



CARIBBEAN METEOROLOGICAL ORGANIZATION

ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES
PORT OF SPAIN, TRINIDAD AND TOBAGO, 15 NOVEMBER 2023

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OUTCOME/HIGHLIGHTS FROM MEETING OF NINETEENTH WORLD METEOROLOGICAL CONGRESS

(Submitted by the Coordinating Director)

SUMMARY

The Nineteenth World Meteorological Congress (Cg-19) was held at the International Conference Center, Geneva, from 22 May to 02 June 2023. The information provided in this document includes key summary points of outcomes and highlights that will have impacts on National Meteorological and Hydrological Services operations during the intersessional period.

One of the major outcomes of the Congress was the election of officers to serve for the next four (4) years. The Congress:

Appointed Professor Celeste SAULO (Argentina) as the Secretary-General of the Organization for the nineteenth financial period

Elected Dr. Abdulla AL MANDOUS (United Arab Emirates) as President of the Organization

Elected Mr Daouda KONATE (Côte d'Ivoire) as First Vice-President of the Organization

Elected Mr Eoin MORAN (Ireland) as Second Vice-President of the Organization

Elected Dr. Mrutyunjay MOHAPATRA (India) as Third Vice-President of the Organization

Elected Dr. Arlene LAING (**British Caribbean Territories**) as a member of the Executive Council

Elected Dr. Garvin CUMMINGS, (**Guyana**) as a member of the Executive Council

Elected Dr. Albert MARTIS, (**Curaçao and Sint Maarten**) as a member of the Executive Council

A. MEMBERS TO LEVERAGE THE EARLY WARNING FOR ALL INITIATIVE

1. The WMO, by [Resolution 4 \(Cg-19\)](#), called on Members NMHSs to leverage the **Early Warnings for All** (EW4All) UN global initiative by assessing their existing hydro-meteorological observation, forecasting, and Multi-Hazard Early Warning Systems (MHEWS) capacity and adopting measures to fill identified gaps. Additionally, Members are urged to develop their own initiatives and to utilize all forms of bilateral and multilateral cooperation, including twinning arrangements as well as Public-Private Engagement, to assist with MHEWS capacity gaps, and contribute to the fulfilment of the EW4All vision.

2. Implementation of new activities associated with EW4All at the national level will require increased capacity development in line with the expected increase in demand for services and associated training. At the same time, it will provide greater visibility and political support for NMHSs, as it will require NMHSs to be part of a collection of partners at national levels with interagency collaboration. Twinning arrangements are advocated as an avenue to support and build the capacities of the NMHSs and to close major gaps associated with EW4All, including the

development of quality management systems, access to a calibration laboratory, maintenance and repair of weather radars and other equipment, IT support, software development and access.

Directors are encouraged to:

- Identify high-priority EW4All activities to address their NMHS urgent needs in building effective multi-hazard early warning systems.
- Incorporate these needs into the respective work plans for the next and following financial periods.
- Identify, catalogue, and integrate priority emerging hazards such as marine heat waves and those due to changes in the cryosphere that are affecting the region in support of the development of necessary monitoring and early warning systems.
- Implement priority activities in a collaborative, coordinated, and synergistic manner.
- Regularly track and report progress of priority activities.

B. ICAO PROPOSED AMENDMENTS TO IMPROVE THE DEFINITION OF METEOROLOGICAL AUTHORITY IN ANNEX 3

3. ICAO, by letter dated 26 January 2023, entitled, [Proposals for Amendment of Annex 3](#) has suggested amendments in Attachments B and C of the document to clarify the existing definition for "**meteorological authority**" and, in consequence, introduce a new definition for "**meteorological service provider**", to better distinguish the roles and responsibilities of both entities.

~~Abc~~ : Proposed to delete, ~~Abc~~ def: Proposed replacement, ghi: New

4. The proposed definitions are as follows:

Meteorological authority. The authority entity providing or arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State, and providing oversight and regulation of the meteorological service.

Meteorological service provider. The relevant entity providing meteorological service for international air navigation on behalf of a Contracting State.

5. The changes and text that will be affected in the general provisions in Annex 3, Chapter 2 are as follows:

2.1.4 Each Contracting State shall designate the authority entity, hereinafter referred to as the meteorological authority, to provide or to arrange for the provision of meteorological service for international air navigation on its behalf. Details of the meteorological authority so designated shall be included in the State aeronautical information publication, in accordance with Annex 15, Chapter 5.

2.1.5 The meteorological authority shall designate an entity (or several entities), hereinafter referred to as the meteorological service provider, to provide meteorological service for international air navigation on behalf of the Contracting State. Details of the meteorological service provider(s) so designated shall be included in the State aeronautical information publication, in accordance with Annex 15, Chapter 5.

