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

**Simon's Town, South Africa,
29 September-1st October 2015**

GCOS-196

UNITED NATIONS
ENVIRONMENT
PROGRAMME

INTERNATIONAL COUNCIL
FOR SCIENCE

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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 Simon's Town, South Africa. The participants (Appendix 1) introduced themselves.

The agenda was approved. It was agreed that the carbon cycle and flux paper would be addressed under agenda item 10, which will discuss climate indicators and discussions on WMO Resolution 60, which was decided at the 17th Session of the WMO Congress, and data sharing issues, would be addressed under the report from the WMO Technical Commission for Climatology.

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

In addition to the general business, including reports from panels and sponsors, there were three major items: the approval of the new Status Report, discussion and agreement of plans for the next Implementation Plan and for the GCOS Science Conference. A report reviewing the status and adequacy of the observing system is produced about every 6 years followed by an implementation plans which builds on it, addressing any gaps and issues that the status report identifies. Alan Belward, supported by Mark Dowell, will lead the development of the *Implementation Plan for the Global Observing System for Climate* to be finished in 2016 and submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in December of that year. The 3rd major item was the GCOS Science Conference which will discuss the new GCOS Implementation Plan with the broader community. Other items that needed to be discussed included the important UNFCCC COP 21 in Paris coming at the end of the year 2015, where the Steering Committee members and experts will need to think about the consequences for the GCOS programme. One issue participants would need to consider during all these items **are there observations that will be needed in addition to the existing list of Essential Climate Variables?**

GCOS has done a good job in defining observations for scientific understanding but, over the last two years, there is a broader range of users that GCOS has started taking into account. GCOS has to decide what is the nature and scope of the observations that GCOS is responsible for. For example, the GCOS Workshop on Enhancing Observations to Support Preparedness and Adaptation in a Changing Climate – Learning from the IPCC 5th Assessment Report and its outcome should be part of this discussion. These broader uses encompass adaptation and vulnerability planning. In particular, GCOS needs to decide how best to relate to the needs for the evolving Global Framework for Climate Services (GFCS).

Finally, the issue of climate indicators needed to be discussed to enable GCOS to better communicate with the public and policy makers. GCOS should move beyond treating surface temperature (which represents a small part of the climate thermodynamic system and is difficult to measure as a global mean) as a single indicator and move towards a basket of measurements that better reflect climate change such as ocean heat content (or global), sea level rise and ocean acidity. However, the Steering Committee did note that surface temperature is important, particularly as the UNFCCC structured dialogue had agreed that while temperature was not the perfect indicator it was better for policy development to use a temperature limit and link this to actions. Based on the

Intergovernmental Panel on Climate Change (IPCC) assessments an emission limit can be derived from a temperature limit.

Other issues that were raised included:

- High mountains are a priority with WMO what can GCOS to improve monitoring?
- Governance: how can GCOS work better with WMO Technical Commissions? Connections are often through science panels rather than steering committee;
- Local climate observations are increasingly important and link to adaptation issues. Regional issues are also important and receiving more attention in other forums;
- Risk depends on exposure and vulnerability so there needs to be a connection with social science to include these factors. GCOS may need to ensure suitable data is available;
- GCOS has set up a fairly established assessment cycle, which is recognized, in particular, by the space agencies. The value of this robust process should not be underestimated.

It was agreed that the GCOS communications should be improved. The accomplishments of GCOS and its work plan should be emphasized. GCOS will need to work closer with the climate services; take seriously into account the regional perspective; and also to integrate with other programmes and initiatives. This is important for visibility at climate policy level and thus for fundraising.

RECOMMENDATION: To improve the communication on GCOS accomplishments.

Number	Action	Notes	Responsibility
XXIII/1	The Director of the Secretariat to make a proposal for a future communication strategy.		D/GCOS

3. Sponsors Views on the Development of GCOS

3.1 WMO (W. Zhang)

Earlier this year, the 17th WMO Congress (Cg-17) was held in Geneva, Switzerland. Many programmes noted their links to GCOS, which was specifically referred to in WMO Resolutions 15, 22, 35, 46 and 60. The GCOS review and other developments in the Earth Observations community including Future Earth, Global Programme of Research on Vulnerability, Impacts and Adaptation (PROVIA), Global Earth Observation System of Systems (GEOSS), Global Framework for Climate Services (GFCS), World Climate Research Programme (WCRP) and Intergovernmental Panel on Climate Change (IPCC) were noted and it was recognized that GCOS would evolve in response. The WMO Congress supported the development of the GCOS Status Report and new GCOS Implementation Plan. The GCOS Cooperation Mechanism was recognized for its support to developing countries. WMO encouraged its Members to strengthen their climate observations, to assist developing countries, to improve the long-term space based observational component of GCOS, to improve their links to the UNFCCC and to support the GCOS secretariat.

GCOS has a broad remit including application to national economic development; assessing impacts of and supporting adaptation to, climate vulnerability and change; detecting and attributing climate change; monitoring the climate system; and research to improve understanding, modelling and prediction of the climate system.

GCOS is starting to consider adaptation needs with three workshops over the last two years. It will be important to talk with the regional groupings in the UNFCCC. The African Group, Least Developed Countries (LDCs) and Small Island Developing States (SIDS) are producing an adaptation plan one of whose pillars is observations.

RECOMMENDATION: It was recommended to have a stronger link to the regional groupings within the UNFCCC. One example is the Climate for Development in Africa (ClimDev-Africa) Programme.

Number	Action	Notes	Responsibility
XXIII/2	Establish a contact with the African Development Bank to discuss about funding possibilities.		D/GCOS

3.2 ICSU (E. Madela-Mntla, ICSU Office for Africa)

ICSU thanked GCOS for participating in a side event at *Our Common Future under Climate Change* in July 2015 and will be planning future events.

Number	Action	Notes	Responsibility
XXIII/3	GCOS to endorse the outcome document of the Conference and inform ICSU about activities at UNFCCC COP21.		D/GCOS

The ICSU regional offices were highlighted – there is one in South Africa, one in Mexico and one in Malaysia and would like GCOS to interact with them. ICSU is working on disasters, global climate change and adaptation so has a range of experts who may be able to contribute to GCOS.

ICSU will soon start the process of the development of the next strategic plan (2018 -2023). The process to develop this will take at least a year. The Committee on Strategic Planning and Review (CSPR) will be discussing the process at its next meeting in October. ICSU will keep programmes informed accordingly.

ICSU has requested a progress report from GCOS for submission to CSPR.

Number	Action	Notes	Responsibility
XXIII/4	Provide ICSU a progress report from GCOS until 30 October 2015.		D/GCOS

ICSU stressed the importance of GCOS to other ICSU programmes e.g. Future Earth and science and policy process related to post-2015 development agenda and Sustainable Development Goals.

Concerning the budget and overall support to the GCOS programme, ICSU requires clarifications on the development and status of the new Memorandum of Understanding (MoU) – if there is a draft

MoU that GCOS wants to submit for review by ICSU, it should be sent to the Secretariat as soon as possible – possibly by 10 October (so it can be tabled at the CSPR). An understanding of the MoU will be important to define the role of sponsors also with respect to financial implications. At the moment ICSU does not provide regular contributions to GCOS.

Number	Action	Notes	Responsibility
XXIII/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
XXIII/6	Engage with the ICSU Office to issue a call for potential new candidates of GCOS SC to its members and associated organisations, if needed.		D/GCOS

The GCOS Review asked that GCOS re-start regional activities, workshops and regional implementation plans. GCOS does have coordinators and needs to re-vitalise the network. There are proposals from countries to support regional workshops but this is rather ad-hoc and needs to be planned and coordinated. There are several regional initiatives, e.g. WCRP or ICSU, that are not coordinated.

The Steering Committee agreed that regional workshops are important but recognized that the resources for the secretariat to arrange them are limited.

Number	Action	Notes	Responsibility
XXIII/7	Consider joint UNFCCC/GCOS/ICSU/WCRP regional workshops and 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)

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

The IOC is a small organization with 30 professional staff and core budget of \$5 million. The IOC Congress re-affirmed their support to GCOS decided to strengthen its support. The Global Ocean Observing System (GOOS), which has the same set of sponsors as GCOS, is based at the IOC.

It is important to communicate that GCOS is not just a WMO programme but has a much wider role including ocean and terrestrial monitoring systems. Essential Ocean Variables (EOVs) and their

specifications are being developed, as part of the GOOS Strategic Mapping Process – many are also ECVs, though requirements for these variables may vary for different applications. GOOS strategic planning and GCOS Implementation plan should draw on same ECV/EOV and their specifications.

The main partners with links to societal benefits are GFCS, GEO Blue Planet and the IPCC.

WMO should ensure GCOS's value is reflected in GFCS.

