WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

The State of the Global Climate and WMO's role in Coordinating the Global Observing System

Dr Anthony Rea
Director Infrastructure
Director GCOS Secretariat

WMO OMM
World Meteorological Organization
Organisation météorologique mondiale

Overview

- Provisional State of Climate 2021
- GCOS Status Report
- Developments at WMO Congress
  - Data Policy
  - Global Basic Observing Network
  - Systematic Observations Financing Facility

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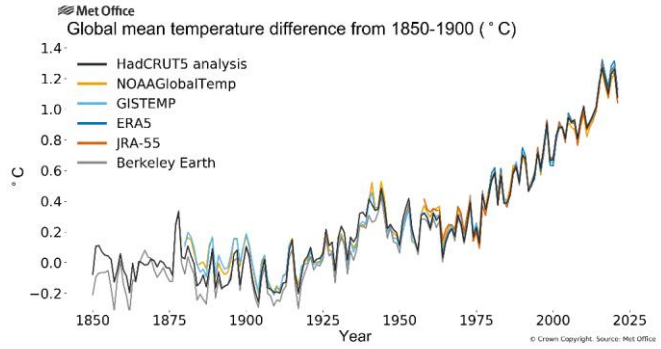
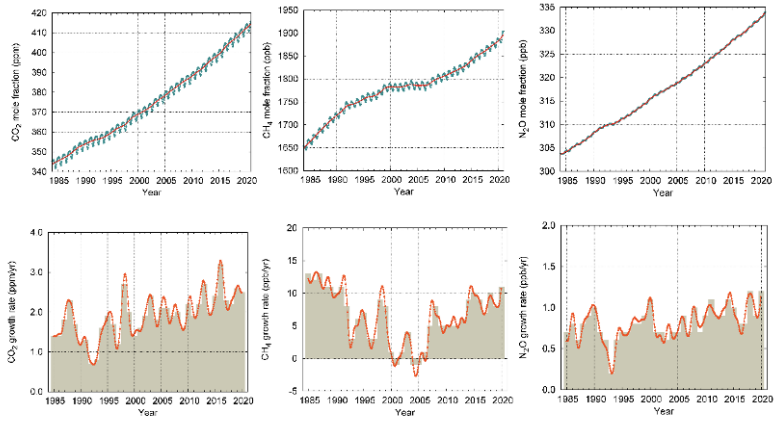
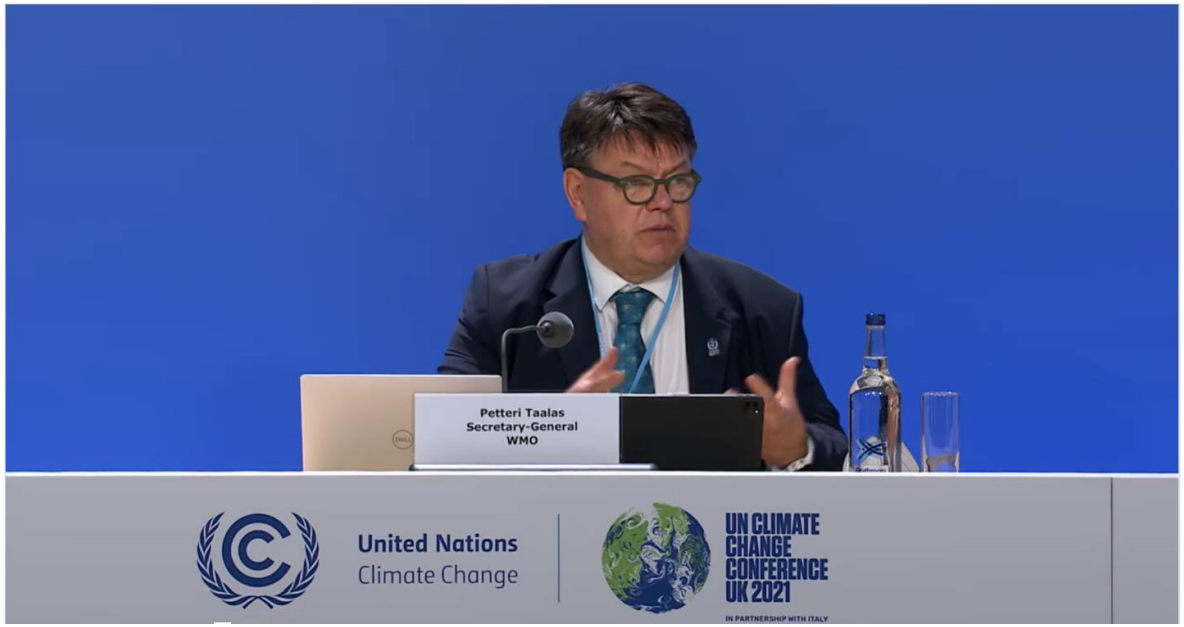
Provisional State of Global Climate 2021







