FINAL REPORT OF THE SIXTY-SEVENTH MEETING OF THE CARIBBEAN METEOROLOGICAL COUNCIL

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CHAIRPERSON:

The Honourable Minister **Kye M. Rymer,** Minister for Communications and Works of the **British Virgin Islands**.

VENUE AND DATE:

Maria's by the Sea Hotel
Road Town, Tortola
BRITISH VIRGIN ISLANDS
21-22 NOVEMBER 2024

1 OPENING OF THE SESSION AND ELECTION OF CHAIRPERSON

1.1. The Sixty-Seventh Session of the *Caribbean Meteorological Council* (CMC67) was hosted by the Government of the British Virgin Islands (BVI) at Maria's by the Sea Hotel, Road Town, Tortola on 21-22 November 2024. The Caribbean Meteorological Council (CMC) is the supreme organ, governing and policy-making body of the *Caribbean Meteorological Organization* (CMO).

1.2. ***Mrs. Elvia Smith-Maduro****,* Permanent Secretary in the Ministry of Communications and Works, BVI, opened the Session by extending words of welcome, after which the Territorial Song of the BVI and an invocation were rendered.

1.3. ***Dr. Arlene Laing***, Coordinating Director of the CMO Headquarters Unit, thanked the Government of the BVI for hosting CMC67 and welcomed all participants to the Council Session. Dr. Laing then outlined a brief history of the CMO, and its role in fostering scientific and technical cooperation among the CMO Member States and regional institutions, which helps to build resilience to extreme weather, climate change, and related hazards.

1.4. ***Prof. Celeste Saulo***, WMO Secretary General, provided a video message in which she highlighted the beneficial collaboration between the CMO and WMO, including the role of the Coordinating Director and the Regional Training Centre at CIMH.

1.5. The outgoing Chair of the CMC, ***The Honourable, Marvin Gonzales***, Minister of Public Utilities of the Republic of Trinidad and Tobago provided remarks and highlighted five priority areas for strengthening regional National Meteorological and Hydrometeorological Services (NMHSs) to the incoming Chair. The Honourable Minister thanked CMO for the notable work being done within the Caribbean and wished the incoming Chair success.

1.6. The feature address was delivered by ***The Honourable Minister Kye M. Rymer,*** Minister of Communications and Works of the ***British Virgin Islands,*** who expressed gratitude to Minister Gonzales, and issued a call to action for the strengthening of Caribbean NMHSs.

1.7. The Honourable Minister noted the critical role of national meteorological services, which are at the heart of disaster risk reduction, sustainable development, and economic stability, through the provision of early warnings, impact-based forecasting, and support for strategic decision-making. He noted that these services are essential for protecting life and property, enhancing aviation and marine safety, and supporting key economic sectors such as tourism, agriculture, and fisheries. He also noted that the Virgin Islands is taking steps towards establishing a National Meteorological Service to support the building of a resilient and sustainable territory. He further noted that, in addition to Hurricanes Ivan in 2004, Irma and Maria in 2017, Dorian in 2019, and Beryl in 2024, broad swaths of the Caribbean also faced record-breaking heat in 2024. These events highlight the multi-hazard risk environment of the Caribbean and the importance of accurate forecasting and timely communication that enables anticipatory actions by all sectors.

1.8. The CMC confirmed the election of ***The Honourable, Kye M. Rymer,*** Minister of Communications and Works of the ***British Virgin Islands*** as the ***Chair of the Caribbean Meteorological Council*** for its 67th session and the intersessional period until the next annual meeting of the Council.

2 ADOPTION OF AGENDA AND PROCEDURAL MATTERS

2.1 Agenda adopted by the Meeting is shown in **ANNEX I** of this Report. The Meeting fixed its hours of work and determined the order in which it would conduct its business. The list of Delegates attending the Meeting is attached as **ANNEX II** to this Report.

3 CMO EXECUTIVE REPORTS

3(a) Coordinating Director's Report

3.1 The Coordinating Director provided updates on the activities of the CMO Headquarters Unit since the 65th Session of the Council (CMC65), held on 17-18 November 2023, and hosted by the Government of the Republic of Trinidad and Tobago. The report covered operational matters affecting the Headquarters and other topics for the CMC's attention and guidance. Additional details on specific activities and developments were discussed under separate agenda items as needed.

High Impact Tropical Weather Events

3.2 The Council was informed that since CMC65 the region has experienced significant weather events, including hurricanes, tropical storms, strong tropical waves, upper-level troughs, and other disturbances. The 2024 hurricane season was forecasted to be above normal due to warmer-than-usual sea surface temperatures in the Atlantic Ocean and the onset of La Niña conditions, which typically increase the likelihood of major hurricanes. The season began with Hurricane Beryl, a record-breaking storm as the earliest major hurricane to form in the tropical Atlantic, causing catastrophic damage in Grenada (Carriacou and Petit Martinique), St. Vincent & the Grenadines (Union Island, Canouan, Mayreau), and Jamaica. However, the strong performance of tropical cyclone forecasting by the National Meteorological Services and early warning systems saved lives, with only eleven (11) fatalities in the Caribbean, a far lower death toll than what could have happened without early warnings and appropriate preparedness and response actions.

3.3 The Council also learned that after Hurricane Beryl, the eastern Caribbean Basin experienced relatively calm conditions with few tropical storms or hurricanes in 2024. However, from October to November, storm activity increased in the western Caribbean and Gulf of Mexico. Hurricane Helene caused deadly storm surge and inland flooding, resulting in more than 200 fatalities in the United States. Through coordination with the US National Weather Service Weather Prediction Center's International Desk, the region and CMO Headquarters received valuable excessive rainfall outlooks linked to these systems. These outlooks, shared with the National Hurricane Center, were crucial for preparing for and understanding the impacts of heavy rainfall.