GOOS regional alliances do not all have the same focus – some are oceanic; others have a more coastal focus. Their grouping has a political component as well as a scientific one. There is a new attempt to produce a constituency to study the Arctic Ocean. While some is outside national jurisdictions it is accessible only through national jurisdictions. There is need for a focus on observations in this region.

The coordination between GCOS and GOOS can be described as follows:

- GCOS is the lead in reporting on climate observations;
- WMO leads on ensuring GCOS's (and GOOS's) value reflected in GFCS;
- Framework for Ocean Observing inspired by GCOS concept and cycles;
- The GOOS Strategic Mapping and GCOS Implementation Plan will draw on the same ocean ECV/EOV and observing network specification sheets;
- The OOPC is a focal point together with the GOOS project office in collecting information for GCOS purposes.

However, it was noted that there is a communications gap on the immediate relevance of GCOS to IOC Member States

4. Director's Introduction (C. Richter)

4.1 Report on major activities since last Steering Committee in 2014

The director presented her report contained in document GCOS-XXIII/4.1. 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.

At the last SC-XXII, the Steering Committee had criticised the terms of references of the proposed engagement committee which was contained in a draft of the GCOS review as its aim and differentiation for the Steering Committee was unclear. However, this proposal has now been dropped. The Terms of Reference have been amended and there is now a regular meeting of the sponsoring organizations on how they manage their contributions to GCOS.

The Steering Committee thanked the Director and the Secretariat staff for its work in the past years, and approved their planned meeting schedule.

4.2 Status on the update of the MoU

The WMO Congress and election of new Secretary-General has delayed the WMO approval of the new GCOS MoU. It is now being edited and a draft will be distributed to the sponsoring organization at the end of October 2015. **The Steering Committee agreed that it would be good to have the MoU signed by the sponsors as soon as possible.**

Number	Action	Notes	Responsibility
XXIII/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 Secretary-General starts, it may have to wait until the next WMO EC in June 2016.	D/GCOS

5. Status Report (A. Simmons)

Adrian Simmons, lead author, reported on the structure, methodology and production of the Status report and its review (Doc SC-XXIII/5.2, the draft Status Report [v4.0 24/09/2015] and the Compiled Responses and Actions [Rev2 24/09/2015]).

The Steering Committee discussed the Summary and Key Conclusions section of the Status Report in more detail and with a few changes to clarify the text, approved the report.

There will be an *Executive Summary*. The paragraph order of the *summary and key conclusions* will be changed to increase the visibility of the link to the 2010 Implementation plan.

The Steering Committee proposed emphasizing any unexpected outcomes, for example, the increase of methane, or that the number of types of space-based observations increased, new up-coming missions, and new data records that were being produced. It should be also mentioned that while reprocessing is successful, it will need sustained on-going effort and resources. The Steering Committee also suggested giving existing projects and large international programmes, such as National Ecological Observatory Network (NEON), more credit, especially in the light of the failure of reviving the GTOS programme.

The Steering Committee discussed how the GCOS programme could benefit from recommendations coming from the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA), and if there were areas where SBSTA could give advice or guidance to GCOS. The Steering Committee noted that the impact of gaps in observations is particularly serious for the regional information needed for adaptation planning in addition to its impact on the global record, and the conclusions will be revised to reflect this. The need for sustainable ways to fill observational gaps should be emphasised: many initiatives, particularly in Africa, are not sustainable. Lack of this observational information raises the risk of poor or incorrect forecasts of severe weather and projections climatic changes, and thus poor response and adaptation leading to increased risks to humans, property and the economy.

Number	Action	Notes	Responsibility
XXIII/9	The cover notes for the documents to be provided to SBSTA should contain more	GCOS will forward to SBSTA the Workshop Report, Status Report, and outline Implementation Plan. In	GCOS Secretariat.

	tailored information for the SBSTA audience.	addition WMO will report on GFCS. GCOS is also invited to give a statement at the SBSTA Plenary.	F. Vladu
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The Steering Committee expressed their thanks and appreciation to the authors for their efforts in producing this comprehensive, high-quality report. **The Steering Committee profoundly thanked in particular Adrian Simmons for leading this process and for his dedication to submit this excellent document.**

There is an opportunity to identify key conclusions as part of communications around this report: this should form part of the GCOS communication plan. A short press release and briefing note could be prepared using the publicity and interest surrounding the UNFCCC COP21.

Number	Action	Notes	Responsibility
XXIII/10	Prepare short briefing and press release about Status Report.	Include successes and highlight increased risk in most vulnerable areas due to lack of observations	GCOS Secretariat

The Steering Committee agreed that a flyer, around the Status Report, should be produced for the UNFCCC COP21. It should:

- Be four pages long and show importance of observations;
- Focus on a few key conclusions;
- Show the link between ARGO floats and improved monitoring of ocean heat content;
- Consider El Niño as an example of the impact of observations on preparedness;
- Maybe include 4-5 good examples of impact of GCOS, maybe examples of adaptation and anisotropic sea level rise.

Number	Action	Notes	Responsibility
XXIII/11	Provide input to brochure on Status Report on El Nino and ARGO system.		T. Suga, R. Martinez
XXIII/12	Prepare first draft of 4 page brochure on Status Report.		GCOS Secretariat
XXIII/13	Review and contribute to new brochure on Status Report.	Final Version due before COP21	Steering Committee

6. GCOS Implementation Plan (M. Dowell)

The plans for the development of the new GCOS Implementation Plan and the writing team were presented by Mark Dowell (documents SCXXIII/6 and the Implementation Plan Outline) on behalf of Alan Belward.

The production of the Implementation Plan is just beginning. The overall message of the plan will be *continuity with progress*. While the primary purpose of GCOS, supporting the UNFCCC, remains, a broader scope is envisaged including global cycles (energy, carbon, water), contributions to other conventions and processes, (Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCCD) and Sustainable Development Goals (SDG)), adaptation and mitigation and climate services.

GCOS should increase its visibility in the different Rio conventions, and working through their expert groups will be a good way to start this cooperation. There are considerable overlaps in observational requirements between the different Rio Conventions and GCOS's existing plans. The SDG reporting requirements also apply to developed countries and the European Union has already identified GCOS as part of this process.

It was agreed that the new GCOS Implementation Plan will need an associated new Satellite Supplement. While this will be similar to the previous Satellite Supplement, reducing the effort required, any new ECVs will need to be addressed. However, the time gap between its production and that of the new GCOS Implementation Plan should be reduced: ideally they should be released simultaneously or as an annex to the new GCOS Implementation Plan. Some feedback from the space agencies on what they would like to see in the Satellite Supplement is needed. **It was agreed that an in situ supplement is also needed. It has the same importance as the satellite supplement but can be developed with less urgency.**

New topics in the new GCOS Implementation Plan should include cross-convention and SDG support; cycles; new requirements (MRV, emissions, adaptation & mitigation, indicators); services (The SBSTA Agenda Item on Research and Systematic Observations to include services); and possible any relevant outcomes arising from COP21.

It was agreed that the role of the three panels (AOPC, OOPC and TOPC) would be to:

- Confirm the structure for their section;
- Check for completeness of the ECV list;
- Review actions as a result of the status report and any reframing of ECVs;
- Advise on combinations of ECVs for climate system cycles, Rio Conventions, adaptation and mitigation and climate services;
- Identify any supporting observations;
- Provide nominations for writing team (this has been done).

A section in the new GCOS Implementation Plan is needed to show how the variables and cycles link across the three observational domains. Groups outside of GCOS are developing lists of Essential Variables (EOV, EBV, EV...) and there is a considerable overlap with GCOS ECV: while GCOS is aware of these developments, and may cooperate with them, GCOS needs to concentrate on its climate role. While the list of ECVs needs to be considered but there will not be any major changes, and maybe one or two new ECVs.

The Steering Committee noted that regional issues need to be covered.

SBSTA specifically asked for costs to be included in the previous implementation plan and it has proved useful to those implementing observations so **costs should be included in the new GCOS Implementation Plan.**

In considering the draft outline of the new GCOS Implementation Plan the Steering Committee noted that there will be a lot of new cross-cutting material to go into chapter 3. Chapter 3 could be split at section 3.8 on external needs and cross-disciplinary issues – the broader context; this could be a new chapter 3 with the current chapter 3.1 to 3.7 and 3.9 as a new separate chapter 4. The new chapter 3 would have sections on adaptation, mitigation, cross-convention needs and climate services. Supporting measurements would be covered in the scientific and technological challenges section in the new chapter 4. The revised chapter outline is presented in Appendix 8. Emerging ECVs (variables that are important, but for with the practicality of their global observations still needs to be demonstrated, limiting their immediate adoption as ECVs) should be discussed in sections on domains, or cycles, noting they are new and developing technologies that may become ECVs in the near future.

