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. 5**

St. George’s, GRENADA, 9 NOVEMBER 2016

**OUTCOME/HIGHLIGHTS OF THE SIXTY-EIGHT MEETING OF WMO EXCUTIVE COUNCIL**

(Submitted by the Coordinating Director)

**Summary**

1. The sixty-eighth session of the WMO Executive Council (EC) was held in Geneva from 15 to 24 June 2016 at the WMO headquarters building, 7 bis, avenue de la Paix.

2. There was a major change of the documentation for the Meeting. The documents were in the form of decisions and/or resolutions requiring EC action. Resolutions contained formal decisions on budgetary, regulatory and other matters requiring implementation by Members and delegated to EC by Congress; as well as the establishment of subsidiary bodies and their terms of reference. Other decisions were recorded in the form of structured and numbered decisions. Decisions will be used to place on record instructions/directives to Secretary-General, the President, and constituent bodies in accordance with Cg resolutions/decisions; EC subsidiary bodies and other bodies reporting to EC; EC opinion/observations on a specific topic, procedural decisions and other decisions pertaining to the internal matters of EC. Background information was only be provided if it supported the draft decision/resolution.

**A. Meteorological Services for Aviation**

3. The number of WMO Members who are compliant with the Quality Management System (QMS) requirements has been increasing slowly. Currently, there are about 120 Members fully QMS certified; about 10 Members have not started QMS implementation, while the rest of the Members are in different stages of implementation.

4. The competency assessment for aeronautical meteorological observers (AMO) and aeronautical meteorological forecasters (AMF) has been completed or is in progress by the majority of WMO Members. The CAeM Expert Team on Education, Training and Competency (ET-ETC) has prepared and made available online ample guidance material and selection of good national practices. Currently, a new WMO Guide on Competencies is being developed with the active participation of the ET-ETC in collaboration with the WMO Education and Training (ETR) Panel.

5. The entry into force of the WMO standard on required qualifications for AMF is 1 December 2016. To help Members carry out the necessary compliance checks, the CAeM ET-ETC has developed guidance material including a “compliance flow chart” and “frequently asked questions”. This material has been sent through a circular letter to all Members on 28 January 2016 with a request for reporting back the status of compliance.

6. The first meeting of the CAeM Expert Team on Governance (ET-GOV) was held in Wellington, New Zealand from 30 November to 3 December 2015. The meeting adopted a work programme including the development of improved guidance material for the meteorological offices serving aviation including an analysis of the existing institutional arrangements and business models, and cost-recovery mechanisms. Examples of good practices from different regions will also be provided. The new guidance material will be published in a new edition of WMO-No. 732, *Guide for Meteorological Offices Serving Aviation*.

7. In order to collect baseline information, the ET-GOV plans for a survey of national service delivery models for aviation with the assistance of the Expert Team on Communication, Coordination and Partnership (ET-CCP) and regional associations.

8. The Executive Council approved the *Action Plan - Meteorological Services for Aviation*, which states inter alia:

***“Expresses concern*** *about the low response rate to the request by the Secretary-General to Members for reporting status of conformity with the WMO requirements on competency and qualification, related to aeronautical meteorology;*

***Urges*** *Members to report to the Secretary-General on the status of implementation of the competency and qualification requirements and any issues thereof by 1 December 2016”;*

The Action Plan is provided in **ANNEX I**.

**B. Country Profile Database**

8. The Meeting will recall the presentation made by Mr Robert Masters, Director, Development and Regional Activities Department of the WMO (Kingston, Jamaica, 22 November 2014) on WMO's Country Profile Database (CPDB). On the request of EC66 (2014) version v2.0 of the CPB was launched in May 2016. The development follows requests by Cg-XVI for implementation of a platform integrating and monitoring information collected across WMO, to which added the requirement for a sustainable update mechanism.

9. The key achievements of the CPDB are:

* Integration of information from institutional and observational databases across WMO and aggregation by Member and Region (Cg-XV);
* CPDB has started to be used as an information exchange mechanism between Members and the Secretariat;
* Members are nominating CPDB Focal Points and updated requests are being received (Cg-XV). Over 60 countries have updated information to date.

10. However, there remain gaps and challenges which are:

* Members should be able to update all information directly online in the CPDB (Cg-XVI);
* Monitoring of the information in the CPDB over time (Cg-XV);
* A private and personalized Member “Dashboard”, showing indicators, open issues (nominations, surveys, compliance status), as well as status tracking of requests sent to WMO (Cg-XV);
* A survey policy and clearing-house to reduce the number of questionnaires (Cg-XV);
* An internal knowledge exchange component of the CPDB;
* Provide Members and other stakeholders with enhanced services and updated information about WMO Programmes and activities.