3.4 The Council was reminded that it is important to remember that other types of severe weather systems can also be damaging and cumulatively costly by events in early February when a strong cold front and mid-latitude trough brought strong winds and waves to the Greater Antilles and Leeward Islands, with flooding and rough seas affecting the Virgin Islands, Anguilla, and St Kitts and Nevis. In early to mid-November, flash flooding occurred in the Windward Islands, and Trinidad and Tobago experienced heavy rainfall and flooding. Several flooding events were caused by tropical waves and an active Inter-Tropical Convergence Zone (ITCZ), especially over the Windward Islands and Guyana. The Council was referred to the Annual Meeting of Directors (DMS2024) reports which provide detailed information on the weather, climate, and impacts experienced by Member States. Additionally, frequent episodes of significant Saharan dust were observed, underscoring the need for enhanced monitoring and prediction capabilities and the importance of the Global Atmospheric Watch (GAW).

Early Warnings for All – Selected Activities

3.5 The Council was informed that in order to strengthen global and regional early warning initiatives at the national level, the CMO Headquarters will implement the CREWS Caribbean 2.0 project in collaboration with WMO, funded at $583,000. Further details will be presented under

Agenda Item 11. The Coordinating Director was invited to join the Americas and the Caribbean EW4All Regional Coordination Mechanism and served as a panelist during the 46th Hurricane Committee's session on the role of the CMO in delivering Early Warnings for All. Additionally, CMO Headquarters contributed to a special issue of the WMO Bulletin, with the article "*All-Members Approach to Project Coordination on Early Warnings in the Caribbean*" by Arlene Laing, Kenneth Kerr, and Haley Anderson, accepted after review for publication in Vol. 73 (1) – 2024.

3.6 The Coordinating Director also pointed out that the CMO HQ and WMO organized the "*Caribbean NWP Capacity Development and Operational Readiness Workshop in Support of Early Warnings for All*" to build capacity for operational, high-resolution numerical weather prediction (NWP) tailored to small islands in Trinidad and Tobago from 5-9 August 2024. The workshop focused on implementing the WMO-developed Plug and Run WRF-based Tool (PN-Tool) for real-time operations and historical research. Participants left with a fully configured PN-Tool tailored to their national needs and engaged in presenting case studies and collaborating with facilitators and peers.

Showcasing the work of National Meteorological Services

3.7 The Council was informed that CMO Headquarters had submitted five abstracts on behalf of Member States to the 2025 Annual Meeting of the American Meteorological Society (AMS), continuing a tradition that began in 2022 to highlight the outstanding work of National Meteorological Services. Additionally, the Council joined CMO Headquarters in expressing gratitude to the US Permanent Representative to WMO and the NOAA National Weather Service for sponsoring experts from CMO Member States to attend the 2024 AMS Meeting, where CMO Headquarters delivered three oral presentations.

Visits of Strategic Partners and Stakeholders

3.8 The Council was informed that CMO Headquarters hosted several key delegations in 2024. On 23 January, a delegation from the Embassy of the *Federative Republic of Brazil* visited for discussions on disaster risk reduction, early warnings, preparedness, and response. On 26 January, the Regional Director of the *International Civil Aviation Organization* (ICAO) for North and Central America & the Caribbean, Mr. Christopher Barks, visited CMO Headquarters. In March, representatives from the Finnish Meteorological Institute engaged with CMO Headquarters to discuss the implementation of the *Systematic Observations Financing Facility* (SOFF) as a Peer Advisor for several CMO Member States. In September, CMO Headquarters welcomed Mr. Brian Bogart, the new multi-country programme coordinator for the UN World Food Programme, during his introductory visit.

WMO Matters

3.9 The Council was informed that many activities of CMO Headquarters focused on regional implementation of global WMO programmes and initiatives relevant to the Caribbean, particularly CMO Member States. As a key aspect of its mandate, the CMO actively participated in WMO activities at the highest level to ensure the interests of small island developing states (SIDS) were represented and to guide Member States in related actions.

3.10 The Council was guided to details of the WMO Executive Council, Technical Commissions, and Research Board outcomes under Agenda Item 5, while noting key initiatives impacting Member States including the implementation of the Early Warnings for All Executive Action Plan, the Global Basic Observation Network (GBON), and the Systematic Observations Financing Facility (SOFF), which supports SIDS in sustaining contributions to GBON. Additional efforts encompassed the Hydrological Status and Outlook System (HydroSoS), support for the WMO Integrated Global

Observing System (WIGOS), and the WMO Information System (WIS), with CMO hosting a Caribbean node of WIS2.0.

3.11 The Coordinating Director represented the region at the WMO Executive Council (June 2024) alongside Dr. David Farrell of CIMH and Mr. Kenneth Kerr of CMO Headquarters. She also continued her role as RA IV representative on the WMO Research Board, co-chairing the Task Team on Early Warnings for All and participating in the Task Team on Data Exchange for the Research Sector. Additional roles included membership on the WMO Panel on Socio-economic Benefits and representation on the WMO Staff Pension Committee.

3.12 In June 2023, the CMO HQ hosted the WMO WIS2.0 in a Box Workshop, training 19 participants from 15 countries on software installation and configuration for streamlined data exchange. The CMO also signed an agreement with WMO for cloud services to support a regional WIS2.0 node for four years, making the Caribbean among the first regions to pilot this new technology.

