



GCOS

GLOBAL CLIMATE OBSERVING SYSTEM

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ICSU
International Council for Science



WORLD
METEOROLOGICAL
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INTERGOVERNMENTAL
OCEANOGRAPHIC
COMMISSION

**REPORT OF THE TWENTY-FOURTH SESSION OF THE
WMO-IOC-UNEP-ICSU
STEERING COMMITTEE
FOR GCOS**

Guayaquil, Ecuador

3–6 October 2016

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Part 1 Strategy, Review and Plans

1. Opening of the Session

The meeting was opened by Stephen Briggs who welcomed the participants to *Centro Internacional para la Investigación del Fenómeno de El Niño* (CIIFEN), Guayaquil, Ecuador, and thanked the Director of the Institute, Rodney Martínez Güingla, for hosting the meeting. The participants (Appendix 1) introduced themselves.

The agenda was approved without comment.

2. Chairman's Introduction and View (S. Briggs)

After the agreement in Paris in December 2015, the 22nd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP 22) in Marrakesh will start the implementation of this agreement. The GCOS Status Report was well received at its presentation at COP 21, where GCOS was asked to submit a plan for implementation based on, inter alia, the GCOS Status Report. Alan Belward (Joint Research Institute, Ispra, Italy) led the development of the plan. One important aim of this Steering Committee meeting is to approve the plan and look forward to its implementation. This is not just an update of earlier plans, but has been written with a wider perspective on the uses of observations and information beyond scientific needs such as adaptation and climate services, and supporting other multilateral environmental agreements.

Another aspect of climate observations is the realisation from the climate change policy community of the need to provide relevant information to society to enable the development of policies and solution and to understand future risks. This places a responsibility on GCOS to support this – it will not be done by GCOS but GCOS will provide a baseline of observations that underpin these indicators.

The GCOS Science Conference held from 2–4 March 2016, in Amsterdam, The Netherlands, was a success both for attendees and those who watched on line.

The good relationship with the UNFCCC has allowed GCOS to play a full role at the UNFCCC and the COPs and we need to look at how this is continued into the future.

The issue of the revised GCOS Memorandum of Understanding (MoU) among the four sponsoring organizations still needs to be tidied up – no one has signed it so far. This does raise the issue of our partnership with our sponsors and others. Unfortunately, UNEP representative had to withdraw at the last minute.

A final point is the future membership of the Steering Committee. The term of membership is three years and GCOS needs to get broader representation, including gender. For future members of the Steering Committee the breadth of experience in the light of the broader requirements in the Implementation Plan need to be considered, not just strong depth of scientific understanding.

The Chairman thanked the panel chairpersons for their efforts and contributions to the status report and implementation plan. The Steering Committee is aware of the effort required. The Chairman also thanked the GCOS Secretariat for their support.

The Steering Committee then had a general discussion about the future and significant issues.

The Steering committee noted that there was a need to ensure that GCOS gets the recognition it deserves in Africa. For example, the link between the Global Ocean Observing System (GOOS) is in South Africa very

governmental and researchers does not always exist. There is still an important need for support to African countries. The idea was raised to mobilize the national GCOS Coordinator concept again. It was suggested to focus on regional WMO Integrated Global Observing System (WIGOS) centres and that perhaps GCOS could cooperate with the WMO Commission for Basic Systems (CBS) to improve understanding.

On regional needs the Steering Committee noted that observations sit early at the value change. While every country is organized differently, the value of the observations needs to be articulated. Regional observations need to be integrated into other activities. There remains a big gap between observations and regional services. The GCOS requirements are global, but GCOS needs to break these down into regional needs. GCOS should consider a stronger link with the Copernicus Climate Change Services of the European Union. GCOS should use existing regional coordination mechanisms such as Regional Climate Centres, as a good example serves CIIFEN.

Regarding policy and the UNFCCC, there is a difference at what is said at policy level and what is actually going on the ground. Sometimes it is not well communicated to the UNFCCC what is actually being done on the ground regarding adaptation, however there are many local and regional activities, as the Steering Committee heard during the Science day preceding this meeting. Regional workshops are on the UNFCCC agenda, one aim should be to bring regional information to the attention of negotiators. Another issue is the timing of review cycles mentioned in the implementation plan which calls for better synchronisation with UNFCCC. The Intergovernmental Panel on Climate Change (IPCC) is trying to align with global stocktake (5-year cycle after 2023). While a five year cycle is needed there should also be a long-term perspective.

The Steering Committee also noted that activities deriving fluxes from atmospheric composition will take a long time before this is routine, but some examples are already published. So far, techniques to estimate CO₂ or CH₄ fluxes have been thought of as verification for emission inventories. The IPCC is looking at concentrations as validation mechanism in their upcoming update of the 2006 Guidelines for national GHG Inventories.

Regarding science needs it was discussed that as models develop they will have higher resolution and so there is a need for improved datasets to check and validate them. While snow and ice will decrease everywhere, in general, the climate system will become less predictable. Changes in extremes are going to emerge before changes to the mean is detectable. This means that monthly averages are no longer enough – there is a need for sub-daily data. Global networks are needed as a prime reason for science, but they remain fragile. It was suggested to possible discuss a long-term perspective and to formulate a vision for 2050 for the need of climate observations.

The Chairman pointed out that it has been a tremendous effort to produce the status report and new Implementation Plan one year after. He suggested that now there is an additional need which is to fit into other external drivers such as the “Global Stocktake”. We will have to consider timing issues when we look into more details of the actions in the new Implementation Plan. We need to be in particular careful with looking at adaptation and mitigation. Mitigation needs are more limited, as they refer to Agriculture, Forestry and Other Land Use (AFOLU), Land use, land-use change and forestry (LULUCF) and uncertainties in the GHG fluxes and are more related to national and sub-national levels.

The Chairman noted that the important issue was not the promotion of the GCOS programme itself, but access to the observations GCOS supports. Two points emerged out of the overall discussions:

- Regional Activities. How do we emphasize the needs of regional observations?
- How best do we fit into external cycles and timing (e.g., UNFCCC and IPCC)?

3. Sponsors Views on their expectations with regard to the future of GCOS programme

3.1 WMO (J. Cullmann)

Johannes Cullmann, representing the World Meteorological Organization (WMO), discussed whether GCOS is only looking at a perfect system in 50 years or whether it wants to be a practical system on what is needed now. He would like to have more clarity on what is needed and on how it links to monitoring for UN Sustainable Development Goals (SDGs).

The most important issue for WMO is how climate services are supported. How are these observations and information, transferred and made available to users? The new Implementation Plan need to be accompanied by a guide for countries on what needs to be done now. A GCOS strategy should include how GCOS links to the WMO constituency and how does GCOS support those Members with less capacity.

The MoU still needs some coordination between sponsors on how they work together and what they want out of GCOS. There is a need to clarify with partners if they see GCOS as part of their plans for climate issues: WMO is not convinced of the commitment of all the sponsors. There should be better coordination between GCOS sponsors and other partners.

He also suggested that GCOS should consider its working practices to reduce their climate impacts and become more “green”.

He stated that GCOS is important and, while WMO is trying to streamline climate activities, we need to ensure it continues to flourish.

3.2 Intergovernmental Oceanographic Commission (IOC) of UNESCO (Albert Fischer)

Oceans are important for the policy and science of climate change. 93% of excess heat has ended up in oceans and other impacts include acidification, de-oxidation and sea level rise. Oceans are also extremely important for seasonal prediction.

IOC is part of UNESCO and responsible for ocean science with increasing resilience and adaptation an important task. In 2014 there were a number of high-level agreements, Paris Agreements, SDG 14, Agenda 2030, Sendai Framework for Disaster Reduction, SIDS Samoa Pathway, all of which have significant implications for ocean observations.

GCOS and the Global Ocean Observing System (GOOS) have the same sponsors, and the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) is joint with WMO and IOC.

GOOS works on climate, services and ocean health. GOOS is defining Essential Ocean Variables (EOVs) and works primarily through JCOMM for in-situ observations. There is an overlap between EOVS and ECV, but EOVS are defined primarily for oceanographic science needs.

A common panel (OOPC) coordinates GCOS and JCOMM structures for GCOS, while for GOOS it is the focal point for physical requirements. Therefore it is important to have a coordination strategy and good planning.

The next GOOS Steering Committee will be held in May 2017 and JCOMM-5 in October 2017 in Indonesia. GOOS is preparing a new GOOS Strategy for agreement at its next meeting.