11. Improved IT capabilities are required in order to make the Country Profile Database capable of meeting the requirements of Members. The Secretariat is undertaking a project to do this, while at the same time laying foundations that will benefit the whole Organization. The project, undertaken under the umbrella of the CPDB Project Steering Committee, consists of several phases. The first phase will lay the foundations to closing before-mentioned gaps in the CPDB, while subsequent phases will build on this infrastructure to meet additional organizational requirements. Upon full implementation of the project, the following functionalities will be available to Members and the wider WMO community:

1. Self-service capabilities. Permanent Representatives and other authorized Focal Points can log-on across WMO systems using a single identifier. Expert and Focal Points can be nominated directly online in the CPDB, replacing the paper-based process. WMO Focal Points will be able to manage their own contact details. Ultimately, this online process will also be extended to enable nomination of delegates for technical commissions, and self-management of other WMO systems (such as OSCAR/surface, the Weather Radar Database);
2. Member “Dashboard”. A personalized space displays relevant country indicators, open WMO tasks (such as surveys or nominations needing completion) as well as tracking of requests sent to WMO. This private space will ultimately contain an overview of all important information for the PR in one location;
3. Tracking/Monitoring. Information submitted to or collected by WMO will be processed and stored centrally allowing for routine progress and tracking reports against indicators to be shown in the CPDB and available to Members. A subset of progress indicators linked to WMO Expected Results and Priorities will be generated for tracking on the public site. Customized reports can be generated for decision-makers, regional associations, and development partners to assist in establishing and following priorities;
4. Enhancements to the CPDB. The CPDB will contain project information, including national bilateral projects, as well as projects of other development partners and regular reports, such as for Severe Weather Forecast Demonstration Project (SWFDP) and Disaster Risk Reduction (DRR). These enhancements will improve coordination with development partners involved in weather, water, climate and related environmental activities, especially at national and regional levels. Also, routine collection of basic information from Members through the CPDB, together with the establishment of a survey clearing-house will lead to the reduction in the number of surveys sent to Members;
5. Community space. Establishment of collaboration tools for the WMO community, such as Working Groups and Task Teams, easing the process of sharing and co-editing documents, following-up on meeting results and making collaboration of WMO working bodies more efficient and transparent. Such tools will also facilitate organization of meetings including the registration of participants;
6. Internal coordination. Enhancements to the CPDB will allow the WMO Secretariat to better coordinate and integrate its interaction with each country across departments and with WMO Secretariat applications to improve how WMO staff work together to support Members. WMO staff would be collectively responsible to maintain the information structured by WMO priorities and containing relevant information from WMO databases, document management and project management systems. This will enable WMO staff to better serve Members by consolidating country information from across the Secretariat;
7. Establishment of a common architecture platform for WMO systems. This platform will ease maintenance and cost of developing new services for Members. Initially, CPDB and PUB5 will be migrated to the new platform, replacing the legacy systems. In later phases, other WMO applications operated by external parties will be integrated into the platform.

**C. Competency for Climate Service**

12. At the 2015 Meeting of Directors of Meteorological Services held in Belize City, Belize on 11 November, in the paper on the Outcome/Highlights of the 17th World Meteorological Congress, it will be recalled that Cg-XVI had recommended that all WMO Technical Commissions make the definition of competency requirements for the core tasks in meteorology and hydrology a high priority activity and incorporate this task into their work programmes.

13. During the 68th Meeting of the Executive Council, a draft resolution on *Competencies for Provision of Climate Services* was debated and adopted. The resolution stated inter alia:

**Recognizes that**:

1. The provision of climate services within a country or region, either by one or several National Meteorological and Hydrological Services (NMHSs) or other institutions, might be accomplished by a variety of skilled personnel;
2. The provision of climate services can be done by meteorologists and climatologists, engineers, oceanographers, geographers, statisticians, mathematicians, economists, computer scientists and science communicators, among others;

**Observes that**:

1. Climate services provision involves the transformation of climate data (including in situ, remotely sensed, reanalysis and model output) into climate products and services;
2. Such services involve professionals at the managerial level, trainers, information technology specialists, communicators and administrators, and those specifically involved in climate services delivery;
3. The competencies framework for climate services is built to help the NMHSs and other institutions to deliver high quality climate services in compliance with WMO standards and regulations, specifically those defined by WMO’s Commission for Climatology (CCl) and the Global Framework for Climate Services (GFCS);
4. To achieve this, the institutions (through collective skill of their staff) must demonstrate the following competencies, or an appropriate set of them, according to their mission and institutional capacity in the following areas:
5. Create and manage climate data sets;
6. Derive products from climate data;
7. Create and/or interpret climate forecasts, climate projections and model output;
8. Ensure the quality of climate information and services;
9. Communicate climatological information with users;

