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 OBSERVACIÓN DEL CLIMA
SIEMPRE VIGILANDO EL CLIMA

GLOBAL CLIMATE OBSERVING SYSTEM
KEEPING WATCH OVER OUR CLIMATE

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KEEPING WATCH OVER OUR CLIMATE

WMO IOC International Science Council UN environment

Supported by the European Union
Copernicus Europe's eyes on Earth

GCOS AOPC

WMO Update

Dr Anthony Rea (D/I, D/GCOS)

27 June 2022

Outline

- WMO Data Policy
- GBON
- SOFF
- Historical Data
- GBON Expansion

The World Meteorological Congress approved three linked strategic infrastructure initiatives

WMO Unified Data Policy

- Increased international exchange of observations and data by all Members
- Return of high-quality model output to all Members

Global Basic Observing Network

- Example of regulatory implementation of data policy
- Increased exchange of observations by all Members, **facilitated by both Data Policy and SOFF**

Systematic Observations Financing Facility

- Technical and financial support for **GBON** implementation where it is most needed
- Building on **GBON regulations**

Unified Data Policy (Resolution 1)

(1) **Members shall** provide on a **free and unrestricted basis** the **core data** that are necessary for the provision of services in support of the protection of life and property and for the well-being of all nations, at a minimum those data described in Annex 1 to this resolution which are required to monitor and predict seamlessly and accurately weather, climate, water and related environmental conditions;

(2) **Members should** also provide the **recommended data** that are required to support Earth system monitoring and prediction activities at the global, regional and national levels and to further assist other Members with the provision of weather, climate, water and related environmental services in their States and Territories. Conditions may be placed on the use of recommended data;7

Agrees also that **Members should** provide **without charge** access to all **recommended data** exchanged under the auspices of WMO to **public research and education communities**, for their non-commercial activities;

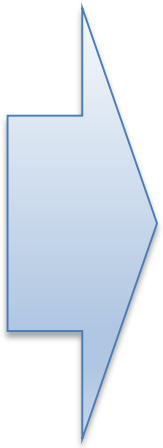
Requests the presidents of regional associations to support and monitor the implementation of this resolution within their regions;

New WMO Unified Data Policy (2021)

Key changes with respect to Resolution 40 (1995)

Resolution 40 (1995)

1. Covers weather data only;
2. Two main categories of data:
   - *Essential* (*shall* be exchanged);
   - *Additional* (*should* be exchanged);
3. Specific "*essential*" datasets listed directly in Annex I to the resolution (with some reference also to RBSN);
4. "*Free and unrestricted*" exchange (term not defined in the Resolution);
5. Covers exchange of data between NMHSs



Resolution 1 (2021)

1. Covers all WMO Earth system data: weather, climate, hydrology, ...
2. Two main categories of data:
   - *Core* (*shall* be exchanged);
   - *Recommended;* (*should* be exchanged);
3. Specifics on *core* and *recommended* data referred to Technical Regulations, primarily Manuals on WIGOS, GDPFS;
4. "*Free and unrestricted*" exchange (term defined directly in the Resolution, literal interpretation);
5. Addressed to Members, but covers exchange of data between all partners, inclucing private sector, academia, etc.

1. Weather-related data

This section lists observational and other data necessary to support weather monitoring and prediction efforts of the WMO Members. Such data are generally exchanged in real or near-real time, depending on the specific application.

1.1 Core observational data:

1.1.1 Surface-based:

Observations provided by the Global Basic Observing Network (GBON) and other observational data, as specified in the ***Manual on the WMO Integrated Global Observing System*** (WMO-No. 1160).

1.1.2 Space-based:

(a) Satellite data required in order to ensure the performance and quality of NWP output, as agreed with Members operating satellites or relevant satellite operators, and listed in the ***Manual on the WMO Integrated Global Observing System*** (WMO-No. 1160);

(b) Satellite data required to support nowcasting applications including the generation of warning and advisory products, as agreed with Members operating satellites or relevant satellite operators, and listed in the ***Manual on the WMO Integrated Global Observing System*** (WMO-No. 1160).

2. Climate

Note that some core climate data are covered under the weather, cryosphere, hydrology, atmospheric composition and ocean sections. Core data includes current and historic time series data needed to understand climate change, assess the associated impacts and risks for lives, livelihoods, and property and support climate services. Data shall be made available in a timely manner, with a tentative maximum delay of one year.

