



Updates on the Global Climate Observing System - GCOS

Earth Information Day 2024
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Thelma Krug, GCOS Chair



Supported by the European Union



GCOS – Global Climate Observing System



**GLOBAL CLIMATE
OBSERVING SYSTEM**
KEEPING WATCH OVER OUR CLIMATE

GCOS is a Co-Sponsored Programme:

• WMO



• IOC - UNESCO



• UNEP



Intergovernmental
Oceanographic
Commission

• ISC



Additional contributors:

EU Commission, US State Dept.,
NOAA, Germany, EUMETSAT



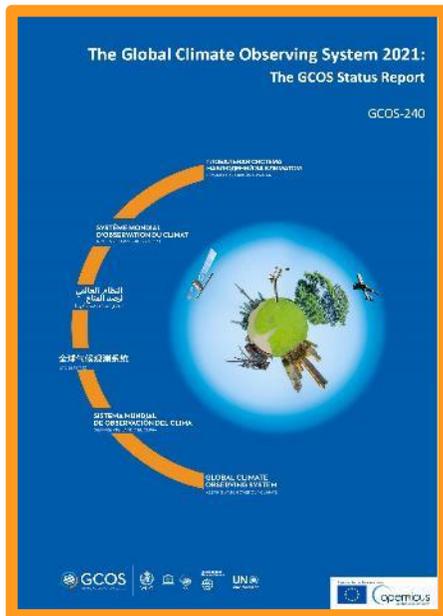
**GCOS: Climate Observations
enabling climate science and services**

GCOS works towards **climate observations** being **enhanced** and **sustained** into the future, to provide the evidence needed to understand and predict the evolution of the climate, to guide mitigation and adaptation measures, to assess risks and enable attribution of climatic events to underlie causes, and to underpin climate services.

GCOS is mandated to report to UNFCCC

≈ 5 years cycle

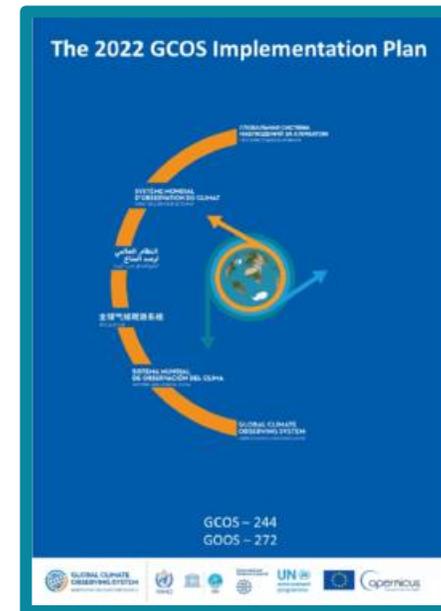
GCOS STATUS REPORT



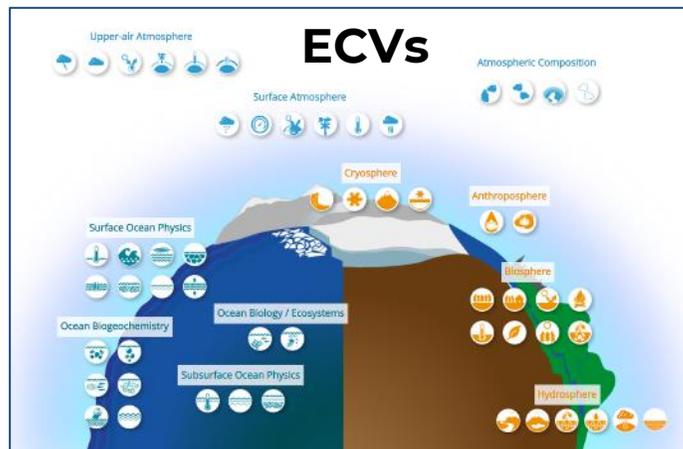
Assess if the status of the observing system for climate meets those requirements



GCOS IMPLEMENTATION PLAN and ECVs REQUIREMENTS



Propose actions to improve the observing system for climate



Identify what we need to measure (ECVs requirements)

GCOS and friends (few examples)

