### WMO INITIATIVE ON ENVIRONMENTAL SUSTAINABILITY OF OBSERVING SYSTEMS AND METHODS: OVERVIEW AND MILESTONES

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- Introduction and context
- Timelines
- TECO Panel results
- MTWE Forum takeaways
- Regulatory updates
- Conclusions and next steps



### The way we measure weather and climate has environmental impacts...

- National networks for observing weather and climate are designed to meet domestic and international requirements, within resource constraints
- Some of the foundational observations in the production of critical weather and climate information are also the most environmentally impactful

#### Examples of observation methods, operational practices with environmental impacts

- Radiosondes and ozonesondes
- Marine drifter buoys
- Oil/antifreeze mixtures used in precipitation gauges

- Waste transportation and disposal
- Use of mercury / Minamata convention
- Site decommissioning





Credit: ECCC, J.Anderson Credit: AU Seabird & Turtle Rescue

Credit: ECCC, P.Leibiuk







Credit: balloonsblow.org



Credit: waterencyclopedia.com

...which have generally been accepted to meet the data requirements of users, applications, and services



# Organizations around the world are shifting to "greener" policies and practices...

#### **GBON** (WMO Global Basic Observing Network)

Establishes requirements for the spatial and temporal frequency of observations without consideration of environmental impacts

**INFCOM** (WMO Commission for Observation, Infrastructure, and Information Systems) Has resolved to update GBON requirements to address the environmental impact of observations



## A trend towards greener operations that consider:

- Innovative tech solutions
- Renewable energies
- Improved waste management
- Green fleet management
- Reduced plastic use
- Reduced carbon footprint
- Public awareness campaigns
- Green procurement

...and the WMO has recognized the environmental impact of observing systems and practices



# The international Focal Point coordinates plans and activities towards recommended amendments to WIGOS regulatory material



### **Advocacy theme**

- Influence policy and operations to consider environmental sustainability in decision making processes
- Consider capacity development activities, incentive programs, training material and events

### **Technical theme**

- Understand environmental impacts of current observing systems and operations and explore mitigation options
- Assess new or emerging technologies and practices to complement existing systems and processed while reducing environmental impacts
- Articulate technical solutions in support of environmentally sustainable observation technologies, methods, processes, standards
- Collaborate with vendors to explore new business models and grow a competitive market



# Observing systems and practices vary in degree of environmental impact and criticality to weather and climate services...



Credit: Windy.app



# The Environmental Sustainability of Observing Systems and Methods initiative will evolve over many years...

#### Report **Report** on Host virtual **Present** at Host Survey summarizing event status at **TECO 2024** international **TECO** Panel data analysis findings & **INFCOM-MG** workshop recommendations 2022 2023 2024 OCT DEC JAN FEB MAR MAY SEP OCT DEC APR SEP DEC International World Met **Future** International Present **Engagement with** workshop **Tech Expo** activities TBD recommendations Marine community survey planning initiated presentations & responses closed at **SOT-12** to INFCOM-3 (Phase 2) panel

#### PHASE 1: Meteorology & Marine

PHASE 2: Hydrology & Atmospheric Chemistry TBD

...ensuring continuous improvements can be achieved for each observational domain



# The 2022 TECO panel discussion on environmental sustainability had several key takeaways and recommendations



Discussion on possibilities to enhance environmental sustainability produced the following suggestions:

Business framework	International standards	<b>Evaluation criteria</b>	Life cycle management
E.g., adoption of ISO 14001 for NMHS' and vendors	Standards for common processes could reduce waste during life cycle replacement	Manufacturing principles for environmentally sustainable methods/instruments	Goal to extend the life of usable instruments, parts, reduce maintenance, etc.

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# The Meteorological Technology World Expo (MTWE) hosted a forum on advancing the environmental sustainability of observing systems & methods

#### A venue for industry representatives to:

- showcase the latest developments in sustainable weather and climate observing systems and methods
- engage with each other and the broader user community
- share and discuss opportunities and challenges

Key ideas and sustainable initiatives:

#### October 2023 in Geneva, Switzerland

### **Primary Focus:**



Meteorological (surface, upper air) and marine observational domains

#### **Goal:** enhance sustainable outcomes



# The initiative has been successful in establishing initial recommended amendments to WMO Regulatory Material...

As a member of the Task Team on GBON Implementation (TT-GBON), consideration for environmental sustainability was added to the **SOFF technical specifications** for both surface and upper air observing networks

During WMO EC-76 a proposed decision was adopted to revise the **WIGOS manual** (WMO-No.1160) and the WIGOS manual ANNEX to introduce a new observing network design principle:

13. Advancing environmental sustainability

...a critical first step in international policy guidelines surrounding the environmental sustainability of observing systems and methods



### Summary of conclusions from activities to date

- Positive steps are being taken by many Members to enhance environmental sustainability at all stages of the observing network life cycle
- At the same time, there is recognition from the community that more needs to be done and can be done – across all observational domains
- Initial integration of environmental sustainability considerations into WMO guidance (SOFF Technical Specifications, WIGOS Manual, GBON Guide) has been well-received
  - Vision to have environmental sustainability integrated into all applicable WMO regulatory materials
- Member response to engagement has been positive, and will likely be enhanced by further advocacy, communication, education, and capacity development activities
- The success of the initiative will require significant stakeholder participation and Member contribution

#### **Next steps:**







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