2.1.6 ~~Each Contracting State~~ The meteorological authority shall ensure that the designated meteorological authority service provider complies with the requirements of the World

Meteorological Organization (WMO) in respect of qualifications, competencies, education and training of meteorological personnel providing service for international air navigation.

2.2.2 Each Contracting State The meteorological authority shall ensure that the designated meteorological authority service provider referred to in 2.1.45 establishes and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2.

6. These recommendations make a distinction between the Meteorological Authority and the Meteorological Service Provider and, if approved, will have implications for Member States NMHSs, that are currently the Meteorological Authority for international air navigation and can engage in cost recovery. Furthermore, the recommendations differ from the definitions in the new edition of [WMO Guide on Cost Recovery \(WMO-No. 904\)](#) that was approved at EC76 in March 2023.

7. In the new edition of WMO-No. 904, under “**Meteorological Authority**” at paragraph 1.7, it points out that “Paragraph 2.1.4 of Annex 3 states that each Contracting State shall designate the authority, hereinafter referred to as the meteorological authority, to provide or to arrange for the provision of meteorological service for international air navigation on its behalf. **It is important that an aeronautical meteorological service provider knows who, in their State, the designated meteorological authority is with respect to ICAO. Since only the meteorological authority can recover costs directly from aviation through air navigation charges.**

8. It further states, “However, this may not be as simple as it sounds. While the authority responsible for providing the meteorological service to aviation is listed in ICAO’s Directory of National Civil Aviation Administrations (DGCA), which can be found on ICAO’s secure portal, there can be different interpretations on the role of the meteorological authority (see Notes 1 - 5 below).” Note 3 includes: “..... However, for approximately 20% of States worldwide, the regulatory aspects of the meteorological authority currently remain part of the National Meteorological Service.....”

9. The variance between the proposed changes in ICAO Annex 3 and the updated WMO-No. 904 has implications for the concept of cost recovery for the provision of meteorological services for air navigation by meteorological service providers that are not the meteorological authority. It is important that there is no ambiguity in this regard when it comes to guidance on cost recovery.

C. WMO POSITION ON RELEVANT WORLD RADIOCOMMUNICATION CONFERENCE 2023 (WRC-23) AGENDA ITEMS

10. Among the World Radio-communication Conference 2023 (WRC-23) agenda items to be discussed at WRC-23 from 20 November 20 to 15 December 2023 are 21 items or topics related to frequency bands or issues of prime interest or concern for meteorology and related fields that have been highlighted by the [WMO Position Paper](#). There are at least four items that the WMO raised concerns with and one major item that is not being supported by the WMO, which is of critical importance to the Caribbean, namely:

Agenda item 1.2, “To consider identification of the frequency bands 3300–3400 MHz, 3600–3800 MHz, 6425 – 7025MHz, 7025 – 7125MHz and 10.0–10.5GHz for International Mobile

Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis”.

11. Of primary concern to the WMO is an IMT identification in the **6425 – 7025 MHz or 7025 – 7125 MHz** frequency bands. WMO also opposes IMT identification in 10.0 – 10.5GHz band but is open to IMT identification with certain conditions attached. WMO’s concern is that these bands are used to measure a wide range of ocean and land surface properties and are of critical importance in weather prediction. Specifically, *sea surface temperature (SST) measurements performed in these frequency bands are of prime importance for weather forecasting and climate monitoring.*

12. Passive microwave measurements in or near the 6425 – 7075 and 7075 – 7250 MHz ranges are unique for EESS (passive) measurements since they correspond to the peak sensitivity to SST (for which 6.8 GHz conveys the best information available in the 6 -15 GHz range). Sea surface temperature measurements are vital for the Caribbean, as tropical storms form when sea-surface temperatures exceed 26°C and the intensity of tropical storms and hurricanes and other severe thunderstorms is modulated by warm ocean perturbations. Further, National Oceanic and Atmospheric Administration (NOAA) “Hurricane Hunter” aircraft routinely make passive observations in these bands to provide critical information for hurricane forecasting.

13. WMO notes that the use of any portion of the 6425 – 7125 MHz band by IMT could have detrimental interference and impact on current and planned SST measurements, especially in coastal areas. Further, studies show that the intended new IMT spectrum identification will have high levels of interference with sea surface temperature measurements up to 2000 km from the coast, thereby degrading the data and making it difficult to predict and monitor severe weather.

