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Item 4.10 of the Provisional Agenda

**SUMMARY OF THE FINAL REPORT
OF THE JOINT STUDY GROUP ON GCOS (JSG-GCOS)**

Summary

The Joint WMO, IOC, ISC and UNEP Study Group on the Global Climate Observing System (JSG-GCOS) was formed in 2020 under the Infrastructure Commission of WMO. The Joint Study Group reviewed the GCOS governance and structure, making a number of key recommendations for consideration by the GCOS sponsors (cf. full report GCOS-246).

This document provides the Executive Summary, high-level recommendations, and recommendations from the JSG-GCOS, which relate to the IOC and are the subject of the decision.

Financial and administrative implications: paragraph 32.

The proposed decision is referenced Dec. A-32/4.10 in the Action Paper (document IOC-32/AP Prov.Rev.)

Executive Summary

1. The Joint WMO, IOC, ISC and UNEP Study Group on the Global Climate Observing System (JSG-GCOS) was formed in 2020 (the Terms of Reference are included in Appendix D and membership in Appendix E of the full report, GCOS-246). Under the leadership of the two co-chairs, Qingchen Chao (CMA¹) and Martin Visbeck (GEOMAR²), the Joint Study Group reviewed the GCOS governance and structure.
2. The role of GCOS is to support [...] relevant aspects of [...] climate-related global programmes. Specifically, the GCOS will ensure that the data needs are met for climate system monitoring, for assessing the impacts of climate variability and change and applications to national economic development, as well as research leading to improved understanding, modelling and prediction of the climate system (1998 Memorandum of Understanding)³.
3. GCOS performs a vital role in ensuring that climate observations are globally coordinated to ensure timely delivery of the information; to establish best practice and methods to safeguard high quality and calibration; to advance a fit-for-purpose system across many dimensions; and to ensure that data and information are easily accessible to all users.
4. GCOS competence and expertise as well its success in providing critical base line information to the international climate processes (UNFCCC) are widely recognized. However, its visibility at the national level and within the scientific community is mixed.
5. The sponsors last reviewed GCOS in 2014 and made some suggestions for change. However, the governance was not changed. After 30 years its current structure needs a review, update and strengthening in some areas, towards clearer relationships with sponsors, observing networks, supporters and key users. Greater clarity is needed in how GCOS recommendations can be implemented across the wide range of stakeholders and network partners. Funding for the GCOS coordination as well as for several of its networks needs to be improved recognizing the diverse national realities and resulting uneven engagement.
6. The JSG-GCOS has gathered information about the GCOS programme and intensively discussed the current situation. The JSG-GCOS established a number of subgroups and consultations and, with the support of the GCOS secretariat, undertook detailed analysis of the GCOS situation and shared an interim report that comments on several elements and aspects of the programme for reflection by the sponsors.
7. The JSG-GCOS identified many strengths:
 - GCOS is recognized as a powerful and authoritative mechanism for the international coordination, planning, developing and review of Climate Observing Systems and networks.
 - The strong scientific and technical expertise of the panels and the steering committee, together with efficient working arrangements across both, provides effective input into the GCOS implementation plan and the GCOS status reports.
 - GCOS is recognized as one of the key international coordination mechanisms that facilitates climate observations by networks supported by WMO, GOOS, space-based observations coordinated by CEOS and CGMS as well as many other networks of other important sponsors. GCOS developed and implemented the concept of Essential Climate

¹ China Meteorological Administration

² GEOMAR Helmholtz Centre for Ocean Research Kiel

³ The Memorandum of Understanding between the World Meteorological Organization, the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization, the United Nations Environment Programme and the International Council for Science 1998 see Appendix B.

Variables (ECVs) which are widely endorsed by the community and scientific programmes.