Number	Action	Notes	Responsibility
SC-24/1	Present GOOS Strategy to next GCOS SC (SC-25).		Albert FISCHER

3.3 ICSU (M. Limonta)

The International Council for Science, ICSU regional office is now based in El Salvador: it moved from Mexico in August 2016. ICSU has 144 countries and 31 scientific unions amongst its members. Climate change is included under the ICSU programme Future Earth. It also has a programme on open data. Lucilla Spini, Head of Science Programmes at ICSU, is the contact for observing systems.

The International Social Science Council, ISSC – ICSU merger will be finalized at a joint general assembly in 24 October 2016 in Oslo. It already has been agreed by the executive bodies of each organization. ICSU and ISSU are working together on a high level strategy document for adoption in 2017.

An important issue for ICSU related to GCOS is the improvement of the communication of the need for open data. At the regional level there is a need to make better use of opportunities of existing bodies. A communications strategy is needed – both globally and regionally. There is also a need to consider how the merger will impact the relationship between ICSU and GCOS noting that social science is important with regard to the human component of climate change.

In conclusion, ICSU support supports GCOS and hope that GCOS will take into considerations the point raised above.

The Steering Committee noted that often interdisciplinary approaches work better if they are performed with strength in the separate disciplines. While GCOS has well defined focus and should not dilute this, it was also clear that currently related issues are often discussed in isolation – e.g. limits to global carbon emissions and energy needs for development need to be considered together.

The Steering Committee noted that the regional networks should be used by GCOS.

3.4 UNEP

Unfortunately, the UNEP representative had to pull out at a late stage.

4. Director's Introduction (C. Richter)

4.1 Report on major activities since last Steering Committee in 2015

The director presented her report contained in document GCOS-24 Doc. 4.0. The main and recurrent activities of GCOS are the three panels co-sponsored by WCRP and the annual provision of advice and guidance provided by the Steering Committee.

GCOS has reported to the WMO Congress and the ICSU assembly but UNEP does not have observations on their agenda so there was, in the past, no opportunity to report to their assembly. GCOS does not have a way to formally consult and contribute to GFCS (although it has done so on an ad hoc basis).

Since the last Steering Committee (SC-23), GCOS has assessed climate observing systems and reported on progress made in implementing a GCOS report: the GCOS Status Report (GCOS-195). The Status report is one of the key inputs for the new implementation plan (GCOS-200) that has been developed by GCOS also based on the GCOS Open Science Conference which was held from 2–4 March 2016, in Amsterdam, The

Netherlands, and the work of the science panels and writing team. GCOS has also provided advice requested by space agencies and by European climate services. Milestones included:

- Publishing the report *Status of the Global Observing System for Climate* and its executive summary, and presented this at COP 21;
- Holding the GCOS Science Conference, Amsterdam, The Netherlands, 2–4 March 2016;
- Holding the three science panel meetings which contributed to the implementation plan and determined ECV product requirements;
- Producing the new implementation plan with two writing team meetings and two review periods for approval at SC-24.

The plans (with planned attendance) for 2016–2017 include (see Doc.4 for more details):

1. Supporting Parties of the UN Framework Convention on Climate Change (UNFCCC)
 - a. SBSTA 45, COP 22, 7–12 November 2016, Marrakech, Morocco
 - b. UNFCCC Lead reviewers Meeting, February 2017
 - c. SBSTA 46, 8–18 May 2017
 - d. UNFCCC Inventory Review, September 2017
2. Contributing to the Group on Earth Observations (GEO):
 - a. GEO-XIII, St Petersburg, 9–10 November 2016, St. Petersburg, Russia
3. Contributing to the implementation of the Global Framework for Climate Services (GFCS)
 - a. 3rd GFCS IBCS Management Committee meeting, 26–28 October 2015, Geneva
 - b. Informal Management Committee of the IBCS, 18 June 2016, during WMO EC-68, Geneva
4. Contributing to the Intergovernmental Panel on Climate Change (IPCC) and working in coordination with IPCC
 - a. IPCC Plenary 44, 17–20 October 2016, Bangkok, Thailand
 - b. 45th Session of the IPCC 3–9 April 2016
 - c. 46th Session of the IPCC 4–10 September
 - d. IPCC Task Force on Inventories, 1st Author Meeting, June 2017
 - e. IPCC Task Force on Inventories, 2nd Author Meeting, September 2017
5. GCOS Programme Activities
 - a. Planned attendance:
 - i. GRUAN 9th ICM, 21–16 June 2017, Helsinki, Finland
 - b. Planned Panel sessions in 2017:
 - i. OOPC 20th session, 14–17 March 2017, WHOI, Cape Cod, USA
 - ii. AOPC 22nd session, 27–31 March 2017, Exeter, UKMO, UK
 - iii. TOPC 19th session, 6–7 April 2017, University Vienna, Austria
 - c. Planned expert team meetings on cross-panel issues in 2017, on:
 - i. Coastal zones (OOPC-TOPC)
 - ii. Cross-validation of ECV products
 - iii. The identification of climate indicators
 - iv. Better understanding adaptation needs
 - v. Complementing ECV product requirements (consistency of Terrestrial satellite products)
6. Cooperating with space agencies and addressing requirements for climate monitoring from space:
 - a. CEOS 30th Plenary, 31 Oct–2 November 2016, Brisbane, Australia
 - b. CEOS SIT, spring 2017
 - c. Joint WG Climate, 6–10 February 2017, INPE, Brazil

- d. 7th ESA CCI, Model User Group Integration Meeting 2017
- e. CGMS plenary, 45th session, 12–16 June 2017, Korea Met Agency
- f. CEOS 31st Plenary, autumn 2017, USA
7. Cooperating with partner programmes
 - a. WDAC, 6th session, 22–23 March 2017, ESRIN/ESA, Frascati, Italy
8. Cooperating with WMO on Regional Activities. Planning meetings in 2017 for the Regional Workshop Programme starting in 2018:
 - a. Task team on the design of the workshop programme (1st Quarter 2017)
 - b. Task Team on the implementation of the workshops (2nd Quarter 2017)
9. Strengthening cooperation with ocean observation community
 - a. GOOS-RCN Workshop on the Implementation for Multidisciplinary Sustained Observations, 8–10 February 2017, Miami, Florida
 - b. 8th Session of the JCOMM Observations Coordination Group, 22–25 May 2017, Qingdao, China,
 - c. WCRP-IOC Conference on Regional Sea Level Changes and Coastal Impacts, 10–14 July 2017, New York, United States
 - d. TPOS 2020, 4th meeting, Steering Committee, October 2017
10. Cooperation with Terrestrial Observation Communities
 - a. Global terrestrial Network – Hydrology GTN-H, June 2017
 - b. International Long-Term Ecological Research (ILTER) biosphere coordination meeting 2017
 - c. GOFC-GOLD Project Meeting 2017
11. Cooperation with Atmosphere Observation Community
 - a. CBS-16, 23–29 November 2016, Guangzhou, China
 - b. Specific expert team meetings related to WMO Technical Commission’s work to be identified in the course of the year.
12. Attending and contributing to the Executive Bodies of GCOS’ sponsors
 - a. ICSU Extra-Ordinary Assembly, 24 October 2016, Oslo, Norway
 - b. WMO Executive Council, 69th session, 10–19 May 2017, WMO
 - c. IOC Assembly, summer 2017, Paris, France
 - d. Expert meeting with IOC, ICSU, WMO and UNEP to develop a strategic plan, first half of 2017.
 - e. Engagement Committee meeting, second half of 2017.

The expert team meetings are small internal meetings to plan how GCOS takes this forward. GCOS will coordinate with a wide range of bodies including:

- Satellites CEOS and CGMS
- Copernicus Climate Services
- WCRP
- IPCC TFI
- GOOS
- JCOMM
- TPOS
- GOFC-GOLD
- GTN-H
- WGMS
- 2017 – ILCER
- A range of WMO bodies including:

- WIGOS, EGOS
- WMO data management
- GAW
- CIMO, CBS, JCOMM, CCI, CHy

For the **Expert Team on Climate Indicators**. The GCOS Director has met with the Copernicus Climate Change Service (C3S) programme team that has a large budget but short time scale, and that would be happy to contribute to a meeting. GCOS will consolidate needs, engaging CCI, CBS and GFCS, to have an internal view before this meeting. This would be about indicators of change but addressing indicators of future risks also needs to be considered. Other bodies involved in climate indicators include the Bulletin of American Meteorology which produces an annual review and the WMO whose annual statement of the climate report also publishes relevant information. The UNFCCC needs this information on an annual basis and looks to WMO to provide it.

