C A R I B B E A N

M E T E O R O L O G I C A L

O R G A N I Z A T I O N

**ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES Doc. 4**

St. John's, ANTIGUA AND BARBUDA, 15 NOVEMBER 2017

**OPERATIONAL MATTERS**

(Submitted by the Coordinating Director)

## INTRODUCTION

1. Several matters that are particularly related to the operations at National Meteorological Services (NMSs) are raised or addressed in this document. Some of the matters may be of immediate concern or require immediate action on the part of the NMSs, while others are raised to create awareness of issues upcoming in the near future.

## A. WMO Annual Global Monitoring

2. The World Meteorological Organization (WMO) Manual on the Global Telecommunication System (GTS), in its Attachment 1‑5, refers to a plan for monitoring the operation of the World Weather Watch (WWW). This plan includes provisions for the internationally coordinated monitoring of the operation of the WWW on a non-real-time basis.

3. The Annual Global Monitoring (AGM) is carried out in October each year. The WWW centres are invited to monitor SYNOP, TEMP, PILOT, and CLIMAT reports from the *Regional Basic Synoptic Network* (RBSN) stations, in accordance with the responsibility taken for the exchange of data on the GTS:

* The **National Meteorological Centres** (NMCs) should monitor data from their own territory:
* **Regional Telecommunication Hubs** (RTHs) should at least monitor data from their associated NMCs, and possibly from their own Region:
* **World Meteorological Centres** (WMCs) and RTHs located on the Main Trunk Network (MTN) should monitor the complete global data set.

4. The results of the AGM make it possible to compare the availability of the reports received from RBSN stations at the NMC responsible for inserting the data in the Regional Meteorological Telecommunication Network (RMTN), at the associated RTH and at MTN centres. The differences in the availability of data between centres are generally due to the following main reasons: (i) differences of requirements in the reception of data, (ii) shortcomings in the relay of the data on the GTS, (iii) data not monitored due to differences in the implementation of the monitoring procedures at centres.

5. There are ten (10) Members States of the Caribbean Meteorological Organization whose National Meteorological Service (NMS) are RBSN stations. These are Antigua and Barbuda, Barbados, Belize, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Saint Lucia and Trinidad and Tobago.

6. WMO's data archive at **ftp://ftp.wmo.int/GTS\_monitoring/AGM/To\_WMO/201710/** shows that Antigua, Barbados and Cayman Islands Dominica and Jamaica submitted results of their monitoring for the AGM in 2017. Hence, the results presented in **Table 1** below for the monitoring of SYNOP, TEMP and CLIMAT reflects, for the most part, the reports from the RTH and MTN centres.

|  |  |  |  |
| --- | --- | --- | --- |
| **Country** | **SYNOP****(%)** | **TEMP****(%)** | **CLIMAT****(%)** |
| Antigua and Barbuda | **90-100** | **N/A** | **N/A** |
| Barbados | **Silent** | **90-100** | **Silent** |
| Belize | **90-100** | **90-100** | **Silent** |
| Cayman Islands | **45-90** | **90-100** | **Silent** |
| Dominica (Canefield) | **45-90** | **N/A** | **N/A** |
| Dominica (Melville Hall) | **45-90** | **N/A** | **N/A** |
| Grenada | **90-100** | **N/A** | **N/A** |
| Guyana (Cheddi Jagan) | **90-100** | **N/A** | **Silent** |
| Jamaica (Kingston) | **90-100** | **90-100** | **90-100** |
| Jamaica (Montego Bay | **90-100** | **N/A** | **90-100** |
| Saint Lucia (Hewanorra) | **90-100** | **N/A** | **N/A** |
| Saint Lucia (Vigie) | **45-90** | **N/A** | **N/A** |
| Trinidad and Tobago (Crown Point) | **90-100** | **N/A** | **N/A** |
| Trinidad and Tobago (Piarco) | **90-100** | **90-100** | **90-100** |

 Table 1: Results of the 2016 Annual Global Monitoring:

 N/A - Not Applicable

7. The results also show that the stations at Ebini (81010) and Kaieteur Falls (81080) in Guyana and Hunting Caye (78596) in Belize were silent during the reporting period. The RTH and MTN centres results also indicated that between 45-90% of the expected synoptic reports were received from the stations at Kamarang (81005), Lethem (81006) and Mabaruma (81100).