2.1 Core observational data:

(a) Measurements provided by the GCOS Upper-Air Network (GUAN) and GCOS Surface Network (GSN) stations (see also 1.1.1 (a));

(b) Climate data as defined in the ***Manual on High-quality Global Data Management Framework for Climate*** (WMO-No. 1238);

(c) Essential Climate Variables (ECVs) as defined by the Global Climate Observing System (GCOS) in ***the Manual on the WMO Integrated Global Observing System*** (WMO-No. 1160) to the extent that the Member holds the data in a digital archive.

2.2 Other core data:

Climate reanalysis fields provided by GDPFS centres, as listed in the ***Manual on the Global Data-processing and Forecasting System*** (WMO-No. 485).

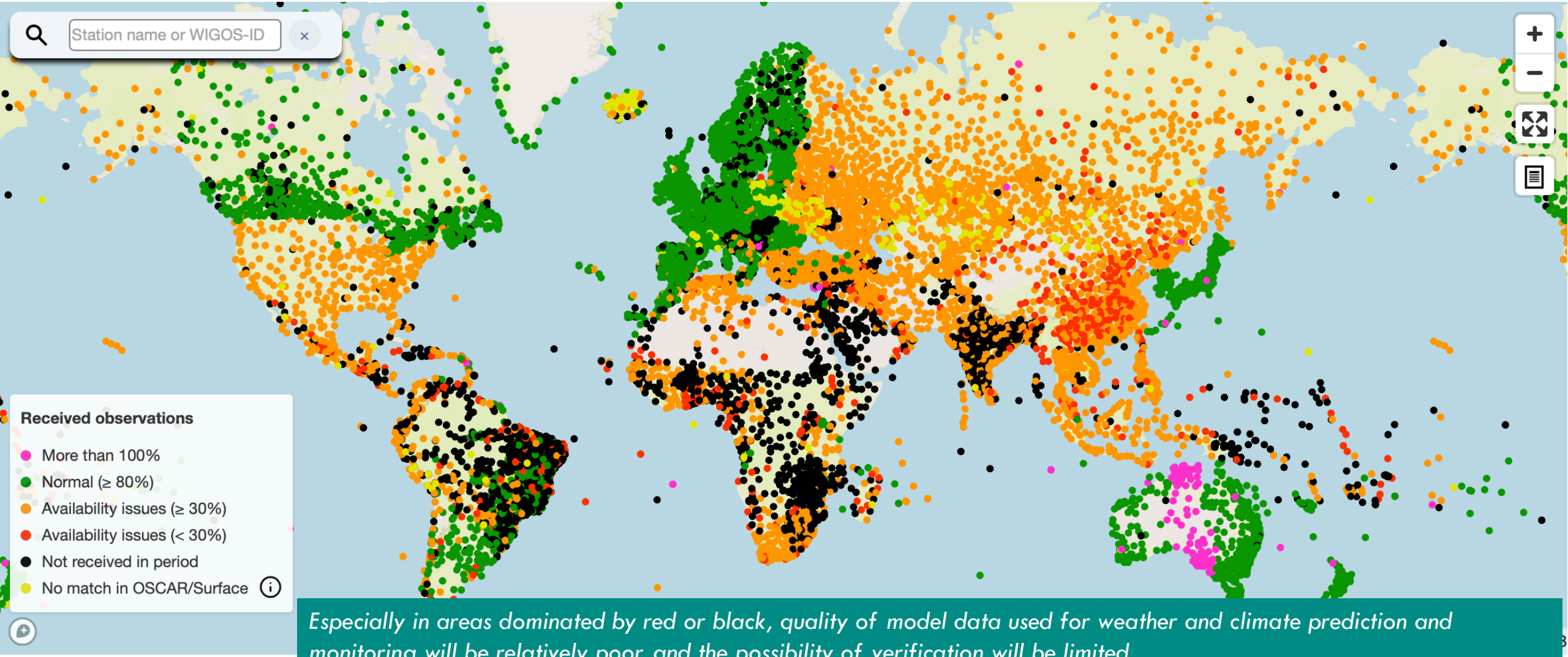
2.3 Recommended data:

Members should exchange all climate data defined in the ***Manual on the WMO Integrated Global Observing System*** (WMO-No. 1160) and encourage all data holders to share their climate data.