The Steering Committee agreed with this overall plan.

The Steering Committee thanked the Director and the Secretariat staff for its work in the past years, and approved their planned meeting schedule as outlined in in GCOS SC-24, Doc. 4. The expert team meetings arising from the new Implementation Plan should be planned as noted later in section 5.

The Steering Committee also noted that the GOOS panels will have a joint ECV/EOV meeting in February 2017, (focussing on oxygen minimum zone, coastal zones and ocean productivity) where GCOS should be represented.

Number	Action	Notes	Responsibility
SC-24/2	GCOS Secretariat work plan based (Doc. 4).	Plan to be developed in 2016.	D/GCOS

4.2 GCOS Science Conference (H. Dolman)

The GCOS Science Conference was successful and there was a short publication in Nature Geoscience. The organization was outstanding with major support from EUMETSAT. There is still a need for a larger paper based on the conference and new Implementation Plan. The issue is how to get a longer paper in a suitable widely-read journal. Some of the videos from the meeting are being used by universities for teaching. The conference was clearly linked to the new Implementation Plan. It brought together a wide range of observations not normally discussed together: forest fires to ocean heat.

Another meeting could be held in 2–3 years and help promote GCOS and review status of observations, stocktaking. It should focus on specific issues: e.g., gaps and progress.

Number	Action	Notes	Responsibility
SC-24/3	Develop plan for new science conference. Circulate to SC for discussion.	Plan to be developed for possibly 2–3 day meeting in spring 2019.	D/GCOS

5. GCOS Implementation Plan (A. Belward)

Alan Belward, Lead, Implementation Plan, thanked the authors and secretariat for their efforts. He noted this was the latest stage in a process dating back to the first plan (2004) which was requested by the UNFCCC and was a 10-year plan.

COP 21 encouraged GCOS to consider the outcomes of the 21st session of the COP (COP 21) when preparing the new Implementation Plan. The document was written by a writing team with the three science panels. An initial outline was written in March 2015 and a version submitted to COP 21. There were two writing team meetings in 2016. There were two reviews, and initial expert review and an open review. Together over 2000 comments were received.

The document consists of:

- Executive Summary
- Part 1: meeting the needs. This is a new departure from past plans.
 - Background
 - Implementation steps
 - Observations for adaptation, mitigation and indicators
 - Broader relevance of climate observations: SDG, Rio convention, Sendai, Ramsar
 - Consistent observations across earth systems cycles
 - Capacity Development and Regional and national support
- Part 2: sectoral plans as before
 - Introduction
 - Overarching and cross-cutting actions
 - Requirements for Climate Observations
 - Planning, review and oversight
 - Data management, stewardship and access
 - Production of integrated ECV products
 - Ancillary and additional observations
 - Atmospheric
 - Oceans
 - Terrestrial
 - Summary
- Annexes: product requirements: another new addition.

The Steering Committee were happy with the document as presented. The Director of the World Climate Research Program (WCRP) noted that they need this to take their work forward: it is well structured and substantial.

The Steering Committee discussed regional needs and implementation. Africa is an area of clear needs. In addition, the northern part of South America would be a good place to start regional implementation given the existing regional activities and coordination. The ICSU regional office would support this.

In the past, the GCOS Secretariat had developed regional workshops and regional plans. These need to be restarted but the details of how this can be done is not yet decided. An expert group should discuss, how this can work forward and an approach should be decided in 2017. They should not think of separate GCOS workshops but link to regional organizations to provide continuity and develop an on-going process. There are other partners and also climate work not owned by countries, who all need to be informed to avoid

duplication. There is also the GCOS Cooperation Mechanism (GCM) where parties can contribute to build up observational systems on the ground.

The GCOS climate monitoring principles (GCMP) have stood the test of time, but have not been implemented everywhere. While not all meteorological offices implement the GCMP, satellites agencies are now trying to do so, e.g., Landsat is now calibrated back to 1972. The Tropical Pacific Observing System (TPOS) plans emphasis need to follow the GCMP and they are included in the WIGOS manual, and GCOS requirements are included in the WMO Technical Commission for Basic Systems (CBS) network design principles.

The plan is at the right level, however, to implement each action needs a plan itself. The plan is not a detailed roadmap for every action but outlines what is needed. Thus, while the implementation plan is a great document at global level, it lacks specific details at national levels. National Hydrological and Meteorological Services (NHMSs) such as DWD have strong national implementation but not many countries do and so will need guidance material and plans for implementation. Effective monitoring of actions is needed. After the implementation plan is published GCOS should develop some technical guidelines, possible in coordination with the WMO Expert Team of the Evolution of the Global Observing System (EGOS), currently led by John Eyre from the UK MetOffice. One example is the implementation of AMDAR, the Aircraft Meteorological Data Relay.

Another question is, how GCOS makes observational agencies understand the need for climate observations. How should GCOS communicate the benefits?

The plan makes a good step forward with clear technology independent requirements for each ECV product. These will to be developed for different applications and need consider the practicalities of different technologies. Work on these requirements should not wait for the next plan.

Introducing the implementation plan to the COP needs to make clear what is new and what it means for the Parties. Is there a need to update the earlier decision with the new ECVs? For the previous implementation plan, the UNFCCC thanked GCOS and asked actors to implement it. Parties should include this implementation plan in their plans and report on their progress. So new guidance is needed from Marrakesh which references the earlier decision.

GCOS should highlight certain actions from different perspectives to encourage funding and support. GCOS cannot select the most important ECVs and actions, as there is no agreement on this, but can tailor case studies on how the plan will help individual areas and sectors in order to sell them to specific groups with different interests and priorities. For example, WMO should use GCOS in requests for money from World Bank for hydro-meteorological networks.

Many WMO members will only implement what is in the WMO technical regulations and so an effort is needed to get the climate needs in the technical regulations where they apply. This would make it mandatory for NHMSs.

The meeting approved the new Implementation Plan and its submission to the UNFCCC.

Number	Action	Notes	Responsibility
SC-24/4	Submit the new Implementation Plan to UNFCCC by 10 October.		Secretariat

Number	Action	Notes	Responsibility
SC-24/5	Produce plan on how to implement these expert teams: <ul style="list-style-type: none"> • Expert Team: Climate Indicators • Expert Team: Adaption – review way forward • Expert Team: ECV product requirements • Workshop: Coastal Zones • Expert Team: Cross validation of ECV (TOPC to ensure consistency of satellite products). 	Ensure this is done efficiently. May hold meeting in association with other meetings, teleconferences where practical.	Secretariat
SC-24/6	Task team to design regional workshops: Revise regional workshop plan and discover sources of funding. Work with other organizations in value chain: UN, but also regional bodies.		Secretariat
SC-24/7	Ensure communicating the plan is appropriate to audience and motivates groups to implement the plan.		Secretariat

6. UNFCCC COP 22, SBSTA 45 (F. Vladu)

Florin Vladu reported to the meeting on behalf of the UNFCCC.

At the last SBSTA the research dialogue opened to more people. GCOS presented its plans and outcomes of Science Conference. The GCOS poster and presentation were well received.

There was an informal meeting with UNFCCC Executive Secretary and SBSTA chair which went well. It concluded on the need for better coordination of activities and identification of needs of support e.g., WMOs Integrated Global Greenhouse Gas (GHG) Information System (IG3IS) and atlas of health impacts for Africa.

At COP 22 there will be an opportunity for a two minute GCOS statement. There will also be an Earth Info Day on 8 November. This is the first of a planned series of such days. The overall aim is to communicate information on the status of climate observations as well as new developments and opportunities.

Countries can ask the Global Environment Facility, GEF, (and now the Green Climate Fund, GCF) for funding for observations, but plans should come from parties themselves. They cannot fund implementing GCOS by itself, but as part of an activity to support something else (e.g., adaptation or mitigation) in the region, therefor regional activities could be a mechanism to generate projects).

The SBSTA should discuss the implementation plan and propose a COP Decision. If a decision includes organization of regional workshops, the UNFCCC could help support these workshops. The Director of WCRP recommended to make it regional relevant and find the best examples for the regions, i.e., focussing

on agriculture measures for Africa. Reporting on systematic observations is for Annex I parties only and the existing decision may need to be revised to match the new Implementation Plan.