**B. Impact Based Forecast and Warning Services**

8. Despite the science, technology, data, and other resources that exist in the meteorological community, some recent severe weather and associated events have been the cause of many deaths and destruction of properties and loss of livelihoods. It is generally agreed that the primary responsibility of National Meteorological and Hydrological Services (NMHSs) is to provide timely and accurate forecasts and warnings of meteorological events and hazards. However, in order for governments, economic sectors and the public to take appropriate action, they need to know how the meteorological hazard will impact their lives, livelihoods, property and the economy.

9. However, understanding disaster risk and forecasting meteorological impacts are generally beyond the remit of meteorologists and hydrologists. In most countries, those affected are demanding more than statements of expected weather conditions from theirNMHSs. The risk associated with a meteorological hazard depends on knowing how that hazard impacts human beings, their livelihoods, and assets due to their vulnerability and exposure.

10. Issues related to impact-based forecasts and warnings are complex and require planning and forging of partnerships at many levels and with many other government agencies and stakeholders: not only with disaster managers, but also with those responsible for urban planning, education authorities, health authorities, etc. This complexity often leads to reluctance of meteorologists to forecast impacts since extensive knowledge of vulnerability and exposure are required and can only be addressed through data sharing among different agencies and departments. However, forecasting the impact of a hazard (what the weather will do), is often more important than the meteorological forecast (what the weather will be). Such forecasts will ensure that critical weather information is communicated about societal impacts to individuals and sectors most at risk. This information should be made available to the community in a variety of easy-to-understand formats.

11. The implementation of the WMO Strategy for Service Delivery is an important tool for integrating impact-based forecasting and risk-based warnings into a common planning framework to maximize benefits and allow for planning and maintenance of observing infrastructure, and efficient implementation of predictive services of Members in support of social resilience and mitigation of impacts. A national Public Weather Service(PWS) underpins observing capabilities of meteorological serviceswhich needs to be upgraded and strengthened on a continuous basis to cope with the optimum delivery of new services, ranging from day-to-day operations in providing guidance which informs decision makers and policy makers on longer timescales.

12. One such methodology to develop a national PWS is to have national stakeholder workshops in order for stakeholders to be familiarized with the challenges and issues involved. The main goal of the workshopswould be to help stakeholders develop individual: (a) hazard matrices for those hazards that impacted their particular sector and to separate those into primary, secondary and tertiary hazards, (b) impact matrices to show the effect of a hazard on their particular sector and classify it in terms of the severity of the impact, and (c) mitigation advice matrices for each hazard.Based on the outcome of the analysis of the matrices a discussion can be held with all the stakeholders and a follow-up plan for the implementation of impact-based forecasting be created.

13. The stakeholders group can be institutionalized as a permanent committee, which could meet regularly to implement the impact-based forecast and warning services, especially as the socio-economic, planning and development environments change in the future.

**C. Quality Management System**

14. The Meeting will recall that the implementation of a quality management system (QMS) by Meteorological Services has been a discussion point at many past meetings and the last discussion on QMS specifically for aviation was at the 2014 Meeting of Directors (Kingston, Jamaica).

15. WMO is in the process of reviewing its proposed Organization-wide approach to QMF and related roles of the Members, technical commissions, regional associations and Secretariat. Based on recommendations by the meetings of the Presidents of Technical Committees and Regional Associations and the Executive Council Working Group on Strategic and Operational Planning, the following five recommendations were developed:

1. Review and update the Quality Policy Statement to reflect the evolving requirements and nature of WMO QMF;
2. Align and streamline the quality management activities of different programmes, technical commissions and expert bodies to ensure their consistency as part of the overarching Organization-wide QM policy. To facilitate this process, it is proposed to develop and publish a new high-level document “WMO Quality Management Framework”;
3. Review and enhance relevant regulatory and guidance material. This includes development of new provisions/requirements for the implementation of Quality Management Systems (QMS) for certain service areas, and updates of the existing WMO QMS guidance material to reflect the changes in the new ISO 9001:2015;
4. Continue monitoring the implementation of QMS requirements for aviation and related assistance to Members;
5. Promote further the general recommendations for implementation of QMS by NMHSs stipulated in the WMO Strategy for Service Delivery, and highlight the benefits for NMHSs. This implies continuation of the mechanisms of twinning and mentoring arrangements between Members.

