WEATHER CLIMATE WATER

World Meteorological Organization

COMMISSION FOR OBSERVATION, INFRASTRUCTURE AND INFORMATION SYSTEMS

First Session
9 to 13 November 2020, Virtual Session

INFCOM-1/Doc. 4.1.1(2)

Submitted by: Chair

10.XI.2020

APPROVED

AGENDA ITEM 4: **TECHNICAL REGULATIONS AND OTHER TECHNICAL DECISIONS**

AGENDA ITEM 4.1: **Decisions requiring approval by the Infrastructure Commission at this Virtual Session**

AGENDA ITEM 4.1.1: ***Standing Committee on Earth Observing Systems and Monitoring Networks (SC-ON)***

UPDATE OF REGULATORY MATERIAL RELATED TO ESTABLISHMENT OF THE GLOBAL BASIC OBSERVING NETWORK (GBON)

DRAFT RECOMMENDATION

Draft Recommendation 4.1.1(2)/1 (INFCOM-1)

Update of Regulatory Material Related to Establishment of the Global Basic Observing Network (GBON)

THE COMMISSION FOR OBSERVATION, INFRASTRUCTURE AND INFORMATION SYSTEMS,

Recalling Resolution 34 (Cg-18) - Global Basic Observing Network,

Having examined the draft GBON provisions provided in the Annex to this recommendation,

Endorses the current draft GBON provisions provided in the Annex to this recommendation,

Recommends that the amendments to the *Manual on WMO Integrated Global Observing System* (WMO-NO. 1160), section 3.2.2 based on the current draft as given in the Annex to this recommendation be adopted by the Extraordinary World Meteorological Congress in 2021, with effect from 1 January 2022,

Recommends that the Executive Council review the environmental impact and sustainability of WMO systems and activities and to make recommendations to Congress on the highest priority activities to be undertaken by Members.

Requests the Secretary-General to take the necessary steps to finalize the draft GBON provisions and provide them to Members for their review prior to their submission to the Extraordinary World Meteorological Congress in 2021.

_____

Annex: 1

Annex 1 to draft Recommendation 4.1.1(2)/1 (INFCOM-1)

GBON provisions of the *Manual on the WMO Integrated Global Observing System* (WMO-No. 1160)

3.2 DESIGN, PLANNING AND EVOLUTION

3.2.1 Composition of the surface-based subsystem of WIGOS

3.2.2 Global Basic Observing Network

3.2.2.1 The Global Basic Observing Network (GBON) shall be a subset of the surface-based subsystem of WIGOS, used in combination with the space-based subsystem and other surface-based observing systems of WIGOS, to contribute to meeting the requirements of Global NWP, including re-analysis in support of climate monitoring.

3.2.2.2 Members shall establish and manage the GBON.

Notes:

1. Global NWP provides an essential backbone for all products and services provided by all WMO Members. The geographically relevant component of the GBON provides an essential base component within each Regional Basic Observing Network (see 3.2.3 below).

2. GBON is based on a global design and the implementation is monitored globally.

3. GBON is designed to respond primarily to those Global NWP requirements that are currently not met, or fully met, by space-based systems.

4. The specification for GBON is laid out in provisions 3.2.2.7 - 3.2.2.20. These are derived from the observational requirements for Global NWP that are recorded in the OSCAR/Requirements database together with an analysis of the operational technologies for collecting such observations and availability of observations from other sources. The technical assessment is conducted for the World Meteorological Congress by INFCOM.

5. The list of GBON stations/platforms is drawn from the list of all available stations/platforms in the WIGOS as registered in OSCAR/Surface by the Members. The identification of the subset to be proposed for GBON designation is based on the specification of GBON listed below. The list of GBON stations/platforms is elaborated in collaboration between the Members and INFCOM.

3.2.2.3 Members shall maintain the continuous operation of those stations/platforms that are designated as contributors to GBON.

Note: The designation process is defined in 3.2.2.22-3.2.2.23 below and further detailed in the *Guide to the WMO Integrated Global Observing System* (WMO-No. 1165).

3.2.2.4 Members shall strive to design, install, manage, and operate stations within their networks in an environmentally sustainable fashion.

3.2.2.5 Members shall make available internationally through WIS all GBON observations in real time or near-real time. according to the overall WMO data policy

3.2.2.6 If a Member finds that the horizontal resolution required according to one or more of provisions 3.2.2.7 - 3.2.2.18 is not practically achievable for the observing network within parts of their territory, e.g. in uninhabited and remote areas, the

Member shall inform the Secretary General of the reasons as per Article 9(b) of the WMO Convention, and paragraph 6 of "GENERAL PROVISIONS".

