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

REPORT OF THE

ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES

Roseau, DOMINICA

16 NOVEMBER 2011

INTRODUCTION

1.1 At the kind invitation of the Government of the Commonwealth of Dominica, the 2011 Meeting of Directors of Meteorological Services was held at the Fort Young Hotel on Wednesday 16th November 2011 under the Chairmanship of Mr Tyrone Sutherland, Coordinating Director of the Caribbean Meteorological Organization (CMO).

1.2 The Meeting fixed its hours of work and determined the order in which it would conduct its business.

1.3 A list of participants and observers attending the Meeting is attached as **ANNEX I** and the Agenda adopted by the Meeting is attached as **ANNEX II** to this Report.

STATUS OF ACTIONS FROM THE PREVIOUS MEETING
(Agenda Item 2)

2.1 The CMO Headquarters produced a single document containing an ***Action Sheet*** that would allow the Meeting to follow-up on the actions taken on the decisions of its previous meeting, and to discuss any further actions if required.

2.2 In this regard, a summary of the decisions of DMS2010 (Cayman Islands, 2010) was prepared by the CMO Headquarters. The Science and Technology Officer gave the status of actions taken to implement these decisions to the Meeting.

2.3 Under Agenda Item 4 – Training of DMS2010, the Meeting noted that although the actions associated with the competency evaluation toolkit were completed through the training provided in July 2011 at the Caribbean Institute for Meteorology and Hydrology (CIMH), the toolkit was still available to Meteorological Services that did not attend the workshop at the URL **http://forum.14.caem.wmo.int/post14web.**

TRAINING
(Agenda Item 3)

3.1 The Principal of the Caribbean Institute for Meteorology and Hydrology (CIMH) informed the Meeting about the following initiatives:

1. **Vocational Training and the Bachelor of Science Programme:** Student enrollment in the meteorological programme at the Cave Hill Campus of the University of the West Indies continued to show strong growth. Twenty (20) students enrolled in the first year meteorology programme for the 2011-2012 academic year, which is approximately 75 percent higher than average. In addition, quite a few students in the programme were self-funded and would have expectations of being employed by their National Meteorological Service after completing the Operational Aeronautical Forecasters Course at the end of their university studies. Hence, feedback from the Directors of Meteorological Services on the performance of their students that attended the Operational Aeronautical Forecasters Course was essential in order to “fine-tune” the course. Also, the enrollment in elective courses, such as Hydrometeorology, should be encouraged since students would be able to apply meteorology into other fields, which would benefit the Meteorological Services.

2. **Professional Development Course**: The development of this course was undertaken at the urging of the Directors; hence it was a bit disappointing that it was not fully subscribed to by all Meteorological Services with a forecast office. The course, which started in September 2011, would not provide any credits towards a university degree.
3. **Training:** Directors of Meteorological Services should provide the CIMH with ample notification of their list of students who will be attending courses. This is to avoid having the CIMH cancel courses due to insufficient numbers, then receiving notification from the Directors of the impending arrival of students for the cancelled course. The Senior-level Meteorological Technician courses are usually well subscribed. However, this has not been the case for the Mid-level and Entry-level Meteorological Technician courses, despite a minimum number of three students to run the course. The Principal recommended that students be screened prior to sending them to CIMH and, if necessary, have the weaker students attend a community college to improve their basic skill sets in mathematics and physics, prior to enrollment at CIMH.
4. **Teaching:** There have been challenges in providing suitable equipment to the Entry-level Meteorological Technician's (ELMT) course. However, this situation has been remedied. New techniques have been introduced in teaching Physical Meteorology with the launching of aerosondes and the analysis of the data. While these new techniques were innovative, the need would have to be sustainable.
5. **Funding:** It was recommended that because of the high cost of living in Barbados, Directors of Meteorological Services should examine cost sharing mechanisms if they intend to approach donors, especially the World Meteorological Organization (WMO), for funding fellowships.
6. **In-country training**: In the past, CIMH has provided in-country training to two countries; however, it may not be feasible to continue this type of training in the future given the present teaching commitments. In-country training will have to be revisited or restructured around the CIMH training program.