The Steering Committee noted that there is a need to coordinate messages with consistent examples. Negotiators need time before the session to see document. GCOS should prepare a PowerPoint to present status and new Implementation Plan for Parties. Developing countries (LDC, AOSIS, African Groups) are interested in actions: support, technologies and capacity building. Now that the implementation plan is agreed, there is a need to deliver the plan and to get people to buy into the plan. GCOS should try to inform national negotiators and provide sets of slides. It was also suggested by individual SC members to develop technical guidelines to monitor ECVs and demonstration projects, in order to provide different angles and perspectives on ECVs, and to publish case studies, for example, on sea level rise, decadal time scales and for regions. There was also a suggestion to plan for training, dialogues and workshops.

Number	Action	Notes	Responsibility
SC-24/8	Identify places where GCOS can be discussed during COP 22 e.g. Water Event, Ocean day, Forest Day, Space Agency Day, etc.		All to provide to Secretariat
SC-24/9	Produce a few slides that can be used by anybody in a range of situations on the new Implementation Plan and GCOS.	Talk about benefits, use of GCOS.	Secretariat
SC-24/10	Raise awareness with national delegations and try to have GCOS included in national statements.		All
SC-24/11	Prepare presentations and posters on new Implementation Plan and its implementation.		Secretariat
SC-24/12	Ensure GCOS has effective speaker(s).	Could have two speakers.	SC and secretariat
SC-24/13	Coordinate input to the Earth Info day agenda how to present new Implementation Plan at COP 22: presentations, posters, brochures, etc.	Highlight benefits of GCOS and systematic observations. Describe need of regional activities and links to funding.	Florin. GCOS Secretariat, SC
SC-24/14	Draft Statement to SBSTA 45 and agree with SC Chair in consultation with Florin.		D/GCOS
SC-24/15	Try to connect with UNFCCC negotiators to enable them to support discussions on new Implementation Plan.		SC Members

Part 2 Scientific / Technical Discussion with Partners and Expert Panels

7. Reports and discussion on past and future activities and engagements:

7.1 *Feedback from the National GCOS Science Day*

The GCOS Science Day was held on the day before the Steering Committee started, Monday 3 October 2016, also at CIIFEN. About 30 experts and scientists attended from a range of national and regional bodies. The presentations highlighted significant climate activities and are available from the GCOS web site¹. The meeting was a huge success and will be repeated at future GCOS Steering Committee meetings.

The Steering Committee thanked Rodney and his staff at CIIFEN for organising the Science Day.

7.2 *Atmospheric Observation Panel for Climate (K. Holmlund)*

K. Holmlund presented proposed future plans for the AOPC. The report on the 21st AOPC meeting was also presented (GCOS-199)².

The AOPC Chair felt that, in future, the process to develop ECV product requirements by AOPC could be improved. The GCOS Steering Committee noted that the other panels were happy with the way they had reviewed the ECV product requirements and encouraged the panels to work together on this in the future.

The Steering Committee agreed the AOPC plans as presented.

The issue of a GCOS Surface Climate Reference network was discussed. WMO Region VI wish to start some reference climate stations, and the WMO Technical Commission on Climatology (CCI) is defining some requirements (led by Peter Thorne). GCOS should contribute and assist on network design.

Number	Action	Notes	Responsibility
SC-24/16	Design and implement a work plan for AOPC as outlined in the AOPC presentation.		AOPC Chair

7.3 *Ocean Observations Panel for Climate (B. Sloyan)*

B. Sloyan presented the OOPC work plan and the report of the 19th meeting of OOPC (GCOS-201)³.

The Steering Committee supported joint TOPC and OOPC efforts to improve observations in the coastal zone. While higher resolution is needed, except for storm surges, there is no model that crosses boundary, so supporting developments in this area is extremely useful.

¹ http://www.wmo.int/pages/prog/gcos/SC-24_GCOS_Science_Day_Presentations.html

² <http://www.wmo.int/pages/prog/gcos/Publications/GCOS-199.pdf>

³ <http://www.wmo.int/pages/prog/gcos/Publications/GCOS-201.pdf>

The Steering Committee agreed the OOPC plans as presented.

Number	Action	Notes	Responsibility
SC-24/17	Design and implement a work plan for OOPC including the topics outlined in the OOPC presentation.		OOPC Chair

7.4 Terrestrial Observation Panel for Climate (S. Eggleston on behalf of TOPC Chairman)

S. Eggleston presented the report of the 18th meeting of TOPC (GCOS-202)⁴ and its future plans.

A new chairperson of TOPC has been proposed: Wolfgang Wagner, University Vienna. He has been a member of TOPC looking after the soil moisture ECV. TOPC needs to consider reviewing ECV requirements and the current monitoring of ECVs, the needs of adaptation, regional demands, metadata and the availability of guidance material. In order to plan its future tasks, the next TOPC meeting will be a brain storming session to plan its future.

The Steering Committee agreed the TOPC plans as presented.

The Steering Committee agreed to the appointment of Wolfgang Wagner TOPC chair.

A discussion took place concerning the lack of coordination in the terrestrial domain and the absence of GTOS. This is a matter of concern for the Steering Committee as well as for partners, such as GEO. Several organizations, including GCOS, have identified GEO as a platform to facilitate discussions regarding the establishment of an effective coordination mechanism in this area. Following discussions with ICSU, the GCOS Secretariat, UNEP, and ILTER, ahead of the SC meeting, GEO proposed to co-organize a scoping workshop to discuss pathways towards an improved coordination mechanism for terrestrial observations. The Steering Committee seconded this idea and noted that substantial discussions will be needed before such a meeting.

Number	Action	Notes	Responsibility
SC-24/18	GCOS should find an alternative coordination mechanism to GTOS. GEO to convene a short workshop to discuss and find an alternative to GTOS.	Consider options and agree an way forward that can be presented to sponsors.	GEO, Secretariat & TOPC Chair
SC-24/19	Design and implement a work plan for TOPC including the elements outlined in the TOPC presentation.		TOPC Chair

The Steering Committee also noted that the interface between panels could be improved and made a routine part of their process. One possibility would be to bring all of GCOS community together (perhaps every 3 years) to discuss and agree at a general level major issues topics such as how to define requirements.

⁴ <http://www.wmo.int/pages/prog/gcos/Publications/GCOS-202.pdf>

Number	Action	Notes	Responsibility
SC-24/20	Consider mechanism to communicate between panels, promote a common approach and definitions.		Secretariat Panel Chairs

The Steering Committee also recommended to invite the Chairman of the Global Atmosphere Watch (GAW) program to next AOPC meeting; and to have an expert covering forests and fluxes coming to the upcoming TOPC meeting.

Number	Action	Notes	Responsibility
SC-24/21	AOPC and TOPC to follow the recommendations for additional expertise in the upcoming panel meeting.	AOPC to invite GAW SC Chairman; TOPC to invite an experts for forest, and for IPCC Guidelines, fluxes.	Secretariat Panel Chairs

8. Discussion about needed expertise for SC members

C. Richter presented the current composition and selection of the Steering Committee. There are

- 12 members nationally split between technical and scientific experts;
- 1 seat for GFCS (proposed by the review board);
- A term length 3 years with an option for a second term, which is a maximum service of 6 years;
- Participants are (members, ex-officio members (the science panel chairs), invited experts and representatives of the GCOS sponsors.

It was noted that 8 members will finish the first term in 2017. It would be better to have a more regular renewal of membership. The process of recruiting new members should be as efficient and as swift as possible. The requirements for members includes technical skill, programme management and influence.

There was a discussion about having an open call for nominations. This would provide a wider more diverse pool of candidates. The call for nominations could be distributed through the sponsors, climate-I and other lists, and the steering committee should disseminate it to their networks. There was concern that this would not provide the correct people and may cause difficulties with rejected nominations. This highlights the need to be transparent, but also the need to encourage people to be nominated.

It was agreed that there should be an open and transparent process involving both an open call for nominations and the current approach of steering committee members searching out for suitable candidates. The aim will be to increase diversity of steering committee members. They should be asked to submit a CV and a paragraph explaining why they are interested and what they could contribute.