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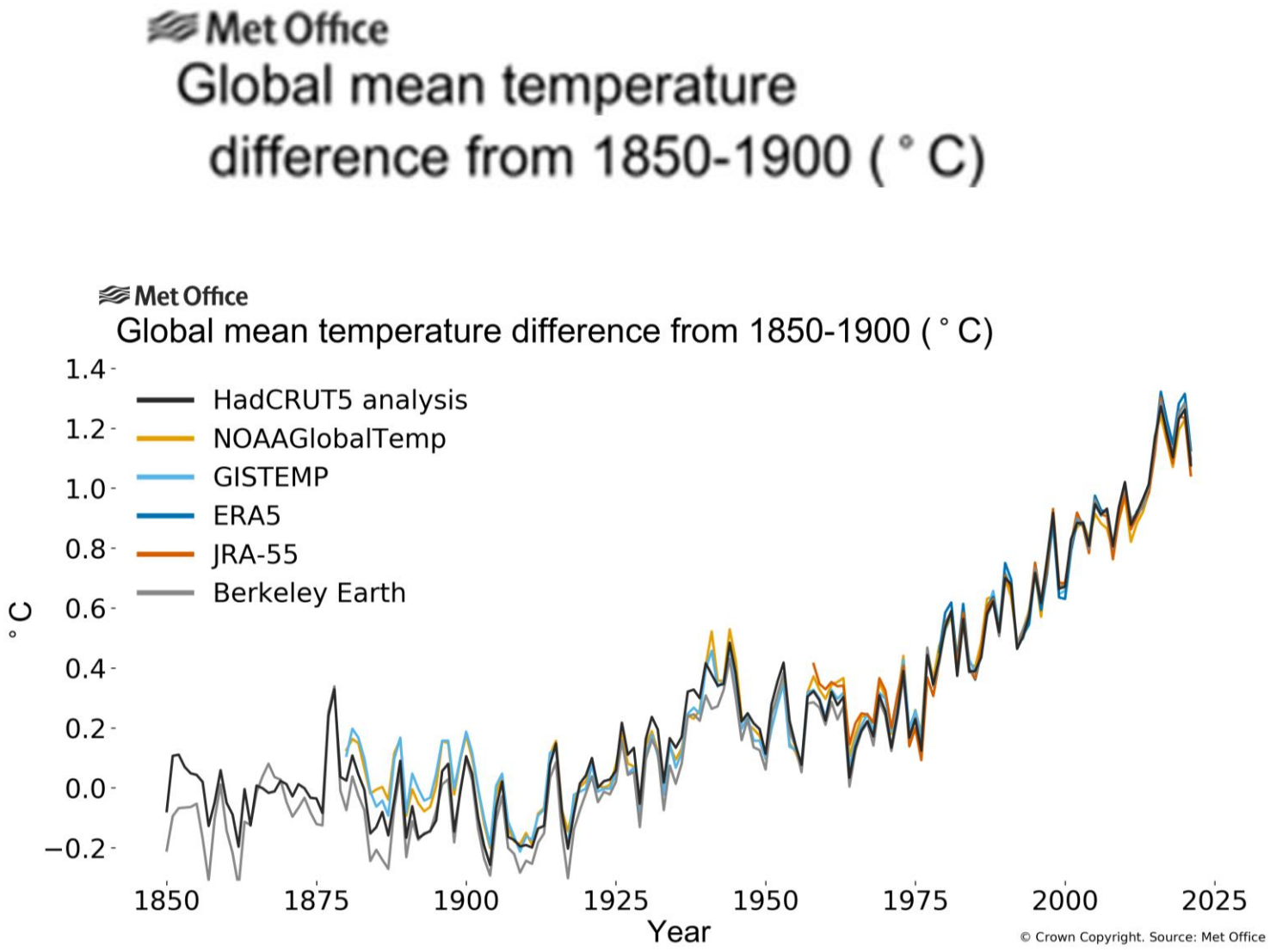
Provisional State of Global Climate 2021 - Temperature

- 2021 (January-September) 1.08 ± 0.13 °C above 1850-1900 (pre-industrial)
- Likely to be 5th -7th warmest year on record, making the past 7 years the warmest 7 on record
- Based on 4 data sets and 2 reanalyses



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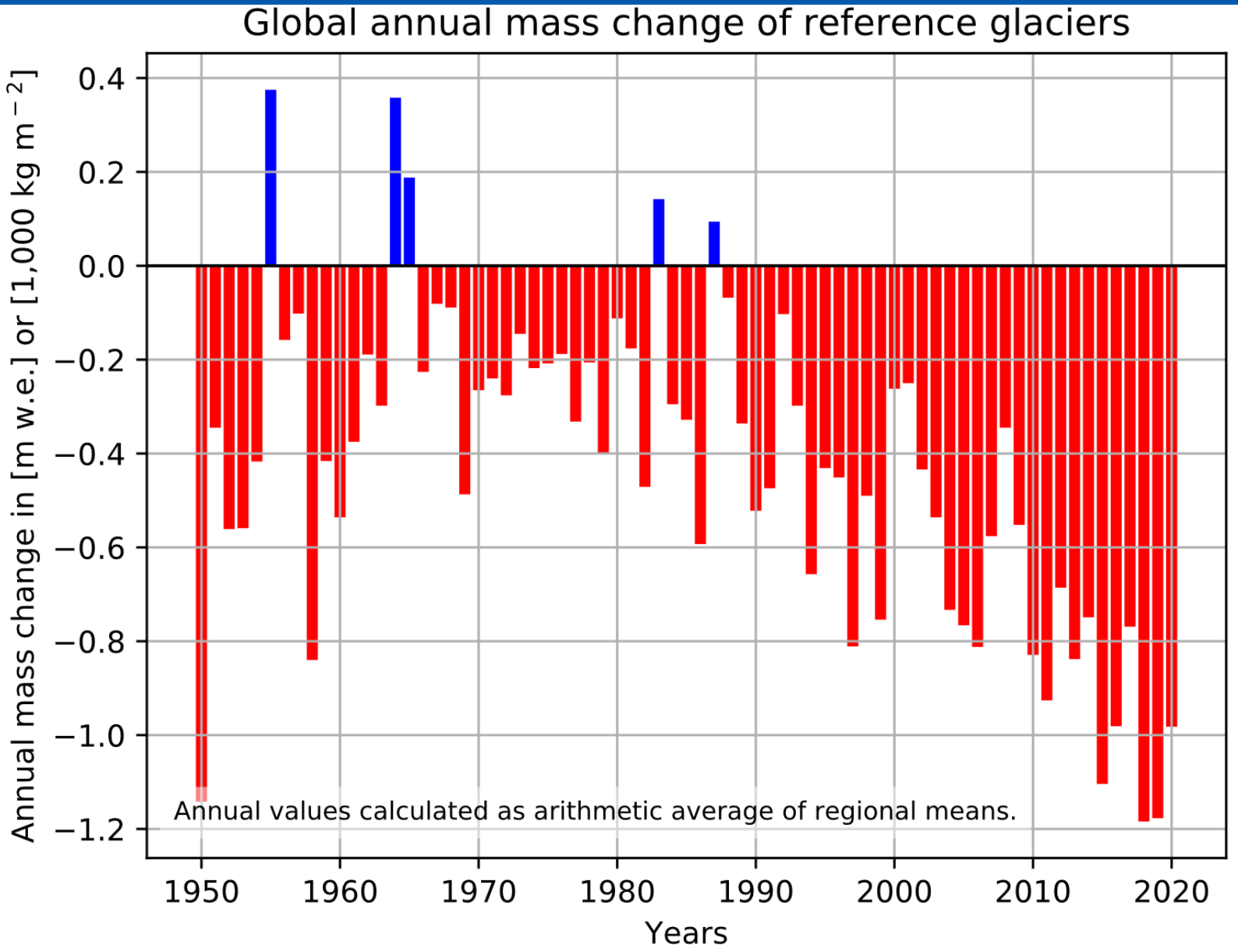
Provisional State of Global Climate 2021 - Glaciers