The distinction between surface and sub-surface (oceans) and surface and upper air (atmosphere) were discussed as they hide scientific issues around the definition of surface properties (for example, temperature is a continuous function of depth (in oceans) and height (in the atmosphere)). The Steering Committee noted that the split surface an upper air does reflect differences on monitoring and networks, however for some ocean variable a split between surface and sub-surface splits what is essentially a continuous measurement and present definitional issues. The Steering Committee also noted that changes should only be made if scientifically necessary.

The Steering Committee agreed that Terrestrial ECVs should be divided into cryosphere, hydrological and biological sub-groups as done informally in the past. Atmosphere ECVs will remain divided into surface, upper air and composition as in the previous implementation plan. Ocean ECVs will split into physical, biogeochemical and biological and each ECV can be sub-divided into interface and water column where necessary.

OOPC will agree the details for each ocean ECV and this should be done in a practical way that makes it relatively straightforward for the ECV requirements to be met.

Number	Action	Notes	Responsibility
XXIII/14	Collaborate with the WMO OSCAR and communicate that this database is taking into account the ECVs sub-categories.		GCOS Secretariat

The Steering Committee approved the writing team (Table 1), the proposed process for developing the document (Table 2) and the outline of the new GCOS Implementation Plan (Appendix 8).

Table 1 Implementation Plan Writing Team (additional people may be added to cover cycles and regional issues).

Name	Notes
Alan Belward	Lead
Mark Dowell	Lead
Roger Saunders	AOPC
Michel Verstraete	AOPC & TOPC
Bernadette Sloyan	OOPC (in-coming OOPC Chair)
Toste Tanhua	OOPC (Chair of GOOS Biogeochemistry and International Ocean Carbon Coordination Project)
Konrad Steffen	TOPC (TOPC Chair)
Shaun Quegan	TOPC (TOPC panel, Above-ground Biomass)
Han Dolman	Carbon Cycle
Stephen Briggs	Chair, Steering Committee
Support staff:	
Carolin Richter	GCOS Director
Simon Eggleston	GCOS Secretariat
Katherine Hill	GCOS Secretariat
Robert Husband	GCOS Space Rapporteur

The writing team will coordinate with and collect inputs from external experts on many issues.

Table 2 Time Line for new GCOS Implementation Plan

Date	Mile stone
29 September – 1 October 2015	Writing team, contents and process submitted to GCOS SC for approval. Draft domain specific templates prepared and agreed.
October 2015	First writing team teleconference. Roles and responsibilities agreed and detailed discussion of contents.
October 2015	IP outline delivered to SBSTA.
2-4 February 2016	First writing team meeting. Panels to provide inputs to writing team well before the meeting, writing team to produce annotated zero order draft for discussion at the meeting.
2-4 March 2016	GCOS Open science meeting.
April 2016	Bring work in progress to the panels' meetings.
24-26 May 2016	Second writing team meeting. Finalise first complete draft. Circulate to Steering Committee and Panels for discussion and comment.
July 2016	Draft submitted for public review. Review period of six weeks required.
August 2016	Public review closes.
September 2016	Final Version prepared in light of comments on the draft.
September 2016	Final Version submitted to GCOS SC September 2016.
October 2016	Submit final report to SBSTA at end of October.

Number	Action	Notes	Responsibility
XXIII/15	Prepare writing team for new GCOS Implementation Plan teleconference in October.		Mark Dowell
XXIII/16	Panels to check chapter, structure and ECVs, and identify supporting measurements for new GCOS Implementation Plan.	XXIII/17 discussed above	Panel Chairs
XXIII/18	Prepare drafts and final document of new GCOS Implementation Plan.	Timeline presented above	Writing Team
XXIII/19	Raise issue of Satellite Supplement at Committee on Earth Observation Satellites (CEOS) meeting in Kyoto, November 2015.		GCOS Director
XXIII/20	Panels to consider and review the draft new GCOS Implementation Plan at their meetings in 2016.		AOPC, OOPC and TOPC
XXIII/21	Provide additional names for the writing team for the new GCOS Implementation Plan to Mark Dowell.	Within one week of SC XXIII	Steering Committee

7. GCOS Science Conference (H. Dolman)

Han Dolman presented the arrangements and planning for the GCOS Science Conference, March 2016, Amsterdam, (documents SC-XXIII/7 and the First Announcement of the GCOS Science Conference).

There is a small organising group looking after the logistics and a larger science group responsible for the content of the programme.

The broad audience consists of both those who produce observations and those use them.

The Steering Committee agreed that there should be Invited Speakers who will be contacted first informally before consolidating the programme.

The Steering Committee agreed that the session chairs can be decided later, closer to the time of the meeting.

The meeting plan was approved with two changes: the initial introduction was dropped and a talk on the new GCOS Implementation Plan added to the first session and on the last day the future technology session was re-named “Meeting Future Challenges”

The funds for the meeting will be used to pay for the meeting infrastructure and logistics and for early career scientists – currently there are funds for about 15 people.

There will be an on-line survey during the meeting to capture questions and ideas. This would provide input into the group developing the summary and conclusions to be discussed in the final sessions.

Number	Action	Notes	Responsibility
XXIII/22	<p>At upcoming teleconference on 5 October on Science Conference 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 organises 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?</p> <p>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 Organizing Committee
XXIII/23	Find name of Asian speaker on plateau areas for Science Conference.		Q. Chao
XXIII/24	Informally ask proposed speakers for Science Conference if they are prepared to attend, before a formal invitation from Han Dolman.	Within one week	D/GCOS to send list and reminder
XXIII/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 the Director General Alain Ratier if he were available to introduce this topic.	H. Dolman R. Husband

Part 2 Scientific / Technical Discussion with Partners and Expert Panels

8. Information on preparations for UNFCCC COP21 / SBSTA43 (F. Vladu)

- GCOS at the SBSTA42 research dialogue
- GCOS Statement to SBSTA43, Submission of reports

Florin Vladu presented relevant activities of the UNFCCC. He highlighted the joint GCOS workshop on Adaptation held in 2015 in Bonn which had been organized in collaboration with IPCC and UNFCCC. The report is available on the GCOS website and will be presented to the SBSTA at COP21.

The research and systematic observation agenda item has been supported by an information note. At the research dialog in June 2015, experts talked about research focussing on low emission scenarios and re-analysis.

At COP21, Parties will focus on a new agreement. While this is still being negotiated, based on the latest draft, it appears the agreement will include objectives, mitigation, adaptation possibly loss and damage, technology and technical support and global stocktaking (assessment of progress towards 2C goal). Under mitigation, countries will make their nationally determined contributions. The current draft for the overall objectives has two options – a temperature goal or referring to the UNFCCC preamble. In the draft, under mitigation, the aim was to operationalize the 2C target. Adaptation would focus on increasing climate resilience of countries but systematic observations are not explicitly mentioned except that it is mentioned under adaptation at national and regional levels. This is in the context of immediate action. It appears that the MRV process would be for individual efforts while national assessment would be through biennial reporting and multilateral assessments.

The UNFCCC secretariat has received INDCs, Intended Nationally Determined Contributions, from many countries; including Brazil and China. The Steering Committee noted that while these reduction commitments so far do not appear to be enough to meet a 2C target they are based on business as normal, the assumption that there will be no further reductions, and the aggregation of targets presented in a range of incompatible ways.

The Steering Committee briefly discussed how observations could be used to monitor emissions of GHGs and support the UNFCCC.

Number	Action	Notes	Responsibility
XXIII/26	Need to think now about how GCOS could be useful in monitoring fluxes of GHGs.		Steering Committee members

In Paris, SBSTA is planned for only Tuesday to Friday of the first week. Given the short time available, the plan is to prepare an information note to assist negotiators with guidance on what they need to agree. Conclusions may note the GCOS statement, the GCOS Status Report, outline of the new GCOS Implementation Plan and the adaptation workshop. Relevant WMO information will be addressed. There may be some conclusions on the Adaptation Workshop and the Status Report.

Number	Action	Notes	Responsibility
XXIII/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 observations leading to validation of emission estimates	Steering Committee Chair, D/GCOS

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

9.1 Feedback from the National GCOS Science Day

The South African National GCOS Science Day was held on the day before the Steering Committee started. About 100 people attended from the climate observing communities in South Africa and the GCOS Steering Committee. There were presentations about the work being undertaken in South Africa from meteorological monitoring with the GRUAN site to terrestrial observations where links were being developed with Australian monitoring networks.

Both the South African organisers and the GCOS Steering Committee thought that this science day was a success and the members thanked the South African organisers for this event. The event did raise some issues that are not discussed in the Steering Committee itself and so to would be useful to repeat this at future Steering Committee meetings.

It was agreed that this should be repeated at other GCOS events outside Switzerland.