- GCOS is mandated to report regularly to Parties to the UNFCCC on its work and progress. It reports to the Subsidiary Body on Scientific and Technological Advice (SBSTA) and thereby provides the UNFCCC with status reports and implementation plans, which are recognized by the Conference of the Parties (e.g., Decision 19/CP.22).
- GCOS is acknowledged as the leading independent reference in defining requirements for climate observations for climate monitoring that benefit science, applications, and wider stakeholder needs, including those in support of climate adaptation and mitigation measures and policies and an increasing range of climate services.
- Despite successes to date, there are areas in need of improvements. In particular, the JSG-GCOS recommended that the mandate should be revised to better reflect the current situation and to ensure that GCOS remains relevant and functional. The updated mandate needs to address the following areas:
 - Provide a more focused and streamlined governance arrangement including provisions for an effective steering committee that guides the strategy and engagement of GCOS and advocates for sustainable, systematic observations for climate.
 - Clarify the funding of the GCOS programme and secretariat, so it can perform its coordination functions and support the networks and data systems.
 - Articulate the additional needs to address observations for adaptation, mitigation and climate services.
 - Provide clear ways for GCOS to make recommendations to its sponsors and the supporting networks (including input into regulatory material, guidelines and best practice).
 - Ensure increased and sustained engagement and global participation in GCOS.
 - Expand and strengthen the understanding of the needs of, and support for, sustained observations programmes in ‘the global South’.

8. The JSC-GCOS provided six high level recommendations summarizing the detailed outcomes and identified another 16 additional recommendations.

High-level Recommendations

9. **HR1:** GCOS sponsors should consider revising the existing Memorandum of Understanding (MoU) and split the content in two sections. The first section would constitute the main MoU that would lay out the high-level objectives of the programme supported by the sponsors. The second section would contain annexes to the main MoU that address operational procedures such as clarifying the role of the signatories with regards to resource arrangements, oversight roles, and a more detailed governance structure including the steering committee and could be updated by the Steering Committee, with the agreement of the sponsors’ representatives on the GCOS Steering Committee.

10. **HR2:** GCOS Steering Committee should ensure that its organizational structure is fit for purpose and should continue to enhance closer collaboration and integration between its panels to take into account changes in the international landscape, new variables and areas of work, the WMO reform and other needs from sponsors and beneficiaries.

11. **HR3:** GCOS should improve its engagement with stakeholders and partners, and the Steering Committee should consider a mechanism for providing a formal recognition of those groups in its revised governance structure.

12. **HR4:** The GCOS programme should continue to address new challenges, especially those caused by changing climate on fresh water, food security and biodiversity, by evolving, revising and improving the utility of the ECVs. Their requirements should contribute to a better understanding of the energy, water and carbon climate cycles, support climate adaptation and mitigation measures and policies, and address the biosphere, biodiversity and biogeochemistry, next to the currently recognized GCOS domains of atmosphere, ocean and land.
13. **HR5:** The MoU should clarify the role of GCOS as an independent group of experts to the UNFCCC process while meeting the needs and ambitions of its sponsors.
14. **HR6:** The Steering Committee should establish a regular structured dialogue with the sponsors (programmatic and resource) on strategic, policy, funding and governance matters of GCOS.

Additional Recommendations

15. **RECOMMENDATION 1:** GCOS should improve its engagement with stakeholders. The GCOS Steering committee should develop a strategy for further improving engagement with all stakeholders and monitor its implementation.
16. **RECOMMENDATION 2:** The MoU is revised as shown in Appendix A of the full report (GCOS-246). This should include clarifying the role of the signatories, funding arrangements, and the role of the steering committee. It should also guide the development of a GCOS strategy and engagement plans. GCOS should continue to respond to the needs of the UNFCCC and respond to the Paris Agreement, i.e. systematic observations, state of the climate, adaptation and mitigation.
17. **RECOMMENDATION 3:** GCOS programme should have understanding of the needs of and support for the Global South. Previous efforts need to be strengthened with adequate support. Regional workshops have only been held with support of other programmes and the GCOS Cooperation Mechanism (GCM) has only received minimal support in recent years. GCOS should restart its regional programme working with WMO and other interested bodies and ensure the results are presented to the UNFCCC.
18. **RECOMMENDATION 4:** The Steering Committee and sponsors should ensure that GCOS maintains its role in advising the UNFCCC on climate observations. The future work programme of GCOS should continue to address the carbon cycle, adaptation, mitigation and climate indicators to help it meet UNFCCC expectations.
19. **RECOMMENDATION 5:** The GCOS Steering Committee should develop a series of multi-year meetings of all stakeholders, across the value chain, to provide advice and input into GCOS. They should be clear on the expectations for these meetings, and commitments to support and funding.
20. **RECOMMENDATION 6:** While GCOS should ensure its regular status reports and implementation plans continue, it should also move towards more regular updates on the status of the climate observing system, based on information produced by the corresponding observing networks and programmes. This would check that the global climate observing system (including the ECVs and their requirements) is fit-for-purpose and meets the needs of all users, as far as is practical, and identify remedial actions.
21. **RECOMMENDATION 7:** GCOS should ensure appropriate geographical, gender and age representation in its bodies.
22. **RECOMMENDATION 8:** The Steering Committee should ensure that the future work programme of GCOS continues to be revised and should improve the utility of the ECV and their requirements. The work programme should clearly address the needs of adaptation and mitigation of climate change; fully integrate observations of the biosphere across all domains; increase its