- Mass balance of reference glaciers reported by WGMS
- Negative mass balance for the 33rd consecutive year
- Average annual loss since 2015 is over 1 m w.e.
- Fifth largest loss on record



World Glacier Monitoring Service https://wgms.ch/

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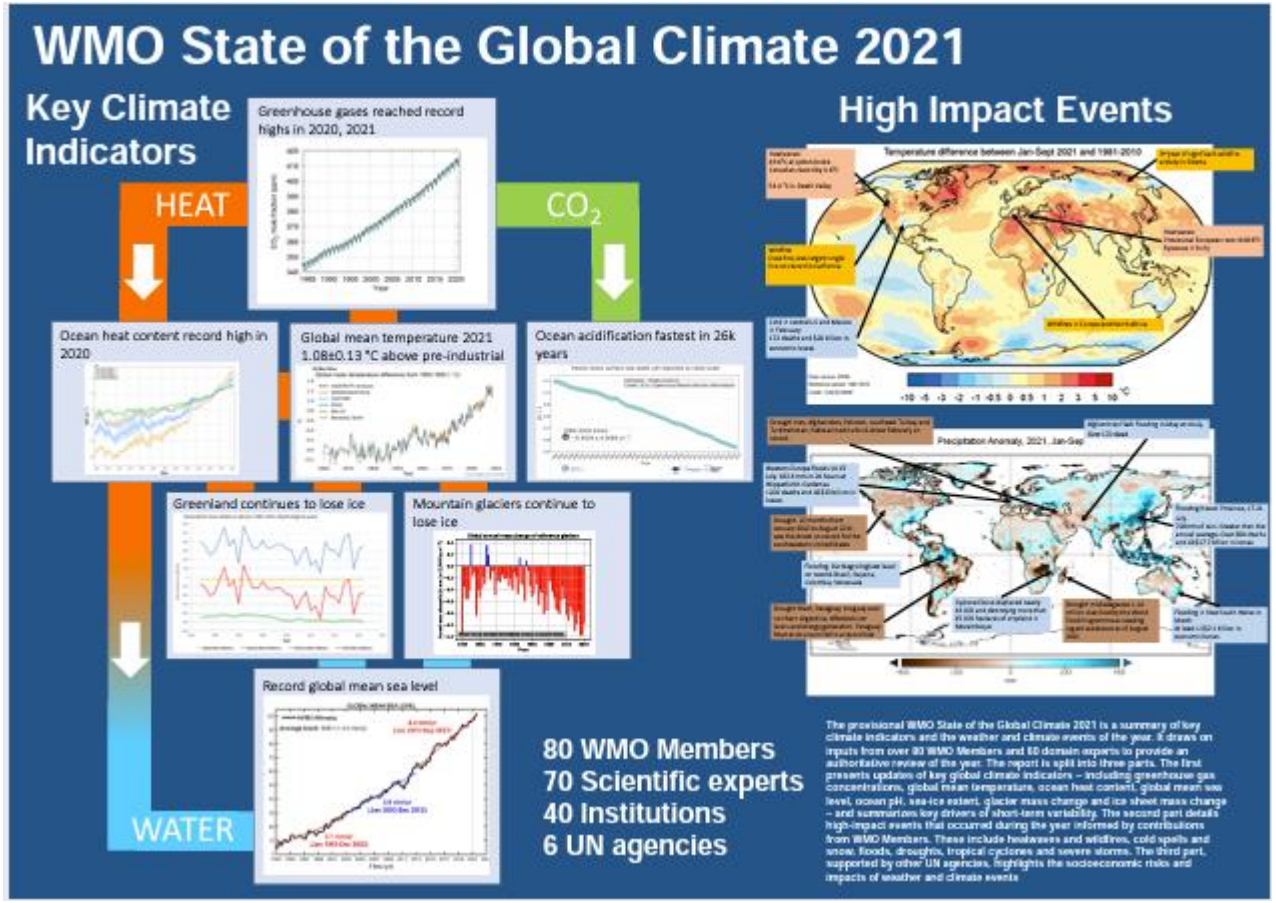
Provisional State of Global Climate 2021 – Poster

Earth Information Day
Poster Session (13:45-14:15)

Presented by:
Dr John Kennedy , UK MetOffice



https://unfccc.int/sites/default/files/resource/Earth_Information_Day_State%20of%20the%20global%20climate.pdf

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Successful delivery and use of climate services depends on all elements in the value chain working properly

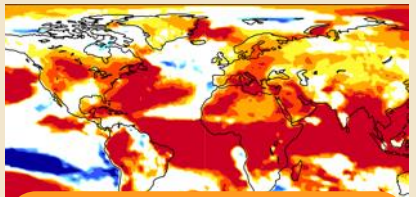
Climate-related infrastructure – must be designed and managed globally

GCOS addresss observations and data exchange but is informed by the needs of the whole value chain

Observations from the entire globe

International exchange of observations

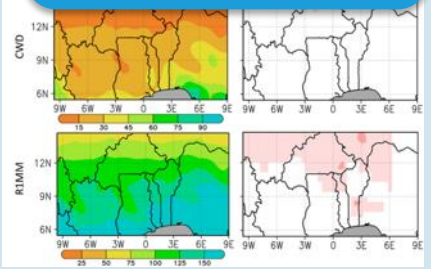
GLOBAL ACTIVITIES



Global climate modelling

LOCAL ACTIVITIES

Local Data Processing, forecast, warning and advisory products



Delivery of climate services

Effective decision making and action

Last-mile activities undertaken at regional, national and local level

Many Improvements since 2016 including

Satellite observations have improved their coverage spatially, temporally and in terms of observed variables. Satellite data are accessible and well curated.