Urges Members to immediately commence their implementation of this network, including the necessary preparations for GBON station designation and GBON data exchange, if needed in a phased approach, as allowed by their individual capacities, where applicable, in combination with support of multilateral and bilateral development partners, and financial mechanisms such as the Systematic Observations Financing Facility (SOFF);

Urges further Members to support the implementation of GBON, including by supporting the development and establishment of SOFF and to consider contributing resources – financial, technical or in-kind – to its development and operation;

1. The persistent problem of insufficient observational data coverage



Especially in areas dominated by red or black, quality of model data used for weather and climate prediction and monitoring will be relatively poor, and the possibility of verification will be limited

Surface pressure observations received by global NWP Centers on May 8 2022, 18Z)
(source: [WIGOS Data Quality Monitoring System](#))

2. Some reasons for persistent observational data gap

Availability of observations versus national resources

WMO Convention and Paris Agreement implicitly assume that observations is solely a national responsibility

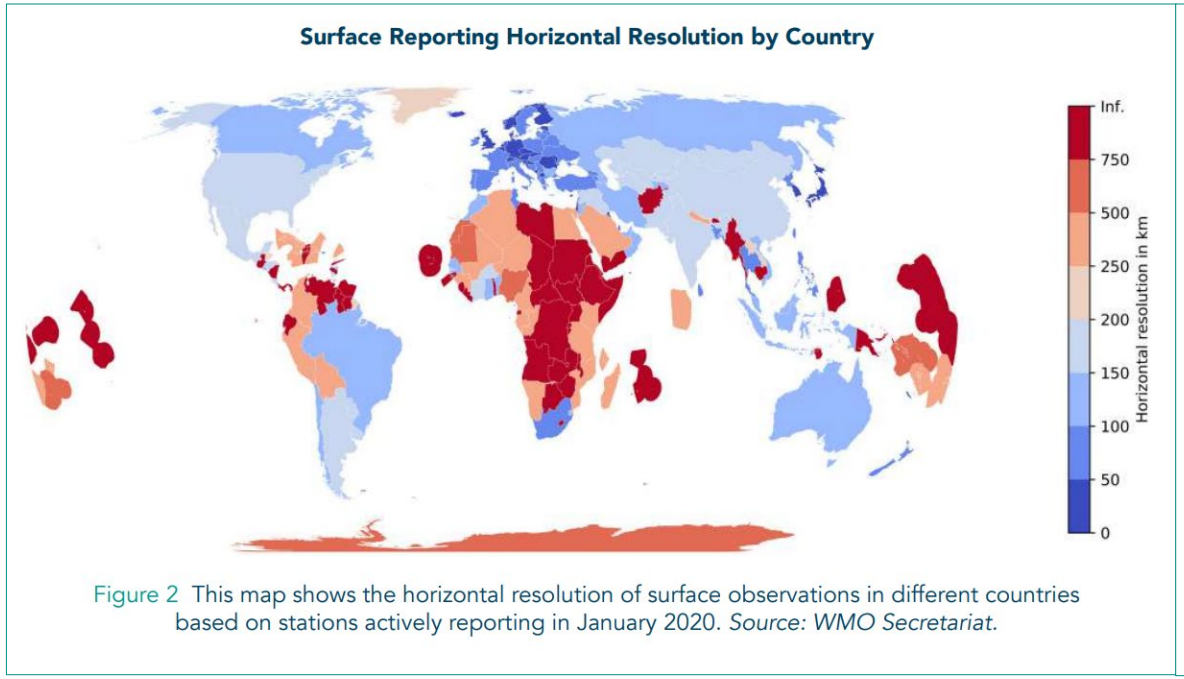
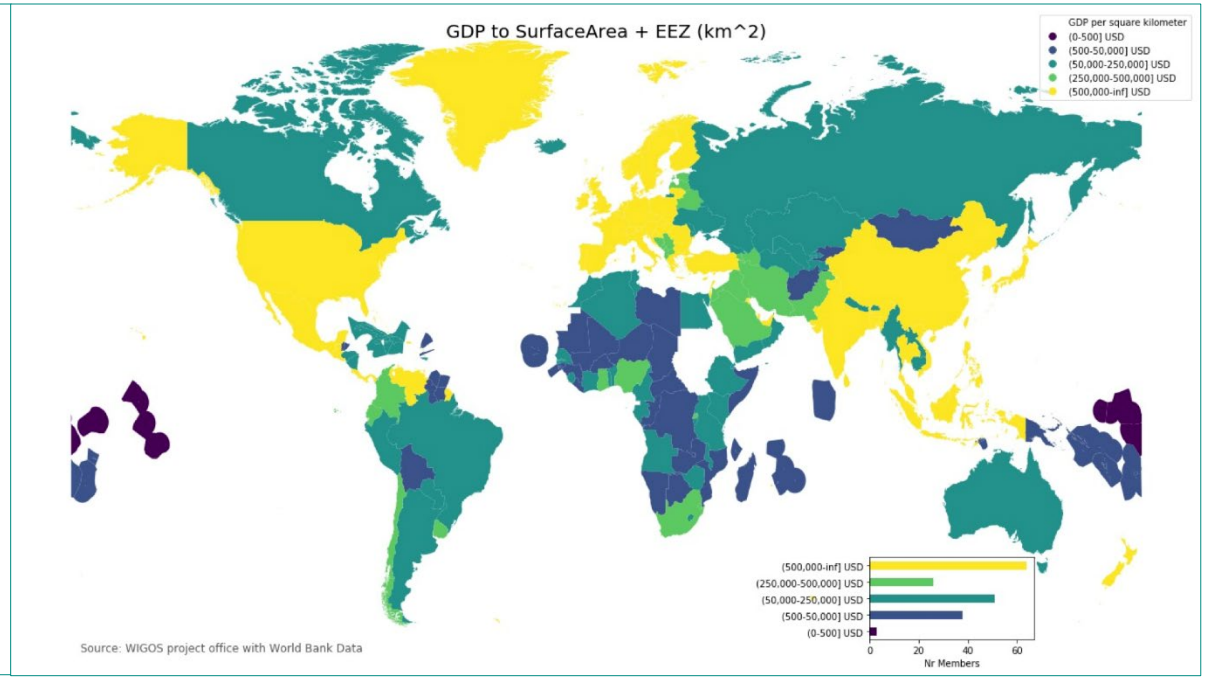