advocacy of the sustainability and continuity of *in situ* observations; and work with WCRP to develop a routine, annual, mechanism to discuss WCRP observational requirements.

23. **RECOMMENDATION 9:** Consideration should be given to strengthening the capability of the GCOS secretariat team, located within the Infrastructure Department of WMO, and the appointment or designation of a team lead at an appropriate level.

24. **RECOMMENDATION 10:** The Chair of the GCOS Steering Committee continue to be recognized and respected as a spokesperson for GCOS in relevant fora, complementary to the representation and advocacy role of WMO and other co-sponsors.

25. **RECOMMENDATION 11:** The GCOS Chair should be recognized as a member of the INFCOM Management Group and, by agreement with the President of INFCOM, be invited from time to time to inform EC and Congress on the progress, performance and requirements of the global climate observing system.

26. **RECOMMENDATION 12:** The GCOS Chair and Panel Chairs should build close linkages, through expert participation and alignment of efforts, with relevant INFCOM expert teams (and vice versa, where appropriate) and also with SERCOM and Research Board teams, especially where it will help in understanding needs for and application of ECVs to inform climate change and adaptation.

27. **RECOMMENDATION 13:** The role of GCOS in reporting progress and needs for ocean climate observations to the IOC should continue to be recognized and strengthened by the IOC.

28. **RECOMMENDATION 14:** A revised MoU should be clear that signatories are committing to long-term support for a GCOS Secretariat. The signatories of the revised MoU should ensure that financial and in-kind resources at an appropriate level (currently one million CHF annually) are available for the GCOS secretariat to implement the revised mandate.

29. **RECOMMENDATION 15:** GCOS should provide clear value-based information and a clear vision of how it hopes to develop the global climate observing system in the future to potential sponsors.

30. **RECOMMENDATION 16:** GCOS should revisit the aims of the GCOS Cooperation Mechanism (GCM) to better align it to the current situation and make it more attractive to potential donors. GCOS should produce a plan to inform potential donors about the GCM and its new focus and mobilize resources.

Proposed Revision of GCOS Memorandum of Understanding

31. The proposed new MoU is divided in two parts: (1) The agreement describing GCOS goals and mandate and the sponsor's commitments and (2) Three technical Annexes describing GCOS, the governance and financial matters. To ensure flexibility in updating the technical part, it is divided into three parts as shown below. It is proposed to delegate the authority to the Steering Committee to formulate and amend the technical parts, with the agreement of the sponsors' representatives on the GCOS Steering Committee:

- Annex A: Concept of the Global Climate Observing System
- Annex B: Terms of Reference, structure and functions of the Steering Committee, and the secretariat
- Annex C: Financial arrangements

32. The suggested revised MoU is available in full in Annex A of the full report (GCOS-246).

Financial and administrative implications

33. There are no current specific financial and administrative implications, however the Executive secretary should note Recommendation 14 that signatories of a revised MoU should ensure that appropriate financial and in-kind resources are available for GCOS to implement the revised mandate.