3.2 The **Representative of Trinidad and Tobago** indicated that students who return from the ELMT course seemed unable to perform simple maintenance functions, such as time marking of charts. Further, the **Representative of Antigua and Barbuda** indicated that they need to know what is required by CIMH for the on-the-job training and therefore, they would prefer more communication between the CIMH lecturers and the on-the-job training providers at the national level. The Meeting recommended that Directors of Meteorological Services should submit the curricular for their on-the-job programme to CIMH for review since, given the different needs and lengths of the individual on-the-job training, it would be impossible for CIMH to create a one-size-fits-all model programme.

3.3 The **Representative of the Cayman Islands** reiterated that BUFR code and GIS training should be offered by the CIMH. He agreed with the suggestion of the **Representatives of Antigua and Barbuda, Jamaica, and Montserrat**, that in-house training should be provided to prospective students of the CIMH prior to their embarking on their substantive training at the Institute. Further, he indicated that refresher training should be provided to staff who remain at the entry-level within National Meteorological Services for more than five years so as to ensure that they remain competent.

3.4 The **Representatives of Grenada and the Cayman islands** indicated that graduates of the Senior-level Meteorological Technician's course show a heavy reliance on numerical weather prediction (NWP) products and have limited ability in analysis. The **Principal** indicated that remedial action will be taken at the CIMH to arrest the indicated reliance on numerical weather prediction products. The **Chairman** indicated that numerical weather models were not able to accurately parameterize convection in the tropics and hence a mixture of numerical weather output and human analysis and forecasting were necessary to accurately forecast in the tropics. The Meeting encouraged the sharing of knowledge between operational meteorologists and the lecturers at CIMH through interaction in programmes, such as the online weather discussions and/or the internship programme.

THE CMO RADAR NETWORK
(Agenda Item 4)

4.1 The Meeting was reminded of the Regional Radar Project which was funded by the European Commission with a budget of 13.2 million Euros. The Project constructed and installed four new digital weather radars in the Caribbean to replace the old and obsolete radar network installed by the CMO. It was intended to link the new radars with others already in place to form a modern network of nine radars as part of the Caribbean Early Warning System for severe weather conditions.

4.2 In order to complete the network of nine radar stations which are located in Barbados, Belize, the Dominican Republic, French Guiana, Guadeloupe, Guyana, Jamaica, Martinique and Trinidad and Tobago, the radars were required to generate scans at specific times, elevation and range, which would be transmitted in a binary code form that would allow for the creation of a radar mosaic by the compositing centre in Martinique. The radar data from the nine radars would be transmitted via the World Meteorological Organization (WMO) Global Telecommunication System (GTS) to Martinique. Martinique would transmit the mosaic after its creation.

4.3 It was noted that initially, data was routed directly to Martinique from Barbados and Trinidad and it was incorporated into the mosaic. However, the *International Satellite Communication System* (ISCS) was changed from a two-way point-to-multi point system, to one in which transmissions by the NMHSs were made directly to Washington via a high-speed terrestrial circuit using **M**utli**P**rotocol **L**ayer **S**witching (MPLS) technology, with data being received in the National Meteorological Services via satellite from Washington. This new GTS configuration meant that all data was now routed through the Regional Telecommunication Hub (RTH) in Washington. Unfortunately, the radar data was not recognized at the RTH in Washington and thus was not rerouted to Martinique, so that radar data has not been available for the regional mosaic.

4.4 The CMO Headquarters was addressing the problem of the non-receipt of data in Martinique by engaging the services of the National Weather Service of the United States through the office of its Director. Through that intervention, it was discovered that data transmitted by the Trinidad and Tobago Meteorological Service was not being stored on the FTP server at the RTH in Washington. The problem has been identified and rectified. Testing will be conducted as soon as all technical issues at both ends were resolved.

