CARIBBEAN METEOROLOGICAL ORGANIZATION

ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES **Doc. 4**
RODNEY BAY, SAINT LUCIA, 19 NOVEMBER 2025

OPERATIONAL MATTERS

(Submitted by the Coordinating Director)

INTRODUCTION

1. The Annual Meeting of Directors of Meteorological Services functions as the principal forum for collectively addressing operational meteorology priorities for the National Meteorological and Hydrometeorological Services (NMHSs) of the Caribbean Meteorological Organization (CMO) Member States. It also provides the opportunity to assess the alignment and progress of operational practices with the World Meteorological Organization (WMO) priorities, standards, regulations, and recommendations.

2. During the intersessional period between DMS2024 and DMS2025, CMO Members and NMHSs have continued to strengthen operations, enhance compliance with international WMO requirements, and advance key programmes and initiatives at national and regional levels, even when faced with operational challenges.

3. This document highlights a number of issues relevant to, affecting, or impacting NMHS operations. These matters are emphasized, reiterated, or newly introduced in order to:

- Raise awareness of the current status of CMO Members' compliance, identify existing gaps that must be addressed, and highlight upcoming deadlines requiring action by NMHSs; and
- Increase awareness of emerging and ongoing issues that are expected to influence operational meteorological and hydrometeorological services in the near term.

A. EARLY WARNINGS FOR ALL IMPLEMENTATION & ARTIFICIAL INTELLIGENCE

Amendments to the Technical Regulations (WMO-No.49) - Early Warning Services

4. WMO amended *Technical Regulations, Volume I – General Meteorological Standards and Recommended Practices (WMO-No.49)*, to introduce Section 6 – Early Warning Services in Part IV – Meteorological, Hydrological, and Climatological Services. The amendments include a definition of Early Warning Services and aim to enhance the design and alignment of capacity-development activities, strengthen partner and donor engagement in the Early Warnings for All (EW4All) initiative, and provide Members with a clear and consistent framework for delivering authoritative high-quality early warning services.

5. These amendments come into effect on 01 January 2027, and Directors are required to fully implement the amendments by 31 December, 2029. WMO has urged Members to:

- Prioritize the implementation of the technical regulations on early warning services and mobilize resources through project development as well as ensure engagement of national disaster risk management stakeholders;

- Contribute to the WMO monitoring of the progress of early warning systems and services.

6. When implementing the amendments, Members are required to:
   - Determine, establish, and operate the necessary early warning services for meteorological, hydrological, climatological, and related environmental hazards taking into consideration the disaster risks associated with the territory-specific hazard event types, their severity, likelihood, spatial and temporal characteristics, and, as far as possible, potential impacts.
   - Ensure the provision of early warning services for meteorological, hydrological, climatological, and related environmental hazards affecting their respective territories.
   - Ensure that early warning services are available to national and local governments, disaster risk management organizations, the general public, and any other stakeholders concerned in a simple, clear, and unambiguous language to enable timely and effective preparedness and response actions.
   - Establish suitable communication channels to ensure timely, accurate, effective, and robust reliable supply of early warning services reaching all stakeholders concerned.

WMO's Call to Action to Accelerate Implementation of Early Warnings for All

7. The Meeting will recall the discussion at DMS2024 (Road Town, 2024) on the WMO-approved list of high-priority activities contributing to the Early Warnings for All Initiative, including the WMO Information System (WIS) 2.0, implementing the Common Alerting Protocol (CAP) integrated with the WIS 2.0 node, the Global Basic Observing Network (GBON) via Systematic Observation Financing Facility (SOFF), and embracing Artificial Intelligence (AI) and Cataloguing of Hazardous Events.

8. During 2025, the WMO continued to urge Members to accelerate the "Early Warnings for All" (EW4All) initiative and produced A *Call to Action* Statement to Accelerate Implementation of Early Warnings for All that was issued on 20 October 2025 by the WMO Secretary General. In this Action Statement, the WMO called on Members to champion open, free, and unrestricted data sharing as a global public good and strengthen forecasting and early warning through universal implementation of the WMO Unified Data Policy, WIS 2.0, and CAP.

9. The Statement also called on Members to expand and modernize observational networks through accelerated implementation of the GBON and to scale impact-based forecasting and warning services and harness innovation responsibly by expanding AI applications within WMO systems. It also emphasized the need for the continuous and reliable provision of early warning services to safeguard lives and livelihoods.

10. CMO Members NMHSs continue to deliver on key early warning elements contained in the Call Action Statement, but critical gaps remain. Almost all CMO Members' NMHSs deliver early warning services and those that do not directly deliver early warning services are provided with early warning services based on CMO regional arrangements.

11. However, a recent assessment of CMO Members' NMHSs revealed that 50% do not yet operate continuously (Figure 1). While these Services maintain staffed operations during standard airport operational working hours, after-hours hazard monitoring activities are limited.

12. Directors or Managers of NMHSs that do not operate continuously are encouraged to advance and advocate for continuous operations to build trust in official forecasts and warnings, which is critical during emergencies when decisions must be made quickly, and reduce disaster losses by improving preparedness.

Figure 1.0: Percentage of CMO Member States with staffed operational meteorological services continuously.

Status of Implementing the Common Alerting Protocol (CAP)

13. To support the Early Warnings for All (EW4All) initiative, WMO continued to accelerate the implementation of the Common Alerting Protocol (CAP) during 2025. The Meeting will recall discussions at DMS-2024, where several NMHSs expressed strong interest in receiving assistance with CAP implementation.

14. In 2025, CMO Headquarters achieved a key milestone by hosting three (3) CREWS 2.0–funded, WMO-supported, capacity-building workshops in Grenada, Saint Lucia, and Dominica from 27 January to 4 February 2025. The workshops, facilitated by regional CAP trainers from the NMHSs of Jamaica and Trinidad and Tobago, used a peer-to-peer learning approach that strengthened regional expertise and accelerated adoption of the CAP standard. Each workshop trained about 20 participants in CAP principles, implementation, and issuance, culminating in WMO certification.

15. Following the workshops, CMO Headquarters collaborated with WMO to integrate the free, open-source WMO CAP Composer with the Caribbean WIS 2.0 Node, creating a regional CAP hub that enables NMHSs to issue and share alerts seamlessly across multiple channels and systems. Detailed guidance on installation and use is available in the **WMO CAP Composer Documentation** and on **GitHub – WMO CAP Composer**. NMHSs are encouraged to download, configure, and utilize the tool as a stand-alone application to support their national warning operations.

16. The tool, accessible via web or as a stand-alone application, allows Members to generate and disseminate CAP-formatted warnings through platforms such as WhatsApp, Facebook, Telegram, X (formerly Twitter), LinkedIn, and CAP XML, ensuring full compliance with global standards.

17. As a result of these efforts, Saint Lucia issued its first official CAP warning on 18 October 2025, while Grenada issued its first test message the same day. Dominica continues internal testing, and Sint Maarten has requested integration into the WIS 2.0–CAP system.

18. Currently, **ten** (10) CMO Member NMHSs (**62.5%**) have operationalized CAP as their national alerting platform—an improvement from seven (7) Members (44%) in 2023. Two (2) NMHSs (12.5%) are in testing phases, while four (4) Members (25%) are yet to begin implementation.