CEOS-CGMS Working Group on Climate

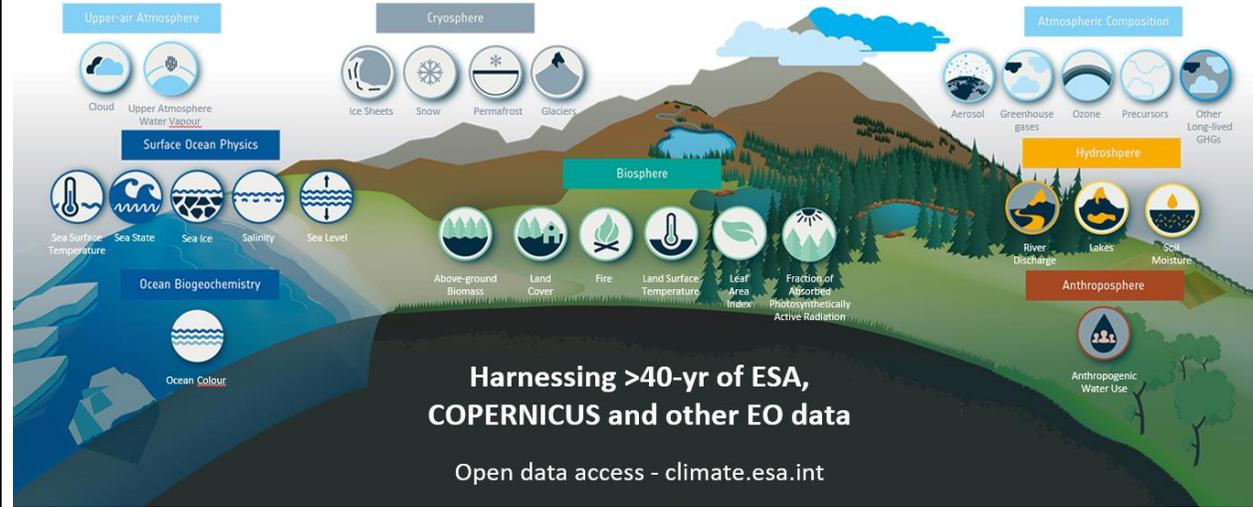
- coordinates and promotes collaborative efforts among the world's major space agencies;
- maintains a comprehensive database cataloging the availability of systematic climate data records derived from space-based obs.;
- provides response to the GCOS IP, encouraging space agencies to develop programs that address identified gaps and strengthen the global observing system for climate

CEOS and CGMS agencies provide long-term climate data records for many ECVs as defined by GCOS.



ESA's Climate Change Initiative - CCI

GCOS defined **55** Essential Climate Variables | **36** benefit from space observations
27 generated by ESA Climate Change Initiative | ~20 transferred to operational climate services



SOFF - Systematic Observations Financing Facility

GCOS is represented in the SOFF Advisory board which serves to formalise GCOS-SOFF collaboration and strengthen the climate voice in SOFF decision making.

GOOS Global Ocean Observing System

- **OOPC**: ocean panel co-sponsored by GOOS, GCOS and WCRP
- GOOS Biogeochemical panel (IOCCP/BGC) is coordinating a **GOOS carbon (and N₂O) plan** to respond to GCOS and G3W mandates regarding GHG monitoring and data management in the ocean



GCOS Climate Monitoring Principles

- First version adopted by COP-5 (1999) decision 5/CP.5
- Current version adopted by COP-9 (2003) decision 11/CP.9

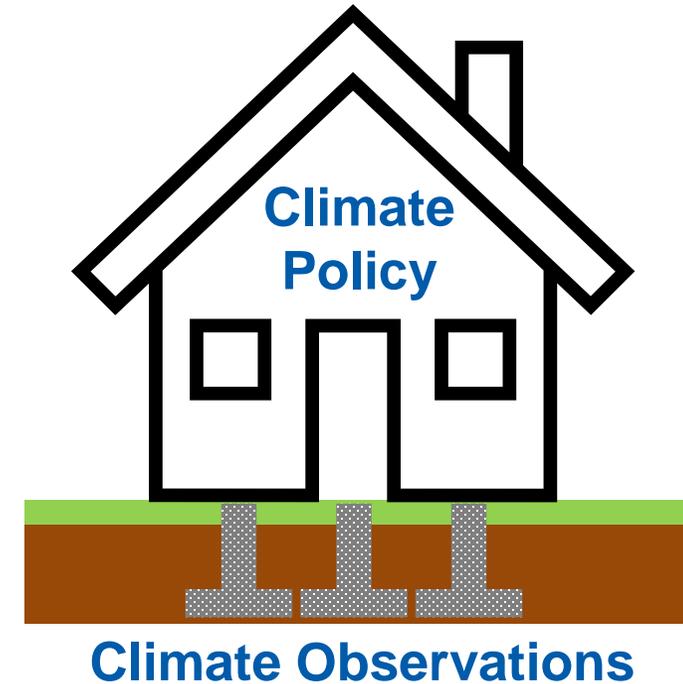
Following best practices a review has been undertaken in 2023 for relevancy and applicability of the GCOS climate monitoring principles. This has resulted in a revised set of principles applicable across all observing domains and technologies.