3.13 The Council was also reminded that the CMO HQ and the Trinidad and Tobago Meteorological Service were designated to oversee data quality management for the English-speaking Caribbean as part of the virtual Regional WIGOS Centre (RWC) for RA IV. Following a January 2020 endorsement and subsequent reviews, the RWC pilot phase was scheduled to commence in late 2023. Training workshops for the Regional WIGOS Centres were attended by CMO representatives, including participation in global workshops and infrastructure reviews.

3.14 The Council was urged to enact draft legislation and policies developed through WMO and CMO agreements under the CREWS Initiative to enhance the legal mandate of National Meteorological and Hydrological Services (NMHSs). This mandate supports Multi-Hazard Early Warning Systems, sectoral partnerships, and adoption of advancements in science, technology, and operational models to strengthen NMHS roles in the Caribbean, particularly under initiatives like Early Warnings for All.

Development of National Meteorological Services in CMO Member States

3.15 The Council was updated on the continued guidance to the Director of Meteorology for the Turks and Caicos Islands Airport Authority, Dr. Holly Hamilton, in establishing their National Meteorological Service. This support included capacity development for their meteorological technician, who participated in operational numerical weather prediction training at the WMO workshop in August 2024. Additionally, CMO Headquarters supported the capacity development of the meteorological services in the British Virgin Islands (BVI). Efforts focused on assisting their compliance with WMO requirements for observation timeliness and quality. The CMO Headquarters also collaborated with CIMH to facilitate operational training for the meteorologist at the Department of Disaster Management (DDM) in the Virgin Islands.

CMO Radar Network and the CMO Operational Radar Group (CORG)

3.16 The Council was advised of significant advancements to enhance regional meteorological capabilities. Collaborating with the Caribbean Development Bank, work progressed on a $25 million radar network upgrade to dual-polarization systems, which is now the operational standard. The CMO HQ continued operational support through the collection and disbursement of funds for radar host countries, while also hosting three virtual CORG meetings. This group, co-chaired by representatives from the Barbados Meteorological Service and CIMH, played a key role in supporting early warning systems. A presentation on CORG as a community of practice at the 2024 American Meteorological Society Annual Meeting was well-received.

Marine Meteorology, Ocean Science, and Services

3.17 The Council also received updates in the field of marine meteorology, with the CMO HQ continuing to coordinate with the WMO to support capacity development for marine service delivery in the Caribbean. This included facilitating participation in the second phase of the marine service delivery course for the English-speaking Caribbean. CMO HQ advocated for the inclusion of marine observations under the Global Basic Observation Network (GBON), which resulted in the WMO's Infrastructure Commission requesting support for this initiative. The organization also represented the Caribbean at the 2nd IMO-WMO Symposium on Extreme Maritime Weather in September 2024.

Disaster Risk Reduction and Climate Change Adaptation

3.18 The Council noted that the CMO HQ has been actively involved in disaster risk reduction (DRR) and climate change adaptation efforts. Notably, the Severe Weather Forecast Programme (SWFP) for the Eastern Caribbean entered its pre-operational phase. This programme, focuses on monitoring severe weather such as heavy rain, strong winds, and rough seas, and is supported by global and regional model forecasts. Furthermore, CMO HQ contributed to the development of multi-hazard early warning systems through its cooperation with CDEMA, CIMH, and other regional institutions. In June 2024, the organization participated in the Understanding Risk Global Forum in Japan, where it presented on "*Harnessing Seeds of Innovations to Support Early Warning Systems*" in the Caribbean.

WMO: Protecting Radio Frequencies for weather, climate and earth observations

3.19 The Council was reminded of CMO HQ efforts to protect essential radio frequencies for meteorological and earth observation services continued in 2024, with CMO HQ collaborating with WMO on a pioneering training workshop on radio frequency coordination. The Organization also presented on this matter at the ITU Regional Radiocommunication Seminar in July. Council noted that the CMO is actively supporting efforts to protect radiocommunications for earth observations, especially as studies show potential interference with sea surface temperature measurements due to new spectrum allocations for International Mobile Telecommunications (IMT). Council noted that CMO is collaborating with the Caribbean Telecommunications Union on radio frequency matters and the attendance of the CTU Secretary General at the Council session.

Lightning monitoring and safety awareness

3.20 The Council recognized that lightning is the most commonly experienced weather hazard, which threatens lives as well as property, including wind and solar energy installations. Lightning safety promotion has been a key focus for CMO HQ, with efforts aimed at strengthening regional capacity in lightning detection and safety awareness. In May 2021, CMO HQ, in collaboration with the WMO, organized the first-ever Symposium on Lightning and Lightning Safety Awareness, which attracted 130 participants from 28 countries. The event highlighted the importance of improving understanding and preparedness for lightning hazards. Council noted the further promotion of lightning safety by the Coordinating Director who presented on "*Strengthening Capacities in Lightning Detection and Awareness Building at the Regional Level*" during the 2024 International Lightning Safety Day, underscoring the need for regional cooperation in addressing lightning risks. These initiatives are now included in the broader CREWS Caribbean 2.0 Project.

CARICOM-CARIFORUM Related Activities

3.21 The Council was informed of the CMO HQ's continued its participation in various CARICOM-related activities. This included meetings of the Council for Trade and Economic Development (COTED) focused on environment and sustainable development, and preparatory meetings for COP29 of the UNFCCC. The organization also supported the Caribbean Community Administrative

Tribunal (CCAT) through virtual training and in-person seminars. The Finance and Administrative Officer, Mrs. Natalie Araujo-O'Brien, continues to serve on the CARICOM RBM Leadership Group and the CCAT Finance Committee.