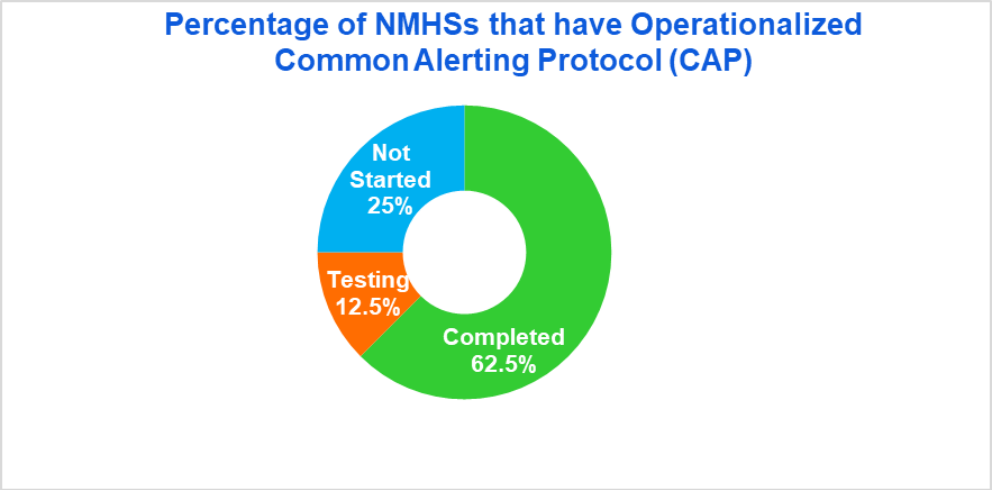

Figure 2. Percentage of National Meteorological and Hydrometeorological Services (NMHSs) with the Common Alerting Protocol (CAP) operationalized

Operationalizing Impact-Based Forecasting and Warnings Services (IBFWS)

19. The WMO has identified Impact-Based Forecasting and Warning Services (IBFWS) as a core component of the Early Warnings for All (EW4All) initiative, particularly under Pillar 2 – Detection, Monitoring, Analysis, and Forecasting of Hazards. For CMO Member States, operationalizing IBFWS is essential to achieving the EW4All objectives within the region.

20. The number of CMO Member NMHSs with fully or partially operationalized Impact-Based Forecasting and Warning Services (IBFWS) continued to increase in 2025, demonstrating growing operational readiness for IBFWS; however, comprehensive IBFWS implementation remains limited.

21. Currently, only one Member provides what can be considered a fully comprehensive IBFWS across multiple hazards, while ten (10) or 62.5% have partially implemented IBFWS, and five (5) or 31.25% have not yet commenced implementation (Figure 3.0).

22. Further effort, supported by stronger operational guidance and standardized procedures, is required to enhance forecaster competencies, strengthen operational readiness, and fully integrate IBFWS into day-to-day forecasting and warning operations.

23. Directors are encouraged to prioritize the full operationalization of IBFWS for all priority hazards by deepening collaboration with national disaster risk management authorities and developing Standard Operating Procedures (SOPs) grounded in national needs and established best practices contained in **WMO Guidelines on Multi-hazard Impact-based Forecast and Warning Services: Part II: Putting Multi-Hazard IBFWS into Practice**.

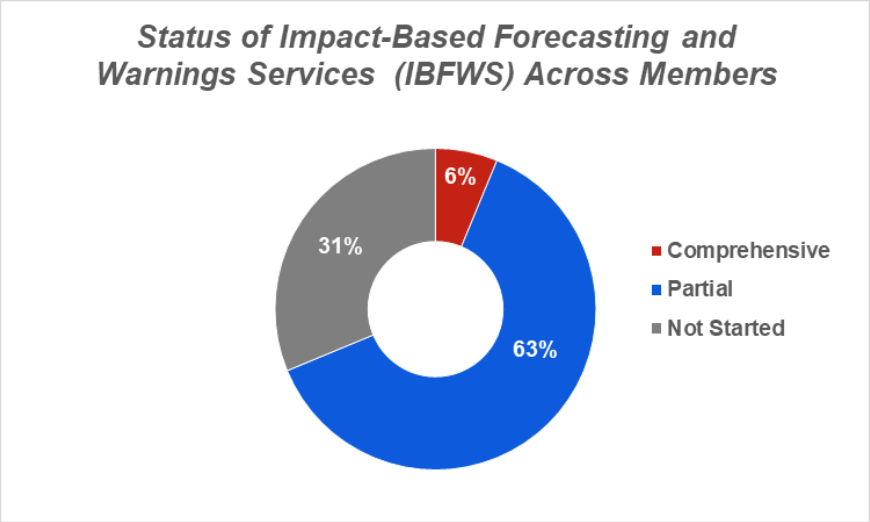

Figure 3.0: Status of operationalized Impact-Based Forecasting and Warnings Services (IBFWS) across members NMHSs.

Leveraging Artificial intelligence (AI) in Early Warning Services

24. Artificial intelligence (AI) technologies have been rapidly developed and applied across meteorological value chains, offering transformative potential for operational forecasting and warning services. These advancements can significantly support the objectives of the Early Warnings for All (EW4All) initiative.

25. The WMO is actively advancing its AI integration strategy and Action Plan, aiming to accelerate the adoption of AI within forecasting, observation, and warning-system infrastructure. Special emphasis is being placed on embedding AI within the WMO Integrated Processing and Prediction System (WIPPS), while promoting operational innovation and capacity enhancement among NMHSs.

26. The 2025 Extraordinary Congress adopted the statement entitled **"WMO Call to All Stakeholders to Collaborate on the Development of Artificial Intelligence (AI) and Machine Learning (ML) Environmental Monitoring and Prediction Technologies, Tools and Applications**." The purpose of the WMO Call is to leverage AI/ML technological advances and accelerate multi-stakeholder collaboration to strengthen the entire value chain of weather, climate, hydrological, marine, and related environmental services, with a particular focus on early warning delivery by NMHSs.

27. A key element of the statement is the recognition that AI has the potential to address long-standing capacity development challenges, especially for developing countries, including Small Island Developing States (SIDS), across meteorological, climate, hydrological, marine, and environmental domains.

28. For CMO Member NMHSs, AI offers the prospect of enhanced forecasting and warning capabilities. AI-based approaches can enable faster, more refined predictions—including nowcasting and sub-seasonal forecasting—and support more tailored warnings for local high-impact events.

29. Directors are encouraged to explore emerging AI/ML technologies and assess their potential impact on operational activities, capacity development, and policy frameworks through pilot projects. This should include joint initiatives with public, private, and academic sector partners in line with the WMO Call. Furthermore, Directors are urged to actively cooperate with stakeholders to harness the benefits of digital transformation and implement trustworthy AI systems to strengthen early warning services.

B. CATALOGUING OF HAZARDOUS WEATHER, CLIMATE, WATER AND RELATED ENVIRONMENTAL EVENTS

30. Following approval at WMO's Extraordinary Session of the Commission for Weather, Climate, Hydrological, Marine, and Related Environmental Services and Applications (SERCOM-Ext (2025)) in March 2025, WMO published its updated **Guidance for the Implementation of the WMO Cataloguing of Hazardous Weather, Climate, Water and Related Environmental Events (WMO-CHE, WMO –No 1317).** The WMO-CHE is not intended to be a real-time database but rather a national-level record of hazardous events and their characteristics, including magnitudes, locations, duration, and timing, and is a key tool for improving situational awareness, and early warning systems, thus directly contributing to the Early Warnings for All (EW4All) initiative.

31. The updated WMO-CHE provides a standardized methodology for recording hazardous weather, climate, water and related environmental events at the national level with linkages for strengthening impact-based forecasting and warning systems and enhancing national and regional hazard monitoring. The WMO-CHE outlines a set of core and optional elements that each record of a hazardous event should include and defines a standard list of hazardous event types (Figure 4). The **mandatory (*)** and **optional (**)** elements capture both the physical characteristics of the hazard and its associated impacts, and include:

1) Event Identification*
    - Unique event ID
2) Originator*
    - Name of institution recording the event
3) Record Creation*
    - Date and timestamp of the event record
4) Event Start and End Information*
    - Start and end dates/times of the event
5) Event Type*
    - Hazard type (e.g., tropical cyclone, flood, drought, heatwave, landslide)
6) Spatial area*
    - Spatial extent or area of the hazard event impacted in a recognized spatial format (point, line, or area)
7) Impact**
    - General description of any impacts associated with this event
8) Affected Sector**
    - Specifies the sectors that may have been affected.