4.5 The Meeting was reminded of the Memoranda of Understanding (MoU) between CARIFORUM and the Governments of the radar host countries, which agreed to operate an Internet Server or any other superseding technology to provide greater detail to the public and other users. This was supplemented by an agreement with the Headquarters Unit for the Meteorological Services of radar host countries to provide greater detail via FTP access. However, only the Meteorological Service in Trinidad and Tobago has provided FTP access to the radar data. The CIMH was asked by the CMO Headquarters to provide FTP access to the data from the Barbados radar for use by the meteorological community. The other radar host countries were encouraged to fulfill their obligations of providing the radar data via a secure FTP server.

4.6 The **Representative from Trinidad and Tobago** indicated that they were continuously reviewing the MoU in order to implement their obligations. Through their FTP server, they were providing radar data to the personnel in the Office of Disaster Preparedness and Management in Trinidad, Civil Aviation and the Air Guard. In addition, they were in discussion with three television stations to ascertain their needs and they were reviewing the suite of images which would be provided on their website.

4.7 The regional demonstration project of the WMO Integrated Observing System (WIGOS) for the sharing of radar data in WMO Region IV (North America, Central America and the Caribbean) was highlighted with the requirement that all Meteorological Services in the region share a specific subset of their radar data either through a data "push" from NMHS through the conventional Global Telecommunication System (GTS) or a "pull" mechanism via the Internet through a secure ftp server. It was noted that telecommunication problems which were experienced in the creation of the mosaic for the CMO Radar Project must be resolved in order for the demonstration project to succeed.

4.8 The **Representative of Jamaica** stated that there were problems with its radar software and it required an upgrade. The Office of Disaster Preparedness and Emergency Management (ODPEM) in Jamaica had provided fifty percent of funds required for the upgrade but further funds would have to be found. Budgetary support for the expenditure for the purchase was lacking and the Meteorological Service was looking for regional support to purchase spares. It was also noted that there were usually severe thunderstorms with violent electrical discharges where the radar was sited in Jamaica. Hence, the radar was usually struck by lightning, which caused it to have frequent downtime and/or communication problems between the radar site and the Meteorological Office.

4.9 The Meeting discussed the fact that there was increasing public use of Meteorological Services' websites to check current and forecast weather conditions, particularly in the States with weather radars. However, it discussed the fact that a loss of public confidence in the Meteorological Services could result when old weather information and data, such as radar data, were displayed on websites without an appropriate status message. The **Representative of Barbados** agreed with the **Chairman** that this loss of confidence could lead to negative press articles and hence, care must be taken to inform the user as to the problems which the radar may be experiencing.

OPERATIONAL MATTERS
(Agenda Item 5)

5.1 The Meeting was informed of a number of matters which were particularly related to the operations and the services delivered by Meteorological Services in the Caribbean:

(a) WMO Annual Global Monitoring

5.2 The Meeting was informed that there were ten (10) Members States of the Caribbean Meteorological Organization with meteorological stations that form part of WMO's *Regional Basic Synoptic Network* (RBSN). In 2011, these were Antigua and Barbuda, Barbados, Belize, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Saint Lucia and Trinidad and Tobago. The Meeting noted that an Annual Global Monitoring (AGM) was carried out in October each year, in which the World Weather Watch (WWW) centres of WMO monitor SYNOP, TEMP, PILOT, and CLIMAT reports from the RBSN stations.

5.3 The results of the AGM allow for the comparison of the number of RBSN station reports inserted into the Regional Meteorological Telecommunication Network (RMTN) by the responsible NMC, with the same reports received at the associated RTH and at MTN centres. Participation by the Meteorological Services of the ten Member States in the AGM was less than stellar. At most, only four (4) Meteorological Services have participated in any one year.

5.4 The results of the monitoring of synoptic, upper-air and CLIMAT observations for a twelve month period ending April 2011 emanating from the Main Telecommunication Network Centres (MTNCs) indicated that observations received from Belize and Guyana was less than fifty percent. Further, the results indicated that for the period July 2010 to April 2011, there was one (1) silent synoptic station in Guyana and another (1) in Belize. WMO records also showed that there was one (1) silent upper-air station in Guyana (81002). In addition, there were three (3) silent CLIMAT stations among CMO Member States, one in the Cayman Islands (78384), another in Guyana (81002) and the last in Jamaica (78388). Some Directors expressed concern about the validity and veracity of the monitoring in some areas. Directors were urged to review their information published in *WMO No 9, Volume A – Observing Stations* and inform WMO of the changes in the RBSN and RBCN stations for their countries as soon as possible.

