon Coordination Project
IFAD	International Fund for Agricultural Development
IGBP	International Geosphere-Biosphere Programme
IGACO	Integrated Global Atmospheric Chemistry Observations (IGOS Theme)
IGAD	Intergovernmental Authority on Development (East Africa)
IGBP	International Geosphere-Biosphere Programme
IGOS	Integrated Global Observing Strategy
I-GOOS	Intergovernmental Committee for GOOS
IGOS-P	Integrated Global Observing Strategy Partnership
IGOSS	Integrated Global Ocean Services System
IICWG	International Ice Charting Working Group
IHDP	International Human Dimensions Programme
iLEAPS	Integrated Land Ecosystem–Atmosphere Processes Study
INCOIS	Indian National Centre for Ocean Information Services
IOC	Intergovernmental Oceanographic Commission
IOD	Indian Ocean Dipole
IODE	International Oceanographic Data and Information Exchange
IOS	Initial Operational System (GCOS); Integrated Observing System (GOOS)
IRDR	Integrated Research on Disaster Risk Programme IRDR
ISO	International Organization for Standardization

ISSC	International Social Science Council
IP-04	Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (2004)
IP-10	Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (2010)
IPCC	Intergovernmental Panel on Climate Change
IPY	International Polar Year
ISCCP	International Satellite Cloud Climatology Project
ISO	International Standards Organization
ISTI	International Surface Temperature Initiative
JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM Observing Platform Support Centre
JMA	Japan Meteorological Agency
JPO	Junior Professional Officer
JRC	Joint Research Centre (European Commission)
LAI	Leaf Area Index
LCA	Long-Term Cooperative Action
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
NAPAs	National Adaptation Programmes of Action
NASA	National Aeronautics and Space Administration (USA)
NBCN	National Basic Climatological Network
NCAR	National Center for Atmospheric Research
NCDC	National Climatic Data Center
NCEP	National Centers for Environmental Prediction
NDACC	Network for the Detection of Atmospheric Composition Change
NGDC	National Geophysical Data Center
NMHS	National Meteorological and Hydrological Service
NMS	National Meteorological Service
NOAA	National Oceanic and Atmospheric Administration
NPP	Net Primary Productivity
NPP	National Polar-orbiting Partnership
NWP	Numerical Weather Prediction
NWP	Nairobi Work Programme
OBS	WMO Observing and Information Systems Department
OOPC	Ocean Observations Panel for Climate
OPAG	Open Programme Area Group
OSes	Observing System Experiments
OSSEs	Observing System Simulation Experiments
PAntOS	Pan-Antarctic Observing System
PAGES	Past Global Changes (within IGBP)
PCOF	Polar Climate Outlook Forum
PECS	Programme on Ecosystem Change and Society
PICO	Panel for the Integration of Coastal Observations (GTOS-GOOS)
PMEL	Pacific Marine Environmental Laboratory
POGO	Partnership for Observation of the Global Oceans
PSC	Polar Satellites Constellation

QC	Quality Control
RAP	Regional Action Plan
RBCN	Regional Basic Climatological Network
RCOF	Regional Climate Outlook Forum
RRR	Rolling Review of Requirements
RWP	Regional Workshop Programme
SAARC	South Asian Association for Regional Cooperation
SAFs	Satellite Application Facilities
SAG	Scientific Advisory Group (GAW)
SBI	Subsidiary Body for Implementation (UNFCCC/COP)
SBSTA	Subsidiary Body for Scientific and Technological Advice (UNFCCC/COP)
SC	Steering Committee
SCIAMACHY	SCanning Imaging Absorption SpectroMeter for Atmospheric CartographY
SCOPE-CM	Sustained Coordinated Processing of Environmental Satellite Data for Climate Monitoring
SHADOZ	Southern Hemisphere Additional Ozone-sondes
SIA	Seasonal-to-Inter-annual Forecasting
SIP	Seasonal-to-Interannual Climate Prediction
SIT	Strategic Implementation Team (CEOS)
SMOS	Soil Moisture Observing System
SOG	Statement of Guidance
SOOP	Ships of Opportunity Programme
SOOS	Southern Ocean Observing System
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
TCDR	Thematic Climate Data Record
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
TSP	Technical Support Project
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
USGS	United States Geological Survey
VCP	Voluntary Co-operation Programme
VOS	Voluntary Observing Ship(s)
VOSclim	Voluntary Observing Ships Climatology Programme
WCC-3	Third World Climate Conference
WCDMP	World Climate Data and Monitoring Programme

WCP	World Climate Programme
WCRP	World Climate Research Programme
WDAC	WCRP Data Advisory Council
WDC	World Data Centre
WDCGG	World Data Centre for Greenhouse Gases
WGCCD	Working Group on Climate Change Detection
WGCM	Working Group on Coupled Modelling
WGCV	Working Group on Calibration and Validation (CEOS)
WGNE	Working Group on Numerical Experimentation
WG-SP	Working Group on Surface Pressure
WHYCOS	World Hydrological Cycle Observing System
WIGOS	WMO Integrated Global Observation System
WIS	WMO Information System
WMO	World Meteorological Organization
WOAP	WCRP Observation and Assimilation Panel
WRAP	Worldwide Recurring ASAP Project
WWW	World Weather Watch (WMO)
XBT	Expendable Bathy Thermograph

**GCOS Secretariat**  
**Global Climate Observing System**  
**c/o World Meteorological Organization**  
**7 bis, Avenue de la Paix**  
**P.O. Box No. 2300**  
**CH-1211 Geneva 2, Switzerland**  
**Tel: +41 22 730 8275/8067**  
**Fax: +41 22 730 8052**  
**Email: [gcosjpo@wmo.int](mailto:gcosjpo@wmo.int)**