**Decides** to adopt the Competencies for Provision of Climate Services in the Annex to this resolution for inclusion in the *Technical Regulations* (WMO-No. 49), Volume I;

14. The Competencies for the Provision of Climate service is in **ANNEX II**.

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August 2016

ACTION PLAN - METEOROLOGICAL SERVICES FOR AVIATION

***Compliance with ICAO and WMO requirements***

*Quality Management System*

* 1. Sustain the stable growth of the Members’ conformity with the ICAO and WMO QMS requirements.

*Note: The level of conformity at April 2016 is 115 Member States; the level of critical non-conformity (i.e., implementation not started) is about 10 Member States.*

* 1. Continue the provision of focused assistance to Members utilizing twinning and coaching arrangements.
	2. Update the WMO QMS guidance material to reflect the changes in the ISO 9001:2015 standard – target date 1Q 2017.

*Competence of aeronautical meteorological personnel (AMP); Qualification of aeronautical meteorological forecasters (AMF)*

* 1. Continue collecting information from Members on the current status of conformity and consider measures to overcome the low response rate by Members on relevant circular letters, including assistance from the regional associations.
	2. Address individual requests for assistance by Members considering most efficient methods (on-site assistance, twinning, training (on-site and remote)).

*Raising awareness and impact assessment*

* 1. Build on the experience of the European Conference on Meteorology for Aviation (ECMA-2015; October 2015, Vienna, Austria) in organizing similar format awareness events in other Regions or sub-regions, involving all relevant stakeholders including the Air Traffic Management sector on the new requirements of the ICAO GANP and ASBU and their impacts on aeronautical service provision.
	2. The organization of the African Conference on Meteorology for Aviation (ACMA-2016), is being coordinated between CAeM, RA I, AMCOMET and regional partners (ASECNA). It is tentatively scheduled for 2–4 November 2016 at Libreville, Gabon.

*Improved guidance material*

* 1. CAeM Expert Teams will work on updated guidance material with focus on governance issues. In particular, WMO-No. 732, *Guide to Practices for Meteorological Offices Serving Aviation* (current edition 2003), and WMO-No. 731, *Guide on Meteorological Observing and Information Systems for Aviation Weather Services* (current edition 2014), will be completely reorganized, updated and merged into a new WMO Guide on Aeronautical Meteorological Services. The established timeline is for a final draft to be available by EC-69, May 2017.
	2. CAeM and CBS, in coordination with ICAO, will provide guidance to develop Members’ capacity in implementing the new weather exchange model (IWXXM) in accordance with the evolving provisions of ICAO Annex 3/WMO Technical Regulations, Vol II.
	3. Updates of WMO-No. 904, *Guide to Aeronautical Meteorological Services Cost Recovery* are also among the priorities during the period with particular focus on LDCs and SIDS.

*Development of regulatory provisions together with ICAO*

* 1. WMO, through its designated experts in the ICAO MET Panel and its subsidiary bodies, will continue to provide inputs to the development of regulatory and guidance material being developed by ICAO, in coordination with the WMO. In addition, WMO will facilitate coordination and cooperation between Members in the planning and implementation of initiatives aimed at adapting the aeronautical meteorological services to the new requirements.

*Note: While the focus of this work is on provision of high quality service aligned with the global, regional and national ATM safety and performance requirements, WMO experts should also endeavour to assess potential impacts of the envisaged changes in the aeronautical meteorology service provision (institutional - business models, regionalization; technological) and raise awareness of Members accordingly.*

*Long-term planning*

* 1. As a follow-up of Resolution 3 (Cg-17) recommending the establishment of a longer term planning horizon for the WMO AeMP, as well as for Members’ national plans, aligned with the objectives and timelines of the ICAO GANP and ASBU, CAeM will prepare a draft long-term plan for consideration by EC-69 in 2017.

*Update of the Working Arrangements between WMO and ICAO*

* 1. Following the recommendation of the Conjoint ICAO/WMO MET Divisional Meeting (2014), the review of the Working Arrangements between ICAO and WMO (ICAO Doc. 7475/WMO-No. 60, Chapter II.3) has to be completed by the end of 2016 and submitted for approval by the executive bodies of the two organizations in 2017. This review should ensure that the respective roles and responsibilities, as well as the commitments, of both organizations are appropriately aligned with the mandates of both organizations taking into consideration evolving technological capabilities and aeronautical requirements.

