

Process for a network to be accredited as 'Part of the Global Climate Observing System (GCOS)'

Background:

Annex A provides the decision by the 29th GCOS Steering Committee (GCOS SC-29, 7–9 December 2021) on recognizing GCOS Network. There are 3 designations of network: **GCOS Network**, **GCOS Affiliated Network** and **GCOS Recognized Network**. These designations differ only in their oversight and reporting relationship with GCOS (see Table 2 in Annex A) and in no way reflect differing quality or importance. It is also accepted that not all high-quality networks may wish to apply for this GCOS recognition.

Process:

- 1) A network wishing to be accredited by GCOS as either a **GCOS Network**, **GCOS Affiliated Network** and **GCOS Recognized Network** shall approach the relevant GCOS Expert Panel¹ and must complete the proforma in Table 1. It is recommended that the panel is approached first as they can assist in completing the application and making the process more efficient.
- 2) The GCOS Expert Panel shall consider the application within 8 weeks. The panel may approach the network for additional information and/or clarifications. If the application meets the requirements agreed by the Steering Committee (see annex A) then they shall accept the proposal. In assessing an application, the panel shall:
 - a. Review the application to ensure that the requirements laid down in Annex A are met;
 - b. Confirm the intent to produce long-term records, accepting that long-term funding may not be guaranteed for a network or data centre;
 - c. Accept some partial exceptions to the requirements (e.g. some access restrictions to the data) provided there is clear evidence that these are being addressed. In this case a provisional acknowledgement should be recommended with a date to be reviewed again.
- 3) The Panel recommendation(s) shall then be reviewed and approved by a representative from each of the Panels and the GCOS Network Manager within 4 weeks.
- 4) A summary report, with the approval (or rejection) decision shall be forwarded to the GCOS Steering Committee for information.
- 5) The network shall be notified of the outcome of the process by the GCOS Secretariat.
- 6) Once approved the network can use the GCOS Network logo (Figure 1) on their website and all publications. Electronic copies of publications should be sent to the GCOS Secretariat. **GCOS Networks and GCOS Affiliated Networks** shall report to the appropriate panels and **GCOS Recognized Networks** are asked to copy reports on network performance to GCOS.

¹ i.e. the panel responsible for the ECV(s) being monitored



Figure 1. GCOS Network logos

Table 1. Application to become a GCOS Network

Application to be formally acknowledged as a GCOS Network:	
1. Name of Network	
2. ECV(s) and ECV products(s) monitored	
3. Contact person (name, email and phone)	
4. Type of network designation proposed?	<i>GCOS Network</i>
	<i>GCOS Affiliated Network</i>
	<i>GCOS Recognized Network</i>
5. Does the network abide to the set of basic GCOS Climate Monitoring Principles listed below? Please provide evidence for your answer in boxes 11 to 19	<i>FULLY</i>
6. Does the network provide, or contribute to, a worldwide ² coverage ³ ?	<i>PARTIALLY</i>
7. How is network performance reported?	
8. Who has responsibility for oversight of the network?	
9. Name & web address of Data repository	
10. Is access to data free and unrestricted? If not, please briefly describe any restrictions.	
11. (GCOS Climate Monitoring Principle #1): How is high priority for additional observations focused on data-poor regions, poorly observed parameters, regions sensitive to change, and key measurements with inadequate temporal resolution?	
12. (GCOS Climate Monitoring Principle #2): How have Long-term requirements, including appropriate sampling frequencies, been specified to network designers, operators and instrument engineers at	

² Worldwide: i.e everywhere the ECV in question occurs (e.g. permafrost is not global).

³ The network can either operate at a global scale or be a regional contribution to global coverage.