(b) Implementation of the Integrated WWW Monitoring

5.5 The Integrated WWW Monitoring would lead to the integration of the Annual Global Monitoring (AGM) and the Special MTN Monitoring (SMM) into one monitoring scheme. The main features of the IWM are as follows:

- National Meteorological Centres (NMCs) should at least 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 Telecommunication Network (MTN) should monitor the complete global data set.

5.6 The monitored data set would include the observations from the stations in the Regional Basic Synoptic Networks (RBSNs) for the main synoptic hours (00, 06, 12 and 18 UTC) and from the stations in the Regional Basic Climatological Networks (RBCNs). The monitoring periods would be: 1-15 January, April, July and October and the NMCs would prepare their quarterly summary reports and send them to their associated RTHs. The RTHs would compile the summary reports received from the NMCs for their zones of responsibility together with their own monitoring summaries, and send their quarterly RTH summary reports to the associated RTH on the MTN and the WMO Secretariat.

5.7 To implement the Integrated WWW Monitoring, each RTH on the MTN must coordinate the development of a plan for the preparation and the exchange of NMC and RTH quarterly summary reports issued from its zone of responsibility. The RTH must inform its associated NMCs and the WMO Secretariat of its plan for the preparation of its RTH quarterly summary reports. The associated NMCs have to inform the RTH and the WMO Secretariat of their plan for the preparation of their NMC quarterly summary, which must include the data on which it would be reporting.

(c) Quality Management Systems

5.8 The International Civil Aviation Organization (ICAO) in Annex 3 - *Meteorological Service to International Air Navigation,* to the Convention on International Civil Aviation (17th Edition) states:

> **2.2.3** *From 15 November 2012, each Contracting State shall ensure that the designated meteorological authority referred to in 2.1.4 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.*
>
> ***2.2.4 Recommendation —*** *The quality system established in accordance with 2.2.2 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*

5.9 The Meeting noted that a quality management system (QMS) does not aim to assure 'good quality' by the more general definition, but rather to ensure that an organization or product was consistent. The QMS can be expressed as the organizational structure, procedures, processes and resources needed to implement quality management. It is used by management to guide their organization towards improved performance. The principles on a QMS include:

a) **Customer focus**: - Since organizations depend on their customers, they should understand current and future customer needs and meet or exceed the expectations of their customers.

b) **Leadership**: - Management of the organization needs to establish unity of purpose and direction within the organization. Hence, they need to create and maintain an internal environment where the staff can become fully involved in achieving the quality objective of the organization.

c) **People Involvement**: - The views of people at all levels of the organization are essential and their complete involvement enables the use of their abilities for the benefit of the organization.

d) **Process approach**: - The desired result can be achieved when activities and related resources are managed in an organization as process.

e) **System approach to Management**: - An organization's effectiveness and efficiency in achieving its quality objectives are contributed by identifying, understanding and managing all interrelated processes as a system.

f) **Continual improvement**: - One of the permanent quality objectives of an organization should be the continual improvement of its overall performance.

g) **Factual approach to decision making**: - Effective decisions are always based on the data analysis and information.

h) **Mutual beneficial supplier relationships**: - Since an organization and its suppliers are interdependent, therefore a mutually beneficial relationship between them increases the ability of both to add value.