3.2.2.7 Members shall maintain the continuous operation of a set of surface land observing stations/platforms that observe, at a minimum, atmospheric pressure, air temperature, humidity, horizontal wind, precipitation and snow depth, located such that the GBON has a horizontal resolution of 200 kilometres or higher for all of these variables, with an hourly frequency.

Notes:

1. The precipitation observation means an hourly accumulation.

2. The *Guide to Instruments and Methods of Observation* (WMO-No. 8), Volume II provides details on measurement of snow.

3. A horizontal resolution of 200 km or higher means that stations/platform are spaced not more than 200 km apart on average.

4. Many manual stations/platforms observe less frequently than hourly; these nevertheless provide a valuable contribution to the GBON.

5. The provisions do not imply that every station/platform must measure all the variables listed, but that the network as a whole delivers observations at the required horizontal resolution for all the variables.

3.2.2.8 Members should operate surface land observing networks/platforms at horizontal resolutions of 100 km or higher.

3.2.2.9 Where Members operate networks as described in 3.2.2.7 and 3.2.2.8, Members shall make the observations of these networks available internationally according to 3.2.2.5.

3.2.2.10 Members shall maintain the continuous operation of a set of surface marine meteorological observing stations/platforms within their Exclusive Economic Zone that observe, at a minimum, atmospheric pressure and sea surface temperature located such that where opportunity exists, GBON has a horizontal resolution of 500 kilometres or higher, over the marine areas of their jurisdictions, for these variables, with an hourly frequency.

Note: For Small Island Developing States where the surface area of the Exclusive Economic Zone is significantly larger than the land surface area, the provision applies to the entirety of the area of observing responsibility.

3.2.2.11 Members should facilitate other Members to make surface marine meteorological observations within their Exclusive Economic Zone, subject to the data being shared internationally according to 3.2.2.5.

3.2.2.12 Members shall maintain the continuous operation of a set of upper-air stations/platforms over land that observe, at a minimum, temperature, humidity and horizontal wind, with a vertical resolution of 100 m or higher, twice a day or better, up to a level of 30 hPa or higher, located such that GBON has a horizontal resolution of 500 kilometres or higher for these observations.

Notes:

1. Radiosonde systems currently provide the primary means for collecting such observations.

2. A vertical resolution of 100 m or higher means that observations are spaced and reported not more than 100 m apart in the vertical on average.

3. Upper-air observations obtained over remote/isolated islands have particularly high impact on Global NWP skill, and continued operation of these stations/platforms are of high priority for GBON.

3.2.2.13 Members should operate networks of upper air stations/platforms providing horizontal resolutions of 200 km or higher.

3.2.2.14 Members should operate a subset of the selected GBON upper-air observing stations/platforms that observe temperature, humidity and horizontal wind profiles up to 10 hPa or higher, at least once per day, located such that, where geographical constraints allow, GBON has a horizontal resolution of 1000 kilometres or higher, for these observations.

3.2.2.15 Members shall operate a set of upper-air stations/platforms that observe temperature, humidity and horizontal wind profiles, with a vertical resolution of 100 m or higher, twice a day or better, up to 30 hPa or higher, located such that, where opportunity exists, GBON has a horizontal resolution of 1000 kilometres or higher over the marine areas of their jurisdictions, for all these observations.

Note: For Small Island Developing States where the surface area of the Exclusive Economic Zone is significantly larger than the land surface area, this provision applies to the entirety of the area of observing responsibility.

3.2.2.16 Where networks described in 3.2.2.13 – 15 are operated, 3.2.2.5 shall apply.

3.2.2.117 Members should make available aircraft meteorological observations of temperature, humidity (where available) and horizontal wind from aircraft ascents and descents, with 300 m or higher vertical resolution with a temporal frequency of at least hourly.

3.2.2.18 Members should make available aircraft meteorological observations of temperature, humidity (where available) and horizontal wind, with a horizontal resolution of 100 kilometres or higher, whilst at level flight.

3.2.2.19 Members should make available hourly remote sensing profiler observations of temperature (where available), humidity (where available) and horizontal wind with a vertical resolution of 100 m or higher.