32. The adoption of the official WMO methodology for cataloguing hazardous events remains limited among CMO Member NMHSs. Most NMHSs engaged in cataloguing hazardous events do so partially or informally, often reflected only in internal reports, and some are not yet familiar with the WMO Catalogue of Hazardous Events (WMO-CHE) guidelines. A preliminary survey indicates that only five (5) NMHSs are currently engaged in cataloguing hazardous events, most of which have only recently initiated the process. An additional five NMHSs have partially implemented cataloguing, two are doing so informally, and four have yet to begin (see Figure 5).

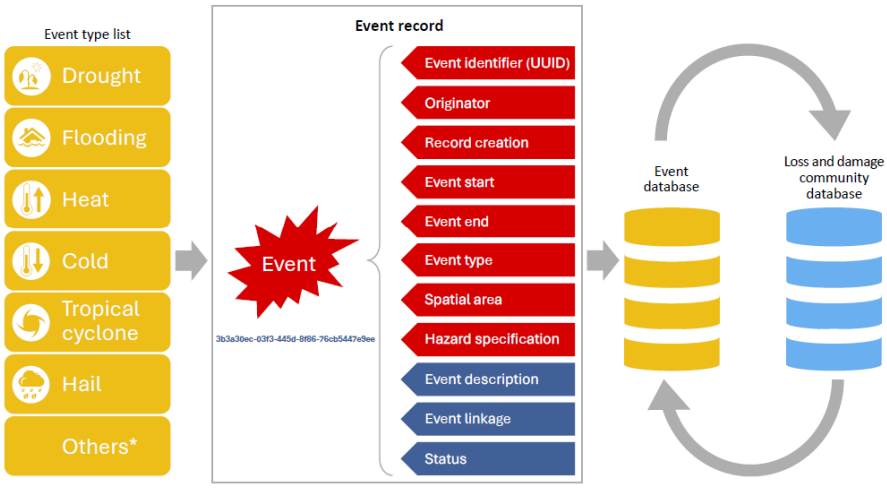

Figure 4. WMO's updated CHE methodology demonstrating a hazardous event record containing the universally unique identifier, key event mandatory (red) and recommended attributes (blue).

Recommendation

33. Directors are encouraged to establish a National Weather, Climate, Water, and Related Environmental Events Catalogue System using the WMO-CHE methodology. This system should be supported by operational procedures that integrate cataloguing into daily operations, thereby strengthening the delivery and effectiveness of impact-based early warning services.

34. Alternatively, Directors are encouraged to strengthen their national hazardous events database by operationalizing their severe weather event procedures towards participating in the **Severe Weather Database for the Caribbean** developed by the CIMH and CMO Headquarters under CREWS in support of WMO Severe Weather Forecasting Programme (SWFP) Caribbean. This database already adheres to the WMO-CHE methodology, providing a standardized framework for cataloguing hazardous events.

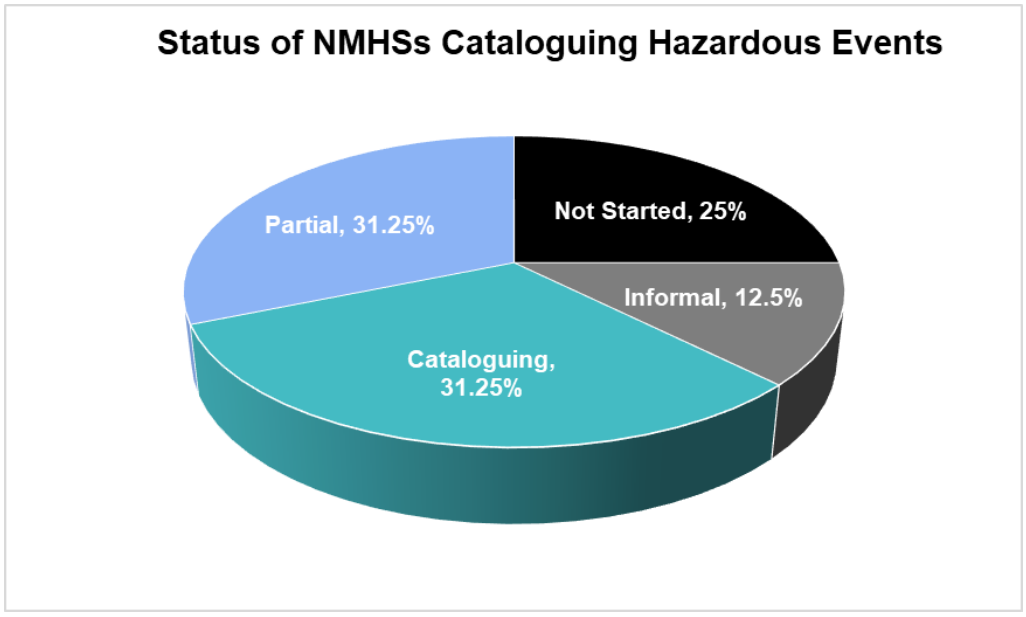

Figure 5. WMO's methodology demonstrating a hazardous event record containing the Universally Unique Identifier, key event mandatory (red) and recommended attributes (blue).

C. AMENDMENT 82 – 21st EDITION ICAO ANNEX 3 – METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION & STATUS OF QMS IMPLEMENTATION

35. In August 2025, the International Civil Aviation Organization (ICAO) published its **21st edition of Annex 3-Meteorological Service for International Air Navigation,** which incorporates Amendment 82, and the new (first) edition of the Procedures for Air Navigation Services - Meteorology (PANS-MET) (Doc 10157), both of which will become applicable on 27 November 2025.

36. The splitting of Annex 3 and the re-introduction of a PANS-MET represents a major reform of ICAO's regulatory framework in aeronautical meteorology and allows Annex 3 to focus on Standards & Recommended Practices (SARPs), with PANS-MET covering detailed procedures.

37. There are three (3) important updates and one (1) enhanced oversight area that Caribbean NMHSs must pay attention to: (1) Governance: Definitions of Meteorological Authority & Meteorological Service Provider; (2) Quantitative Volcanic Ash (QVA) Concentration Information; (3) Digital Information Exchange / Information Model (IWXXM); and (4) more emphasis placed on performance metric: timelines, accuracy, and corrective actions.

Updated and New Definitions - Meteorological Authority & Meteorological Service Provider

38. Key changes in the updated Standards and Recommended Practices (SARPs) include updated definitions to make a distinction between the “meteorological authority” and a new definition of “meteorological service provider.” In the updated SARPs the terms have the following meanings:

- **Meteorological authority**: The entity arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State, and providing regulation and oversight of the meteorological service.
- **Meteorological service provider**: The relevant entity designated to provide meteorological service for international air navigation on behalf of a Contracting State.

39. The term meteorological service in the updated SARP refers to the services delivered (observations, forecasts, warnings), while meteorological authority refers to the organizational or administrative entity designated by the State to provide or arrange for those services. This distinction is important, because the “meteorological authority” is the entity, which could be the national meteorological service or another designated provider; whereas the meteorological service refers to professional aviation meteorological service (observations etc.) that supports operations and flights planning.

40. This distinction has implications for all NMHSs. Accordingly, CMO Members NMHSs are encouraged to review their aviation meteorological service governance, clarify and or verify their legal status and regulatory relationships as the “meteorological service provider” recognized by their civil-aviation authority, to ensure regulatory alignment with ICAO SARPs.

Quantitative Volcanic Ash Concentration

41. Effect November 27, 2025 it is a Standard and hence mandatory for all Volcanic Ash Advisory Centres (VAACs) to provide **Quantitative Volcanic Ash (QVA) concentration** information for significant volcanic ash clouds. QVA forecasts will provide higher resolution detail than existing volcanic ash products and will include both a single, specific forecast snapshot and probabilistic forecasts of ash concentration within the boundaries of an eruption.

42. VAAC London and VAAC Toulouse will provide QVA forecasts from 27 November 2025. The other seven ICAO designated worldwide VAACs including Washington will not initially supply QVA forecasts. However, Amendment 82 recommends that all VAACs should issue QVA forecasts from 26 November 2026.