Number	Action	Notes	Responsibility
SC-24/22	Establish a hybrid process of open nominations and identifying people to be SC members and Panels. Under take process and have nominations ready early 2017. Preselect nominations for consideration by SC Chair and Sponsors.	Process should be open and transparent. Decide where call should be made.	Secretariat
SC-24/23	Inform secretariat where call for nominations for SC and panels should be posted, and identify potential new SC and panels members.		SC Members
SC-24/24	Select and appoint new members.		Sponsors
SC-24/25	Produce a plan for cycling members as they come to the end of their time on SC.		Secretariat

In addition, there was a short discussion about invited experts for the Steering Committee. The skills and background that would be useful could include data analysis and financial institutions (GEF, World Bank, etc.) but also could include NCEI and Copernicus, e.g., experts who could inform about the new Earth cycles: carbon, energy and water; or about data politics, or having a background in economy or re-insurance. Perhaps people nearer the observations are needed than end users. These experts will need to be able to answer the questions, what needs to be done to cover cross ECVs, for example to target other conventions? One suggestion was that they could be invited as experts for a period (e.g., 3 years) to encourage greater participation. Another way of informing the steering committee of issues of interest would be to hold thematic workshops which could fit into the steering committee and could be perhaps held back-to-back workshop with future Steering Committee meetings.

Number	Action	Notes	Responsibility
SC-24/26	Make a proposal for workshop back-to-back with SC to inform SC on important issue.	e.g. a workshop on climate communications.	Secretariat
SC-24/27	Make proposal on potential experts (for long term participation) who could help on areas such as: <ul style="list-style-type: none"> • Improve synergies with other MEAs • Regional implementation • Communications. 	Look at presentations from Science conference. Could include NCEI and Copernicus.	Secretariat for consideration by SC

WMO can help with internal communications support but it would be good to have someone from outside as well.

9. Partners View on how GCOS should engage with them:

9.1 *How can GCOS Better service WMO Members? (Views from WMO Programmes, and Technical Commissions)*

Dr Jochen Dibbern (CBS) and Dr Thomas C. Peterson (CCI) made short presentations. GCOS should be represented in CBS and other WMO commissions such as CCI and CHy. However many ECVs are not measured by NHMSs.

GCOS should be clear about what it does for WMO Members. Some countries need basic observations: e.g. improving the precipitation network in Bahamas. Other ECVs are not needed locally, but are observed globally and feed into local forecasts and projections.

The beneficiaries of GCOS are not the NHMSs alone but governments more widely. It should be explained more clearly, that NHMSs services are not the only groups who use the products. NHMSs services may implement much of the observations but users are wider community.

GCOS needs to locally relevant but also suitable for climate. Meteorological services are under pressure, but are an essential part of the system just as ocean observations are essential. Climate observations have a higher standard than other meteorological observations to be useful. While it is easy to sell precipitation and sea level monitoring as an issue but carbon is seen as less important despite its potential large role in the carbon cycle. There is a tension between WMO seeing itself as the UN climate voice while much of the outside world see it as a collection of NHMSs. The UNFCCC would like a single source on UN climate data. While there is no single source that gives the final answers, WMO is starting to attempt this through its state of the climate reports.

Number	Action	Notes	Responsibility
SC-24/28	GCOS should cooperate with CBS on implementation of climate observing system.		Secretariat & Experts representing the Science Panels
SC-24/29	Check GCOS is represented where this is needed.		Secretariat

9.2 *What is needed to improve our partnership with GEO and GOOS? (views from GEO Secretariat and from IOC)*

Group on Earth Observations (GEO) Dr André Obregon presented the view of GEO regarding the partnership with GCOS. The new GCOS Implementation Plan provides an excellent basis for future collaboration. GEO welcomes the plan and recognizes that GCOS has been very responsive to the comments from the GEO Secretariat and the GEO community at large. The new plan outlines several concrete collaboration areas; 15 action items list GEO as an agent for implementation. To further improve the partnership it is proposed to focus on tangible areas of mutual benefit. The most immediate collaboration areas are as follows:

1. Improvement of coordination in the terrestrial domain (refer to chapter 7.4). In addition, the GEO Work Programme includes a Foundational Task on the coordination of in-situ observations that can be capitalized on;

2. Synergies with MEAs and SDGs. The new plan acknowledges the role of GEO in these processes. GEO has a dedicated Initiative on the SDGs, partnering with the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM). GEO is also an anchor partner in the Global Partnership for Sustainable Development Data (GPSDD);
3. Maintain and improve coordination with GEO Initiatives/Flagships (such as GEO Carbon, GFOI, Blue Planet). The GCOS Panels and GEO communities need to be better linked together. It should be discussed what needs to be done to improve coordination;
4. Data access and discoverability. GCOS and GEO have complementary mandates. GEO invites GCOS to work together towards a community portal to ensure access to ECV datasets;
5. Identification of user needs across GEO's Societal Benefit Areas;
6. GCOS can also benefit from GEO's convening power. GEO can raise awareness about GCOS at Minister level. GEO-XIII Plenary is also a good opportunity for GCOS to get additional visibility.

Number	Action	Notes	Responsibility
SC-24/30	Determine how best to present GCOS at the GEO plenary in St Petersburg, Nov 2016.		Secretariat
SC-24/31	Ensure GCOS contributes to GEO in situ observation foundational task.		Secretariat

Albert Fischer noted that the best approach is to use existing GOOS structures to deliver to GCOS. Clear future planning is needed to organize this, and, as noted above, he will present the new GOOS strategy at the next Steering Committee.

9.3 What can be done about the missing "GTOS"? (Views from GEO, ICSU, and from UNEP)

Discussed above.

9.4 How should GCOS and WCRP partner to better support and effectively contribute to GFCS? (views from GFCS, R. Pulwarty on CSIS)

Roger Pulwarty presented on behalf of GFCS. He discussed the Climate Services Information System (CSIS) one of the 5 pillars of GFCS:

- **User Interface Platform:** Users can make their voices heard through the Platform and make sure climate services are relevant to their needs;
- **Climate Services Information System (CSIS):** The production and distribution system for climate data and information products that address user needs. The CSIS mechanism will archive, model, analyse and dissemination information;
- **Observations and Monitoring:** The essential infrastructure for generating the necessary climate data;
- **Research, Modelling and Prediction:** To advance the science needed for improved climate services that meet user needs;
- **Capacity Development** will support the systematic development of the institutions, infrastructure and human resources needed for effective climate services.

GFCS's Operational and Resource Plan 2015–2018 (ORP) is now being finalized. GFCS national CSSI and GCOS national coordinators need to be stronger linked. The amounts of money in the ORP are leveraging amounts: there needs buy-in from governments and private sector.

This cannot fund everything so there needs to be good communications to demonstrate benefits of connections between global efforts and regional and national efforts. This will not ensure that fragile systems are maintained but actions aim to highlight the importance of observations.

There will be an exemplar on seasonal forecasting linked to tropical ocean observations.

When dealing with users ranging from government to people you can never satisfy everyone so you need to develop something that is useful and provides a benefit – not perfect but useful.

The Steering Committee also noted that the landscape of tools, e.g., modelling, is changing. Climate models are moving to 25km resolutions and weather models to 10km: how does this relate to observational needs should be investigated. Decadal studies are a useful driver for observations. As groups sell climate projections there may be a role for WCRP in setting guidelines and standards and best practices on them. It is not clear who should ensure quality standards for climate services.

9.5 Should we strengthen our engagement with Future Earth? How to liaise better with PROVIA? (views from WCRP, WMO, UNEP, ICSU and IOC)

Manuel Limonta (ICSU) spoke on behalf of Future Earth. He noted that it is a programme aiming at promoting the stability of the planet. Engaging with Future Earth can be done through knowledge action networks. He would encourage dialogue between the secretariats.

The Steering Committee noted that WCRP is full partner of Future Earth. At present there is no clear way forward with core projects and knowledge action networks. The Steering Committee decided that while GCOS should stay connected, through WCRP if needed, it should maintain a watching brief and be ready to participate when the status of observations in the planning process is clearer.

10. Budget and Resources and Fundraising Strategies (C. Richter)

Carolin Richter introduced the GCOS Budget (Doc. 10). Currently spending is greater than income and the difference is funded by carry over from previous years. GCOS is underfunded and raising funds is an issue.

The Steering Committee agreed the new Implementation Plan should be translated into all 6 UN languages – if funds are not available only translate part 1.

The Steering Committee accepted the budget document and plans present therein.

11. Summary of actions and decisions which had been made (S. Briggs/C. Richter)

The Steering Committee accepted the report from last year and asked the GCOS Secretariat to follow-up on the actions which are still open.