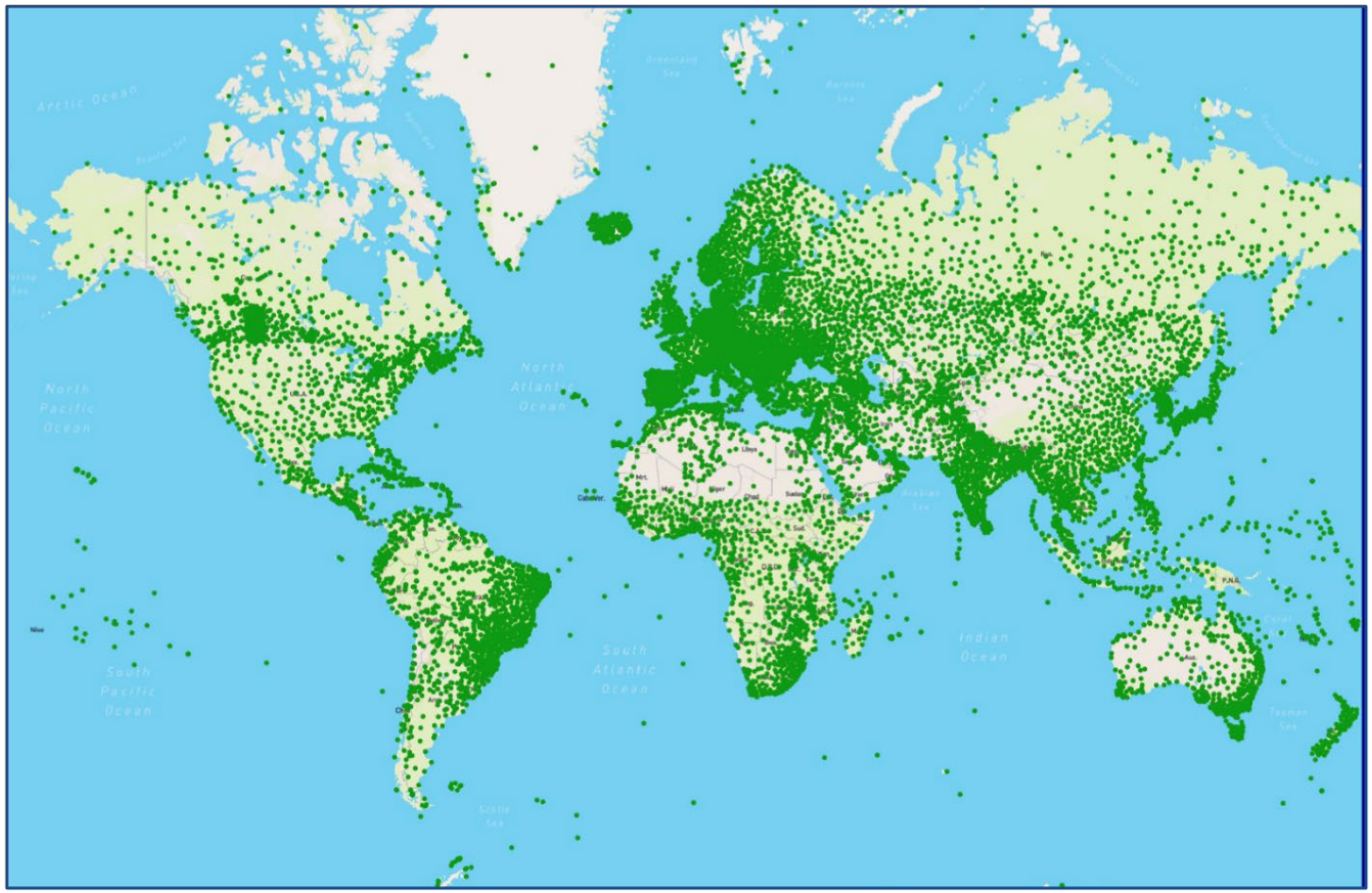
Figure 2 This map shows the horizontal resolution of surface observations in different countries based on stations actively reporting in January 2020. *Source: WMO Secretariat.*