Status update on Strategic Objectives

3.22 The Council was briefly updated on progress made in aligning the CMO's objectives with the broader goals of strengthening national meteorological services and improving early warning systems. The organization continues to support the implementation of the WMO Integrated Global Observation System (WIGOS) and is contributing to regional operational research priorities. This aligns with efforts to improve the Global Basic Observation Network and promote the free exchange of core and recommended data.

Spanish Language Course with University of Chile and UK Met Webinar

3.23 In terms of capacity building, CMO HQ expressed gratitude to the Embassy of Chile in Guyana and the University of Chile for providing a free Spanish language course to three officers from CMO HQ. Additionally, the Coordinating Director presented a webinar on the history of the British Caribbean Territories and their National Meteorological Services as part of the UK Met Office's Black History Month outreach. The Coordinating Directed invited the Cayman Islands National Weather Service and the Turks and Caicos Islands National Meteorological Service to be joint presenters.

Other Matters

3.24 The Council was informed that as of October 2024, financial contributions from Member States reached 77% and some Members had contributed to the clearing of their arrears.

3.25 The Coordinating Director briefed the Council on the numerous missions of the CMO Headquarters in support of Member States and international matters relating to weather, climate, and water and related environmental sciences and the CMO Headquarters' facilitation of the participation of the technical staff of CIMH and the National Meteorological and Hydrometeorological Services in various workshops, conferences, and courses.

3.26 The Council was informed that CMO HQ continued to support the CIMH in the implementation of the Intra-ACP ClimSA Programme, serving on the Project Steering Committee and participating in related workshops and activities. These initiatives underscored CMO Headquarters' ongoing commitment to fostering regional resilience, advancing capacity development, and improving operational meteorological services.

3.27 The Council:

(i) **Noted** the activities and issues concerning the CMO Headquarters in 2024, in particular, the engagement with disaster risk reduction and early warning systems; radio frequency coordination to protect meteorological observations and their transmission, and applications; as well as those issues concerning the wider Caribbean Community.

(ii) **Discussed** the impact of the 2024 hurricane season, other high impact weather, on the region and, in particular, the impact on CMO Member States.

(iii) **Noted** the progress on the development of the CMO Headquarters Strategic Planning for 2024-2029.

3(b) CIMH Principal's Report

3.28 The Principal made a presentation to the Council on the activities of the *Caribbean Institute for Meteorology and Hydrology* (CIMH). A copy of the presentation is available at https://owncloud.cimh.edu.bb/index.php/s/8mcuDzRbDIvQQw9/download. While the report contained many of the essential elements contained in Principal's Report to the Board of Governors, there are some differences as the report is intended for a less technical audience and time allocated for the presentation of the report quite short.

3.29 The report's Foreward provides (i) a high-level summary of the work performed by the CIMH during FY2024, (ii) a summary of the importance of this work to the region and the international community, and (iii) an outline of how the work aligns with the current and future ambitions of the CIMH. Specific areas covered include (i) support for the UN EW4All initiative, support for the UN Loss and Damage Initiative, as well as, emerging support for a regional climate attribution science programme, (ii) a summary of major achievements during the strategic period 2020 – 2024 which coincided with the global COVID-19 pandemic, (iii) a summary of goals and anticipated challenges for the coming Strategic Period 2025 – 2029. The Foreward identified anticipated changes in US policy and support to science, in particular, climate and related sciences as a significant concern that will have to be mitigated through a range of initiatives including a strong pivot to new and existing non-US partnerships as well as an increased focus on revenue generation to fund some core activities. The Foreward also noted the need for CIMH to strengthen its succession planning activities to ensure its programmes and services remain globally competitive. The Foreward also recognized that climate will remain a major focus for the CIMH given the region's vulnerability to climate change. The Foreward encouraged the Board of Governors and the Council to have an appetite to work with the CIMH to chart a new direction for the organization that will allow it to be a leading regional and global institution.

3.30 As in previous years, the CIMH noted its strong focus on demonstrating value for money to ensure that all investors in the organization see a positive return on investment. This ensures a continuous stream into the organization especially a time when investments from traditional partners are becoming increasingly uncertain. As part of the Principal's presentation, he identified the strategic plans of several development partners noting that CIMH targets those initiatives for resource mobilization that align with its strategic objectives. This has been a successful strategy.

3.31 The Principal reminded the Council of the (i) Caribbean multi-hazard early warning platform it is pursuing that supports (i) cascading risk assessment for hydrometeorological, climate, geological, and marine hazards, (ii) the range of considerations that are part of the emerging platform and (iii) the number of in-house regional models and realtime data collection systems that have been developed that will be integrated into the platform.

3.32 The Principal reported on the performance of CIMH's various prediction platforms for Hurricane Beryl and the value they provided to various regional stakeholders. For example, (i) the marine modeling platform was instrumental in providing accurate marine forecasts as well as identifying marine processes driving coastal impacts which has significant implications for marine parametric insurance products offered to regional governments and (ii) the CIMH weather prediction models did very a very good job predicting the track and intensity of the system. The good performance of the system of models allowed for reasonably accurate impacts forecasts. CIMH also unveiled a new population wind exposure product tested over Jamaica during the passage of Hurricane Beryl.

3.33 The Principal also addressed CIMH's work in the water and geo-hazards sectors including (i) emerging challenges to water quality posed by pharmaceuticals, (ii) emerging realtime water quality and quantity monitoring of groundwater aquifers and strategies to automate management of such system, (iii) operationalization of the joint IAEA, Government of Barbados and CIMH water quality laboratory, (iv) work on landslide drivers at the Anguilla following the passage of Hurricane Tammy, and (v) work performed with WMO on HydroSOS implementation in the region, among others.