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**COMPETENCIES FOR PROVISION OF CLIMATE SERVICES**

In a given institution the list of the competencies to be met and the associated performance criteria, would be determined by its infrastructural capacity. Competencies falling in the areas of quality of climate information and services as well as communication of climatological information with users are considered cross-cutting and should be met, at least at basic levels, by all institutions providing climate services.

The competencies framework is conditioned by:

1. The organizational mission, priorities and stakeholder requirements;
2. The way in which internal and external personnel are engaged in the provision of climate services;
3. The available resources and capabilities (financial, human, and technical);
4. National and institutional legislation, rules, organizational structures, policies and procedures;
5. WMO guidelines, policies and procedures for climate data and products;
6. The dominant weather and climate influences and extremes experienced.

Description of competencies and associated performance criteria:

**Competency 1: Create and manage climate data sets**

Climate data, metadata and climate data products are gathered and stored in datasets, quality controlled and assessed for homogeneity:

1. Conduct climate data preservation and rescue procedures;
2. Assess the location and characteristics of the observation sites against the requirements for a climate observation reference network;
3. Collect and store in relational databases climate data and metadata;
4. Apply quality control processes to climate data and resulting time series;
5. Assess climate data homogeneity and adjust inhomogeneous time series;
6. Create, archive and document climate datasets;
7. Apply spatial and temporal interpolation to ensure data continuity.

**Competency 2: Derive products from climate data**

Climate data products for science and user applications are derived from different sources of climate data (such as observed and reconstructed time series, reanalysis, satellite and modelled data) applying statistics which describe their spatial and temporal characteristics:

1. Identify and retrieve climate data from different sources to generate climate products;
2. Compute basic climate products, normals and averages, or anomalies defined relative to a reference period;
3. Compute Climate Indices for the monitoring of climate change, climate variability and climate extremes;
4. Compute sector-specific Climate Indices and other sector oriented climate products;
5. Apply statistical and geo-statistical analysis to monitor the spatial distribution and temporal evolution of climate;
6. Create value-added products, such as graphics, maps and reports to explain climate characteristics and evolution, according to the needs of specific sectors such as health, agriculture, water, energy and disaster management.

**Competency 3: Create and/or interpret climate forecasts, climate projections and model output.**

Climate data, climate data products and climate models output are operated and used to create sub-seasonal and seasonal climate forecasts and future climate projections:

1. Locate, select and retrieve climate forecasts and climate models output generated by Regional Climate Centres, Global Producing Centres and other institutions;
2. Create sub-seasonal, seasonal and longer scale forecast products;
3. Create future climate projections using climate models over selected domain for different scenarios and parametrization;
4. Apply statistical and geo-statistical analysis, including downscaling, to monitor the spatial distribution and temporal evolution of model output;
5. Evaluate the performance of climate models output and quantify the associated uncertainties;
6. Create value-added products, such as graphics, maps and reports to communicate climate forecasts and climate model information.

**Competency 4: Ensure the quality of climate information and services**

Climate information and services are defined and routinely updated. Best Practices are followed and/or Guidelines and Quality Management Procedures for climate information are created and routinely maintained. Monitoring processes of the climate services are documented and used in quality control activities:

1. Create and apply Quality Management processes procedures for climate services;
2. Recruit competent personnel and design the organization workforce to develop and deliver climate services;
3. Ensure that the institution meets the competency framework at its infrastructural capacity level and has a strategy for sustainable capabilities;
4. Provide training to personnel to fulfil their job requirements and expand their capabilities;
5. Define and implement a catalogue of climate datasets, products and services, to meet user requirements at the national/regional level;
6. Monitor the functions of climate services, including validation of data, products and services;
7. Evaluate the impacts and benefits to customers of climate services, including gathering customer comments, suggestions, and complaints;
8. Make service improvement decisions based on evaluation results;

(9) Build partnerships with science and service providers and end user stakeholders to improve products and service delivery.

**Competency 5: Communicate climatological information with users**

Climate science, data and products are communicated to policymakers, stakeholders and the general public:

1. Prioritize the communication of climatological information according to social, political and economic relevance;
2. Establish effective communication channels with climate services users and build outreach capacities, such as Regional Climate Outlook Forums;
3. Conduct and evaluate customer needs analysis on a regular basis;
4. Revise climate services and their communication based on user feedback;
5. Formulate and deliver, in partnership with users, specific applications to facilitate the understanding and use of the climate products and services;
6. Comply with the interfacing requirements of the GFCS and the integration within the WMO WIS system.

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