5.10 The ISO 9001:2008 QMS presents only few mandatory requirements. It is the Meteorological Service, rather than the ISO Standard, which is responsible for deciding its own needs and directions and how complex its QMS should be. The Meetings also noted that a central component of the QMS was its structured documentation showing how the organization works. In most cases the hierarchy of this documentation would be presented in three levels, as follows:

- Quality Policy, Quality Manual, Quality Objectives (Strategic level)
- Documented Procedures (Tactical level)
- Working Instructions, Guides, Records (Operational level)

5.11 The *Quality Policy* defines commitment to quality by the management of the organization and provides a framework for setting quality objectives. All staff should be made aware of the Quality Policy and what was required by this policy. The *Quality Objectives* are performance indicators to measure the degree of satisfaction with the quality system.

5.12 The *Quality Manual* defines the scope of the QMS and outlines documentation related to the Standard. It includes or references documented procedures and describes how processes interact to form the QMS. The Quality Manual may be either a high level document with little detail on how the work is done, or it may include considerable detail and combined with System Procedures. An outline of a Quality Manual is provided in **ANNEX III**.

5.13 The Directors of Meteorological Services were urged to complete their documentation for their QMS and the CMO Headquarters was tasked with assisting the National Meteorological Services with identifying organizations which can provide QMS certification. This would allow Services which have completed the documentation to tender for certification from the organizations identified by the CMO Headquarters. The meeting was made aware that for the British Overseas Territories, there are specific regulators, such as the United Kingdom Civil Aviation Authority's national representative, usually the Director General of Civil Aviation or Air Safety Support International. The regulator audits and certifies the service which was delivered to Aeronautical Services. This approach does not mandate ISO certification but rather the demonstration of an acceptable QMS system to the regulator. The Representative of Trinidad and Tobago seemed aligned with this interpretation – that National Meteorological Services that provide aeronautical services shall have a QMS in place by November 2012 and shall seek certification, if not before November 2012, as soon as it was feasible thereafter.

(d) The Future of the International Satellite Communication System (ISCS)

5.14 The Meeting was made aware of the planned changes to the International Satellite Communication System (ISCS). The dissemination of WAFS products via the ISCS would be discontinued on **30th June 2012** and countries which receive WAFS products via the ISCS should transition their workstations no later than **30th March 2012.**

5.15 The ISCS Program Office in Washington, which supports RA IV Member States and other associated users, would be initiating a new service for transmitting meteorological data to RTH-Washington. The new service would employ Secure Socket Layer Virtual Private Network (SSL VPN) technology to allow computers in National Meteorological and Hydrological Services and Regional Centres in RA IV to securely transmit files to the RTH using traditional File Transfer Protocol (FTP).

5.16 Transition to the new service (GTS Internet File Service (GIFS)) would commence in January 2012, and has a planned completion date of 31st March 2012. All existing NOAAnet service (i.e. MPLS) used for ISCS FTP would be terminated upon the successful transition of the Member States to the SSL VPN Service. The ISCS satellite broadcast of both WAFS data and RMTN data would be terminated simultaneously for all users of ISCS at the end of June 2012.

5.17 RTH-Washington would provide to WMO Member States, at no cost, the client software required for the transmission to interface with the RTH SSL VPN server. NMHSs would be responsible for all costs associated with maintaining a local VPN-capable Internet service to permit the SSL VPN connection.

5.18 CMO Member States that operate an Aeronautical Meteorological Office were urged to register to access the WAFS Internet File Service (WIFS). Information on registration for access to WIFS is available at: **http://www.aviationweather.gov/wifs/registration/index**. In addition, Member States which operate Weather Forecast and Warning Offices can also register to access WIFS. However, once GIFS becomes operational, it will provide both WAFS and GTS data products similar to what pertains on the ISCS broadcast. Once GIFS was available, users should contact the ISCS Program Office for access authorization. Status information on the implementation of GIFS would be posted to the URL **http://www.weather.gov/iscs/countdown.php**.

OUTCOME/HIGHLIGHTS OF THE SIXTEENTH WMO CONGRESS
(Agenda Item 6)

6.1 The Directors' Meeting was briefed on the following five key priorities set out by the 16th WMO Congress for the period 2012-2015, and discussed several items linked to these priorities:

(i) The ***Global Framework on Climate Services*** (GFCS);

(ii) ***Capacity Building*** for developing and least developed countries;

(iii) Implementation of the ***WMO Integrated Global Observing System*** (WIGOS) and the ***WMO Information System*** (WIS);

(iv) ***Disaster Risk Reduction*** (DRR) programmes and activities;

(v) ***New Services to Civil Aviation***.

