

ГЛОБАЛЬНАЯ СИСТЕМА  
НАБЛЮДЕНИЙ ЗА КЛИМАТОМ  
НЕУСТАННО СЛЕДИМ ЗА КЛИМАТОМ

SYSTÈME MONDIAL  
D'OBSERVATION DU CLIMAT  
NOUS VEILLONS SUR LE CLIMAT

النظام العالمي  
لرصد المناخ  
لنضع المناخ نصب أعيننا

全球气候观测系统  
密切监视气候

SISTEMA MUNDIAL  
DE OBSERVACION DEL CLIMA  
SIEMPRE VIGILANDO EL CLIMA

GLOBAL CLIMATE  
OBSERVING SYSTEM  
KEEPING WATCH OVER OUR CLIMATE

# Report on AOPC

31<sup>st</sup> Session of the GCOS Steering Committee  
*Geneva, 2-5/07/2024*

Peter Thorne



**GLOBAL CLIMATE  
OBSERVING SYSTEM**

KEEPING WATCH OVER OUR CLIMATE



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# AOPC members

**Peter Thorne – University of Maynooth (Ireland) – Chair**

Elizabeth Kent (NOC-UK)

Rainer Hollmann (DWD)

Imke Durre (NCEI, USA)

Chiara Cagnazzo (ECMWF, Italy)

Stephan Bojinski (EUMETSAT)

Blair Trewin (BOM; Australia)

Christine Best (Canada)

Gary Morris (NOAA/GML, USA)

Carmen García Izquierdo (CEM, Spain)

Kouakou Bernard DJE (NMHS, Cote D'Ivoire)

Martin Ridal (SMHI, Sweden)

Colin Morice (UK)

Steve Goodman (USA)

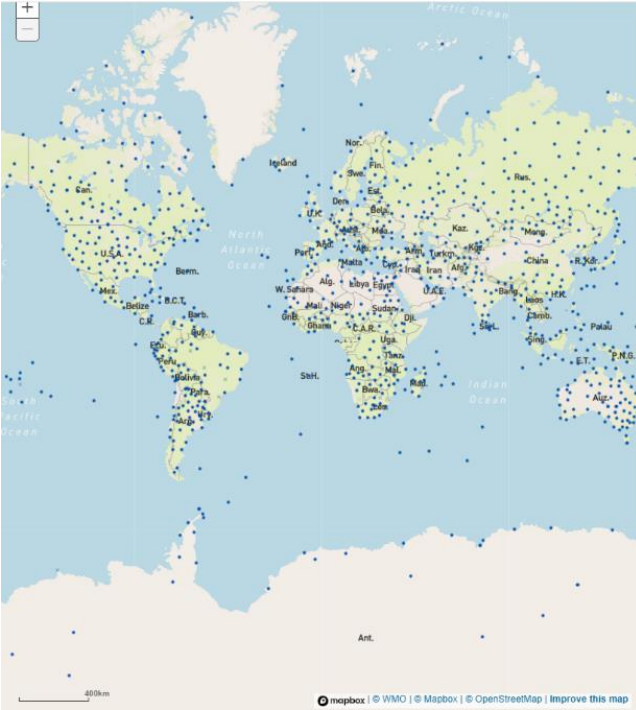
Ex-officio members:  
WGClimate: Wenying Su  
GAW: Paolo Laj  
BSRN: Christian Lanconelli

GCOS Secretariat Support: Caterina Tassone  
GCOS Network Manager: Tim Oakley (UK Metoffice)

# Networks

4 global networks are under AOPC governance: GSN, GUAN, GRUAN and GSRN

Additionally, BSRN (Baseline Surface Radiation Network) is a recognized GCOS Network reporting to AOPC



GCOS Surface Network (GSN) – 1025 stations (2022)

The GCOS Surface Network (GSN) is a baseline network comprising a subset of stations chosen mainly to give a fairly uniform spatial coverage from places where there is a good length and quality of data record. Mandatory parameters measured by a GSN station are temperature and precipitation.

The purpose of the GUAN and GSN is to preserve a minimum set of upper-air stations for the foreseeable future and to provide this information to the global climate community with no formal restriction.



The GCOS Upper-Air Network (GUAN) serves specifically the needs of global climate applications and has been established mainly on the basis of existing GOS networks. It forms a minimum configuration required for global applications for upper-air.

Dedicated GCOS Network Manager to support the GSN and GUAN monitoring.

# Reference Networks

AOPC is driving the establishment of reference networks. Members of AOPC work closely with BIPM, SC-MINT, SC-ON



GCOS Reference Upper-Air Network measurements are providing long-term, high-quality climate data records from the surface, through the troposphere, and into the stratosphere. These are being used to determine trends, constrain and calibrate data from more spatially-comprehensive observing systems (including satellites and current radiosonde networks), and provide appropriate data for studying atmospheric processes. GRUAN is envisaged as a global network of eventually 30-40 sites that, to the extent possible, builds on existing observational networks and capabilities.



The GCOS Surface Reference Network (GSRN) will deliver the reference component of the tiered system for surface observations. The initial GSRN will provide sustained reference quality observations, with full traceability and fully defined uncertainty, on a global scale (on land) of at least the ECVs surface temperature and precipitation.

A TT-GSRN under GCOS and SC-ON was established under INFCOM-2 and is now working on the establishment of a pilot GSRN.