As a side note, in discussions on regional actions and developments, it was recommended that GCOS should investigate a task team headed by Bruce Hewitson, who is also chairing a WCRP Working Group. This task team should report back to GCOS on regional adaptation actions.

Number	Action	Notes	Responsibility
XXIII/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 co-ordination with D/WCRP

9.2 Atmospheric Observation Panel for Climate (K. Holmlund)

K. Holmlund presented the proposed revised Terms of Reference for AOPC (document SCXXIII/9.2). A new item was to maintain and review the list of ECVs, the remainder were minor changes.

The Steering Committee agreed the revised AOPC Terms of Reference as presented.

The report on the 20th AOPC meeting was also presented (GCOS-190). At the AOPC meeting, there was a day with the Swiss GCOS community which was very informative and also a joint session with TOPC.

The AOPC presentation discussed the characteristics of the observational systems and calibration issues in the ground based systems. The formal relationship of various network types (“baseline”, “reference” and “comprehensive”) to GCOS and monitoring of the ECVs was raised: the Steering Committee realized there was a lack of clarity on this issue.

Other issues raised included the lack of complete access to data (historical and current); ensuring long-term sustainable operation of observational systems; and the need for a better understanding of regional groupings and activities.

Number	Action	Notes	Responsibility
XXIII/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, Italy.	GCOS Secretariat, in particular GCOS Network Manager
XXIII/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.	WMO Region VI has asked for this guidance	AOPC, GCOS Network manager
XXIII/31	Produce document on different regional groupings in WMO, IOC etc., for next Steering Committee.		GCOS Secretariat

9.3 Ocean Observations Panel for Climate (M. Bourassa/T. Suga)

Toshio Suga presented the OOPC work plan and the 18th meeting of the OOPC (Terms of Reference [document SCXXIII/9.3] and report of the 18th meeting of OOPC [GCOS-192]).

The Steering Committee agreed the OOPC Terms of Reference as presented.

Mark Bourassa presented a revised list of biogeochemical ECVs some were new while for others, changes in names or definitions were proposed. One, the carbonate system, would combine two existing ECVs pCO₂ and acidity.

New proposed ECVs were proposed:

- **Nitrous Oxide;**
- **Ocean Surface Vector Stress** is measured over oceans by satellite and is more linked to energy transfers and evaporation. It is distinct from wind;
- **Sensible and Latent Heat Fluxes.**

The OOPC chairperson provided a table, which translated current ECVs into the proposed, new ones and explained to the Steering Committee what kind of subdivisions and subsidiary products will be needed.

The Steering Committee agreed Ocean Surface Vector Stress and Nitrous Oxide should be new ECVs and that pCO₂ and acidity are combined into new ECV Carbonate System. Sensible and Latent Heat Fluxes can be considered an emerging ECV as the Steering Committee expressed caution about the global capability to monitor them. Ocean ECVs will be split into physical, biogeochemical and biological, and, where necessary, an ECV can be sub-divided into surface and water column, as noted above. There would be no other changes to the Ocean ECVs.

9.4 Terrestrial Observation Panel for Climate (K. Steffen)

Konrad Steffen presented the outcomes of the 17th TOPC meeting (Terms of Reference [document SCXXIII/9.4] and report of the 17th meeting of TOPC [GCOS-189]).

The Steering Committee agreed the revised TOPC Terms of Reference as presented.

The need to revitalise the membership of TOPC was highlighted with an emphasis on the need for a wider geographical representation. There is no member with the background to advise on adaptation and mitigation, food and water. There is also little input from the modelling side and there should be a modelling member for the panel. While WCRP is a good partner for physical sciences, other partners for food and water still have to be identified.

There may need to be new ECVs for adaptation and mitigation, this is still under consideration.

The overlap between ocean and cryosphere, coasts and sea ice are important and there need to be linkages between relevant ECVs in the different domains.

It was proposed that:

- A new Land Surface Temperature ECV (radiative temperature of the surface). A working group has been established to come up with a definition;
- Ice sheets to be extended to Ice Sheets and Ice Shelves (more a change in name than definition);
- Glaciers and Ice caps to be renamed Glaciers (again a name change to better reflect the ECV);
- Lake and River Ice is an emerging ECV and could be extended to a more general river properties (temperature etc.) ECV;
- Anthropogenic GHG emissions are also a possible emerging ECV.

These proposals were accepted by the Steering Committee.

From the TOPC perspective, energy fluxes may be essential cannot be well measured over land thus no new ECVs were proposed for energy. However, this is an important issue and should be discussed in the new GCOS Implementation Plan.

The panels are the first step in the chain Observe – Understand – Predict – and so need to define accuracy and resolution requirements as well as natural variability with feedback from users of the information.

Number	Action	Notes	Responsibility
XXIII/32	At the next TOPC panel session in 2016, discuss new developments, end the reporting cycles. Add a modelling expert to the panel, keep close connection to the WCRP.		TOPC Chair and GCOS Secretariat
XXIII/33	Agree on the recommendations for changes for Terrestrial Observations for the next implementation plan.		TOPC Chair and GCOS Secretariat, IP Authors
XXIII/34	All panels should review the table which relates ECVs and to Energy Cycle, (as pressure will need to be linked).		all Panel Chairs
XXIII/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

9.5 GCOS Cooperation Mechanism (GCM) (T. Oakley, GCOS Network Manager)

Tim Oakley presented the work of the GCOS Coordination Mechanism (GCM) (document SCXXIII/9.5).

GCM works with GSN, GUAN, BSRN but is not solely focused on these specific networks. The Network Manager engages with the WMO regions and is represented at the regional associations. The African region performs particularly poorly compared with expectations.

Currently only Japan directly funds the GCM. There is some indirect support from Germany and the UK.

The GCM defines its priorities depending on the network gaps and needs based on GCOS expert panel meetings. The GCM also implements designated projects for sponsors.

Number	Action	Notes	Responsibility
XXIII/36	GRUAN will need WMO network recognition.		D/GCOS, D/OBS and GCOS Network Manager

9.6 GCOS Space Rapporteur on CEOS and CGMS links (R. Husband, GCOS Space Rapporteur)

The GCOS Space Rapporteur is an informal conduit between CEOS and CGMS and GCOS. The CEOS/CGMS Working Group on Climate was formed in November 2013 with a focus on GCOS and the ECVs. The working group is working on gap analysis, looking at how well the GCOS ECV requirements have been met.

The future planning has been revised as the workload is greater than previously anticipated. The ECV inventory will be transferred to Europe.

Number	Action	Notes	Responsibility
XXIII/37	Align outcome of the CEOS response to the 2010 GCOS Implementation Plan with the Status Report from 2015.		Lead, Status Report

10. Climate Indicators

The Steering Committee Chair, Stephen Briggs, introduced climate indicators and asked “Can GCOS develop a list of climate indicators that are easy to understand and communicate, and would it be helpful?”

The Steering Committee considered that their potential uses of material from GCOS includes informing the general public, producing material to confront deniers, to inform policy makers of climate change (including its range of socio-economic effects). The current ECVs are good for science but not so good for this wider communication. This is a gap that indicators could fill.

While there are many efforts in this area but they are not tied to something concrete like the ECVs. The participants discussed the example given by International Geosphere-Biosphere Programme (IGBP), which is using four indicators: Sea Surface Temperature (SST), Land-surface Temperature (LST), sea ice extent minimum for the Northern Hemisphere and CO₂.

The Steering Committee considered that as a basic requirement, such indicators should, have long-term records, only be few in number, be credible like ECVs, be revisited at least annually and should be highly graphical. The practicality of indicators for region needs to be determined. Global indicators should be part of the overall GCOS communications plan.

Number	Action	Notes	Responsibility
XXIII/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.	Call in a small expert meeting to decide how to proceed. Instigate panel discussion in April 2016.	D/GCOS, Panel Co-chairs, A. Belward, M. Dowell

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

11.1 WMO Programmes, and Technical Commissions

- **WIGOS (W. Zhang)**

Wenjian Zhang presented the development and progress of WMO Integrated Global Observing System (WIGOS) which is aiming to be operational from 2020. WIGOS works at global, regional and national levels. The relative lack of stations compared to other regions and the low level of reporting in Africa was highlighted. National meteorological services are being encouraged to reach out to other operators of meteorological stations in their countries to improve their national observational coverage. Improving network coverage will improve forecasts.

Many climate services will be based outside of the traditional meteorological services.

WIGOS is considering the challenges of monitoring in 25-years' time with climate change, increasing extreme events, and changing urban structures at a meeting in Geneva in November 2015.

- **Commission for Climatology of WMO (CCI) (T. Peterson)**

Thomas Peterson presented the organization of the CCI and gave an example of their work in developing and encouraging volunteer monitoring networks as a way of cheaply extending network coverage and density of observations.