43. CMO Member States NMHSs need to prepare for the shift from qualitative ash advisories (VAA/VAG) to QVA. This will require updates to internal SOPs to incorporate ash concentration thresholds in SIGMET language, training of meteorologists and forecasters on interpreting QVA fields and applying them to local airspace and integrating QVA into early warning systems to inform impact-based early warning services for aerodromes and general populations.

Increased Use of IWXXM (ICAO Meteorological Information Exchange Model)

44. Directors will recall previous discussions on operationalizing IWXXM during DMS meetings, based on ICAO's mandate, which came into force in 2020. Implementing IWXXM has proven challenging for CMO Members and involves far more than simply installing software. It requires integrated system upgrades, trained personnel, regulatory alignment, and robust infrastructure.

45. The Meeting is informed that, under the updated ICAO Annex 3, States are required to provide operational meteorological (OPMET) data in IWXXM format starting 27 November 2025. This requirement applies to all internationally exchanged OPMET data, including METAR, SPECI, TAF, SIGMET/AIRMET, Volcanic Ash Advisories, Tropical Cyclone Advisories, Space Weather Advisories, SIGWX, and WAF products.

Implications for CMO Member States

46. NMHSs are expected to maintain TAC data exchange during the transition to IWXXM, while generating OPMET data in IWXXM format that is validated against ICAO/WMO schemas. This is necessary to ensure that national systems or the Regional OPMET Centre (ROC) can distribute their TAC in IWXXM.

47. Globally, only a limited number of States currently have the capability to send and receive OPMET in IWXXM. Among CMO Members, only the NMHSs of Barbados, Guyana, Trinidad and Tobago, along with Sint Maarten, are currently exchanging OPMET data in IWXXM alongside TAC.

48. The majority of CMO Members use the Aeronautical Fixed Telecommunications Network (AFTN) for exchanging TAC-based OPMET. Importantly, IWXXM cannot be transmitted over AFTN due to character set limitations. The Aeronautical Message Handling System (AMHS) is required for IWXXM exchange, but implementation is incomplete in the region. Among CMO Members, only Cayman Islands, Guyana, Jamaica, and Trinidad and Tobago have AMHS capability (Figure 6).

49. It is crucial that when a Member State upgrades from AFTN to AMHS, the new system is capable of sending, receiving, and routing both TAC-based messages and IWXXM files via File Transfer Protocol Extended (FTPE). Without AHMS with FTPE integration, a State may have AMHS but will not be able to exchange IWXXM.

50. CMO Member States NMHSs will continue to face challenges in fully operationalizing IWXXM. To accelerate adoption, CMO Headquarters has initiated discussions with ROC London to provide regional TAC → IWXXM translation support. Initially, this service will assist the British Overseas Territories, with plans to extend support to other CMO Members that wish to access this translation service operationally.

51. The Meeting is informed that ICAO Regional OPMET Centres (ROCs) are responsible for collecting IWXXM-formatted OPMET data and bulletins from National Operations Centers (NOCs) within their area of responsibility and disseminating them to other capable ROCs. ROC London already collects and distributes OPMET data (METAR, TAF, SIGMET, etc.) for many Caribbean States and exchanges data with North, Central, and South America. ROC London also provides TAC → IWXXM conversion and validation for States that cannot yet generate IWXXM natively.

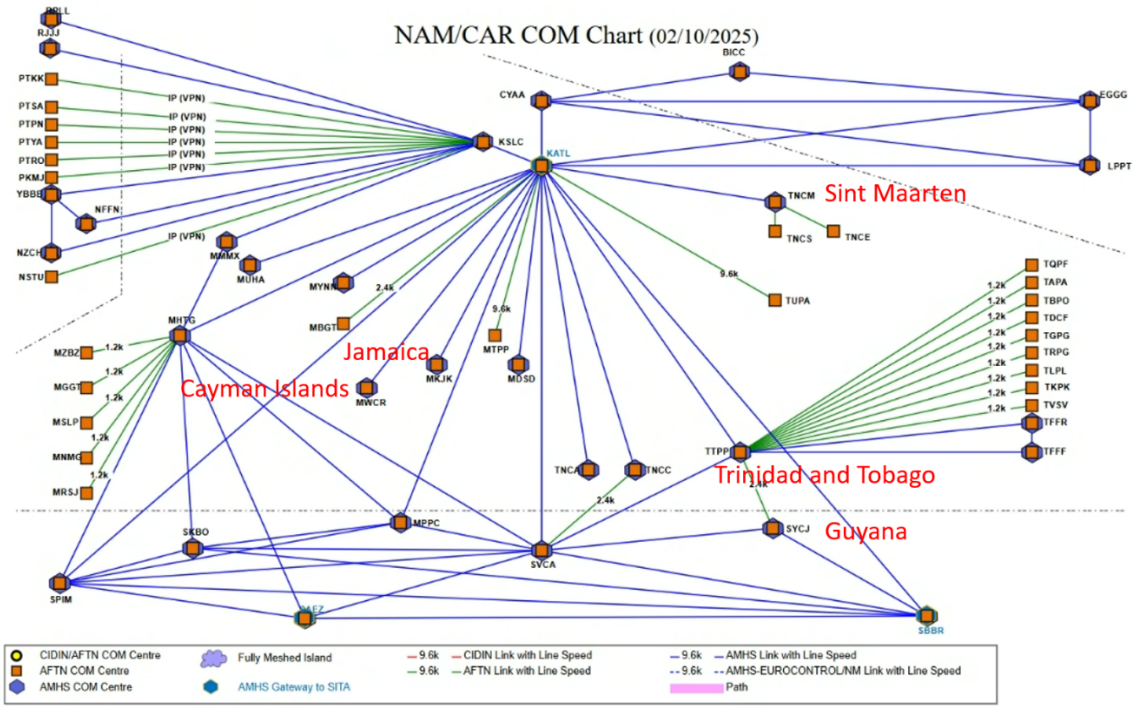

Figure 6. ICAO communication (COM) charts for the North American (NAM) and Caribbean (CAR) air navigation regions.

Enhanced oversight, audit and performance monitoring

52. The updated definitions of “meteorological authority” and “meteorological service provider” affect QMS oversight and responsibility. Amendment 82 clarifies distinction between “Meteorological Authority” **(regulatory oversight)** and “Service Provider” **(QMS implementation).**

53. NMHSs must confirm that their national regulatory framework clearly designates the meteorological authority vs the service provider, and that the service provider is accountable for implementing the QMS. NMHSs that are service providers are expected to implement robust audit, verification/validation, non-conformance handling, performance indicators, and continuous improvement within the QMS.

Status of QMS Implementation In CMO Member States

54. The Meeting is reminded that since 2012, WMO standards have mandated that NMHSs providing meteorological services for international aviation implement and maintain a Quality Management System (QMS) conforming to the ISO 9000 series, typically ISO 9001.

55. Implementing a Quality Management System (QMS) for aviation meteorological services remains a complex task for CMO Members’ NMHSs. As of October 2025, QMS implementation among CMO Member NMHSs remains variable and incomplete, although additional progress has been made during the year.

56. Only five (5) NMHSs have fully functional QMS integrated into daily operations, while two (2) have legacy QMS versions that are not aligned with current standards and require updating, five (5) are currently implementing a QMS, and three (3) have not yet started QMS implementation (Figure 7.0).

57. Recognizing the critical role that standardized quality processes play in ensuring the delivery of reliable, timely, and user-focused meteorological services, the CMO Headquarters will organize a regional certificate-earning QMS Lead Auditor capacity-building workshop during the first quarter of 2026. The training will enable selected NMHS professionals to acquire internationally recognized

certification as ISO 9001:2015 QMS Lead Auditors, strengthening national and regional capacities for implementing, auditing, and maintaining QMS across meteorological operations.

58. Directors are asked to note that the 2015 edition of the ISO 9001 series is undergoing revision with publication of the revised version, possibly **ISO 9001 2026** planned for September 2026. NMHSs should consider that the new version of QMS is likely to arrive around quarter 3 of 2026, and start budgeting and preparing the revised version.