16. To achieve these recommendations some actions have already occurred and what is necessary now is to update the existing regulatory and guidance material (WMO‑No. 49, Technical Regulations Vol. IV; WMO-No. 1001 and WMO-No. 1100) in order to align these documents with the new ISO 9001:2015.

17. The 2014 Meeting of Directors of Meteorological Services was informed that ICAO had proposed an amendment to *Annex 3- Meteorological Service for International Air Navigation*, which would come into effect from November 2018: The proposed amendment will state:

*2.2.6 Demonstration of compliance of the quality system applied shall be by audit. If nonconformity of the system is identified, action shall be initiated to determine and correct the cause. All audit observations shall be evidenced and properly documented*.

This text has been inserted in WMO No.49 Technical Regulation Volume II-Meteorological Service for International Air Navigation, 2016 edition,

18. Further, the Technical Regulation also states in paragraph:

*2.1.4 Each Member 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. Details of the meteorological authority so designated shall be included in the State aeronautical information publication, in accordance with ICAO Annex 15, Appendix 1, GEN 1.1.*

*2.2.2 Each Member shall ensure that the designated meteorological authority referred to in 2.1.4 above 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 above.*

*2.2.3 [Recommendation] The quality system established in accordance with 2.2.2 above should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.*

19. As noted in the change to Annex 3, paragraph 2.2.6, (paragraph 17 above) audits will have to be performed on the Meteorological Service Provider to ensure that a quality management system was established. It is the responsibility of the Meteorological Authority to ensure that its designated Meteorological Service Provider is audited. ICAO audits focus on the safety oversight capability of the designated governmental authority responsible for civil aviation and are performed under the framework of the Universal Safety Oversight Audit Programme (USOAP).

20. The USOAP audits focus on validating a State’s capability of performing safety oversight of its industry. There are eight audit areas, which are assessed individually to ensure whether the State has effectively and consistently implemented the critical elements of a safety oversight system. They also determine if the States comply with ICAO’s safety-related Standards and Recommended Practices (SARPs) and associated procedures and guidance material. The eight audit areas of a Member State’s aviation system that the programme monitors are:

1. Primary Aviation Legislation and associated civil aviation regulations
2. Civil Aviation Organizational structure
3. Personnel Licencing activities
4. Aircraft Operations
5. Airworthiness of civil aircraft
6. Aerodromes
7. Air Navigation Services
8. Accident and Serious incident investigations

21. ICAO has performed safety oversight audits within the Caribbean for well over a decade. The results of these audits allow ICAO to assess Member States’ safety oversight capabilities and to generate a more comprehensive analysis of aviation safety, including in terms of its effectiveness and its development.

22. Although aeronautical meteorology initiated the drive for a QMS through ICAO's recommendations, the ultimate goal of a QMS is to encourage and to support the continual improvement of the quality of the delivered services and products. Another driver to adopt a quality management approach to the delivery of weather services and products is the WMO Quality Management Framework (WMO-QMF) initiative that has been implemented to encourage NMHSs to develop quality management systems and to provide appropriate guidance. Part of this initiative has seen the development of a WMO - International Organization for Standardization (ISO) Working Arrangement to strengthen the development of International Standards and to avoid duplication of work on standards related to meteorological, climatological, hydrological, marine and related environmental data, products and services.

23. NMHSs are encouraged through capacity development to implement QMS as part of their development plans linked to the WMO Strategic Plan and other relevant strategies, such as the WMO Strategy on Service Delivery and the WMO Capacity Development Strategy.

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September 2017