Application to be formally acknowledged as a GCOS Network:

<p>the outset of system design and implementation?</p>	
<p>13. (GCOS Climate Monitoring Principle #3): Is this an observing system based on limited term funding (e.g. research)? How can long-term operations be assured?</p>	
<p>14. (GCOS Climate Monitoring Principle #3): How is the operation of historically uninterrupted stations and observing systems maintained?</p>	
<p>15. (GCOS Climate Monitoring Principle #4): How is the impact of new systems or changes to existing systems assessed prior to implementation?</p>	
<p>16. (GCOS Climate Monitoring Principle #4): What period of overlap for new and old observing systems is required?</p>	
<p>17. (GCOS Climate Monitoring Principle #5 and #8): How are the metadata (details and history of local conditions, instruments, operating procedures, data processing algorithms and other factors pertinent to interpreting data) documented, treated and preserved?</p>	
<p>18. (GCOS Climate Monitoring Principle #7): How is the quality and homogeneity of data regularly assessed as a part of routine operations?</p>	
<p>19. (GCOS Climate Monitoring Principle #9): What data management systems that facilitate access, use and interpretation of data and products are part the climate monitoring systems?</p>	

ANNEX A: GCOS Networks

Decision of GCOS Steering Committee 2021

- 1) Being recognized as a GCOS Network should:
 - Impose little or no extra effort on the networks;
 - Recognize the contribution these networks make to global climate observations;
 - Allow the networks to clearly show their contribution to global climate observations.
- 2) It is clear that most, if not all, networks contributing to GCOS also serve other needs e.g. most atmospheric observations are made primarily for weather prediction and warnings. This proposal will not change the requirements on the observing stations but will clearly indicate those that are needed to contribute to the development of long-term climate data records.
- 3) Networks do not need to be acknowledged by GCOS – this proposal provides option for networks wanting to take part but there is no need for networks to do so if they do not wish.
- 4) To be acknowledged by GCOS, a network shall:
 - Abide by the GCOS Monitoring Principles (UNFCCC decision 11/CP.13, WIGOS Manual, Annex VIII);
 - Report regularly on the performance of the network;
 - Ensure there is a data repository allowing free and open access to all data and metadata. This can be a data centre associate with the network, or a separate institution. Data repositories should have a commitment to storing data indefinitely;
 - Have identified who has responsibility for oversight of the network. Oversight is the role of monitoring the performance of the network as a whole, identifying non-operational stations and keeping track of the opening and closing of stations. This distinct from the operation and management of individual stations which can be spread across many bodies in a single network (e.g. many NMHS operate stations in GSN);
 - Monitor one or more ECV Products;
 - Aim to provide, or contribute to, a worldwide⁴ coverage. The network can either operate at a global scale or be a regional contribution to global coverage;
 - Meet specific climate needs, e.g.:
 - Commitment to provide long-term, historic data records;
 - Adequate accuracy and stability.
- 5) GCOS acknowledges three types of networks to be identified as: **GCOS Network**, **GCOS Affiliated Network** and **GCOS Recognized Network** (see Table 2). This classification is about who has oversight and how the network reports – NOT about quality or importance and is separate from the network tiers.
- 6) There are additional networks that may not want to be recognized by GCOS, or may not meet all the requirements in (18) above, that, nevertheless, make significant contributions to global climate observations.
- 7) Where a global coverage is achieved thorough combining several regional networks it may be appropriate for the regional networks to be *recognized* and the global network to be *affiliated*.

⁴ Worldwide: i.e everywhere the ECV in question occurs (e.g. permafrost is not global).

- 8) There is no need for an ECV product to be only measured by a single network.
- 9) Networks wishing to be acknowledged by GCOS should discuss this with the appropriate GCOS Expert Panel which will consider if they meet the requirements described in this document. If the panel agrees the proposal shall be forwarded to the Steering Committee for approval.

Table 2. Types of GCOS Networks

Network Oversight ⁵		Reporting
<i>GCOS Network</i>	GCOS, oversight by GCOS Network Manager or GCOS panels	Annually to GCOS, represented at GCOS Meetings
<i>GCOS Affiliated Network</i>	Oversight exists but is not GCOS e.g. OCG for ocean networks or this is part of the network as in the GTN	
<i>GCOS Recognized Network</i>		Annual report available but no direct reporting to GCOS

⁵ Oversight is the role of monitoring the performance of the network as a whole, identifying non-operational stations and keeping track of the opening and closing of stations. This distinct from the operation and management of individual stations which can be spread across many bodies in a single network (e.g. many NMHS operate stations in GSN).