QMS Implementation Status 2025 – CMO Members			
Fully Functional QMS	**Legacy QMS Implemented**	**QMS Implementation Phase**	**QMS Not Started**
Anguilla	Jamaica	Antigua and Barbuda	Belize
Barbados	Trinidad & Tobago	Grenada	Dominica
Cayman Islands		Saint Lucia	Turks & Caicos
Guyana		St Kitts & Nevis	
Montserrat		St Vincent & the Grenadines	

Figure 7.0 Status of Quality Management Systems Implementation at National Meteorological and Hydrometeorological Services in CMO Member States.

D. WIGOS IMPLEMENTATION: OSCAR/SURFACE, REGIONAL WIGOS CENTRE, WDQMS, GBON, AND SOFF

OSCAR/Surface Replacement

59. WMO notified Members that it was developing an Observing Systems Capability Analysis and Review (OSCAR)/Surface Next Generation (NextGen) system to replace the existing OSCAR/Surface platform by 2026, as several software components of the current system are approaching end-of-life. To avoid disruption of operational data exchange, WMO has entered into an updated agreement with MeteoSwiss to maintain the current application until the end of the first quarter (Q1) of 2027.

60. On July 28, 2025 WMO provided Members' NFPs with a survey seeking responses on national use of OSCAR/Surface to inform the efforts by the task team to analyze and prioritize use cases, and to understand how Members were using the OSCAR/Surface tool. User requirements for new systems is scheduled to be completed by the end of 2025, to be followed by development of the new application starting March 2026.

61. NMHSs that have not done so are encouraged to respond to the OSCAR/Surface user survey to help WMO shape system requirements relevant to Members' needs. Between now and quarter 1 of 2026, NMHSs should review and correct all OSCAR/Surface entries to ensure they're complete and accurate before migration starts, since stations with outdated metadata may face migration errors. Ensure OSCAR/Surface and WDQMS NFPs are active and trained, since they will play a key role in migration and testing.

Regional WIGOS Centre (BCT-CMO, Trinidad and Tobago) Contributing Nodes Activities

62. The Meeting will recall the discussion at the DMS2024 discussion on the implementation of the WMO Integrated Global Observing System (WIGOS), the role of the contributing nodes (BCT-CMO, and

Trinidad and Tobago) in the distributed RA IV Regional WIGOS Centre that is currently in pilot mode and the part to be played by NFP.

63. Since DMS 2024, the BCT/CMO HQ and Trinidad and Tobago contributing nodes continued to provide mandatory and optional functions to eight (18) Caribbean States, including supporting Members with the management of metadata in OSCAR/Surface and performing Incident Management System (IMS) functions such as registering, monitoring, and resolving issues with observational data and creating, updating, and closing incident tickets for issues identified via WDQMS.

64. Between November 2024 to November 2025, the RWC Contributing node issued twenty (27) incident tickets to eight (8) NMHSs and closed 18 of those tickets, leaving 9 tickets outstanding. Some tickets contained individual stations, while some contained larger issues affecting multiple stations in one country (Figure 8).

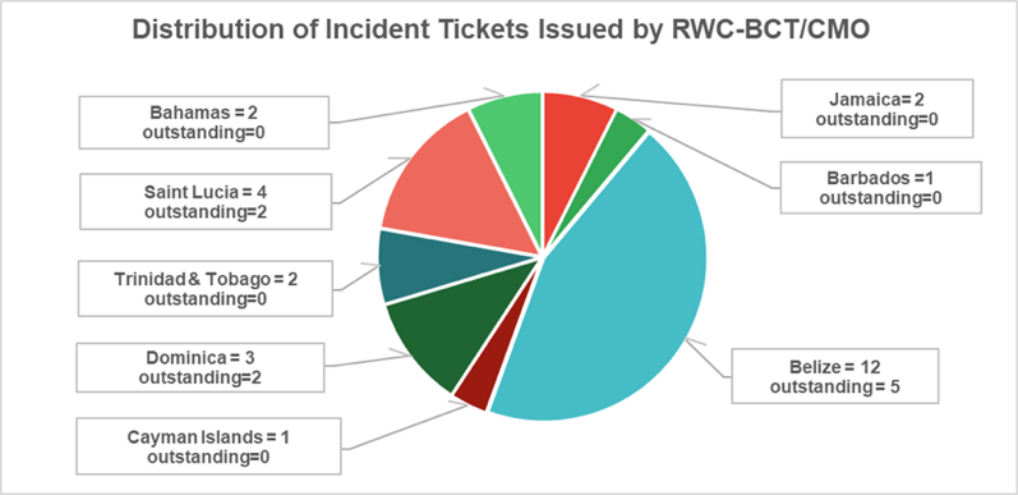

Figure 8. Distribution of incident tickets issued by RWC-BCT/CMO to NMHSs under its responsibility in the RA IV Regional WIGOS Centre.

65. The type of incident tickets issued and resolved included issues with station deployment information, data availability including stations exchanging less or more data than expected, element configuration such as data for international exchange, complete data outages and difficulty to track and differentiate between GTS and WIS 2 bound data, and which was responsibility for data outages when they occur.

66. The main challenges included delayed responses to emails and tickets by NFPs with the unavailability of required NFPs from some Members in the IMS and non-reporting by NFPs on solutions to tickets, which impacts the contributing node of the RWCs to monitor and respond to Members' performance effectively.

67. Most of data availability issue are related to metadata not matching data exchange frequency, and data dissemination. In some instance, upgrading of metadata and tickets are not regarded as priority activities as metadata and tickets remain open for long periods until direct phone calls are made to the NMHS, which is not how the RWC is supposed to work.

Capacity Development Requirements and Opportunities

68. During the period there were a number of peer to peer collaboration between RWC /BCT-CMO and NFPS to understand national framework and challenges, focusing on addressing the root causes and closing knowledge gaps that improved metadata and data availability. More stations under the RWC-BCT/CMO and Trinidad and Tobago turned green on the WDQMS portal due to the work of the RWC.

69. However, there is a need for in-person training for RWC-BCT/CMO and RWC-Trinidad and Tobago affiliated Members in use of WIGOS tools and the linkage between the tools, understanding WIGOS network and programmes, and updates to the WIGOS RWC regulatory guidance material and the role of NFPs. National Focal Points for WDQMS and meteorological service IT staff should be included in the WIS training.

WIGOS Implementation and WDQMS Monitoring Tool Activities

70. WMO's WIGOS Data Quality Monitoring System (WDQMS) is a key component of the WMO Integrated Global Observing System (WIGOS), providing a real-time, objective overview of how well the global observing system meets WMO standards for data availability and quality. Particularly, the meteorological and related observations shared internationally by tracking whether observational data (e.g., SYNOP, TEMP, BUFR reports) from each station are being received at particular global data centres.

71. Among CMO Member States' NMHSs, there were notable improvements in data availability to the Global Numerical Weather Prediction Centres in 2025. Most stations are now reporting the expected number of observations or even more frequently than required, which has increased their WDQMS compliance scores.

72. In terms of monthly trends, Figure 9 shows the distribution of data availability categories across CMO Member stations in 2025. The largest proportion of stations maintained high monthly data availability (greater than 80%, green) throughout the year, with more than 50% of stations consistently meeting the WIGOS threshold of 80% of expected observations submitted to the Global NWP Centres. This high-availability category is particularly prominent from May to October, indicating that the majority of stations consistently provide a substantial portion of their data to NWP centres during the hurricane season.