- ***Ability to observe* (left panel):** *Observing systems in countries depicted in red fail to meet minimum observations requirements for weather and climate analysis and prediction*
- ***Ability to pay* (right panel): A***ffordability of observing responsibility (GDP/km2 of surface area) of countries in yellow up to ten million times higher than for countries in dark blue*

3. Global Basic Observing System; addressing the data gap (part 1)

GBON regulations approved by WMO Congress in October 2021 *(effective on January 1, 2023)*



- GBON regulations establish commitment of all WMO Members to acquire and transmit in real time certain observations at fixed minimum horizontal density and at fixed minimum time frequency;
- GBON provides critical input to weather prediction and climate analysis needed for disaster preparedness, climate adaptation, etc.
- SOFF has as its sole purpose to provide technical and financial support to the implementation and operation of GBON where it is most needed

Implementation of GBON will be monitored using data from the WIGOS Data Quality Monitoring System (WDQMS; shown); GBON (and SOFF) metrics of success are simple and unequivocal: "green dots on the map"

SOFF
Systematic Observations Financing Facility

Weather and climate information for the global public good

Urges Members who have the capacity to:

(1) Financially contribute to the SOFF United Nations Multi-Partner Trust Fund;

(2) Provide expert readiness technical advisories, including peer-to-peer in support of the implementation of SOFF; or

(3) Provide any other form of support;

Urges Members who qualify as beneficiaries to take advantage of SOFF to achieve sustained compliance with GBON.

SOFF value proposition

Global approach and data exchange as measure of success	▪ Optimal, detailed and **agreed global design and metrics** –GBON
Innovative finance	▪ **Results-based, long-term finance,** incl. operations and maintenance ▪ **Grants-only,** recognizing a global public good
Technical competency and coordination	▪ **Peer-to-peer technical assistance** by advanced met offices ▪ **Standardized, authoritative technical advice**