WMO and its Members ensure the required long-term monitoring, with established practices and instruments, for many ECVs.

Observations of atmospheric variables have further improved in the past decade thanks to new in situ observations from the ground and from commercial aircraft.

Most ground-based networks are well managed and archives appropriately stewarded.

GCOS and WMO are now working together to establish a reference network for atmospheric and land surface observations

The ocean observing community is working on best practices for observations and data and metadata standards.

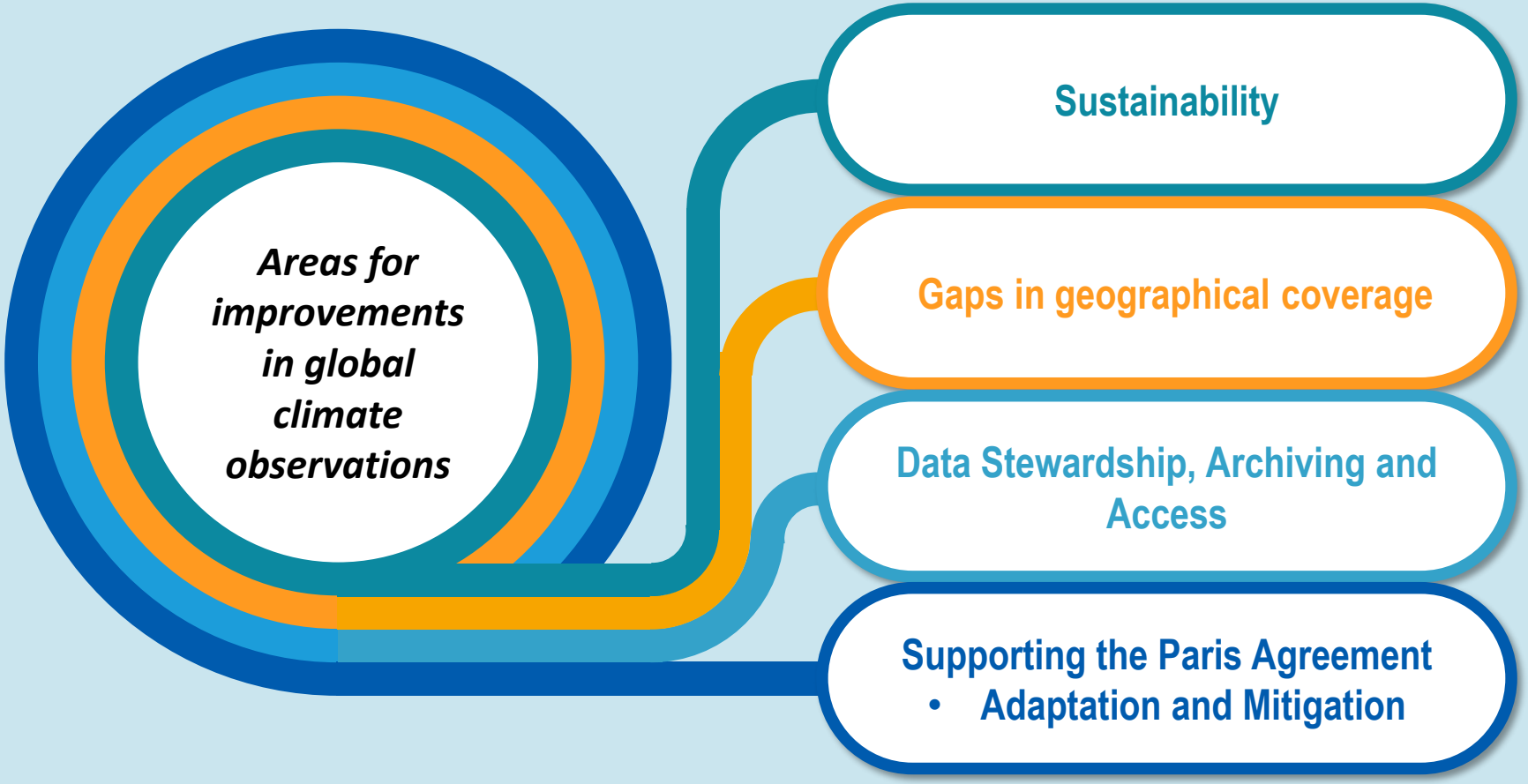
It was decided to expand the Argo program to the full water column and under sea ice, including biogeochemical variables.

Technological innovations have contributed to expanding the ocean observing system and its capability