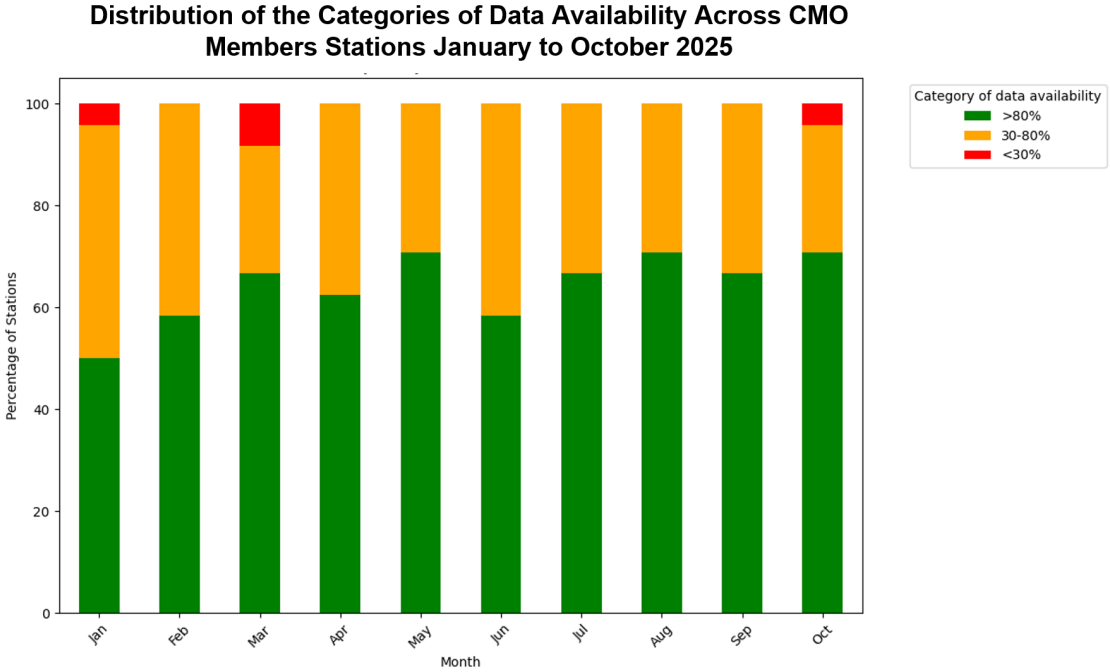

Figure 9. Distribution of the categories of data availability across CMO Members Stations from January to October 2025.

73. Overall, data availability performance across CMO Member States is strong, with most stations consistently maintaining availability above the 80% target (green) (Figure 10). However, some stations continue to underperform, reporting data less frequently than required. In particular,

stations in Anguilla, Dominica, Jamaica, Saint Lucia, and Turks and Caicos recorded moderate (30–80%) or low (<30%) availability (Figure 10).

74. Notably, Jamaica and Saint Lucia showed marked improvement from May onward due to targeted efforts to stabilize station operations using WIS 2.0, ahead of the Atlantic hurricane season, when continuous observations are critical for forecasting and early warning.

Country	Station Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Anguilla	Anguilla	40	31	28	30	73	70	70	53	56	60
Antigua and Barbuda	Vc Bird Airport	99	100	99	99	99	98	99	99	99	96
Barbados	Grantley Adams	96	69	100	99	100	99	100	99	100	99
Belize	Phillip Goldston Airport	40	80	100	100	100	100	98	96	100	99
	Punta Gorda	0	69	75	80	83	73	58	54	54	46
Virgin Islands (UK)	Beef Island, Tortola	100	100	100	100	100	100	96	91	96	92
Cayman Islands	Owen Roberts Airport	99	98	99	96	100	100	100	100	100	99
	Cayman Brac	99	98	99	96	100	100	100	100	100	100
Dominica	Melville Hall Airport	76	95	93	88	50	31	35	32	33	29
	Canefield Airport	70	92	89	81	46	34	33	33	36	36
Grenada	Maurice Bishop Airport	100	98	99	100	99	99	100	100	99	99
Guyana	Cheddi Jagan Airport	95	99	97	99	99	99	99	97	95	92
	Ogle Airport	86	86	98	70	100	100	99	100	100	100
Jamaica	Kingston/Norman Manley	33	33	29	31	52	59	87	80	90	91
	Montego Bay/Sangster	34	33	33	33	57	66	98	97	94	84
Montserrat	John A. Osborne Airport	75	100	100	100	100	100	78	93	73	97
Saint Lucia	Hewanorra Int'l Airport	46	73	70	71	82	80	81	84	79	72
	George F.L. Charles Airport	33	33	33	34	33	33	36	83	68	58
St Kitts and Nevis	R.L. Bradshaw Int'l Airport	97	99	100	98	99	100	99	99	99	96
	V.W Amory Int'l Airport	88	92	100	89	87	78	76	77	89	91
St Vincent & Grenadines	Argyle International Airport	80	75	80	63	89	88	92	86	87	86
Trinidad and Tobago	Piarco Int. Airport	97	97	97	96	98	97	98	97	99	98
	Crown Point Airport	96	98	96	95	98	97	98	98	98	97
Turks and Caicos	Providenciales	59	60	56	57	57	54	59	53	54	53

Figure 10.0 Percentage data availability (reported vs expected) across CMO Members NMHSs observation stations based on WDQMS-monitored station performance levels. The chart shows the level of data availability achieved above 80% (green), between 30–80% (yellow), and below 30% (red) by each station.

New WDQMS Timeliness Metric

75. The Meeting is informed that in late March 2025, WMO released version 1.5.3 of the WIGOS Data Quality Monitoring System (WDQMS), which included the Marine Quality Phase II module linking marine stations to OSCAR/Surface and a new toggle button (steering wheel) to display only marine assets lacking an OSCAR/Surface metadata record.

76. Subsequently, on 2 September 2025, WMO released WDQMS version 1.6. The main enhancement in 1.6 was the addition of the timeliness metric to the NWP surface observations view. The timeliness metric measures the difference between the reception time at a Global NWP monitoring center and the observation time (reception time minus observation time), indicating how quickly a station's observation data are received. Timeliness, alongside data availability and quality, is critical for ensuring the reliability of observational data for weather forecasting and climate monitoring.

77. A snapshot of CMO Member stations on 5 November 2025 shows that all SYNOP reports, except one station, were received at the Global NWP Centers within 30 minutes of observation, meeting the WMO timeliness target (Figure 11).

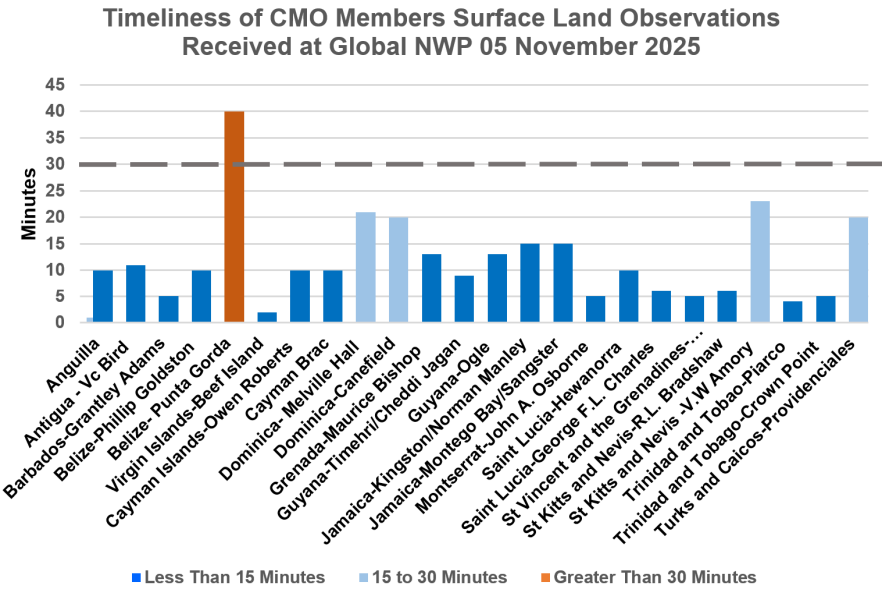

Figure 11. Snapshot of CMO Members stations data exchange timeliness on 05 November 2025.