14. WMO has urged that all Members promote WMO’s position on the relevant WRC-23 agenda items to ensure the availability and protection of suitable radio-frequency bands required for meteorological and related environmental operations and research, and in particular:

- 1) Ensure that their national radiocommunication administrations are fully aware of the importance of and requirements for radio frequencies for meteorological and related activities.
- 2) Seek their support in the ITU World Radiocommunication Conferences and Radiocommunication Sector (ITU-R) activities.
- 3) Participate actively in the national, regional, and international activities on relevant radiocommunication regulatory issues and, in particular, involve experts from their Services in the work of relevant regional telecommunication organizations and of ITU-R.
- 4) Register adequately with the national radiocommunication administration all radiocommunication stations and radio frequencies used for meteorological and related environmental operations and research.

D. REGIONAL IMPLEMENTATION PLANS FOR THE WMO HYDROLOGICAL STATUS AND OUTLOOK SYSTEM (HydroSOS)

15. Directors are asked to recall the recommendation to start operationalizing the global WMO Hydrological Status and Outlook System (HydroSOS) through regional implementation plans ([Resolution 5, Cq-Ext\(2021\)](#)).

Caribbean HydroSOS Implementation

16. At Cg-19, regional plans (including RA IV) for the implementation of HydroSOS were approved ([Resolution 9, Cg-19](#)), and Members were urged to contribute to the plan. Currently, the [RA IV HydroSOS Implementation Plan](#) does not have a Caribbean component. As such, the development of a HydroSOS implementation plan for the Caribbean is currently ongoing. CMO Headquarters was asked to support the implementation by coordinating with CMO Members to nominate experts, including a meteorologist, an IT specialist, and an expert in hydrology.

17. As an initial step in developing the Caribbean HydroSOS implementation plan, RA IV conducted its first HydroSOS Caribbean Virtual Workshop on 19 September 2023. A second workshop was scheduled to identify key needs and gaps, as well as opportunities and challenges related to developing the Caribbean HydroSOS. At the time of writing this document, a face-to-face meeting to develop the HydroSOS Caribbean implementation plan was being held from 31 October to 02 November 2023 in Barbados.

18. It is expected that the plan will focus on implementing HydroSOS at regional, national, and local scales, including developing the capacity of NMHS in the Caribbean to produce hydrological status reports and outlooks. In this regard, it will assist NMHSs with strengthening their monitoring and forecasting capacities for floods and droughts.

E. WMO STRATEGY FOR SERVICE DELIVERY AND ITS IMPLEMENTATION PLAN

19. The [WMO Strategy for Service Delivery](#) provides a detailed description of a roadmap for the Member States and their NMHSs to improve their standard and specialized services. The WMO states that the success of the Global Framework for Climate Services (GFCS) implementation depends on the establishment of similar frameworks at national levels and has encouraged Members to establish National Frameworks for Weather, Water, and Climate Services to enable the coordination and collaboration mechanisms needed to identify gaps, needs, and priorities and to support the development and application of climate services.

20. In this regard, WMO will provide a variety of support functions to NMHSs of relevance to the provision of services, including assisting Members with technology transfer, training for capacity development, collaboration on research, and the provision of services. It will also contribute to policy formulation related to weather, climate, water, and related environmental issues at national levels.

F. WMO-COORDINATED GLOBAL GREENHOUSE GAS MONITORING INFRASTRUCTURE

21. Given the increasing focus on the role of Greenhouse Gas (GHG) as a driver of climate change and the need to strengthen GHG information for decisions on climate mitigation efforts, Cg-19 approved a new Global Greenhouse Gas Watch (GGGW) as a monitoring initiative to support urgent action to reduce heat-trapping gases that are fuelling temperature increases. It is expected that the new [Global Greenhouse Gas Watch](#) will fill critical information gaps and provide an integrated, operational framework that brings under one roof all space-based and surface-based observing systems, as well as modelling and data assimilation capabilities.

22. The GGGW will consolidate existing measurement and analysis capabilities to provide estimates of total net greenhouse gas fluxes on a global scale at a relatively high resolution in space and time. Improved understanding of the fluxes will allow for better prediction of their long-term

future climate trajectories, with potentially strong implications for the required mitigation activities here and now.

G. GLOBAL AND REGIONAL IMPACTS OF CHANGES IN THE CRYOSPHERE

23. [Resolution 6 \(Cq-19\)](#) - Priorities to address global and regional impacts of changes in the cryosphere - specifically refers to Small Island Developing States, which include the Caribbean. It highlights that the WMO strategic goal of an Earth system approach requires additional actions on the integration and use of cryosphere observations and data to close the gaps to a fully coupled cryosphere in the Earth system. The changes in the cryosphere are felt well beyond the countries where they occur, being transmitted to vast human populations and the ocean via impacts on atmospheric circulation and hydrological systems, with cascading impacts on weather and climate.

24. The Caribbean is exposed to downstream impacts of melting glaciers through sea level rise, coastal flooding and inundation, and increased hazardous seas. Understanding the downstream impacts of cryosphere dynamics requires long-term marine meteorological observations.

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