Simon Eggleston presented the list of draft actions of this Steering Committee and achieved a first agreement on the set of required activities from the SC-24.

The GCOS Steering Committee Chairman asked that at the next session, only issues for the Steering Committee arising from panel meetings should be discussed, as the panel reports themselves can be studied in advance of the Steering Committee.

12. Decisions on next meeting: (Date and Place)

The Steering Committee and the staff of the GCOS Secretariat thanked very much the local organising team led by Rodney Martinez Güingla for all the arrangements.

China offered to host next meeting on 25–29 September in Hangzhou, China.

13. General Steering Committee Membership and Related Issues – In Camera Session

At the in camera session, only Steering Committee Members, the GCOS Panel Chairpersons in their capacity as ex-officio member, the sponsors representatives, and the GCOS Secretariat were allowed remained in the room. The closed meeting discussed:

- **Steering Committee Membership**

14. Any other business

14.1 GCOS Strategy

The Steering Committee agreed that the development of the GCOS Strategy, as requested by the GCOS programme review; is now urgent. The current strategy was produced in 1995 but this needs to be updated and shortened. The revision should be delivered Q1 2017 and should:

- Describe the value of GCOS;
- Consider the alignment with GFCS and other partners;
- Enable communications with sponsors;
- Look 10 years ahead with a long-term vision.

The GCOS direct will lead this effort assisted by 2–3 SC members. The work plan for secretariat is agreed by the SC annual. Each panel will develop its own work plan as described above.

Number	Action	Notes	Responsibility
SC-24/32	Development of a new GCOS Strategy.	Delivered by Q1 2017.	Secretariat; SC Chairman

14.2 Joint CEOS/CGMS Working Group on Climate

There was a Joint CEOS/CGMS Working Group on Climate presentation prepared by Robert Husband that was presented by Ken Holmlund.

Departing Steering Committee Members:

The Steering Committee thanked greatly Roger Pulwarty, Ed Harrison and Juliet Hermes as they are ending their terms on the Steering Committee.

15. Close of the Session

The 24th Session of the GCOS Steering Committee was closed at 16:00 hrs, on Thursday 6 October 2016.

Table 1 Closed (green) and open (red) actions arising from the past Steering Committee session SC-23 in 2015:

Number	Action	Responsibility	Status	Note
SC-23/1	The Director of the Secretariat to make a proposal for a future communication strategy.	D/GCOS	Done	in draft implementation plan
SC-23/2	Establish a contact with the African Development Bank to discuss about funding possibilities.	D/GCOS	Done	Further contact to explore this further
SC-23/3	GCOS to endorse the outcome document of the Conference and inform ICSU about activities at UNFCCC COP 21.	D/GCOS	Done	
SC-23/4	Provide ICSU a progress report from GCOS until 30 October 2015.	D/GCOS	Done	
SC-23/5	Provide ICSU with the draft MoU from GCOS, preferably by 10 October, but not later than 30 October 2015, for consideration by CSPR.	D/GCOS	Done	
SC-23/6	Engage with the ICSU Office to issue a call for potential new candidates of GCOS SC to its members and associated organizations, if needed.	D/GCOS		Not needed
SC-23/7	Consider joint UNFCCC/GCOS/ ICSU/WCRP regional workshops/regional programmes. Aim to better coordinate regional activities, link with focal points. Ensure follow-up process.	UNFCCC (F. Vladu), GCOS Secretariat, WCRP (D. Carlson), ICSU Secretariat (L. Spini)		Included implementation plan and planning proceeded
SC-23/8	Sponsors to approve and sign the new GCOS MoU as soon as possible. If it cannot be done this year, before the new WMO SG starts, it may have to wait until the next WMO EC in June 2016.	ICSU, IOC, UNEP, WMO		Awaiting sponsors

Number	Action	Responsibility	Status	Note
SC-23/9	The cover notes for the documents to be provided to SBSTA should contain more tailored information for the SBSTA audience. GCOS will forward to SBSTA the Workshop Report, Status Report, and outline Implementation Plan. In addition WMO will report on GCFS. GCOS is also invited to give a statement at the SBSTA Plenary.	GCOS Secretariat. F. Vladu	Done	
SC-23/10	Prepare short briefing/press release about Status Report. Include successes and highlight increased risk in most vulnerable areas due to lack of observations.	GCOS Secretariat	Done	
SC-23/11	Provide input to brochure on Status Report on Status Report on El Nino and ARGO system.	T. Suga, R. Martinez	Done	
SC-23/12	Prepare first draft of 4 page brochure on Status Report.	GCOS Secretariat	Done	
SC-23/13	Review and contribute to new brochure on Status Report.	Steering Committee	Done	
SC-23/14	Collaborate with the WMO OSCAR and communicate that this database is taking into account the ECVs subcategories.	GCOS Secretariat	Done	
SC-23/15	Prepare writing team for new GCOS Implementation Plan teleconference in October.	Mark Dowell	Done	
SC-23/16	Panels to check chapter, structure and ECVs, and identify supporting measurements for new GCOS Implementation Plan.	Panel Chairs	Done	
SC-23/18	Prepare drafts and final document of new GCOS Implementation Plan. Timeline presented above.	Writing Team	Done	
SC-23/19	Raise issue of Satellite Supplement at CEOS meeting in Kyoto, November 2015.	GCOS Director	Done	
SC-23/20	Panels to consider and review the draft new GCOS Implementation Plan at their meetings in 2016.	AOPC, OOPC and TOPC	Done	
SC-23/21	Provide additional names for the writing team for the new GCOS Implementation Plan to Mark Dowell. <i>Within one week of SC-23.</i>	Steering Committee	Done	

Number	Action	Responsibility	Status	Note
SC-23/22	<p>At upcoming teleconference on Science Conference on 5 October discuss and decide:</p> <ul style="list-style-type: none"> • Who will be responsible for the travel managements; • Who will make a decision whose travel will be eventually supported (invited speakers, young career scientists); • Who supports and organizes a guided tour through the Rembrandt-Museum as an alternative to the ice breaker. <p>Also prepare detailed guidance on the submission of abstracts.</p> <p>It was also recommended to find an approach how to engage explicitly the middle-aged / sandwich generation? Han Dolman proposed that a small planning group should meet end of December / early January (GCOS Sec / Panel chairs) to decide on speakers for talks, and sessions.</p>	The Organising Committee	Done	
SC-23/23	Find name of Asian speaker on plateau areas for Science Conference.	Q. Chao	Done	
SC-23/24	Informally ask proposed speakers for Science Conference if they are prepared to attend, before a formal invitation from Han Dolman. <i>Within one week.</i>	D/GCOS to send list and reminder	Done	
SC-23/25	Identify someone from EUMETSAT to report on the outcomes of their 2014 Darmstadt conference and identify where this fits in the agenda of the Science Conference. It was suggested to ask DG Alain Ratier if he were available to introduce this topic.	H. Dolman, R. Husband	Done	
SC-23/26	Need to think now about how GCOS could be useful in monitoring fluxes of GHGs.	Steering Committee members	Done	see implementation plan
SC-23/27	GCOS statement to SBSTA should include the possibilities of monitoring greenhouse gases leading to validation of national emission reports. Include the possibilities of monitoring greenhouse gases in GCOS statement, suggesting that GCOS would provide the requirements of	Steering Committee Chair, D/GCOS	Done	

Number	Action	Responsibility	Status	Note
	observations leading to validation of emission estimates.			
SC-23/28	Further discussion on needs for observations for regional needs should be looked into and the WCRP Panel for Regional Climate (chaired by Bruce Hewitson) should be engaged.	D/GCOS, in coordination with WCRP Director	Done	Implementation Plan and series of workshops planned
SC-23/29	Prepare a note on the status of "GCOS networks" – baseline, reference and comprehensive. To be discussed at future panel meetings and the next Steering Committee. Reference can be made to the Network meeting in April 2014, in Ispra.	GCOS Secretariat, in particular GCOS Network Manager	Postponed until Implementation Plan finalized	To be led by AOPC
SC-23/30	AOPC to interact with WMO Commission on Climatology OPACE-1 on its development of guidance on the development of a climate network in Europe. <i>WMO Region VI has asked for this guidance.</i>	AOPC, GCOS Network manager	Done	
SC-23/31	Produce document on different regional groupings in WMO, IOC etc. for next Steering Committee.	GCOS Secretariat	Done	
SC-23/32	At the next TOPC panel session in 2016, discuss new developments, end the reporting cycles. keep close connection to the WCRP. Add a modelling expert to the panel.	TOPC Chair & GCOS Secretariat	Done	membership under review
SC-23/33	Agree on the recommendations for changes for Terrestrial Observations for the next implementation plan.	TOPC Chair and GCOS Secretariat, IP Authors	Done	
SC-23/34	All panels should review the table which relates ECVs and to Energy Cycle, (as pressure will need to be linked).	all Panel Chairs	Done	
SC-23/35	TOPC experts as well as other GCOS panels to take part in the Adaptation Future Conference, 10-13 May 2016, Rotterdam, The Netherlands. Adaptation Futures is the biennial conference of the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA).	GCOS Secretariat, GCOS Panel Chairs	Done	