Global Telecommunication System (GTS)

6.2 The Meeting was informed of the progress on the Improved Main Telecommunication Network (IMTN) with the merging of the two IMTN clouds. It was also noted that significant progress was made in improving the regional networks and that the migration to Internet Protocol was almost complete. The importance of the continued improvement of the regional components of the GTS to underpin the Meteorological Services, as well as to enable the implementation of WMO Information Service (WIS), of which the GTS would be a part, and the WMO Integrated Global Observation System (WIGOS), along with other new initiatives of WMO, such as the Global Framework for Climate Services (GFCS), was stressed.

6.3 The decision in 2010 of the WMO Commission for Basic Systems (CBS) to continue to distribute in parallel, *Traditional Alphanumeric Codes* (TAC) and *Table Driven Code Form* (TDCF) category 1 data, as well as the category 2 (satellite observations) and category 4 (marine data) was noted. This would be discontinued step-by-step whenever possible with respective advance notification by November 2014.

WMO Quality Management Framework

6.4 The need for an all-encompassing approach to Quality Management (QM) was discussed. The ongoing commitment of the Aeronautical Meteorology Programme (AMP) and the initiatives being undertaken by the Marine Meteorology and Oceanography Programme (MMOP) and the Hydrology and Water Resources Programme (HWRP) for the implementation of quality management systems, as well as the inclusion of quality management in the WMO Information System (WIS) and WMO Integrated Global Observing System (WIGOS) concepts was noted.

6.5 The diversity in size and operational complexity of National Meteorological and Hydrological Services (NMHSs) was noted. Many Small Island Developing States (SIDS) and some Least Developed Countries (LDCs) would require a cooperative and mutually supportive approach to the implementation of a QMS. Hence the Meeting was informed of the Congress endorsement of twining partnerships between Member States which operate a mature Quality Management System (QMS) with Member States currently planning or developing a QMS.

6.6 Progress has been achieved in the updating, modernizing and transforming the QMF Website (http://www.wmo.int/pages/prog/amp/ [Quality Management Framework]) into an interactive tool for NMHSs. This initiative would greatly facilitate the exchange of existing resource material, such as documentation examples, templates, sample Quality Objectives and suitable contents for Quality Manuals. The Meeting urged the Directors of Meteorological Services to use the tools and examples available via the website to facilitate the QMS certification of their Services.

Tropical Cyclone Programme

6.7 The effectiveness of the attachment training at Tropical Cyclone (TC) Regional Specialized Meteorological Centres (RSMCs), which allowed forecasters to acquire practical techniques and expertise through on-the-job experience, was noted. Developing countries, especially SIDSs and the LDCs, continued to be in urgent need of improving the tropical cyclone forecasting skills and competencies required for effective operational capacity.

6.8 The Meeting noted that the Hurricane Committee of WMO Regional Association IV (North America, Central America and the Caribbean) supported the development and implementation of the Disaster Risk Reduction (DRR) Central American Pilot Project on Early Warning Systems and the DRR Initiative to Strengthen MHEWS Capacity in the Caribbean. It noted further that synergies were being built between the Hurricane Committee and the *Intergovernmental Coordination Group* for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS). The Meeting was informed by a representative to the ICG, **Dr Mark Guishard,** of the deliberations of the Sixth Session of the ICG/CARIBE EWS. Dr Guishard reported that the USA was urged to continue the phased implementation of the EWS with the establishment of the *Caribbean Tsunami Warning Center* to serve the Caribbean and Western Atlantic Basin by December 2012. He pointed out that the ICG recommended that the Tsunami Exercise entitled *CARIBE WAVE* be the basis and platform for testing outreach and education effectiveness at the country level and the next *CARIBE-WAVE* exercise would be held in 2013. He further reported that the next meeting of ICG/CARIBE EWS would be from 2-4 April 2012 in Curaçao and that Directors of National Meteorological Services who were tsunami warning focal points were urged to attend.