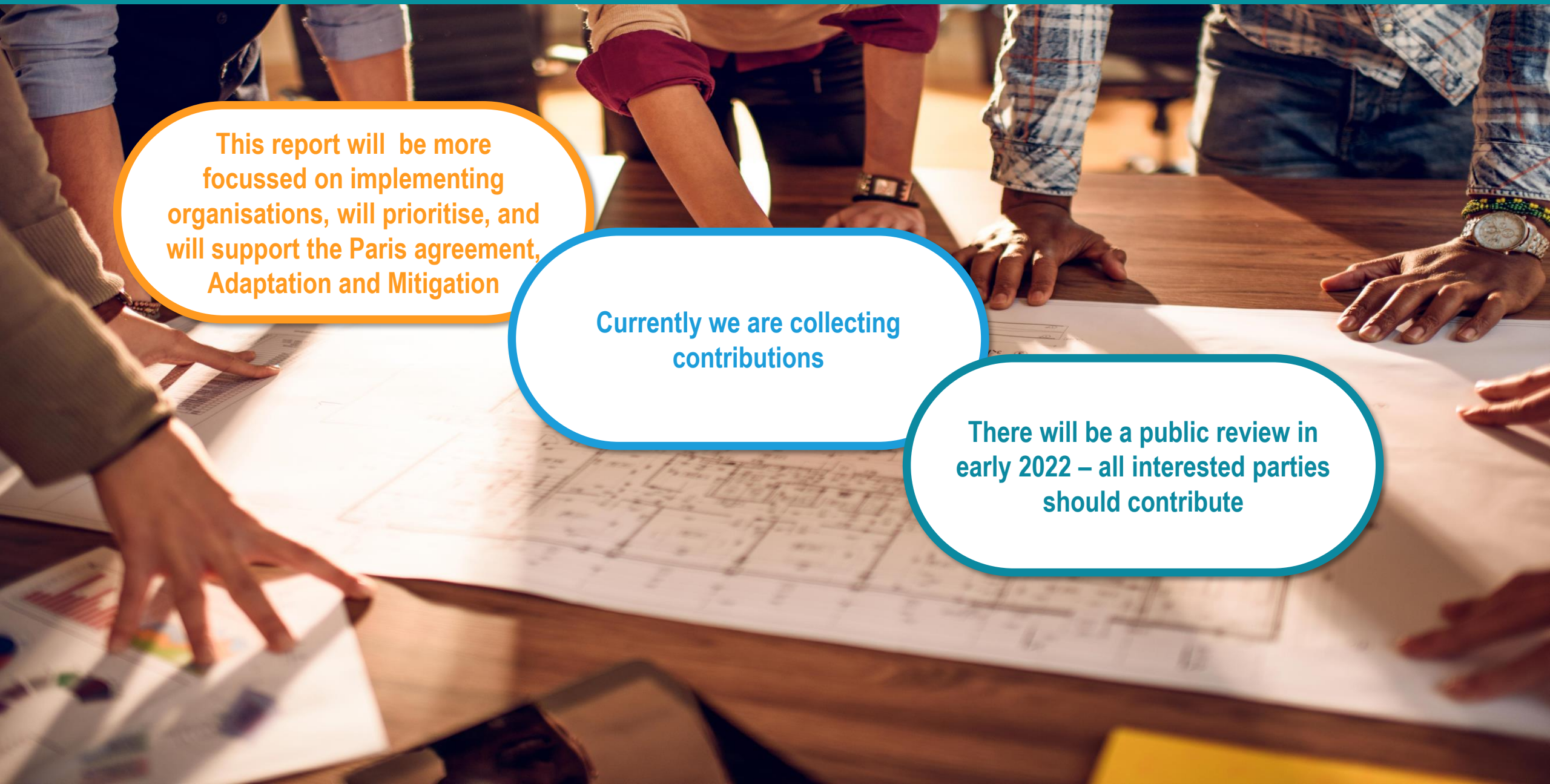
GCOS WMO IOC International Science Council UN environ

Areas for improvements identified in the GCOS Status Report

- The report identifes four key areas where improvements are needed
- The GCOS Implementation plan to be published in 2022 will address these four areas.



The next GCOS Implementation Plan will be published in mid-2022



This report will be more focussed on implementing organisations, will prioritise, and will support the Paris agreement, Adaptation and Mitigation

Currently we are collecting contributions

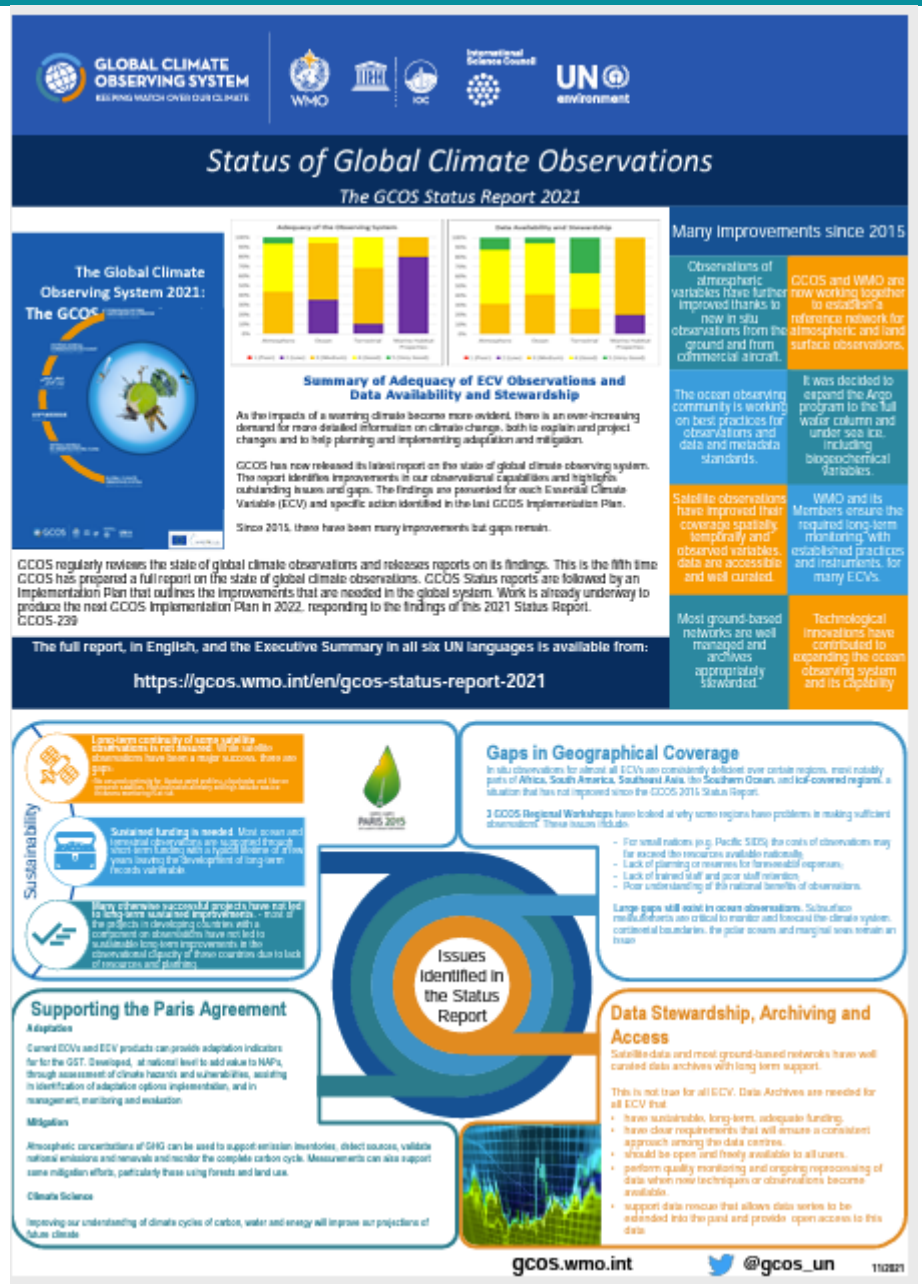
There will be a public review in early 2022 – all interested parties should contribute