3.34 The Council was also informed of CIMH's pioneering work with the Global Centre for Adaptation (GCA) of the development of the SIDS Adaptation Acceleration Programme (SAAP) which seeks to raise in excess of USD 5 billion for adaptation initiatives in SIDS. CIMH's participation in this activity was an outcome of prior engagement with the GCA and a 2024 joint meeting between GCA, Hon. PM Mottley of Barbados and CIMH. In 2024, the Principal was invited by the Government of Barbados to accompany a team consisting of Hon. PM Mottley to visit the Netherlands for a series of technical discussions related to water.

3.35 The Principal reported on the ORCESTRA Atlantic Field Campaign 2024 that commenced in Cape Verde and ended in Barbados. The Principal reported to the Council the outstanding performance of CIMH interns on the project. The interns took part in the Cape Verde and Barbados components of the campaign. The interns are expected to form the next generation of meteorological and climate researchers in the region.

3.36 The Principal updated the Council on the range of marine initiatives CIMH is engaged in and their benefits to the region. In addition, the Principal informed the Council of other partnerships it is either engaged in or pursuing, including partnerships with the (i) the World Bank, (ii) the Eastern Caribbean Central Bank, (iii) Inter-American Institute for Cooperation on Agriculture (IICA) and (iv) Earthmedic, among others.

3.37 Finally, the Principal informed the Council of range of projects it was either currently pursuing or developing proposals for. The total value of these projects is tens of millions of dollars.

3.38 **The Council**

(i) **Noted** the Principal's Report and urged the Principal to report more openly on some of the significant achievements of its work.

3(c) The CIMH's Board of Governors Report

3.41 The document comprises the decisions made at the 61st Meeting of the Board of Governors (BOG-LXI) during the 18-19 November 2024. The Board of Governors (BOG) at the 61st meeting made the following decisions and recommendations:

With reference to Document 4.6 – Statement of the Accounts for FY2023:

(i) The BOG **accepted** the Audited Financial Statements.

With reference to Document 4.7 – Staffing Matters:

(i) The Board **agreed**
(ii) The CIMH will submit a proposal outlining the feasibility of revising its management structure to include consideration of the positions of Deputy Principal, a Finance Manager, a Procurement Manager, and Human Resources Manager among other to strengthen the fiduciary function of the CIMH. The document should be submitted to the Chair of the Human Resources Committee for consideration no later than 19 December 2024.

With reference to Document 4.8 – Security Concerns:

(i) The BOG **noted** the progress being made securing the property and requested

(ii) The CIMH to submit a proposal to the Board outlining the feasilbility of outsourcing the security arrangements of the Institution recognizing that this is a common industry practice. The document should be submitted to the Chair of the Human Resources Committee for consideration no later than 19 December 2024.

With reference to Document 5.1 – Estimates of Expenditure for the Financial Year 2025:

(i) The BOG **agreed** to

a. the Estimates of Expenditure of USD X,XXX,XXX (BBD X,XXX,XXX) for FY2025. The increase is a 5 percent relative to the Estimates for FY2024 to be presented to the Council for approval.

- There were agreements among the respective unions representing the non-academic staff, the Barbados Workers' Union (BWU) and the academic staff (West Indies Group of University Teachers (WIGUT) and the UWI Cave Hill Campus (UWI-CHC) for salary increases. There was a three (3) percent increase from August 2023, and another three (3) percent from August 2024, respectively.

- There were four promotions for academics on the academic salary scales (three Senior Lectures and one Lecturer) and one promotion of a non-academic staff to Technical Officer I.

3.47 **The Council**

Noted the decisions emanating from the 61st BOG meeting.

4 STATUS OF ACTION FROM THE PREVIOUS SESSION

4.41 Following every session of the Council, the CMO Headquarters produces a single document containing an Action Sheet that allows the Council to follow-up on the actions taken on the decisions of its previous session, and to discuss any further actions if required. A summary of the decisions of CMC67 (The Virgin Islands) was presented to Council, giving the status of actions taken to implement these decisions of Council, and indicating areas where action as proposed had not materialized.

4.42 Council was informed of decisions from the previous meeting that would be reported on in this Session.

4.43 The **Council:**

(i) **Noted** the Status of Actions from CMC65.

~~5.~~ SPECIAL WMO ISSUES

5 (A) OUTCOMES/HIGHLIGHTS OF THE 78TH EXECUTIVE COUNCIL (EC-78) SESSION OF THE WMO

5.1 Council noted that the Coordinating Director and elected EC member, *Dr Arlene Laing* participated with her advisors, *Dr David Farrell*, Principal of the CIMH, and *Mr Kenneth Kerr,* CMO Headquarters Science and Technology Officer, in the EC-78 held during 10-14 June 2024 in Geneva.

5.2 Council was also pleased to note the active participation in the EC-78 of the three CMO experts serving on the WMO Executive Council, ***Dr Arlene Laing,*** Permanent Representative of the British Caribbean Territories, ***Dr Garvin Cummings***, Permanent Representative of Guyana, ***Mr Evan Thompson***, Permanent Representative of Jamaica and *President of WMO Regional Association IV*, as an ex-officio member of the Council.

5.3 Council noted a major highlight of the 78th Executive Council was that of the adoption of a Road Map for the Early Warnings for All initiative, which lays out the vision and actions for enhancing multi-hazard early warning systems (MHEWS), for the period from 2024-2027 and includes detailed dates, deliverables and defined responsibilities.