Education and Training Programme

6.9 The Meeting was informed of the Education and Training Programme activities that the WMO Congress proposed for 2012-2015, with particular emphasis to be placed on the following approaches, which would support each of the high priority areas mentioned in 6.1.

(a) Providing increased assistance to least developed countries (LDCs) in planning, management and implementing human resources development (HRD) activities in their NMHSs;

(b) Promote international cooperation in order to exploit more efficiently the wealth of education and training resources available world-wide in multiple languages; and supporting distance and e-learning activities in meteorology, hydrology and other relevant topics;

(c) Encouraging quality education by stimulating national/international accreditation of training institutions and programmes, and professional certification of NMHS personnel;

(d) Supporting school and popular education in meteorology and hydrology, and contributing to the increase of public awareness on disaster risk-reduction, prevention and mitigation as well as climate change science, adaptation and mitigation options.

6.10 The Meeting also noted that the definitions of Meteorologist and Meteorological Technician were amended to read:

"Meteorologist – a person who has successfully completed the Basic Instruction Package for Meteorologists (BIP-M) requirements at university degree-level", and

"Meteorological Technician – a person who has successfully completed the Basic Instruction Package for Meteorological Technicians (BIP-MT) requirements".

6.11 The implementation date for the changed definitions and for the basic instruction packages will be 1 December 2013.

SCIENTIFIC TOPIC
(Agenda Item 7)

Topic:
Early Warning Systems in Dominica

7.1 ***Mr Nathanael Isaac***, National Disaster Coordinator, Office of Disaster Management in Dominica, gave a presentation on the Early Warning System in the Commonwealth of Dominica. Dominica is approximately 754 square kilometres, with its highest elevation, Morne Diablotins, approximately 1447 metres above sea level. It is impacted by natural disasters caused by hydro-meteorological and seismic events.

7.2 Disaster Management in the Commonwealth faces many challenges and these include the following:

- The dependency on agencies outside its borders to issue either hydro-meteorological warnings or seismic information;
- The topography of the island and its land use policies;
- Communication infrastructure and backup;
- Lack of legislation governing the operations of the Office of Disaster Management.

7.3 Notwithstanding these challenges, the Commonwealth has a National Emergency Planning Organization (NEPO), which must meet at least twice per year as per its mandate and at least one meeting must occur prior to the start of the hurricane season. The mandate of NEPO is to develop and recommend policies, plans, and guidelines for prevention, mitigation, preparedness, response, and recovery measures for the Commonwealth. The composition of NEPO is as follows:

- Ministers of Government
- Permanent Secretaries
- Heads of Government Departments
- Representatives from the private sector.

THE IMPACTS OF WEATHER DURING 2011
(Agenda Item 8)

8.1 The Directors of Meteorological Services provided the impacts of weather on their countries during 2011.

8.2 The **Cayman Islands** experienced deficit rainfall for the first seven months of the year, which could be classified as **drought or drought-like** conditions. It was the second driest January to September period with 655.3mm of rainfall. One person died on June 7 in **Grand Cayman** and it was speculated that the cause could be heat stress since his body temperature after death was measured at 41°C.

8.3 The Southern Windward Islands had significant rainfall during the month of April. **Grenada** and **St. Vincent** experienced intense rainfall, which led to **flooding** and **landslides** from a non-cyclonic event on 12 April. Damage in Grenada was assessed at 11.6 million Eastern Caribbean dollars (ECD), and in St. Vincent, damage was assessed at 60 million ECD. **Dominica** and **Montserrat** also experienced flooding from non-cyclonic events. On 28 July in Dominica, after eleven days of consecutive heavy rainfall (approximately 50mm each day), Miracle Lake, which had been created earlier by a landslide damming the Layou River, experienced a **dam-burst** which flooded the lower valley. Damage was estimated at 2.86 million ECD and rehabilitation works was estimated at 22 million ECD. On 16 August, low-lying areas in Montserrat flooded after localized heavy rainfall in the Lookout Community, which led to the inadvertent **death of a five year old boy**.