Provisional State of Global Climate 2021 – Poster

Earth Information Day
Poster Session (13:45-14:15)

Presented by:
Professor Han Dolman,
Chair GCOS Steering Committee

https://unfccc.int/sites/default/files/resource/EarthInformationDay2021%20GCOS%20SR.pdf



GCOS | WMO | IOC | International Science Council | UN environment

International exchange of data is a major purpose of WMO
WMO Convention, Art. 2 b

What does it take to do this?

I. **Requirements and gap analysis;**

II. **Outreach and advocacy** – analyzing and explaining benefits of data exchange to stakeholders;

III. **Data policy** – general commitment of national governments to exchange certain data for certain purpose(s);

- **WMO Unified Data Policy;**

IV. **Regulatory material** – agreement on specifics of data exchange (what, when, where, how, …);

- **Global Basic Observing Network;**

V. **Financial and technical support if needed**; capacity development;

- **Systematic Observations Financing Facility;**

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The World Meteorological Congress approved three linked strategic infrastructure initiatives

WMO Unified Data Policy

- Increased international exchange of observations by all Members (**GBON**)
- 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**

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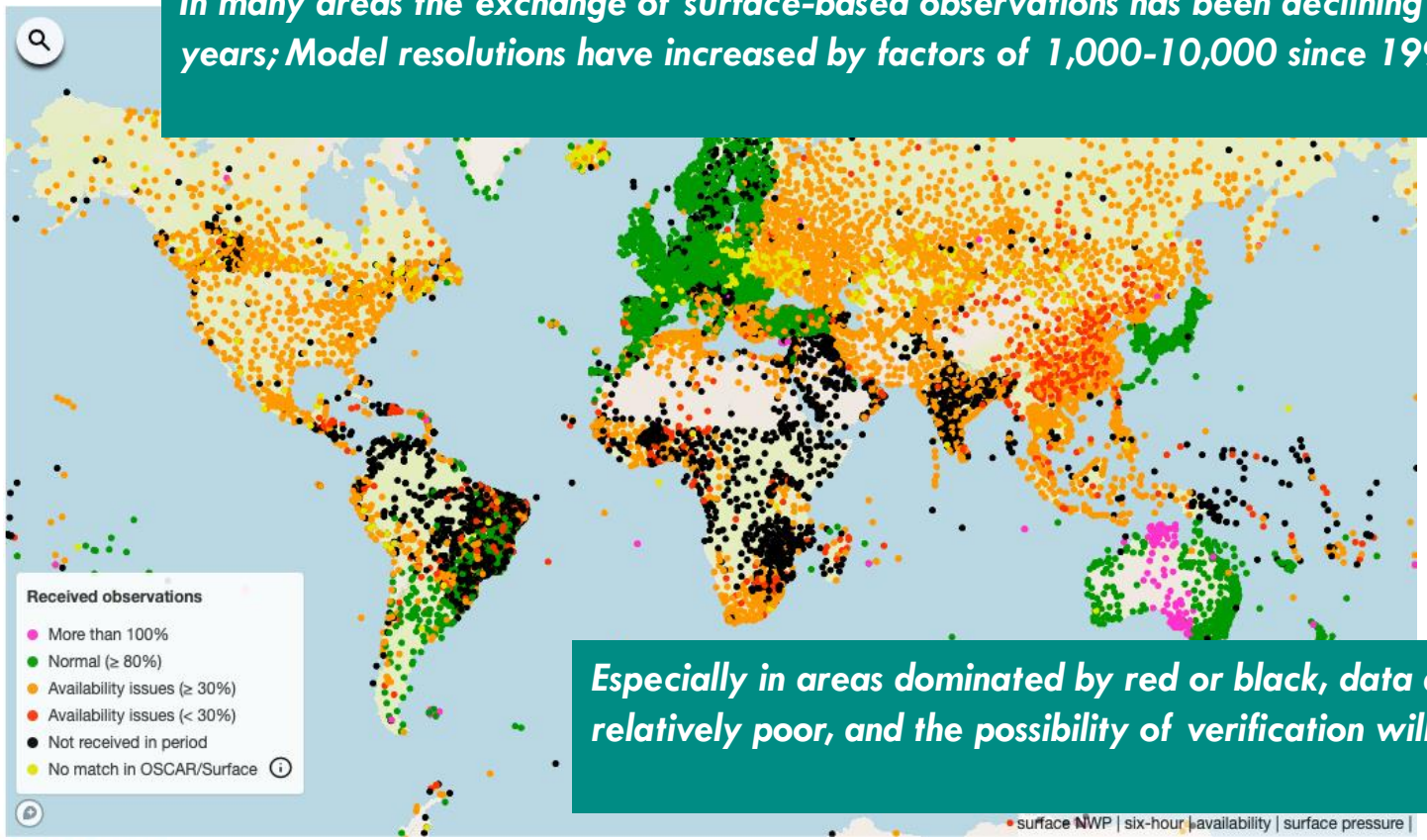
GBON – a historic WMO initiative to address a persistent problem: Lack of adequate observational data coverage over many parts of the globe

In many areas the exchange of surface-based observations has been declining in recent years; Model resolutions have increased by factors of 1,000-10,000 since 1995!