5.4 The Council recognized the importance of addressing drought in the Early Warnings for All initiative and the EC-78 approval of **Resolution 5 – Implementation Plan on National Drought Early Warning Systems**. The NDEWS has seven objectives that are centred around three pillars:

- Drought Monitoring and Early Warning;
- Drought Risk and Impact Assessment;
- Drought Risk Mitigation, Preparedness and Response

5.5 Council also encouraged all WMO Members to use the **Standardized Precipitation Index** for classifying meteorological droughts and the additionally endorsed Standardized Precipitation and Evapotranspiration Index (SPEI), encouraged the exploration of the use of the Combined Drought Index (CDI).

5.6 Council was pleased to learn that the Executive Council endorsed the *Business Continuity Management Guidelines for WMO Member*s, as approved and recommended by the Third Session of the WMO Services Commission. The guidelines were developed to ensure preparedness against events that may disrupt operations and services. Council noted that the formation of a WMO ***Task Team on the Business Continuity Management*** to support National Meteorological and Hydrological Services (NMHS) with implementation of their BCM and the membership of **Mr Haley Anderson**, CMO Headquarters Project Development Officer, as an expert on the Task Team.

5.7 Council welcomed the EC-78 approval of the WHO-WMO 2023–2033 Implementation Plan for Advancing Climate, Environment and Health Science and Services 2023–2033, which proposes innovative approaches, sustained mechanisms, and engagement opportunities for better health and well-being for people facing existing and emerging extreme weather events, climate change, and environmental risks.

5.8 Council also noted EC-78 decisions aimed at strengthening the climate database, which underpins WMO climate services, especially the annual State of the Climate flagship reports and the plans for modernizing the State of the Climate reporting at global and regional scales.

5.9 Council recalled that Dr Garvin Cummings is serving on the EC Panel on Polar and High Mountains Observations, Research, and Services (PHORS) and noted his innovative **video presentation** in a Side Event entitled, *'Antarctica - a global continent: Towards a WMO Antarctic dialogue'*. EC-78 agreed on actions related to the cryosphere. Attention for SIDS warranted because changes in the cryosphere in polar and high mountain areas affect the whole globe, in particular the downstream impacts in small island states and densely populated coastal zones.

5.10 Council was reminded that the 19th *World Meteorological Congress* approved a new *Global Greenhouse Gas Watch* (G3W) for systematic monitoring of greenhouse gases to inform implementation of the Paris Agreement on climate change. The monthly flux data can be used for various applications such as the Global Stocktake. Council was informed of the approval of the implementation plan of the G3W by the Third Infrastructure Commission in April 2024 and the adoption of the G3W implementation plan by the WMO Executive Council in June 2024.

5.11 Council note that the new initiative takes advantage of WMO's experience with international cooperation and international data exchange in weather prediction and climate analysis as well as its *Global Atmospheric Watch* and *Integrated Global Greenhouse Gas Information System*, which have been operating since 1989. The proposed components are:

- A comprehensive, sustained, global set of surface-based and satellite-based observations of CO_2, CH_4 and N_2O concentrations, total column amounts, partial column amounts, vertical profiles, and fluxes and supporting meteorological, oceanic, and terrestrial variables, internationally exchanged as rapidly as possible
- Prior estimates of the GHG emissions based on activity data and process-based models;
- A set of global high-resolution Earth System models representing GHG cycles;
- Associated with the models, data assimilation systems that optimally combine the observations with model calculations to generate products of higher accuracy.

5.12 Council was pleased to learn that the ***Model Hydro-Meteorological Bill*** for English-speaking CARICOM Members, has been included in the **Appendix** of the WMO **Guidelines for Public-Private Engagement (2024 edition)*****,*** *which was* endorsed by EC-78. The Model Bill and Meteorology Policy were developed with support of WMO CREWS and endorsed by CMO Members in June 2021.

5.13 Council was informed that the 78th Executive Council honoured **Prof. Tim Palmer** as the 68th IMO Prize winner and nominated Prof. Gerhard Adrian as the 69th IMO Prize winner. Prof Tim Palmer was honoured for his role in developing probabilistic ensemble prediction methods for forecasting on all timescales. His work transformed weather and climate prediction and forecast-based action.

5.14 Council noted that on the final day of EC-78, the theme for the World Meteorological Day 2025 was adopted, which is, "*Closing the Early Warning Gap Together*".

5(b) Issues emerging from meetings of the WMO Technical Commissions and Research Board in 2024

Third Session of the WMO Weather, Climate, Hydrological, Marine and Related Environmental Services and Applications (SERCOM-3)

5.15 Council noted that SERCOM-3 was held on 4-9 March 2024, in Bali, Indonesia and in hybrid mode. The meeting was attended by *Dr Arlene Laing*, as the Principal Delegate of the British Caribbean Territories (BCT) delegation, which included *Mr Kenneth Kerr* and *Mr Haley Anderson* (CMO Headquarters) and *Dr. David Farrell*, *Ms Kathy Ann Caesar*, *Dr. Cedric Van Meerbeeck* (CIMH). Because SERCOM-3 was held in Bali, Indonesia (AST+12 hours), the BCT delegation participated virtually during the nighttime hours. The final report of SERCOM-3 was made available in June 2024.