Global Basic Observation Network (GBON)

78. Directors are asked to note that progress toward full compliance with Global Basic Observing Network (GBON) requirements remains moderate among CMO Member NMHSs. According to WMO's GBON compliance app, results for the third quarter of 2025 (**GBON Compliance in Q3 2025**) show that the number of Members achieving full GBON station-level compliance increased from 5 in 2024 to 9 in 2025, representing 56% of Members, a 25% improvement.

79. The number of fully GBON-compliant stations also increased, from 7 of 23 stations (30%) at the time of DMS 2024 to 11 stations (48%) in 2025 (Figure 12). The Member countries with stations that became GBON-compliant in 2025 are Belize, Jamaica, Montserrat, and Saint Lucia.

80. Despite this progress, achieving full compliance remains a challenge in some countries, as the effective contribution of certain stations to the global observing system remains below potential. This shortfall is particularly evident in States where NMHSs do not operate 24 hours a day and have not fully integrated their automatic weather stations with the WIS 2.0 infrastructure, resulting in periods when observations are not transmitted in real time, as required by GBON. This gap underscores the need for capacity-building support, including automation of data routing to WIS 2.0, to ensure that data from all GBON stations are globally accessible from CMO Members.

81. A key operational activity facilitated the increase GBON compliance was the integration of WIS 2.0 with automatic weather stations, which made it easier for NMHSs to share data globally by removing the need for continuous manned observations and allowing stations that do not operation for the full 24-hours to still exchange data continuously. An example of this is the Montserrat station, which operates

manually for 12 hours but currently meet GBON compliance of 24 hourly observations reported through WIS2 integrated with its automatic weather station.

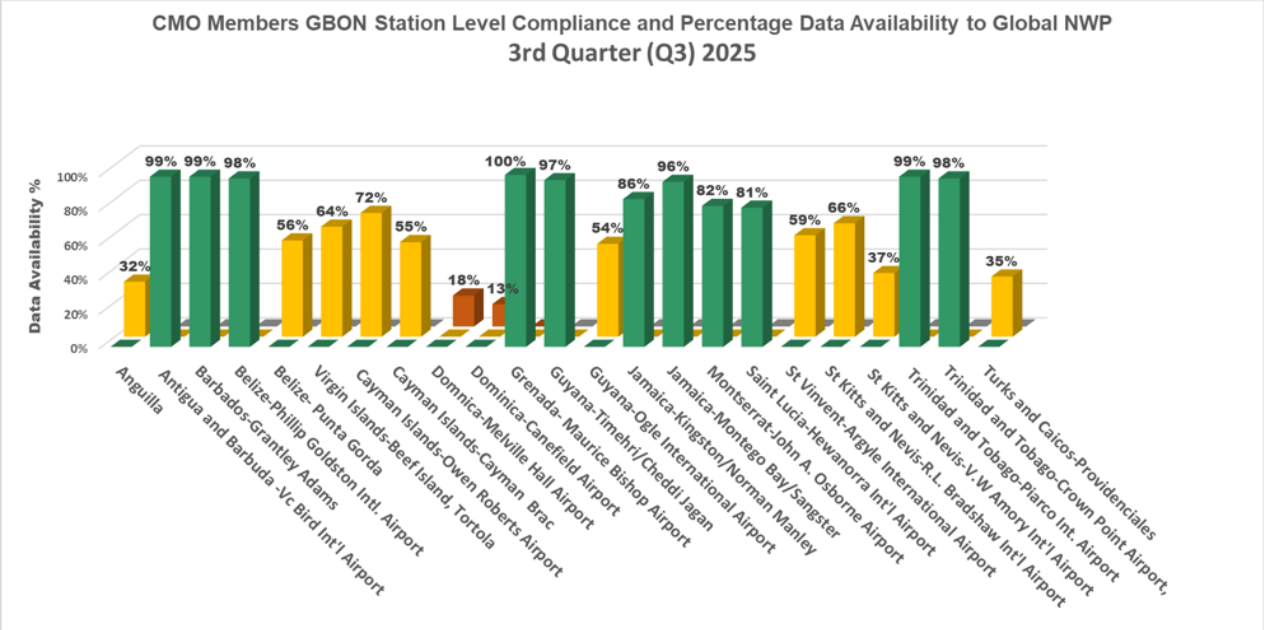

Figure 12. GBON Station Level Compliance for Quarter 3, 2025 based on percentage availability

Recommendations for Non-compliant GBON NMHSs Due to Shorten Operational Hours

82. NMHSs that are not operating on a 24-hour basis and are therefore unable to meet GBON compliance are encouraged to take one of the following actions:

1) **Seek an Exemption:** Request an exemption from WMO for non-compliance with GBON Technical Regulations under Article 9 of the WMO Convention by formally writing to the Secretary-General, explaining the reasons for non-compliance.

2) **Transition to an AWS-GBON Station Integrated with WIS 2.0:** Convert the manual GBON station into an Automatic Weather Station (AWS) integrated with WIS 2.0, while retaining the existing station metadata.

83. This latter approach is suitable where NMHSs operate both manned and automatic stations collocated at the same coordinates under a WIGOS Station Identifier (WSI) in the 20000 series (e.g., 0-200000-X-99999). To achieve this, the NMHS should register the AWS as a new station in OSCAR/Surface (e.g., 0-ABC-X-00000, where ABC is the country identifier), keeping “Intended for international exchange” initially disabled.

84. If the collocated AWS data are currently used in SYNOP messages exchanged internationally, enable “Intended for international exchange” for the new AWS WSI and disable it for the old 0-200000-X-99999 station. This allows the TAC data to continue reporting under the same 99999identifier but now linked to the new AWS WSI in OSCAR/Surface.

85. If it is newly installed AWS stations at the same location register them in OSCAR/Surface as described above and operate the manned and automatic stations in parallel to verify data accuracy. Once confirmed, enable “Intended for international exchange” for the AWS and disable it for the old manual station.

SOFF Portfolio and Implementation Progress

86. The Systematic Observations Financing Facility (SOFF) Portfolio and Implementation Progress Report (**SOFF INF 11.2, 2025**), dated 31 March 2025, indicates that eight (8) of the eleven (11) CMO Member States eligible for SOFF funding were actively engaged in the Readiness Phase (Figure 13). Additionally, three (3) Members have fully completed the Readiness Phase; however, only Belize has advanced to the Investment Phase, while Guyana is in the Investment Phase Pipeline and Antigua and Barbuda have submitted a request for investment funding.

87. While this reflects positive but uneven progress, the slow transition from Readiness to Investment suggests that gaps remain in meeting key readiness deliverables. NMHSs are therefore encouraged to sustain engagement with their Peer Advisors and the SOFF Secretariat, and to prioritize the completion and formal endorsement of their national GBON contribution plans in alignment with SOFF requirements.

		Readiness Phase Implementation Progress		
Country	**SOFF Status**	**National Gap Analysis**	**National Contribution Plan**	**Country Hydromet Diagnostics**
Antigua and Barbuda	Investment Funding Request Submitted	Completed	Completed	Completed
Barbados	Readiness Phase Ongoing	Completed	On Track	Completed
Belize	Investment Phase	Completed	Completed	Completed
Dominica	Readiness Phase Ongoing	Completed	On Track	On Track
Grenada	Readiness Phase Ongoing	On Track	On Track	On Track
Guyana	Investment Phase Pipeline	Completed	Completed	Completed
Jamaica	Readiness Phase Ongoing	Completed	On Track	Completed
Saint Lucia	Readiness Phase Ongoing	Completed	On Track	On Track
St Kitts and Nevis	Readiness Phase Ongoing	Completed	On Track	Completed
St Vincent and the Grenadines	Readiness Phase Ongoing	Completed	On Track	Completed
Trinidad and Tobago	Readiness Phase Ongoing	On Track	On track	Completed

Figure 13. NMHSs status within the SOFF portfolio and implementation process

E. WIS 2.0 TRANSITION & STRENGTHENING NATIONAL CAPACITY IN WIGOS & WIS 2.0

WIS 2.0 Transition Status

88. The Meeting will recall that on 1 January 2025, the WMO Information System 2.0 (WIS 2.0) became operational, marking the start of the critical GTS-to-WIS 2.0 transition phase (2025–2030). To facilitate a coordinated and seamless transition, WMO has developed a dedicated **WIS 2.0 Transition Guide**. During this transition period, all NMHSs are required to fully migrate their non-aviation weather data from the GTS to the WIS 2.0 platform.