Catalogue of Core Data

2. Climate

Reference to Annex 1	WMO-No.	Part/ Section	Provision	Text of Provision	Data Type	Status	Note	Comment
2.1(b)	1238	1	1.1.14	WMO requires NMHSs to routinely provide basic climate-related data in agreed standard formats, as follows: (a) NMHSs shall provide climatological standard normals and monthly CLIMAT reports;	Climatological standard normals and monthly CLIMAT reports	C		
2.1(b)	1238	1	1.7.2	Entities providing observations and data and contributing to the Marine Climate Data System (MCDS) shall share the data on a free, open and unrestricted basis through the appropriate international data centres and systems, including WIS and relevant Intergovernmental Oceanographic Commission (IOC) systems.	Observations and data	C		
2.1(c)	1160	5.8	5.8.1	Members making observations for climate applications shall observe the following mandatory ECVs: (a) surface observations: atmospheric pressure, air temperature, humidity (water vapour), surface wind speed and direction, and precipitation; (b) upper-air observations: air temperature, humidity (water vapour) and wind speed and direction.	ECVs	N	Approved by EC-73	Effective 1 December 2022
2.1(c)	1160	5.8	5.8.2	Members shall exchange both historic data archives and current observations of the mandatory ECVs with a tentative maximum delay of one year.	ECVs	N	Approved by EC-73	Effective 1 December 2022
2.2	558	Part VII	3.2	Members shall provide data and metadata to the appropriate DACs within the MCDS to support the development of metocean climate products.	Not specified	C		DACs: Data Acquisition Centres; MCDS: Marine Climate Data System

GCOS

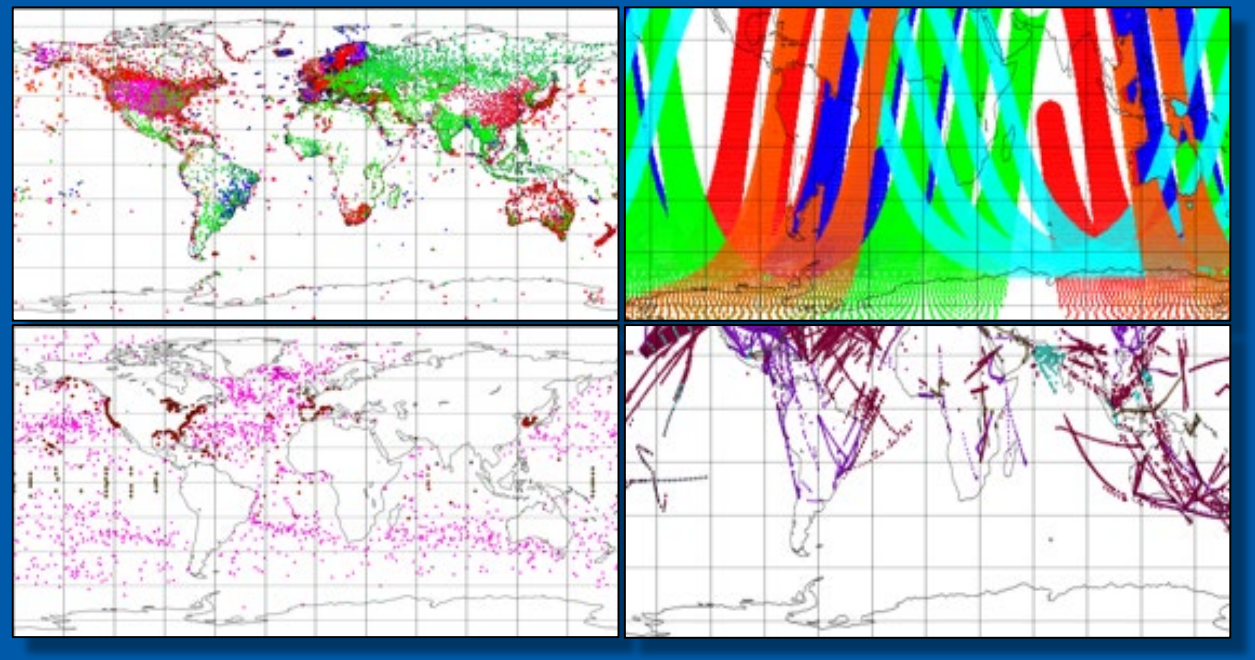
Next Steps

WMO

- GBON implementation supported by SOFF
- Exploration of expansion of GBON into other domains (hydrology, oceans, atmospheric composition)
- Increased availability of modelling and derived products

GCOS

- Monitoring of availability of ECVs
- Implications of the SOFF for WCM
- Anticipated improvement in coverage and availability of some ECVs
- Long term occupancy of stations



Thank you

https://gcos.wmo.int/en/gcos-status-report-2021

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