In 2024 this updated version has been included in the new [WMO Integrated Global Observing System \(WIGOS\) Manual](#) that was adopted at the 78th session of the WMO Executive Council.

Request to Parties: to replace the Climate Monitoring Principles contained in appendix II to chapter III of document FCCC/CP/1999/7, and updated with Decision 11/CP.9, with the new version included in the WMO WIGOS Manual.

Observations are foundational for Climate Policy

- Climate observations are a foundational element for climate related policy.
- Without a global observing system for climate you do not have the robust evidence basis needed to understand climate change and inform policy.
- It is critical to both support systematic global observations and relevant coordinating mechanisms such as GCOS and WMO.



Observations are at the beginning of the value chain for many applications

Observations need to be sustained

Currently both the observing systems and the coordination of observations are not adequately funded to close the significant gaps that still exist, especially for in-situ observations for almost all the GCOS Essential Climate Variables (ECVs).

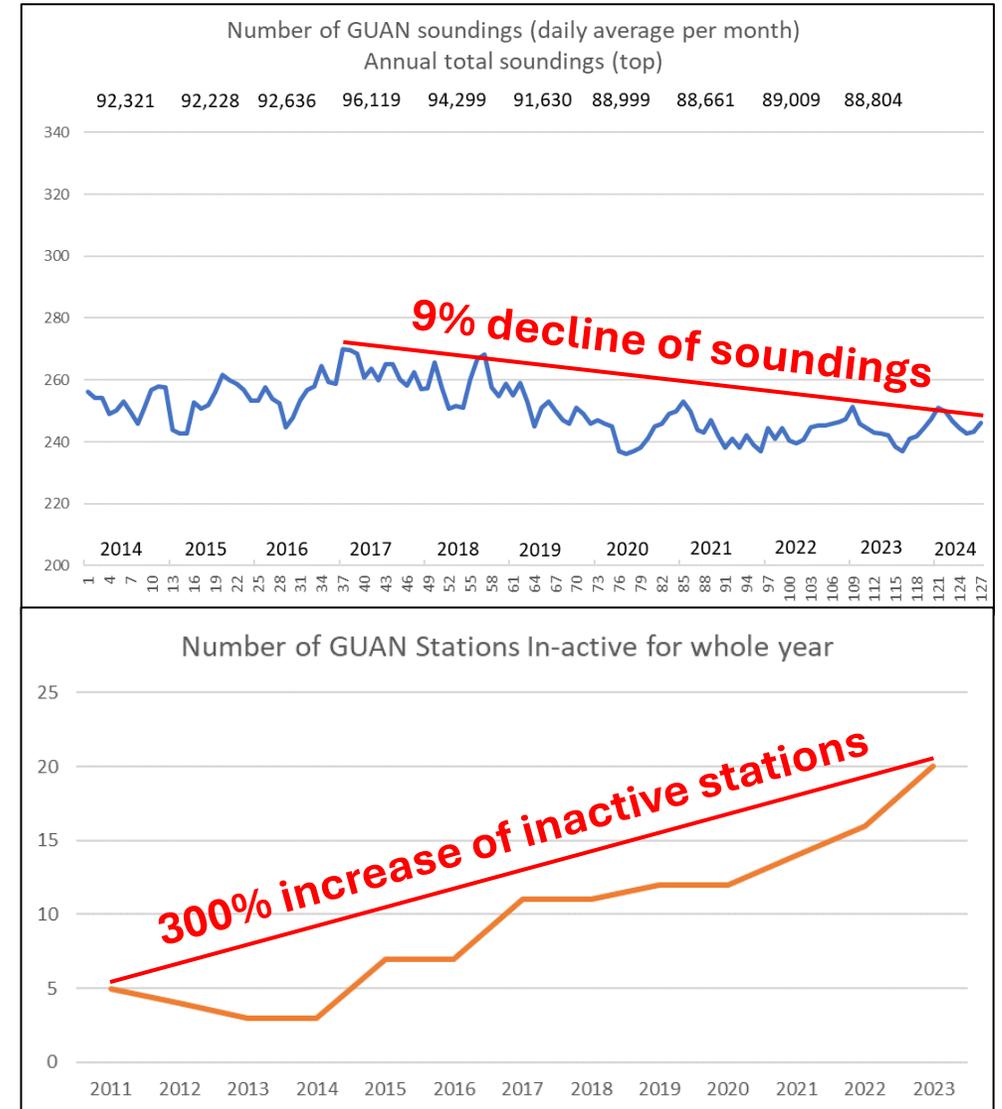
Examples of Gaps:

- geographical coverage
- monitoring capacity
- long-term data preservation
- access to data
- etc.



improvements
expected
thanks to SOFF

GUAN - GCOS Upper-Air Network



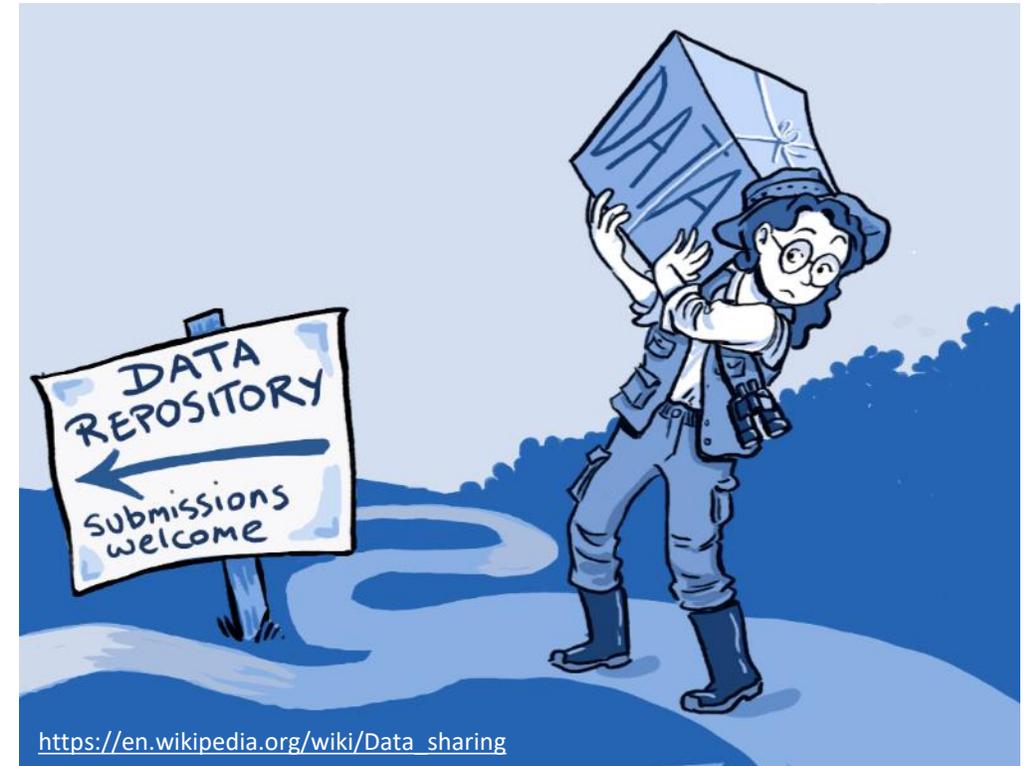
... and many of the regions are showing a decreasing performance of stations

Importance of Historical Data Sharing

Historical data sharing (including data rescue) is essential for:

- obtaining high quality long-term climate datasets
- developing adaptation metrics supporting GGA and EW4A
- producing the next generation of reanalysis products which will drive improved Machine Learning forecast products and impacts assessments in the IPCC AR7 cycle.

Request to Parties: noting the new WMO Unified Data Policy, Parties are encouraged to share their historical archives of data for GCOS Essential Climate Variables (ECVs) to recognised global and regional climate repositories.



GCOS can provide advice and support

GCOS and Countries

- Global observations originate at the country level.
- Parties play a key role in establishing the national component of a comprehensive global system.
- GCOS underlines the importance of increasing collaboration at national level and encourages Parties to implement relevant actions of the 2022 GCOS IP.
- GCOS is ready to assist countries in their climate observations efforts by liaising with GCOS National Coordinators.

Request to Parties: designate (if not already done) your GCOS National Coordinator (ref. FCCC/SBSTA/2005/10, FCCC/SBSTA/2009/3).

A national GCOS coordination mechanism for climate observations is needed for:

- linking global observations with local needs;
- ensuring that national observations are regularly reported and follow the GCOS requirements and guidance;
- developing a closer connection between GCOS and the UNFCCC delegates;
- informing the GCOS Status Report;
- undertaking the GCOS IP.



Thanks