5.16 Council noted that the Commission approved a **new work programme (2024-2027)** to support the development and implementation of globally harmonized weather, climate, hydrological, ocean, and environment-related services. It includes ***Early Warnings for All*** and supporting climate adaptation and sustainable development

5.17 Council noted that the SERCOM work programme will be providing technical support and services to NMHSs to enhance their capabilities in supporting renewable national energy systems. The Services Commission endorsed a long-term ***Capacity Development Plan for WMO Energy Services***. Already, Members have access to a training course and an online learning platform.

5.18 The Council noted that the WMO Services Commission endorsed a set of **good practices for the implementation of integrated urban services** and for assessing their socio-economic and organizational costs and benefits. Integrated urban services are relatively new area of service provision for the NMHSs, with WMO encouraging a **value-driven approach to the development of weather, climate, hydrological, marine, and related environmental services in urban settings**.

5.19 Council further noted that the new SERCOM work programme also includes plans to provide hydrological support to the ***WMO Flood Forecasting Initiative***, which has as an objective, to improve the capacity of meteorological and hydrological services to jointly deliver timely and more accurate products and services required in flood forecasting and warning and to **strengthen collaboration with disaster managers that are**, active in flood emergency preparedness and response.

5.20 light of the importance of the safety of lives at sea for the Caribbean, Council noted that SERCOM-3 approved the ***Guide to Marine Emergency Response***, which provides meteorologists with clarity on factors affecting Marine Emergency Response (MER) operations, aiding in marine environmental emergency response (MEER) and search and rescue (SAR) operations. SERCOM also decided to develop guidance material regarding Forecasting/Alerting for Coastal Hazards caused by weather driven long waves

5.21 With tropical cyclones being the most dangerous weather system of the Caribbean, Council noted that SERCOM-3 approved **Decision 6: Tropical Cyclone Forecasting Competency Framework** (TCFCF), which consolidated the five regional Tropical Cyclone Forecasters (TCF) competencies as a single framework to the *Compendium of WMO Competency Frameworks* (WMO-No. 1209) and requested that Members make use of the TCFCF within their regions. There are two levels of TCF competency in TCFCF. The first is for Senior TC Forecasters at Regional Specialized Meteorological Centres (RSMC)/Tropical Cyclone Warning Centres (TCWC). The second, which is relevant to most CMO Member States NMHSs, is for the TC Forecaster working in a forecasting office that receives guidance from an RSMC or TCWC to provide tailored forecasts and warnings for their areas of responsibility.

5.22 Council further noted a unique RA IV TCF competency, which is a third level of TC competency for non-forecast office personnel. This competency targets preferably a trained forecaster or at least a Meteorological Technician tasked with liaising with the regional forecasting center, who can receive and interpret the watches, warnings, and forecasts, deliver and explain TC information, and interpret and communicate impact-based hazard information for disaster managers and other local stakeholders. **This latter competency is included to satisfy operational practices within less developed CMO Member States Meteorological Offices**.

5.23 The 65th Council welcomed the ***Business Continuity Management Guidelines for WMO Members***, one of the new initiatives approved by SERCOM-3 and endorsed by the 78th Executive Council endorsed the Business Continuity Management Guidelines for WMO Members.

5.24 SERCOM-3 had a special ceremony to present certificates to Members whose experts have been contributing to SERCOM, with the following CMO Members being recognized:

- Barbados
- Belize
- British Caribbean Territories (BCT)

- Trinidad and Tobago

WMO Members were urged to nominate experts to the WMO Expert database to expand Member participation in WMO constituent bodies. Members were reminded to seek experts from any institution in their country.

5.25 Council noted the CMO experts in SERCOM, as listed below:

a) Standing Committee on Services for Aviation (SC-AVI);
Co-Chair, Expert Team: Ms Kathy Ann Caesar/BCT
b) Standing Committee on Services for Agriculture (SC-AGR);
Expert Teams: Ms Shontelle Stoute/BCT, Ms Shanea Young/Belize, Ms Arlene Aaron-Morrison/Trinidad & Tobago
c) Standing Committee on Climate Services (SC-CLI);
Expert Team: Mr Adrian Trotman/BCT
d) Standing Committee on Disaster Risk Reduction and Early Warning Services (SC-DRR);
Expert Team on EWS: Dr David Farrell/BCT
e) Study Group on Integrated Health Services (SG-HEA);
Dr Roche Mahon/BCT

SERCOM Management Group
Mr Evan Thompson, President RA IV/ Jamaica
National Focal Point for Severe Weather Forecasting Programme
Dr Arlene Laing/BCT
National Marine Services Focal Point
Mr Dale Destin/Antigua and Barbuda, Ms Carol Surbath-Ali/Trinidad & Tobago, Eron McPherson/Guyana
National Focal Point for Climate Information Systems
Mr Komalchand Dhiram/Guyana, Mr Kaidar Kissoon, Trinidad & Tobago, Ms Kerrie Forbes/BCT, Ms Annie Carrette Joseph/Dominica

Third Session of the WMO Commission for Observation, Infrastructure, and Information Systems (INFCOM-3)

5.26 The Council was informed that *Dr Arlene Laing* (in-person) and *Mr Kenneth Kerr* (virtual) represented the British Caribbean Territories (BCT) at INFCOM-3*,* held on 15 to 19 April 2024, in Geneva Switzerland, in hybrid mode. The other CMO experts in attendance were *Mr Kerry Powery* (Cayman Islands), Chair of WMO RA IV Infrastructure Committee, and *Mr Shakeer Baig*, PR of Trinidad and Tobago with WMO, who served on the Credentials Committee of INFCOM-3.

5.27 Council was reminded that WMO and CMO have increased their coordinated efforts to ensure the protection of radio frequency bands that are vital for weather forecasts and life-saving early warnings. Weather forecasts, climate monitoring, and other environmental services all depend on observations and communication in specific radio frequency bands.