The importance of WMO Resolutions 40 and 60 were presented. WMO Resolution 40 addresses real time meteorological data exchange. Similarly, Resolution 60 addresses the exchange of climate data to support GFCs. It also urges WMO members to provide historic climate data on a free and unrestricted basis: how this is implemented remains to be seen.

- **Joint Commission on Oceanography and Marine Meteorology (JCOMM) (J. Stander)**

Johan Stander presented the JCOMM strategy which, inter alia, includes GCOS. JCOMM in situ Observations Programme Support Centre (JCOMMOPS) monitors observational systems for GOOS, WCRP and GCOS.

He stressed the need to better coordinate across the panels on cross-cutting areas such as coastal regions and sea ice.

Johan Stander also presented South African community rainfall stations. These are cheaper than full stations but can contribute greatly to an early warning system.

11.2 WCRP (D. Carlson)

David Carlson presented WCRP and thanked the Steering Committee for the invitation to attend. GCOS and WCRP provide the basis for the IPCC reports.

The WCRP Data Advisory Council (WDAC) discussed observations and identified 3 actions: Open Data, Earth System Reanalysis and Data Prize. Open Data aims to bring all the WDAC data to the same level of open access. Earth System Reanalysis involves incorporating all observational data to improve the models. A test case is being implemented involves the Surface Ocean CO₂ Atlas (SOCAT) v2 dataset in Earth Systems Federation format: this turns out to be very time consuming and cumbersome to transform the data into Observations for Climate Model Intercomparisons (OBS4MIPS) format.

A Data Prize was considered as there has been success with a model development prize. However, there are at least 6 data prizes that already exist and, while a plan for the next steps is being developed, WCRP may decide not go ahead with a new additional prize duplicating existing initiatives.

It was noted that WDAC has a group looking at surface fluxes.

One issue that was raised was how the WDAC (e.g. OBS4MIPS) should interact with the new GCOS Implementation Plan, both as contributors and reviewers.

11.3 GFCS (Observation and Monitoring Pillar) (Dr Linda Makuleni, PR of South Africa to WMO and Co-Vice Chair of IBCS)

Linda Makuleni was presented a certificate of recognition of the contributions of South Africa to GCOS by the GCOS Director.

Linda Makuleni discussed the need for an integrated approach in helping communities adapt to climate change. While GFCS aims to enable better management of the risks of climate variability and change using science-based climate information, GCOS provides the underlying observational data. One area needing attention is the interface with end users, in order to derive better information for decision makers.

Priority areas include water, disaster risk reduction, health, agriculture and food security and energy. More research is needed on the best way to provide the required information in these areas. Gender balance is a cross-cutting issue across all these priority areas.

The Intergovernmental Board on Climate Services (IBCS) provides strategic guidance to GFCS, setting up working groups as needed. A Partners Advisory Committee provides inputs. A framework with key milestones has been established with flagship projects due to be completed in 6 years and the expectation of improved climate services being implemented within 10 years.

So far, workshops have been held in a number of countries helping countries identify their needs and helping them establish their systems. Regional coordination is being established. In Africa the focus countries are Tanzania and Malawi. It has become apparent that better coordination at global and national levels is needed to provide climate services. More resources are needed to meet the challenges as 70 countries need assistance. More work is needed to strengthen the GFCS pillars.

Linda Makuleni identified some issues for GCOS:

- How can GCOS support the development of the additional variables needed to develop climate services in the 5 priority areas?
- How can GCOS support data needs in countries where GFCS is implementing projects?

South Africa is moving ahead in developing its own National Framework for Climate Services (NFCS) with a clear focus on the needs of end users.

GFCS has made enormous progress at global and governmental levels with flagship projects demonstrating its usefulness. While there are still challenges GFCS has the potential to inform and support decision makers.

The Steering Committee noted that there should be clear links with GFCS and WCRP.

Number	Action	Notes	Responsibility
XXIII/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

11.4 GEO (SBA Climate, new work plan) (A. Obrégon)

Andre Obrégon presented GEO plans on behalf of the GEO Director, Barbara Ryan who was unable to attend. Ministers renewed the mandate of GEO in 2014 and the strategic plan for 2016-2025 will be considered at the GEO plenary and ministerial in Mexico City, November 2015. The draft plan is now available and includes targets and indicators to assist in monitoring the implementation of the plan. Activities related to GCOS occur in the draft strategic plan as Foundational Tasks, Community Activities and as GEO Initiatives. Climate will be a cross-cutting topic, rather than a societal benefit area as it was in the previous strategic plan.

The GEO CARBON initiative on monitoring carbon fluxes continues and CEOS an active participant.

The Steering Committee expressed concern that the new implementation plan, while based on a good strategic perspective, was less well developed in its implementation. Their concern was with the importance ascribed to the GEOSS infrastructure and with the proposed governance mechanisms which were thought to be significantly flawed in terms of representation at the governing bodies.

Part 3 Governance, Budget, in-Camera

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

Carolin Richter introduced the GCOS Budget (document SCXXIII/12). GCOS is underfunded and raising funds is an issue. As a result, some actives cannot proceed (e.g. regional workshops).

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

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

The Steering Committee accepted the report from last year (see Table 3) 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.

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.

14. Date and place of next meeting

The Steering Committee accepted the invitation from Ecuador to host the meeting. It is proposed to hold the meeting on 4-6 October 2016 in Guayaquil, at International Research Centre on El Niño (CIIFEN). The Steering Committee thanked Rodney Martinez for offering to host this meeting. A national GCOS day should be considered and it may be necessary to extend the meeting beyond three days.

China has offered to host a future meeting.

The Steering Committee thanked both Ecuador and China for their generous offers.

It was repeated by the members that the preceding National Science Day and the following scientific and technical excursion should be part of future Committee meetings, if appropriate and feasible. All experts were looking forward to the excursion to the GAW Station at Cape Point, which was scheduled for the next day

The Steering Committee and the staff of the GCOS Secretariat thanked very much the local organising team Juliet Hermes, Johan Stander and Michel Verstraete for all arrangements made.

15. 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 Director of the GCOS Secretariat were allowed to stay in the room. The closed meeting discussed:

- **Steering Committee Membership**
- **AOPC Membership**
- **OOPC Membership**
- **TOPC Membership**

With regard to the upcoming in-camera session, the Chairman asked to improve the documentation on panel memberships to have a better planning tool and in order to avoid ad hoc decisions. The Steering Committee also asked that there should be more proposals including the “younger generation”.

16. Close of the Session

The 23rd Session of the GCOS Steering Committee was closed at 18:00 hrs, on Thursday 1 October 2015.

Table 3 Closed (green) and open (red) actions arising from the past Steering Committee session SC XXII in 2014:

Action	Section	Subject	Action required	Next Steps	Status/Remarks	Responsible
1	3.1	Collaboration with GEO	The GCOS Secretariat and the SC Chair should continue to work to improve collaboration with the GEO Secretariat on activities of mutual benefit.		Done / Ongoing, Note: but only on an ad-hoc base.	SC Chair, GCOS Secretariat
2	3.2	Development of GFCS	The SC Chair and GCOS Secretariat should continue to follow the development of the GFCS and its governance under the IBCS and report back to the Steering Committee with the aim of ensuring that GCOS contributes as fully as possible to the implementation of the GFCS.		Done / Ongoing Note: D/GCOS liaises regularly (quarterly) with D/GFCS due to an WMO internal climate steering committee.	SC Chair, GCOS Secretariat
3	3.3	Future Earth	The GCOS Secretariat should engage with representatives of Future Earth in a follow-up discussion on the interaction between GCOS and Future Earth once the Steering Committee for Future Earth has met and clearly defined its Terms of Reference regarding observations and modelling.	The Future Earth Secretariat will be up and running in 2015. This is when the GCOS Secretariat should actively engage with the Future Earth Director to discuss GCOS` engagement.	Still to do.	GCOS Secretariat, Representative of Future Earth
4	3.4	Engagement with PROVIA	GCOS and PROVIA should liaise at Secretariat and Steering Committee level to clearly define their fundamental linkages, and how climate observations can effectively support VIA research.	The next Steering Committee of PROVIA will take place in Brazil in 2014.	To do. Note: D/GCOS attended in 2014, could not attend the 2015 meeting during Paris Science Conference.	GCOS Secretariat, Representative of PROVIA