17 stations have been selected for the pilot GSRN. First flow of data expected by the end of 2024.

# AOPC and GCOS

- Much of the work of AOPC is guided by the GCOS IP. Panel members are addressing the IP actions related to atmospheric networks and ECVs.
- Additionally, there are cross-cutting actions where AOPC members work together with OOPC and TOPC panel members:
  - ECV Rationalization
  - Air-sea and Land-air fluxes (Action B9)
  - Earth cycles (Action B10)
  - Global Data Centers (Action D1)

# AOPC and WMO

## AOPC members contribute to many of the WMO activities:

- GBON and SOFF: Support the initial GBON; working with the SOFF Secretariat to consider the expansion of SOFF to support GCOS; a GCOS member (Peter Thorne, Deputy Chair of SC), part of the SOFF Advisory Board
- Data Climate Management: work together with WMO (INFCOM and SERCOM) on requirements for global climate data centers
- GSRN: The GSRN is being implemented by a task team jointly with GCOS and SC-ON and in collaboration with SC-MINT
- Tiered Networks: lead the original WMO task team producing a concept note approved at INFCOM-2; lead the workshop on the establishment of 2<sup>nd</sup> task team to implement concept
- Daily Climate: collaborate with WMO for the implementation of the exchange of Daily Climat
- Rolling Review of Requirements: actively collaborates with JET-EOSDE on the application area “Atmospheric Climate Monitoring”

# AOPC and WMO

G3W: 1 AOPC was member in the Study Group; now waiting for decision on how GCOS will contribute to G3W

Data Policy Implementation of the WMO Data Policy for historical observations: AOPC Chair member of the Focus Group on Data Policy Implementation

AOPC member leading a task team on monitoring progress against Paris Agreement on long term temperature goal

AOPC Chair co-chairing the Infrastructure commission TT on climate data models

# AOPC and Copernicus

**GNSS-PW:** Following a request of AOPC, in 2021, the ECMWF, within the C3S, agreed to establish, host, and maintain a GNSS global repository that aims at offering access to the largest amount of GNSS raw data (RINEX files) collected.

**Data Rescue:** collaborate with C3S on C3S2 311 Lot1: access to a comprehensive archive of historical surface observations , with support to data rescue - all aspects of data rescue, securing new data from third parties as well as harmonization and quality control of the secured holdings.

**Thunder Day Database:** hosted by C3S. Member of TT-LOCA actively working to populate this database.

**Reanalysis:** collaborating on paper on reanalysis and adaptation.

**Parallel data holding:** collaboration on creating a repository for parallel data holding

# AOPC and WGClimate

Providing feedback to WGClimate on the ECV Inventory, IP actions and requirements  
Update of documentation



# GCOS IP Actions 2023-2024

## AOPC related actions – 2023-2024

- Action A1: Undertake an assessment of current levels of funding support for global in situ networks delivering relevant in situ ECV data (Done, see topic...)
- Action B1: Reference networks: implementation of GRUAN and GSRN (ongoing)
- Action B2; Implementation of initial GBON and the associated SOFF mechanism to fill long-standing gaps to globally monitor climate over land and oceans. (in progress)
- Action B4: Extend the in-situ monitoring of atmospheric composition over the ocean (in progress)
- Action C1: Review existing monitoring standards, guidance and best practices for each ECV, ensuring these reflect current state-of-the-art (in progress)
- Action C3: General Improvements to in situ Data Products for all ECVs (not yet started)
- Action C3: Undertake efforts to account for spatio-temporal sparsity of in situ measurements via interpolation (in progress)
- Action D1: Advocate for implementation of the WMO Unified Data Policy to foster a free and unrestricted exchange of available data (in progress)
- Action D2: Identify ECVs for which adequate global centres do not exist or are insufficiently supported and facilitate and support the creation or improvement of global data centres for these ECVs (in progress)
- Action D5: Undertake additional in situ data rescue activities (ongoing)
- Action F1: Increase temporal resolution of surface air temperature, soil moisture and precipitation to capture both climate and human-induced change and extremes (in progress)
- Action F1: Include daily averages with the monthly CLIMAT reports for land surface stations(GSN/RBON) (in progress)

# GCOS IP Actions 2023-2024

**Several actions for 2023-2024 are cross-panel actions and will be presented later in the meeting:**

B9: Improve and extend in situ measurements needed to estimate surface fluxes, with the objectives of improving accuracy and better defining the uncertainties of those measurements and calculated fluxes (in progress)

B10: Identify gaps in the climate observing system to monitor the global energy, water and carbon cycles (in progress)

C1: Review the GCOS climate monitoring principles (Done)

D1: Draft requirements for the activities of Global Climate Data Centres and identify the relevant internationally agreed standards (in progress)

# AOPC 2024-2025

AOPC is going to continue work started on the IP actions and add the actions not yet considered.

Next in person meeting: Asheville (USA) 17-20 September 2024

Meeting of GSRN-TT: Xi'An (China) 14-18 October 2024

GRUAN Management Meeting: Lindenberg (Germany), 24-25 February 2025

ICM-16: Fall 2025

Teleconferences every 3 months

# Challenges

- Active participation of panel members
- Many activities within WMO require AOPC experts and this falls always on the same 1-2 experts
- Geographical balance in the panel difficult
  - Career stage and gender balance
- Memory and ownership across successive cycles of Implementation Plan/Status Report
- Cross-Panel coordination

# Thank you!



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