Especially in areas dominated by red or black, data quality will be relatively poor, and the possibility of verification will be limited

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Surface pressure observations received by global NWP Centers on October 25 2021, 12Z)
(source: WIGOS Data Quality Monitoring System)

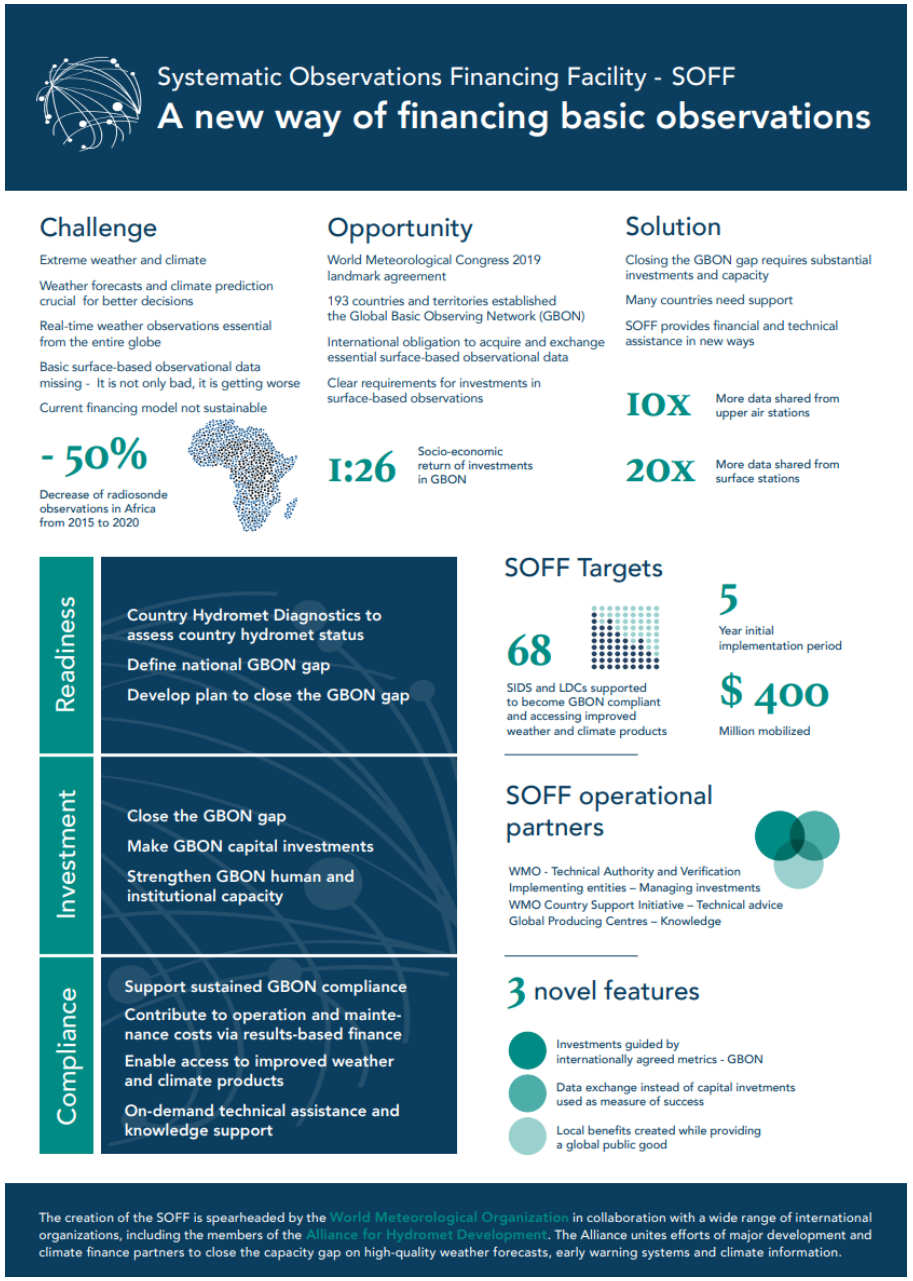
Systematic Observations Financing Facility (SOFF)

SOFF Launch Event at COP26

1815 to 1900 BST/ GMT

Nordic Pavilion

Find out more about SOFF in our communication and knowledge products available here: https://alliancehydromet.org/systematic-observations-financing-facility/