3.2.2.20 Members operating observing networks/platforms at higher density than specified above under the provisions 3.2.2.7 - 3.2.2.19 should make available what is observed at least hourly.

Note: 15 kilometres is the current goal of global NWP requirements

3.2.2.21 Members shall make available the Metadata of their GBON observing stations/platforms in accordance with the provisions of section 2.5.

3.2.2.22 Each Member shall designate at a minimum the required number of surface stations and the required number of upper air stations as per (3.2.2.10 and 3.2.2.15) as their contribution to GBON.

Notes:

1. The Infrastructure Commission will undertake an initial GBON implementation analysis that will provide, for each Member, the number of surface stations and the number of upper air stations that are required for the Member to meet their obligations under 3.2.2.7-3.2.2.21.

2. For each Member, the Infrastructure Commission will review their designated contribution as per 3.2.2.21 *[Secretariat]* and assess whether it meets the requirements specified in 3.2.2.7-3.2.2.21, and will inform the Member in writing of its findings.

3. See Note 3 below 3.2.2.12.

3.2.2.23 Members shall register the stations in OSCAR/Surface and identify that these stations belong to the GBON.

3.2.2.24 Members shall routinely monitor GBON performance across the network to identify non-conformance with the designed performance.

Note: Guidance on data quality monitoring, evaluation and incident management is detailed in the *Guide to the WMO Integrated Global Observing System* (WMO-No. 1165), Chapter 8.

3.2.2.25 Members shall acknowledge, document and rectify any identified non-conformance at one of their stations/platforms within time frames agreed by the WMO Executive Council or the World Meteorological Congress.

Note:

Details on relevant time frames and processes are provided in the *Guide to the WMO Integrated Global Observing System* (WMO-No. 1165).

3.2.2.26 Members shall formally notify the Secretary General, at least three months in advance, of their plan to discontinue the operation of their stations/platforms.

_____

DRAFT RESOLUTION

Draft Resolution 4.1.1(2)/1 (INFCOM-1)

Future development of GBON

THE COMMISSION FOR OBSERVATION, INFRASTRUCTURE AND INFORMATION SYSTEMS,

Recalling Resolution 34 (Cg-18) - Global Basic Observing Network,

Noting Draft Recommendation 4.1.1(2)/1 (INFCOM-1),

Noting further that while GBON will provide a vital basis for all products and services, the implementation of the network will be challenging in parts of the world, e.g. due to local financial, geographic or environmental concerns;

Noting with appreciation more than 20 years of sustained observing system impact studies undertaken by the Numerical Weather Prediction (NWP) community for the WMO Members under the auspices of the Rolling Review of Requirements, on the basis of which the GBON provisions have been developed;

Noting with satisfaction the ongoing development undertaken by WMO in collaboration with a number of development and climate finance institutions of a Systematic Observation Financial Facility (SOFF) intended to provide support to the implementation and operation of GBON where this cannot be achieved based on local resources alone, in particular in LDCs and SIDS;

Mindful of the environmental impact and the issues around environmental sustainability of some of the currently prevailing observing technologies;

Having been informed of the work being undertaken by WMO and the Coordination Groups for Meteorological Satellites (CGMS) to enhance and to strengthen the commitment to provide critical satellite data to NWP;

Observing both the strong support for GBON, and the concerns about the expected difficulty of implementing of some of the proposed provisions, expressed during this session;

Decides to task its SC-ON, in collaboration with SC-MINT, the Research Board, and with relevant Working Groups of the CGMS, to keep implementation options of GBON under ongoing review and report back to INFCOM on any recommended steps, including e.g. potential amendments to the WIGOS regulatory material, to be taken to address the following issues in particular:

(a) The environmental impact of various observing technologies, in conjunction with the drive of many Members toward adopting cleaner, sustainable technologies in all areas of their work;

(b) The need to stimulate the development of emerging observing technologies for both space-based and surface-based observing systems that may help alleviate some of the expected difficulties in the implementation of GBON;

(c) Further strengthening the collaboration with the research community and its involvement in the RRR, with a view toward the potential development of WMO guidance regarding the optimal mix of technologies to meet GBON requirements under various geographic constraints;

d) Potential future paths of evolution for GBON into domains and disciplines beyond its current scope of support for Global NWP and climate analysis.

Decides further to undertake a study aimed at documenting and analysing the expected and evolving benefits of GBON as its implementation progresses, and to make all materials developed thereunder available to all Members to support their national efforts toward GBON implementation.

_____