Action	Section	Subject	Action required	Next Steps	Status/Remarks	Responsible
5	3.5	Case studies showing the benefits of climate observation for adaptation	A few strong case studies should be developed to show the benefits of climate observations for adaptation.	Keep track of UNEP's upcoming climate change adaptation publication; potentially link to UNEP climate change adaptation in Africa projects on GCOS website.	Still to do. Potential collaboration with UNEP.	GCOS Secretariat, UNEP, GCOS Implementation Manager
6	3.6	Start of the assessment process	The GCOS Director should identify a lead for the review process by 31 December 2013, and establish a board represented by domain leads and key supporting experts. A budget, time line and preliminary work plan should also be developed.	Dr Adrian Simmons will take the lead for the review process.	Done/Ongoing.	GCOS Director
7	3.6	Prepare for the next GCOS reporting cycle	A scoping meeting should be held in December 2013, immediately following the Meeting of the Executive Council Working Group on Climate and Related Weather, Water and Environmental Matters (ECWG-CWE).	Outcomes will directly feed into the GCOS assessment cycle.	Done.	SC Chair, GCOS Secretariat
8	4.1	Workshop on observations for climate change mitigation	The GCOS Secretariat and the Project Office of GOF-C-GOLD should organize a workshop that will identify observation needs in regard to some aspects of climate change mitigation.	GCOS/GOF-C-GOLD to organize. Workshop will take place at WMO headquarters in Geneva, Switzerland, in May 2014.	Done.	GCOS Secretariat, TOPC Representative for ECV Land Cover
9	4.1	Soil partnership	TOPC should liaise with the 'Global Soil Partnership' (with focus on soil moisture), which is supported by FAO to collect missing soil moisture data.	To get in contact with FAO/Global Soil Partnership.	To do.	TOPC Panel Members, GCOS Secretariat

Action	Section	Subject	Action required	Next Steps	Status/Remarks	Responsible
10	4.1	Continuing support for TOPC	The GCOS Secretariat and Sponsors should ensure adequate continuing support for TOPC and for terrestrial domain activities, including the preparation of the next progress report and implementation plan, in view of the continuing uncertainty over support for GTOS.		Done/Ongoing . GCOS continues to support the annual TOPC sessions.	GCOS Secretariat, Sponsors
11	4.2	New OOPC Terms of Reference	OOPC should revise and finalise its Terms of Reference based on the discussion at the SC meeting, and in consultation with GOOS and WCRP.		Done.	OOPC Chairs, OOPC Panel Members
12	4.2	Consistency of Terms of Reference	AOPC and TOPC should consider their Terms of Reference, including the possible use of an opening statement similar to that of OOPC, and are invited to make proposals for revised Terms of Reference for approval by the Steering Committee.		Done	AOPC/TOPC Chairs, AOPC/TOPC Panel Members, GCOS Secretariat
13	4.2	Status of the drifting buoy network	OOPC should report back to AOPC and the Steering Committee on the status of the drifting buoy network (OOPC).		Done.	OOPC

Action	Section	Subject	Action required	Next Steps	Status/Remarks	Responsible
14	4.4	Availability of the GOSIC website	The GCOS Director and the SC Chair should jointly write to NOAA to communicate that operation of the GOSIC website should be regarded as essential in view of its use for network monitoring.	Get in contact with NOAA.	To do.	SC Chair, GCOS Implementation Manager
15	4.6	Future engagement with the Space Agencies	The range of activities undertaken by the GCOS Space Rapporteur and other representatives of GCOS in engagement with the Space Agencies should be continued, including liaison with the Working Group on Climate, which was expected to move under the auspices of CGMS as well as CEOS, and review of SCOPE-CM activities, especially in regard to the oceanic and terrestrial domains.		Done/ongoing.	GCOS Space Rapporteur, SC Chair, GCOS Secretariat
16	4.8	GEO	The SC Chair and GCOS Director should engage in the preparation of the 2016-2025 GEO Implementation Plan, and ensure consistency with the new GCOS Implementation Plan.	Director of GCOS to be present at GEO Plenary and Ministerial in January 2014.	Still ongoing, Note: D/GCOS attended the January 204 meeting.	SC Chair, GCOS Director

Action	Section	Subject	Action required	Next Steps	Status/Remarks	Responsible
17	5.	Work plans for GCOS panels	AOPC and TOPC should develop work plans consistent with the overall GCOS strategic and implementation planning to be developed in the coming two to three years. The OOPC work plan should be kept aligned with the overall GCOS planning.		To do.	Panel Chairs, AOPC/TOPC Panel Members
18	5.	GCOS panel meetings	The GCOS Secretariat and Panel Chairs, in liaison with co-sponsors of the panels, should plan back-to-back panel meetings from time to time, as appropriate, to foster cross-panel activities.		Done / ongoing	GCOS Secretariat, Panel Chairs
19	6.	GCOS statement for SBSTA-39	The GCOS Secretariat, in liaison with the SC Chair, should prepare oral and written statements for SBSTA-39.		Done. Statements can be found in Appendix 4.	GCOS Director, GCOS Secretariat

Appendix 1 Participant List

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<p>JCOMM Joint WMO-IOC Commission for Oceanography and Marine Meteorology Mr Johan STANDER (JCOMM Co-president) South African Weather Service Regional Manager Western Cape Regional Office P.O. Box 21, International Airport 7525 Cape Town South Africa</p>	<p>Tel.: + 27 21 934 0450 Fax: + 27 21 934 3296 Email: johan.stander@weathersa.co.za - -</p>
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Appendix 2 Final Agenda

Tuesday 29 September to Thursday 1 October 2015	
PART 1: Strategy, Review and Plans	
1	<p>Opening of the Session</p> <ul style="list-style-type: none"> • Welcome (S. Briggs) • Tour de Table • Approval of Agenda • Arrangements for the Session (C. Richter)
2	<p>Chairman's Introduction and Report (S. Briggs)</p> <ul style="list-style-type: none"> ▪ Expectations of SC-XXIII ▪ Major issues facing GCOS
3	<p>Sponsors Views on the Development of GCOS</p> <ul style="list-style-type: none"> • WMO (W. Zhang) • ICSU (E. Madela-Mntla, ICSU Office for Africa) • IOC of UNESCO (A. Fischer) • UNEP
4	<p>Director's Introduction (C. Richter)</p> <ul style="list-style-type: none"> ▪ Report on major activities since last SC in 2014 ▪ Programme Review – Status on the update of the MoU
5	<p>GCOS Status Report (A. Simmons)</p> <ul style="list-style-type: none"> • The revised draft will be presented to the SC for approval.
6	<p>GCOS Implementation Plan (M. Dowell)</p> <ul style="list-style-type: none"> • The SC will approve the writing team and the outline of the process.
7	<p>GCOS Science Conference (H. Dolman)</p>
PART 2: Scientific / Technical Discussion with Partners and Expert Panels	
8	<p>Information on preparations for UNFCCC COP21 / SBSTA43 (F. Vladu)</p> <ul style="list-style-type: none"> • GCOS at the SBSTA42 research dialogue • GCOS Statement to SBSTA43, Submission of reports • Feedbacks from the National Science Day <p>(The following block requires 2.5 hours of time; 30 minutes each talk incl. discussion) Reports and discussion on past and future activities and engagements:</p> <ul style="list-style-type: none"> • Atmospheric Observation Panel for Climate (K. Holmlund) • Ocean Observations Panel for Climate (M. Bourassa/T. Suga) • Terrestrial Observation Panel for Climate (K. Steffen) • GCOS Cooperation Mechanism (T. Oakley) • GCOS Space Rapporteur on CEOS and CGMS links (R. Husband)
9	<p>Partners View on how GCOS should engage with them:</p> <ul style="list-style-type: none"> • WMO Programmes, and Technical Commissions:

	<ul style="list-style-type: none"> ○ CBS / WIGOS (30 minutes) (<i>TBD</i> F. Branski & S. Barrell unable to attend) ○ CCL (30 minutes) (T. Peterson) ● WCRP (WDAC, JSC task team on observations, WCRP/GCOS Data Prize) (D. Carlson) ● GFCS (Observation and Monitoring Pillar) (L. Makuleni) ● GEO (SBA Climate, new work plan) (A. Obrégon) ● Discussion on further partnerships
10	<p>Climate Indicators (S. Briggs)</p> <ul style="list-style-type: none"> ▪ Discuss a list of potential climate indicators
PART 3: Governance, Budget, in-Camera	
11	Budget and Resources and Fundraising Strategies (C. Richter)
12	Summary of actions and decisions which had been made (S. Briggs / C. Richter)
13	<p>General Steering Committee Membership and Related Issues (<i>In Camera</i>)</p> <p>Close of the Session</p>

Friday 1 October 2015

Excursion to Cape Point to visit the GAW station.