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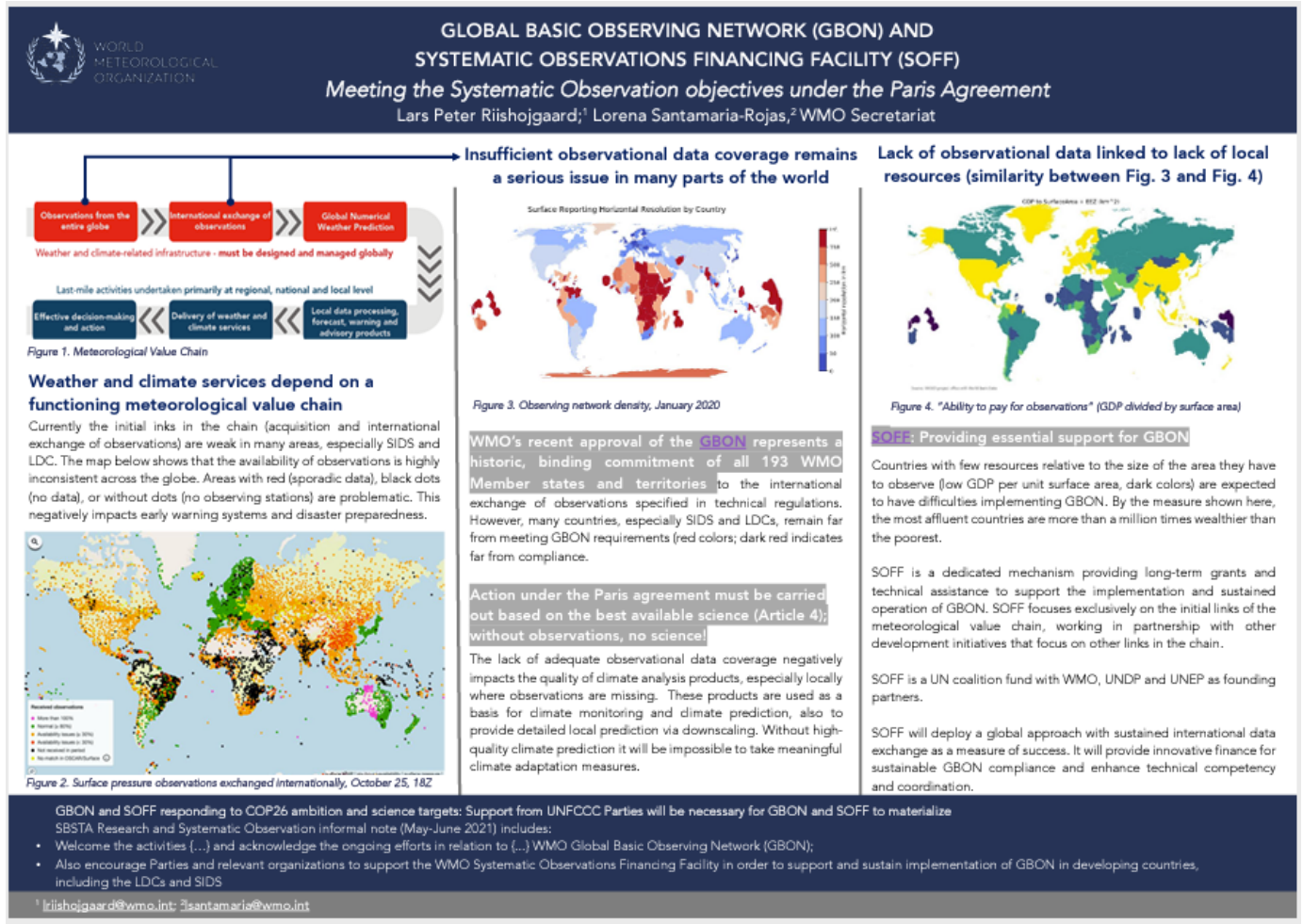
Filling the Data Gap: Global Basic Observing Network (GBON) and Sytematic Observations Financing Facility (SOFF)

Earth Information Day
Poster Session (13:45-14:15)

Presented by:
Dr Lars Peter Riishojgaard,
Director Earth Systems WMO



GLOBAL BASIC OBSERVING NETWORK (GBON) AND
SYSTEMATIC OBSERVATIONS FINANCING FACILITY (SOFF)
Meeting the Systematic Observation objectives under the Paris Agreement
Lars Peter Riishojgaard;[1] Lorena Santamaria-Rojas,[2] WMO Secretariat

Observations from the entire globe
International exchange of observations
Global Numerical Weather Prediction
Weather and climate-related infrastructure - **must be designed and managed globally**
Last-mile activities undertaken primarily at regional, national and local level
Effective decision-making and action
Delivery of weather and climate services
Local data processing, forecast, warning and advisory products

Figure 1. Meteorological Value Chain

Weather and climate services depend on a functioning meteorological value chain

Currently the initial inks in the chain (acquisition and international exchange of observations) are weak in many areas, especially SIDS and LDC. The map below shows that the availability of observations is highly inconsistent across the globe. Areas with red (sporadic data), black dots (no data), or without dots (no observing stations) are problematic. This negatively impacts early warning systems and disaster preparedness.

Figure 2. Surface pressure observations exchanged internationally, October 25, 18Z

Insufficient observational data coverage remains a serious issue in many parts of the world

Figure 3. Observing network density, January 2020

WMO's recent approval of the GBON represents a historic, binding commitment of all 193 WMO Member states and territories to the international exchange of observations specified in technical regulations. However, many countries, especially SIDS and LDCs, remain far from meeting GBON requirements (red colors; dark red indicates far from compliance.

Action under the Paris agreement must be carried out based on the best available science (Article 4); without observations, no science!

The lack of adequate observational data coverage negatively impacts the quality of climate analysis products, especially locally where observations are missing. These products are used as a basis for climate monitoring and climate prediction, also to provide detailed local prediction via downscaling. Without high-quality climate prediction it will be impossible to take meaningful climate adaptation measures.

Lack of observational data linked to lack of local resources (similarity between Fig. 3 and Fig. 4)

Figure 4. "Ability to pay for observations" (GDP divided by surface area)

SOFF: Providing essential support for GBON

Countries with few resources relative to the size of the area they have to observe (low GDP per unit surface area, dark colors) are expected to have difficulties implementing GBON. By the measure shown here, the most affluent countries are more than a million times wealthier than the poorest.

SOFF is a dedicated mechanism providing long-term grants and technical assistance to support the implementation and sustained operation of GBON. SOFF focuses exclusively on the initial links of the meteorological value chain, working in partnership with other development initiatives that focus on other links in the chain.

SOFF is a UN coalition fund with WMO, UNDP and UNEP as founding partners.

SOFF will deploy a global approach with sustained international data exchange as a measure of success. It will provide innovative finance for sustainable GBON compliance and enhance technical competency and coordination.

GBON and SOFF responding to COP26 ambition and science targets: Support from UNFCCC Parties will be necessary for GBON and SOFF to materialize
SBSTA Research and Systematic Observation informal note (May-June 2021) includes:
- Welcome the activities (…) and acknowledge the ongoing efforts in relation to (…) WMO Global Basic Observing Network (GBON);
- Also encourage Parties and relevant organizations to support the WMO Systematic Observations Financing Facility in order to support and sustain implementation of GBON in developing countries, including the LDCs and SIDS

[1] lriishojgaard@wmo.int; [2] lsantamaria@wmo.int

https://unfccc.int/sites/default/files/resource/Earth%20Information%20Day%20GBON-SOFF%20rev1.pdf

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Thank you

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