Number	Action	Responsibility	Status	Note
SC-23/36	GRUAN will need WMO network recognition.	D/GCOS, D/OBS and GCOS Network Manager	Done	GRUAN network information being included in WIGOS and OSCAR
SC-23/37	Align outcome of the CEOS response to the 2010 GCOS Implementation Plan with the Status Report from 2015.	Lead, Status Report	Done	
SC-23/38	The feasibility and production of climate indicators should be considered by the panels at their March 2016 meetings, as part of the new GCOS Implementation Plan and as part of the Communications Plan. <i>Call in a small expert meeting to decide how to proceed. And instigate panel discussion in April 2016.</i>	D/GCOS, Panel CO-chairs, A. Belward, M. Dowell	Done	
SC-23/39	Write to Linda Makuleni, emphasising that one of the high-lights for implementation is actually the national GCOS Science day and suggest to make it part of the NFCS planning.	D/GCOS	Done	

Appendix 1 Participant List

Members of the GCOS Steering Committee:	
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Appendix 2 Final Agenda

Time	Agenda Item	Description
Tuesday 4 October 2016		
PART 1: Strategy, Review and Plans		
9.00 – 9.30	1.	<p>Opening of the Session</p> <ul style="list-style-type: none"> • Welcome (S. Briggs) • Welcome of the host (R. Martinez) • Tour de Table • Approval of Agenda <p>Doc. 1: Draft Agenda V1</p> <ul style="list-style-type: none"> • Arrangements for the Session (R. Martinez, C. Richter)
9.30 – 10.00	2.	<p>Chairman's Introduction and View (S. Briggs)</p> <ul style="list-style-type: none"> ▪ Expectations from this meeting
10.00 – 11.00	3.	<p>Sponsors Views on their expectations with regard to the future of GCOS programme:</p> <ul style="list-style-type: none"> • WMO (J. Cullmann) • IOC of UNESCO (A. Fischer) • ICSU (M. Limonta) • UNEP (TBD) <p>Doc. 3a: GCOS MOU signed 1998</p> <p>Doc. 3b: GCOS Review MoU 2015 final</p> <p>Doc. 3c: GCOS Review MoU 2015 - with tracked</p>
11.00 – 12.00	4.	<p>Director's Introduction (C. Richter)</p> <ul style="list-style-type: none"> • Report on major activities since last meeting <p>Doc. 4: Directors Report</p> <p>Doc. 4a: GCOS Road Map 2016-2017</p> <ul style="list-style-type: none"> • GCOS Science Conference (H. Dolman) <p>Doc. 4b: Dolman_et_al-2016-Nature_Geoscience</p>

12.00 – 12.30	5.	<p>GCOS Implementation Plan (A. Belward)</p> <ul style="list-style-type: none"> • Introduction from the Lead, Implementation Plan <p>Link to Draft Document (version includes comments from the Public Review)</p> <p>Link to Excel Sheet which contains all comments from Public Review</p>
LUNCH BREAK		
<p>14.00 – 17.30</p> <p>This block includes a 15 minutes coffee break</p>	5. continued	<p>GCOS Implementation Plan (A. Belward)</p> <p>The new plan will guide on requirements for climate observations for the next decade. It will be used by space agencies, network operators and hopefully by decision makers on climate policy.</p> <ul style="list-style-type: none"> ▪ The members of the Steering Committee will need to approve the draft document.
Wednesday 05 October 2016		
PART 2: Scientific / Technical Discussion with Partners and Expert Panels		
9.00 – 10.00	6.	<p>UNFCCC COP 22, SBSTA45 (F. Vladu)</p> <p>Key points:</p> <ul style="list-style-type: none"> • GCOS at the SBSTA44 research dialogue (May 2016), informal meeting with Exec Sec <p>Doc. 6b: SBSTA44 RD8 GCOS talk</p> <p>Doc. 6c: Poster RD8 GCOS Paris Agreement</p> <p>Doc. 6d: Briefing notes UNFCCC April 2016</p> <p>Doc. 6e: Agenda v3 Informal Strategic Planning Meeting</p> <ul style="list-style-type: none"> • Earth Science Day – 8 November 2016 Doc. 6a: Rational for EarthInfo Day 01.09.16-1 • How can we promote better the GCOS Cooperation Mechanism? • Statement to SBSTA45 (November 2016) <p>Doc. 6f: SBSTA 43 GCOS Statement to Plenary, Dec 15</p>

		<p>Doc. 6g: GCOS Statement SBSTA44</p> <ul style="list-style-type: none"> • Discuss launch of Implementation Plan at the EarthInfo Day • How GCOS can Contribute to the implementation of the Paris Agreement? • How can we better promote the GCOS Cooperation Mechanism and regional activities?
<p>10.00 – 12.30</p> <p>This block includes a 15 minutes coffee break</p>	7.	<p>Discussion on future activities and engagements:</p> <ul style="list-style-type: none"> • Feedback from the GCOS Science Day <p>Panel leaders should discuss with the steering committee how the future work plans of the panels should look like:</p> <ul style="list-style-type: none"> • Atmospheric Observation Panel for Climate (K. Holmlund) • Ocean Observations Panel for Climate (B. Sloyan) • Terrestrial Observation Panel for Climate (S. Eggleston, on behalf of TOPC Chairman) <p>The panel leaders should be able to address the following questions:</p> <ul style="list-style-type: none"> ▪ Should we plan for cross Panel activities, e.g., with regard to coastal areas? (back-to-back meetings, attendance of experts at panel meetings.) ▪ Discuss how panels could contribute to Regional Implementation plans (time line; needed workshops.) ▪ Do we need special expert workshops on ECV products (e.g., on cross-validation) or on the identification of climate indicators? ▪ Should we continue to address in more details the needs of adaptation, perhaps in organizing another workshop with adaptation experts to better understand their needs.
LUNCH BREAK		
<p>14.00 – 17.30</p> <p>This block includes a 15 minutes coffee break</p>	8.	<p>Discussion about needed expertise for Steering Committee members: service cycle for members; suggestion of new members.</p> <ul style="list-style-type: none"> - Current selection mechanisms and regulations for Steering Committee and panel members (Intro by D/GCOS).

Thursday 6 October 2016		
9.00 – 12.30 This block includes a 15 minutes coffee break	9.	<p>Cooperation with Partners</p> <p>How can GCOS better service WMO Members? (Views from: WMO Programmes, and Technical Commissions: CBS/WIGOS, CCL)</p> <p>What is needed to improve our partnership with GEO and GOOS? (views from GEO Secretariat and from IOC)</p> <p>What can be done about the missing "GTOS"? (Views from GEO, ICSU, and from UNEP)</p> <p>How should GCOS and WCRP partner to better support and effectively contribute to GFCS? (view from GFCS, R. Pulwarty on CSIS)</p> <p>Should we strengthen our engagement with Future Earth? How to liaise better with PROVIA? (views from WCRP, WMO, UNEP, ICSU and IOC)</p>
LUNCH BREAK		
PART 3: Governance, Budget, in-Camera		
14.00 – 17.30	10.	<p>Budget (C. Richter)</p> <ul style="list-style-type: none"> • Presentation of draft budget document "Summary for 2016 and Outlook 2017/2018". Doc. 10 Budget Document 25 Aug 2016 - Copy • List of meetings / events in 2016/2017 (Reference is made to Doc. 4 Director's Report)
	11.	Summary of actions and decisions which had been made (S. Briggs / C. Richter)
	12.	Decisions on next meeting (Date and Place)
	13.	General Steering Committee Membership and Related Issues (<i>In-Camera</i>)
Close of the Session		

Friday 7 October 2017:

Excursion to the National Parque El Cajas, a RAMSAR Wetland.