ANNEX B: GCOS Climate Monitoring Principles

The GCOS climate monitoring principles were adopted by UNFCCC COP-9 in 2003, with Decision 11/CP.9. After twenty years those principles were reviewed by GCOS, resulting in a revised set of climate monitoring principles applicable across all observing domains and technologies. The updated principles were included in the new WMO Integrated Global Observing System (WIGOS) Manual ([WMO-1160](#)) that was adopted by the WMO Executive Council at its 78th session, in June 2024. During UNFCCC COP29 in Baku, the Subsidiary Body for Scientific and Technological Advice on its 61th session (SBSTA61) “noted the updated GCOS global climate monitoring principles” and “encouraged Parties to consider the updated principles” ([FCCC/SBSTA/2024/L.17](#)).

List of the GCOS Climate Monitoring Principles:

1. **Spatial and Temporal Sampling:** It is critical for observations to sample the Earth system in such a way that climate-relevant diurnal, seasonal, interannual and long-term changes can be resolved. When the opportunity exists to fill gaps in the existing observing system high priority should be given to data-poor regions, poorly observed parameters, regions sensitive to change, and key measurements with inadequate temporal resolution.
2. **System Design:** Observing systems should encompass both in-situ and remote sensing platforms as appropriate based on their respective strengths and limitations. Climate monitoring requirements regarding appropriate spatial and temporal sampling, instrument precision and accuracy, and stability should be specified to observing system designers, operators, and instrument engineers at the outset of system design and implementation. Observing systems should include reference observations to ensure well characterized measurement time series traceable to SI and/or community standards with robustly quantified uncertainties that can be used with confidence. Periodic reviews should be conducted to assess the feasibility and benefits of incorporating new technologies into the observing systems.
3. **System Sustainability:** For in-situ observations, operation of historically uninterrupted stations and observing systems that meet the specified calibration, stability, and siting requirements should be maintained for as long as possible. For satellite measurements, continuity should be ensured through appropriate launch and orbital strategies. Relevant climate research⁶ observing systems and networks should be sustained and transitioned to operational status.
4. **System Change Management:** The impact of new systems or changes to existing systems should be assessed prior to implementation. A suitable period of overlap between new and old instruments and observing systems should be ensured for a period adequate to determine inter-instrument biases and maintain the homogeneity and consistency of time-series observations.
5. **Metadata:** In order to ensure the utility of the observations, the details and history of local conditions, site location, instruments, operating procedures, data processing algorithms, data errors and biases, and other factors pertinent to interpreting data (i.e., metadata) and their changes over time should be documented and treated with the same care as the data themselves.
6. **Calibration:** Prior to the deployment of a new instrument or observing platform, its technical characteristics, such as accuracy, precision, and stability, should be rigorously documented and calibrated in order to ensure consistency with climate-relevant requirements. Calibration should be traceable to SI units or to reference observations. Following deployment, all system components should be regularly recalibrated or otherwise evaluated to ensure the highest data quality.

⁶ Research observing systems and networks are often short-term funded with no guarantee for long-term operations.

7. **Data Quality and Homogeneity:** The quality and homogeneity of data should be regularly assessed as a part of routine operations. Random errors and biases in the observations should be identified and documented.
 8. **Data and Metadata Preservation:** Data and metadata should be preserved for secure, long-term storage and retrieval in an appropriate repository according to relevant international standards.
 9. **Data Access:** Data management systems that facilitate access, use, and interpretation of data and products should be included as essential elements of climate monitoring systems. These systems should facilitate open user access to climate products, metadata, and raw data, including key data for delayed-mode analysis, in line with the WMO Unified Data Policy (Resolution 1).
 10. **Data Exploitation:** The collected observations should be used to generate datasets of ECVs. In order to keep pace with evolving technologies, climate-relevant requirements, and methods, these datasets should be sustained, regularly assessed, and reprocessed as needed.
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