Appendix 3 Consolidated List of Actions

Number	Action	Notes	Responsibility
XXIII/1	The Director of the Secretariat to make a proposal for a future communication strategy.		D/GCOS
XXIII/2	Establish a contact with the African Development Bank to discuss about funding possibilities.		D/GCOS
XXIII/3	GCOS to endorse the outcome document of the Conference and inform ICSU about activities at UNFCCC COP21.		D/GCOS
XXIII/4	Provide ICSU a progress report from GCOS until 30 October 2015.		D/GCOS
XXIII/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
XXIII/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
XXIII/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)
XXIII/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

Number	Action	Notes	Responsibility
XXIII/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
XXIII/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
XXIII/11	Provide input to brochure on Status Report on Status Report on El Nino and ARGO system.		T. Suga, R. Martinez
XXIII/12	Prepare first draft of 4 page brochure on Status Report.		GCOS Secretariat
XXIII/13	Review and contribute to new brochure on Status Report.	Final Version due before COP21	Steering Committee
XXIII/14	Collaborate with the WMO OSCAR and communicate that this database is taking into account the ECVs sub-categories.		GCOS Secretariat
XXIII/15	Prepare writing team for new GCOS Implementation Plan teleconference in October.		Mark Dowell
XXIII/16	Panels to check chapter, structure and ECVs, and identify supporting measurements for new GCOS Implementation Plan.	XXIII/17 discussed above	Panel Chairs
XXIII/18	Prepare drafts and final document of new GCOS Implementation Plan.	Timeline presented above	Writing Team
XXIII/19	Raise issue of Satellite Supplement at CEOS meeting in Kyoto, November 2015.		GCOS Director

Number	Action	Notes	Responsibility
XXIII/20	Panels to consider and review the draft new GCOS Implementation Plan at their meetings in 2016.		AOPC, OOPC and TOPC
XXIII/21	Provide additional names for the writing team for the new GCOS Implementation Plan to Mark Dowell.	Within one week of SC XXIII	Steering Committee
XXIII/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 organises 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?</p> <p>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
XXIII/23	Find name of Asian speaker on plateau areas for Science Conference.		Q. Chao
XXIII/24	Informally ask proposed speakers for Science Conference if they are prepared to attend, before a formal invitation from Han Dolman.	Within one week	D/GCOS to send list and reminder
XXIII/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
XXIII/26	Need to think now about how GCOS could be useful in monitoring fluxes of GHGs.		Steering Committee members

Number	Action	Notes	Responsibility
XXIII/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 observations leading to validation of emission estimates	Steering Committee Chair, D/GCOS
XXIII/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 co-ordination with WCRP Director
XXIII/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
XXIII/30	AOPC to interact with WMO Commission on Climatology OPAE-1 on its development of guidance on the development of a climate network in Europe.	WMO Region VI has asked for this guidance	AOPC, GCOS Network manager
XXIII/31	Produce document on different regional groupings in WMO, IOC etc. for next Steering Committee.		GCOS Secretariat
XXIII/32	At the next TOPC panel session in 2016, discuss new developments, end the reporting cycles. Add a modelling expert to the panel, keep close connection to the WCRP.		TOPC Chair and GCOS Secretariat
XXIII/33	Agree on the recommendations for changes for Terrestrial Observations for the next implementation plan.		TOPC Chair and GCOS Secretariat, IP Authors
XXIII/34	All panels should review the table which relates ECVs and to Energy Cycle, (as pressure will need to be linked).		all Panel Chairs

Number	Action	Notes	Responsibility
XXIII/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
XXIII/36	GRUAN will need WMO network recognition.		D/GCOS, D/OBS and GCOS Network Manager
XXIII/37	Align outcome of the CEOS response to the 2010 GCOS Implementation Plan with the Status Report from 2015.		Lead, Status Report
XXIII/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.	Call in a small expert meeting to decide how to proceed. And instigate panel discussion in April 2016.	D/GCOS, Panel CO-chairs, A. Belward, M. Dowell
XXIII/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

Appendix 4 AOPC Terms of Reference

Terms of Reference (Status March 2015)

The Atmospheric Observation Panel for Climate was established by the GCOS Steering Committee in recognition of the need for specific scientific and technical input concerning atmospheric observations for climate. The Joint Scientific Committee of the World Climate Research Programme, recognizing the benefits of the AOPC, agreed in 1995 to co-sponsor the panel, which was therefore renamed as the GCOS/WCRP Atmospheric Observation Panel for Climate. It meets annually in person to review progress and address identified issues with the global observing system for climate.

AOPC is supported, amongst others, by the **WMO Integrated Global Observing System (WIGOS)** – an integrated, comprehensive, and coordinated system that comprises *in-situ* and space-based observations of the present WMO global observing systems. WIGOS represents an integrated framework of existing WMO observing systems and aims at providing the data required for delivery of services for all regions around the globe in an effective and efficient manner.

The goal of the AOPC is to plan, monitor and promote the atmospheric component of GCOS. Its specific Terms of Reference are as follows:

1. To maintain and periodically review the list of GCOS Atmospheric Essential Climate Variables;
2. To liaise with relevant stakeholder bodies in order to determine and maintain the requirements for data to monitor, understand and predict the dynamical, physical and chemical state of the atmosphere and its interfaces on climate relevant time scales, on both global and regional levels;
3. To advocate for the establishment, re-establishment and maintenance of integrated systems to provide long-term, high-quality, consistent data and information to meet those requirements according GCOS monitoring principles;
4. To propose and promote the establishment of new systems, or enhancements to current systems and practices, to address deficiencies;
5. To review the current state and identify gaps and inadequacies of the atmospheric component of the global observing system;
6. To promote the establishment of sustainable observation networks and the use best practises;
7. To promote the rehabilitation of relevant historical data sets;
8. To promote and review institutional arrangements to ensure that climate data and observations are:
 - of the highest quality based on agreed metrics;
 - collected in accordance with the highest standards of practice;
 - archived and accessible to the user community.
9. To instigate the establishment of working groups and other initiatives for pursuing AOPC goals;
10. To liaise with the other GCOS panels, WCRP steering groups and other relevant entities, such as WMO Commissions, CGMS, CEOS and space agencies on atmospheric climate observing system issues;

11. Respond to assignments from the GCOS Steering Committee;
12. To report regularly to the GCOS SC and the JSC for WCRP.

Appendix 5 OOPC Terms of reference

DRAFT Terms of Reference 14/10/13.

For discussion/approval by OOPC Sponsors

Recognizing the need for ocean observations beyond those for climate, and the increased need to connect to societal issues in the coastal zone, OOPC's role has evolved to oversee the Ocean component of the Global Climate Observing System (GCOS) and the physical variables for the Global Ocean Observing System (GOOS), while defining sustained ocean observing requirements for the World Climate Research Program (WCRP) and supporting assessments (i.e. IPCC), monitoring, projections and research. In this context, OOPC provides advice on scientific requirements to the Joint WMO-IOC Technical Commission on Oceanography and Marine Meteorology (JCOMM), which is responsible for the coordination of implementation of platform-based observing system components. It is recognized that there are potentially a large number of groups that OOPC needs to interact with. These connections will be fostered in the context of processing the OOPC Work Plan, which details OOPC activities and foci with a 3-5 year time horizon.

In light of these relationships, the OOPC will operate with the following terms of reference.

1. **Assess, review and prioritise requirements** for sustained ocean observations of ocean Essential Climate Variables (ECVs), and physical Essential Ocean Variables (EOVs) in support of GOOS, GCOS and WCRP by:
 - 1.1. Engaging the broad stakeholder community (primary scientific) to assess, review and update requirements for ECVs and EOVs;
 - 1.2. Assessing the readiness of observing technologies, identifying those that have high feasibility and high potential impact in delivering required information;
 - 1.3. Assessing the adequacy of present global ECV/EOV observations to make recommendations for phased implementation, contributing to the GCOS Implementation Plan and GOOS work plan; and
 - 1.4. Providing an authoritative source of guidance on the development of national coastal and ocean observing requirements and observing system implementation plans.

2. Work with the JCOMM Observations Coordination Group and other relevant regional bodies to **coordinate observing networks** that contribute to ocean ECVs and physics EOVs by:
 - 2.1. Encouraging GOOS Regional Alliances (GRAs) and national commitments to regional and global observing networks;
 - 2.2. Promoting common best practices and observing standards for global and national observations;
 - 2.3. Encouraging readiness of emerging networks, particularly those that fill observing gaps or lower costs per observation;
 - 2.4. Promoting data sharing for global and national observations [and adherence to IOC data policy, GCOS Monitoring Principles];

-
- 2.5. Identifying opportunities for synergistic cooperation and/or common technical support; and
 - 2.6. Developing metrics for implementation.
-
3. Work with the International Ocean Data Exchange (IODE), JCOMM, WMO Information System (WIS), GRAs and other partner organizations (e.g. Group for Earth Observing (GEO), WCRP) to **review the status of and requirements for data and information management**, availability, and resultant products encouraging interoperability and stringent evaluation of fitness for purpose.
 4. Help develop a **process for ongoing evaluation** of the observing system in liaison with users of the data, based on the optimum suite of platforms for required variables, spatial and temporal scales and accuracy through
 - 4.1. Delivering scientific Leadership in evaluating requirements for ECVs and EOVs;
 - 4.2. Engaging with Modelling community on use of and requirements for observations for ocean model development, state estimates, ocean and climate prediction and observing system evaluation to feed back into the observing system;
 - 4.3. Providing guidance to networks on requirements for implementation.
 5. Support global ocean observing activities by involved parties (national/regional activities including GRA's and global programs) through **liaison and advocacy for agreed plans**.
 6. **Report to** the GOOS Steering Committee, GCOS Steering Committee and WCRP Data Advisory Council on the progress in implementing the ocean component of the GCOS Implementation Plan and the physics component of the GOOS Framework for Ocean Observations.
 - 6.1. Liaise with other GCOS and GOOS Panels, WCRP Steering Groups and other relevant entities such as WMO and IOC commissions on observing system issues.