Appendix 3 Consolidated List of Actions

Number	Action	Notes	Responsibility
SC-24/1	Present GOOS Strategy to next GCOS SC (SC-25).		Albert FISCHER
SC-24/2	GCOS Secretariat work plan based (Doc. 4).	Plan to be developed in 2016.	D/GCOS
SC-24/3	Develop plan for new science conference. Circulate to SC for discussion.	Plan to be developed for possibly 2–3 day meeting in spring 2019.	D/GCOS
SC-24/4	Submit the new Implementation Plan to UNFCCC by 10 October.		Secretariat
SC-24/5	Produce plan on how to implement these expert teams: <ul style="list-style-type: none"> • Expert Team: Climate Indicators; • Expert Team: Adaption – review way forward; • Expert Team: ECV product requirements; • Workshop: Coastal Zones; • Expert Team: Cross validation of ECV (TOPC to ensure consistency of satellite products). 	Ensure this is done efficiently. May hold meeting in association with other meetings, teleconferences where practical.	Secretariat
SC-24/6	Task team to design regional workshops: Revise regional workshop plan and discover sources of funding. Work with other organizations in value chain: UN, but also regional bodies.		Secretariat
SC-24/7	Ensure communicating the plan is appropriate to audience and motivates groups to implement the plan.		Secretariat
SC-24/8	Identify places where GCOS can be discussed during COP 22 e.g. Water Event, Ocean day, Forest Day, Space Agency Day, etc.		All to provide to Secretariat
SC-24/9	Produce a few slides that can be used by anybody in a range of situations on the new Implementation Plan and GCOS.	Talk about benefits, us of GCOS.	Secretariat
SC-24/10	Raise awareness with national delegations and try to have GCOS included in national statements.		All

Number	Action	Notes	Responsibility
SC-24/11	Prepare presentations and posters on new Implementation Plan and its implementation.		Secretariat
SC-24/12	Ensure GCOS has effective speaker(s).	Could have two speakers.	SC and Secretariat
SC-24/13	Coordinate input to the Earth Info day agenda how to present new Implementation Plan at COP 22: presentations, posters, brochures, etc.	Highlight benefits of GCOS and systematic observations. Describe need of regional activities and links to funding.	Florin. GCOS Secretariat, SC
SC-24/14	Draft Statement to SBSTA 45 and agree with SC Chair in consultation with Florin.		D/GCOS
SC-24/15	Try to connect with UNFCCC negotiators to enable them to support discussions on new Implementation Plan.		SC Members
SC-24/16	Design and implement a work plan for AOPC as outlined in the AOPC presentation.		AOPC Chair
SC-24/17	Design and implement a work plan for OOPC including the topics outlined in the OOPC presentation.		OOPC Chair
SC-24/18	GCOS should find an alternative coordination mechanism to GTOS. GEO to convene a short workshop to discuss and find an alternative to GTOS.	Consider options and agree an way forward that can be presented to sponsors.	GEO Secretariat TOPC Chair
SC-24/19	Design and implement a work plan for TOPC including the elements outlined in the TOPC presentation.		TOPC Chair
SC-24/20	Consider mechanism to communicate between panels, promote a common approach and definitions.		Secretariat Panel Chairs
SC-24/21	AOPC and TOPC to follow the recommendations for additional expertise in the upcoming panel meeting.	AOPC to invite GAW SC Chairman; TOPC to invite an experts for forest, and for IPCC Guidelines, fluxes.	Secretariat Panel Chairs

Number	Action	Notes	Responsibility
SC-24/22	Establish a hybrid process of open nominations and identifying people to be SC members and Panels. Under take process and have nominations ready early 2017. Preselect nominations for consideration by SC Chair and Sponsors.	Process should be open and transparent. Decide where call should be made.	Secretariat
SC-24/23	Inform secretariat where call for nominations for SC and panels should be posted, and identify potential new SC and panels members.		SC Members
SC-24/24	Select and appoint new members.		Sponsors
SC-24/25	Produce a plan for cycling members as they come to the end of their time on SC.		Secretariat
SC-24/26	Make a proposal for workshop back-to-back with SC to inform SC on important issue.	e.g. a workshop on climate communications.	Secretariat
SC-24/27	Make proposal on potential experts (for long term participation) who could help on areas such as: <ul style="list-style-type: none"> • Improve synergies with other MEAs • Regional implementation • Communications. 	Look at presentations from Science conference Could include NCEI and Copernicus.	Secretariat for consideration by SC
SC-24/28	GCOS should cooperate with CBS on implementation of climate observing system.		Secretariat and Experts representing the Science Panels
SC-24/29	Check GCOS is represented where this is needed.		Secretariat
SC-24/30	Determine how best to present GCOS at the GEO plenary in St Petersburg, Nov 2016.		Secretariat
SC-24/31	Ensure GCOS contributes to GEO in situ observation foundational task.		Secretariat
SC-24/32	Development of a new GCOS Strategy.	Delivered by Q1 2017.	Secretariat; SC Chairman

Appendix 4 List of Acronyms and Abbreviations

Atmospheric Observation Panel for Climate	AOPC
Baseline Surface Radiation Network	BSRN
Committee on Earth Observation Satellites	CEOS
Committee on Strategic Planning and Review	CSPR
Commission for Agricultural Meteorology	CAGM
Commission for Basic Systems	CBS
Commission for Climatology	CCI
Commission for Hydrology	CHy
International Research Centre on El Niño	CIIFEN
Commission for Instruments and Methods of Observation	CIMO
Commonwealth Scientific and Industrial Research Organization	CSIRO
Convention on Biological Diversity	CBD
Conference of Parties	COP
Convention on Biological Diversity	CBD
Coordination Group for Meteorological Satellites	CGMS
Earth Observation	EO
Essential Climate Variable	ECV
Essential Ocean Variable	EOV
European Space Agency	ESA
Expert Team on Satellite Systems	ETSAT
Fifth Assessment Report	AR5
GCOS Climate Observing System Fund	COSF
GCOS Cooperation Fund	GCF
GCOS Cooperation Mechanism	GCM
GCOS Steering Committee	SC
GCOS Surface Network	GSN
GCOS Upper-Air Network	GUAN
Global Climate Observing System	GCOS
Global Earth Observation System of Systems	GEOSS
Global Framework for Climate Services	GFCs
Global Observation of Forest Cover and Land Dynamics	GOFC-GOLD

Global Ocean Observing System	GOOS
GOOS Regional Alliances	GRAs
Group on Earth Observations	GEO
Implementation Plan	IP
Intended Nationally Determined Contributions	INDCs
Intergovernmental Board on Climate Services	IBCS
Intergovernmental Panel on Climate Change	IPCC
Intergovernmental Oceanographic Commission	IOC
International Council for Science	ICSU
International Geosphere-Biosphere Programme	IGBP
International Ocean Data Exchange	IODE
Joint Commission on Oceanography and Marine Meteorology	JCOMM
Land Surface Temperature	LST
Leaf Area Index	LAI
Least Developed Countries	LDCs
Memorandum of Understanding	MOU
National Centre for Atmospheric Research	NCAR
National Ecological Observatory Network	NEON
National Framework for Climate Services	NFCS
Observing and System Information Department	OBS
Observations for Climate Model Intercomparisons	OBS4MIPS
Ocean Observations Panel for Climate	OOPC
Open Panel of CCI Experts	OPACE
Polar Space Task Group	PSTG
Programme of Research on Climate Change Vulnerability, Impacts and Adaptation	PROVIA
Sea Surface Temperature	SST
Small Island Developing States	SIDS
Societal Benefit Area	SBA
South African National Space Agency	SANSA
Subsidiary Body for Implementation	SBI
Subsidiary Body on Scientific and Technological Advice	SBSTA
Sustainable Development Goals	SDG

Surface Ocean CO2 Atlas	SOCAT
Terrestrial Observation Panel for Climate	TOPC
Terms of Reference	TOR
Tropical Pacific Observing System	TPOS
United Nations	UN
United Nations Convention to Combat Desertification	UNCCD
United Nations Educational, Scientific and Cultural Organization	UNESCO
United Nations Environment Programme	UNEP
United Nations Framework Convention on Climate Change	UNFCCC
Working Group	WG
World Climate Programme	WCP
World Climate Research Programme	WCRP
WCRP Data Advisory Council	WDAC
World Meteorological Organization	WMO
WMO Integrated Observing System	WIGOS
WMO Regional Association	RA

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