89. To achieve full WIS 2.0 transition, NMHSs are required to both publish and retrieve data through their national WIS 2.0 node. This means NMHSs must publish their own data to WIS 2.0 (through their national node), subscribe to data they want to receive and retrieve (download) the data themselves.

90. At present, all CMO Members are only using their WIS 2.0 nodes for data exchange (publishing), even though the software supports both publishing and retrieval functions. For NMHSs currently retrieving data via the Global Telecommunication System (GTS), migration to WIS 2.0 will require subscribing to one of the Global WIS 2.0 Brokers to access data. According to WMO, there are currently four (4) operational Global Brokers:

- Brazil – Instituto Nacional de Meteorologia (INMET)
- China – China Meteorological Administration (CMA)
- France – Météo-France
- United States – National Oceanic and Atmospheric Administration (NOAA)

91. These brokers operate on a publish–subscribe (pub/sub) model using the MQTT/WS protocol. In this setup, an NMHS subscribes to a broker's notification service and is automatically alerted when new data becomes available, allowing it to retrieve the data directly from the source or the global cache.

92. Directors are encouraged to ensure that their NMHSs begin utilizing their WIS 2.0 nodes to retrieve data by connecting MQTT Explorer (or equivalent client software) to a Global WIS 2.0 Broker of choice and specifying the required data types. By subscribing to one or more global brokers, an NMHS's WIS 2.0 node will receive timely notifications about available datasets and instructions on how to access them—enhancing data interoperability and situational awareness within the global WIS 2.0 framework.

93. Recommended to NMHSs:

- Begin testing real-time data retrieval functions using WIS 2.0
- Establish Standard Operating Procedures (SOPs) for data retrieval and exchange, subscription management, and troubleshooting during the GTS–WIS 2.0 transition.

94. CMO Headquarters, in collaboration with WMO and the RA IV WIS 2.0 Expert Team, will facilitate regional training and technical support to Members fully implement, test, and validate their WIS 2.0 nodes ahead of the 2030 full migration deadline.

Potential Operational Impacts from Transition to WIS 2.0 on Aviation Data Exchange

95. The Meeting will recall that the U.S. National Weather Service (NWS), through its Telecommunications Gateway in Washington, D.C., serves as a WMO Regional Telecommunication Hub (RTH) providing GTS and GTS Internet File Service (GIFS) support to WMO RA IV, facilitating the exchange and distribution of meteorological data, including for the Caribbean. The NWS implemented WIS 2.0 node is also served by the RTH.

96. The Meeting is asked to note that several CMO Members currently disseminate and retrieve operational aeronautical data via the NWS EMail Data Input System (EDIS) or File Transfer Protocol (FTP). When this data are received by the RTH, it is sent via the NWS message queueing systems to the **GTS**, GIFS, WIS 2.0, U.S. NWPs and other international partners.

97. Under GTS and GIFS, the RTH pushes data it receives out to customers automatically. However, under WIS 2.0, the model is "publish–subscribe", which means that users will need to subscribe to data topics, receive notifications, and pull the data themselves.

98. On 27 May 2025, the NWS issued a **Public Information Statement** indicating it was soliciting feedback up to June 26, 2025 on its plans to consolidate NWS Dissemination Applications, including the RA-IV GIFS website. Further, consolidation included the **potential retirement of WMO's RA-IV GIFS (GTS)**. Further, the NWS will provide all data available in RA-IV GIFS via other **alternative operational platforms**, while allowing users a transition overlap period.

99. The NWS other **alternative operational platforms**, included:

- US WIS2.0 node
- NWS Weather.gov API: https://api.weather.gov
- NWS Telecommunications Gateway Website

100. There has been no explicit answer as to what will happen to Members aeronautical data exchanged via EDIS or FTP, should the NWS decommission its GTS. The RTH Washington will continue acting as the delivery point for Caribbean NMHSs for now. Hence, no immediate disruption is anticipated. Members should continue sending data to RTH Washington as usual.

101. However, as WIS 2.0 evolves, there may be changes to how headers and formats are handled (e.g., some legacy GTS message structures are expected to be dropped). NMHSs must Therefore be prepare for future changes in how exchanged data, particularly for interoperability with ICAO and global partners are handled by the RTH.

102. NMHSs are also encouraged to:

1) Use tool like MQTT Explorer or the WIS 2.0 demonstration interfaces to practice retrieving published data to build familiarity with the new “subscribe-and-pull” model.
2) Work with both the CMO Headquarters and WMO to test publishing your national observational data (SYNOP, TEMP, METAR, TAF, etc.) directly to WIS 2.0.
3) Build internal capacity by training technical staff on WIS 2.0 concepts (publish, broker, metadata, MQTT, etc.) and incorporate WIS 2.0 transition planning into your NMHS’s digital strategy.
4) Seek the regional ICAO’s intervention to ensure that aeronautical data published via their WIS 2.0 node will be interoperable with ICAO platforms.

103. Both the WMO and NWS have provided assurance that they actively working to ensure that the exchange of aeronautical meteorological data is not affected due to the WIS2.0 transition; however, NMHSs are asked to be vigilant about potential disruptions.

F. STRENGTHENING NATIONAL CAPACITY IN WIGOS AND WIS 2.0

104. Strengthening WIGOS and WIS 2.0 capacity will directly enhance forecast accuracy, support the delivery of impact-based services, and contribute to the realization of the Early Warnings for All (EW4All) objectives across the Caribbean region.

105. The Meeting will recall the discussion at DMS 2024 regarding the SURFACE-CDMS application developed under Belize initiative, which was scheduled for beta release by November 2025, with piloting and testing from November 2024 to April 2025. CMO Member NMHSs were invited to participate in the pilot to support testing of the application which is designed to seamless ingest observational data from both manual and automatic stations, manage metadata, perform real-time quality control, and transmit validated data to the WIS 2.0 node.

106. During the pilot, four (4) countries—Jamaica, the Cayman Islands, Dominica, and the Turks and Caicos Islands (TCI) —downloaded and tested the software in their operations. However, only Dominica and TCI currently continue to use and test the SURFACE-CDMS operationally for transmitting observational data to the regional node without major challenges. Members are encouraged to continue testing and operationally integrate the application, while its documenting performance and reliability.

107. A key outcome of WMO’s 4th Regional WIGOS Centres (RWCs) Global Workshop—which convened established RWCs to share experiences and provide feedback—was the identification of national capacity gaps in implementing WIGOS tools, managing metadata, and ensuring that observing systems are fully connected to WIS 2.0.

108. For CMO Member NMHSs, the workshop highlighted gaps in understanding the interconnectedness of WIGOS tools and WIS 2.0, in engagement with contributing nodes of the RWCs, and in data-sharing practices across observation networks. Several NMHSs require strengthening in metadata management, monitoring of data availability, staff training on WIGOS and WIS 2.0 tools, and the full integration of WIS 2.0 with their IT and observation network infrastructure to achieve complete operationalization of WIGOS and WIS 2.0.

109. To address these needs, CMO Headquarters, in collaboration with WMO and CREWS, will provide targeted capacity-building opportunities in the **first quarter of 2026**. This will include **two hands-on regional training workshops** for national focal points and IT personnel of NMHSs. The workshops will focus on:

- OSCAR/Surface for station metadata management,
- WIGOS Data Quality Monitoring System for monitoring data quality and availability, and
- Incident Management System for managing data availability and achieving full operationalization of WIS 2.0, enabling real-time, open, and accessible data exchange and retrieval.