The Chair(s) of the Panel will be selected by the OOPC panel, and approved by the steering committees of the 3 sponsors (GOOS, GCOS and WCRP). Members will be approved by the Chairs of the 3 sponsors and other partner organizations, and serve (repeatable) two year terms.

Appendix 6 TOPC Terms of Reference

Introduction

Three science panels have been established co-sponsored by the GCOS Steering Committee and by the World Climate Research Programme (WCRP) to define the observations needed in each of the three main global domains – atmosphere, oceans and land – to prepare specific programme elements and to make recommendations for implementation. The Terrestrial Observation Panel for Climate (TOPC) is also sponsored by the Global Terrestrial Observing System (GTOS).

The Terrestrial Observation Panel for Climate (TOPC) was set up to develop a balanced and integrated system of in situ, air- and space borne observations of the terrestrial ecosystem. The Panel focuses on the identification of terrestrial observation requirements, assisting the establishment of observing networks for climate, providing guidance on observation standards and norms, facilitating access to ECV and climate data and information and its assimilation, and promoting climate studies and assessments.

Terms of Reference

1. To define the requirements for long-term monitoring of terrestrial properties for climate and climate change, adaptation and mitigation as part of the essential climate variables (ECV);
2. To liaise with relevant research and operational communities to identify measurable terrestrial (biosphere, cryosphere, and hydrosphere) properties and attributes which
 - control the physical, biological and chemical processes affecting climate;
 - are themselves affected by climate change, are indicators of climate change and provide information on impacts of climate change.
3. To assess and monitor the adequacy of terrestrial observing networks (in-situ, air borne and satellite-based) and their archival and quality control at international data centres, promote their integration and the development of their capacity to measure and assess terrestrial properties and exchange climate data and information;
4. To identify gaps in present systems and design, promote and periodically revise plans for a long-term systematic observing system that fills these gaps, makes the data available and so better serves the needs of the research and operational communities;
5. Help develop a process for on-going evaluation of the observing system and data centres in liaison with users of the data, based on the optimum suite of platforms and processing capabilities for required variables, spatial and temporal scales and accuracy;
6. To promote and guide the establishment platforms that enable cooperation between data suppliers and user communities with the goal to establish high-quality and sustainable ECV production;
7. To act as focal points for each ECV and area of expertise;
8. To coordinate activities with other global observing system panels and task groups to ensure consistency of requirements with the overall programmes;
9. Publish and update GCOS/GTOS studies and planning documents, such as the implementation plan and satellite supplement;
10. To liaise with the other GCOS panels, WCRP steering groups, councils and other relevant entities, such as WMO Commissions, CEOS, GFCS, Future Earth, WIGOS and IPCC, on terrestrial climate observing system issues, and also to other GTOS panels, where relevant;
11. Carry out agreed assignments from the GCOS, WCRP and GTOS Steering Committees;
12. Report regularly to the GCOS Steering Committee, the GTOS Steering Committee and the WCRP Data Advisory Council on issues related to the terrestrial component of GCOS;
13. Meet regularly to review progress and address identified issues with the global observing system for climate.

Appendix 7 List of Status Report Reviewers

Institutions or groups who have been solicited for status report review

National GCOS coordinators

GCOS Steering Committee and Panel members

Main WMO programmes dealing with climate, observations and research: OBS (OSD, Space Programme, DMM, WIGOS), CLW, RES (GAW and WCRP)

CBS (OPAG-IOS, ET-SBO), CCI (Management Group, OPACE 1 and 2), CIMO Management Group, JCOMM (Observations Programme Area: OCG, SOT, SOOPIP, VOSP, DBCP; Data Management Programme Area: DMCG, ETDMP, ETMC)

Further distribution within WCRP (core projects, data advisory council and modeling groups)

Further distribution within GAW (Scientific Advisory Groups on GHG, Aerosols and Ozone)

WMO space programme

CEOS/CGMS WG on Climate

Space Agencies: ESA, Eumetsat, NASA, NOAA, JAXA

GEO, IPCC, GFCS, IGBP, PROVIA

Sponsor representatives (in addition to WMO): ICSU, IOC (Secretariat, GOOS SC regional alliances and panels), UNEP

European Union: DG Climate and Copernicus

WMO members (through WMO SG)

National responses

Argentina: National Meteorological Service

Australia: Neil Plummer, Assistant Director Climate Information Services

China: Qingchen Chao, Deputy DG Beijing Climate Center, China Meteorological Administration

Hong Kong, China: C M Shun Director of the Hong Kong Observatory PR of Hong Kong, China to WMO

Italy: Franco Desiato, Italian National Institute for Environmental Protection and Research

Japan: Toshifumi Fujimoto (GCOS coordinator), Japan Meteorological Agency

Uzbekistan, DG of Uzhydromet, PR of Uzbekistan to WMO

UK Met. Office: delayed response expected

Switzerland: Peter Binder, DG Federal Office of Meteorology and Climatology MeteoSwiss.

Experts who responded

Akiviadis Bais (University of Thessaloniki, GAW SAG on Ozone)

David Berry (NOC Southampton)

Greg Bodeker (Bodeker Scientific New Zealand)

Stephan Bojinski (WMO space programme office)

Mark Bourassa, Toshio Suga and Bernadette Sloyan (OOPC co-chairs)

Edward Dlugokencky (NOAA, GAW SAG on Greenhouse Gases)

Nobuyoshi Fujimoto (JAXA)

Simon Hook (NASA/JPL USA)

Elizabeth Kent (National Oceanography Centre Southampton UK)

David Legler (NOAA)

Gerhard Krinner LGGE France (co-chair WCRP/CLIC)

Paolo Laj (university of Grenoble, GAW SAG Aerosols)

Ulrich Looser (Global Runoff Data Centre, Germany)

Rodney Martinez (CIIFEN Ecuador)

Robert Massom (AAD and ACE CRC Australia)

David Parker (Met. Office UK)

Thomas Piekutowski (Canadian Space Agency)

Simon Pinnock (ESA Climate Office Harwell UK)

Shaun Quegan (University of Sheffield UK)

Stefan Roesner (DWD) -German GCOS coordinator

Helmut Rott (University of Innsbruck Austria)

Gabriela Schaepman-Strub (University of Zürich)

Johan Stander (JCOMM Co-President)

Zofia Stott and Peter Jan van Leeuwen (National Centre for Earth Observation Reading UK)

Toste Tanhua (Geomar, Germany)

Oksana A. Tarasova (on behalf of GAW scientific advisory groups)

Peter Thorne Maynooth University Ireland (co-chair GRUAN WG)

Paul van der Linden UK Met. Office (on behalf of Climate User Group ESA CCL)

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Appendix 8 Approved Outline of the new GCOS Implementation Plan

Submission from the Global Climate Observing System (GCOS) to SBSTA 43 on agenda item 8 (a) Research and systematic observation

15 October 2015

The Global Climate Observing System (GCOS)

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Draft Outline of a new GCOS Implementation Plan

SBSTA 37¹ encouraged the GCOS secretariat to provide a draft of a new implementation plan to SBSTA 43 in 2015. SBSTA invited the GCOS secretariat to provide the final implementation plan to SBSTA 45 in 2016.

The new implementation plan is envisaging broadening its scope to global Earth's environmental cycles, i.e., energy, carbon and water, and *inter alia* taking into account Sustainable Development Goals, climate services, climate indicators and relevant outcomes of discussions during COP21. It will advise on new requirements for measures needed for adaptation to a changing climate, and measures to mitigate climate changes.

The new plan will lay out a new strategic approach to further implement the Global Climate Observing System and will introduce a section on cross-cutting disciplines and on scientific and technological challenges.

The GCOS secretariat will develop a new implementation plan along the draft outline in the Annex.

¹ FCCC/SBSTA/2012/L.25

Draft Outline of a new GCOS Implementation Plan

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Appendix 9 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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