8.4 A tropical wave which was interacting with an upper level trough dumped in excess of 88mm over south-eastern villages in **Dominica** between the 16 to 18 September. This led to **flooding** and seven **landslides** and an estimated 1.2 million ECD in damage. On 28 September, localized rainfall associated with the passage of **Tropical Storm Ophelia** produced in excess of 250mm in Pond Casse and Springfield which led to **flooding** in low-lying areas to the west. Damage and rehabilitation costs were estimated to be approximately 52.6 million ECD.

8.5 **St. Kitts and Nevis** received excessive rainfall from the passage of **Tropical Storm Maria**. St. Kitts received 161mm of rainfall on 12 September which led to a **rock fall** on a major road and this caused an estimated 3.5 to 4.0 million ECD in damage. Rainfall on the 11-12 September in Nevis measured 169.3 mm which partially washed away some roads.

8.6 **Trinidad** also experienced **flash flooding** from non-cyclonic events. The flooding occurred on 13 and 15 July in southern Trinidad. Intensive and steady rainfall from the inter-tropical convergence zone (ITCZ) caused widespread **riverine flooding** in the Caroni River Basin on 15 October. The floodwaters persisted for two days.

OTHER MATTERS
(Agenda Item 9)

9.1 There were no matters under this agenda item. The Chairman informed the Meeting that a draft report and the key recommendations would be submitted for the consideration of the 51st Session of the ***Caribbean Meteorological Council*** – the Governing Body of the CMO, to be held in Roseau on 17 and 18 November 2011.

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ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES

ROSEAU, DOMINICA

16TH NOVEMBER, 2011

LIST OF DELEGATES

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CARIBBEAN METEOROLOGICAL ORGANIZATION

ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES
Roseau, DOMINICA - 16th NOVEMBER 2011

AGENDA

1. INTRODUCTION AND ADOPTION OF AGENDA
2. STATUS OF ACTIONS FROM THE PREVIOUS MEETING
3. TRAINING
5. THE CMO RADAR NETWORK
6. OPERATIONAL MATTERS
    - (a) WMO Annual Global Monitoring
    - (b) Implementation of the Integrated WWW Monitoring
    - (c) Quality Management Systems
    - (d) The Future of the International Satellite Communication System
7. OUTCOME/HIGHLIGHTS OF THE SIXTEENTH WMO CONGRESS
8. SCIENTIFIC TOPIC
    Early Warning Systems in Dominica
9. THE IMPACTS OF WEATHER DURING 2011
10. OTHER MATTERS

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OUTLINE OF A METEOROLOGICAL SERVICE QUALITY MANUAL

1. Introduction

This Section contains an introduction of the QMS, historical facts of the NMHS and describes the objectives and the structure of the Quality Manual and the mechanisms to control and make appropriate revision of the QMS documents.

2. Scope

This section describes the scope of the Quality Manual and includes the statement of the Mission, Vision and Quality Policy of the organization. It also includes a flowchart of the organization and makes reference to pertinent government regulations and provides a list of products and services available to users.

3. Responsibility

The responsibilities of top management, including the Director, the Representative of Quality, the Head of Quality Section, Technical Divisions, Administration Division and Heads of regional centres and concerned staff, with respect to the QMS are included in this section.

4. Structure of the QMS

This constitutes the main section of the Quality Manual. It includes a general description, the QMS requirements and flowcharts depicting processes. It also includes the description of the activities related to the following headings:

4.1 Documentation requirements, including Quality Manual, Quality Procedures, Quality Instructions, Guides, Manuals, Records, Control of documents and Control of records.

4.2 Management responsibility, customer focus, quality policy and objectives, planning process, internal communication and the mechanisms for management review.

4.3 Resource management.

4.4 Product realization.

4.5 Measurement, Analyses and Improvement.

4.6 Correlation Matrix indicating the responsibility of each section/division with sections of the standard.

4.7 History of reviews of the document.

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Prepared by Approved by