5.28 Council recalled that the Coordinating Director's has reported to the Council on its efforts to protect radio frequency since the 60th Council (2020, Virtual, St Vincent and the Grenadines), including appeals to the *Caribbean Telecommunication Union* (CTU) on supporting radio frequency coordination for promotion of safety.

5.29 The Council noted that the Coordinating Director, Dr Arlene Laing, was **an invited presenter during INFCOM-3,** following the success of the pioneering WMO training workshop and 5th WMO Expert Team meeting hosted by CMO in Port of Spain, in February 2024. The events were held in

collaboration with the CTU. The workshop increased the capacity of local and regional experts and developed new experts in the field of spectrum management.

5.30 The Secretary General of the CTU, an observer to the 67th Council, affirmed the beneficial collaboration of CMO Headquarters in radio frequency coordination and the contribution of CMO to CTU's regional spectrum management task force.

5.31 The Council was reminded that Caribbean decision-makers and regulators need to be well-informed and up-to-date on the value of the spectrum bands for different applications associated with operational weather forecasting, climate and environmental monitoring and research in weather, climate, water, and related environmental sciences.

5.32 The Council noted that the WMO Infrastructure Commission has established national focal points for radio frequency coordination to boost the capacity and knowledge of the Radio Frequency Regulatory framework within the National Meteorological and Hydrological Services and hence enhance the meteorological community's ability to safeguard critical access to the radio spectrum.

5.33 Council was informed that a current critical issue at the *World Radio Conference 2023* was the **measurement of sea surface temperature**, which is essential for the Caribbean severe weather warnings, as tropical storms form when the sea-surface temperature reaches or exceeds 26ºC and rapid intensification of storms has been observed over warm currents and eddies. Satellite sensors are the sole means of monitoring the vast oceanic regions where hurricanes form. Council noted that sea surface temperature measurements could be severely hindered if International Mobile Telecommunications (IMT) were deployed in these frequency bands that satellite sensors need to measure sea surface temperature.

5.34 Council was reminded that the ***WMO Integrated Processing and Prediction System (WIPPS***), a worldwide network of operational centres operated by WMO Members and relevant operational organizations, provides weather, climate, and hydrological analysis and prediction products. These products are operationally available among WMO Members for applications related to weather, climate, water, and related environmental matters. The WMO Regional Climate Center (RCC), hosted by the CIMH, is one of the WIPPS RCCs conducting regional climate prediction and monitoring.

5.35 Council was informed that the WMO Infrastructure Commission **agreed to increase the number of analysis and forecast products and to provide these at higher resolution**. This update includes impact-based indexes and the new set of tropical cyclone variables that will be **beneficial for CMO Members** to provide better quality forecasts and warnings. The agreement was aligned with the INFCOM recommendations to meet user requirements, support the Early Warnings for All initiative, and follow up on the WMO Unified Data Policy.

WMO Research Board

5.36 Council recalled that Dr Arlene Laing, the Coordinating Director, serves as the *WMO RA IV Focal Point for Research and Earth-system Modeling* and *RA IV Representative to the WMO Research Board*. In that capacity, in July 2024, she organized a first of its kind webinar in RA IV on Machine Learning (ML)/Artificial Intelligence (AI) in Weather Prediction, with the aim to:

1. Discuss how ML/AI works in relation to weather/climate prediction.
2. Identify the prospects of ML/AI in predicting weather and climate events
3. Examine the best use of Artificial Intelligence Weather Prediction (AIWP) versus other numerical prediction methods.
4. Identify the challenges faced in applying AIWP in regions with limited data availability.

5.37 Council noted that in order to guide Members in AI /ML matters for weather prediction in 2024**,** the WMO Research Board established an *Artificial Intelligence for Weather Task Team* (AI4Wx TT),

chaired by **Dr Veronique Bouchet**, Canada, and **Dr Catherine de Burgh-Day**, Australia. This new task team is continuing the work of the RB *Task Team on Exascale Computing, Data Handling and Artificial Intelligence*, which produced two Concept Notes:

- WMO Concept Note on Data Handling and the Application of Artificial Intelligence in Environmental Modelling (*Hines et al., 2023*):
- WMO Concept Note on Exascale Computing and Data (*Govett et al., 2023*)

5.38 Council noted that the RB *Task Team on Early Warnings for All* is co-chaired by the Coordinating Director**, Dr Arlene Laing**, and **Prof. James Hurrell** of Colorado State University, having been established in February 2024. The task team is planning a series of workshops in each Regional Association to harvest seeds of innovations to support early warnings for all. An in-depth, in-person decision workshop is being planned for 2025 as a collaboration of WMO RA IV and the WMO Research Board.

5.39 Council was informed that the Chair of the Research Board is proposing to establish a new ***Task Team on Social Science and Geophysical Science Integration*** (TT-SSGSI), in response to Resolution 35 (Cg-19) – *Scientific Advisory Panel Recommendations with Research Board Appraisal.* The proposed TT-SSGSI will focus on the integration of social science and geophysical sciences in the context of research to operations.

5(c) UN Early Warnings for All

5.41 The Council recalled that the WMO Congress **Resolution 4 (Cg-19)**, references the UN global initiative, led by the WMO and UN Disaster Risk Reduction (UNDRR), to protect all persons from hazardous weather, water, or climate through early warning systems by 2027. ***Early Warnings for All*** is the **highest priority** of the *19th World Meteorological Congress*. The WMO *Early Warnings for All: Executive Action Plan 2023–2027* was launched by the UN Secretary-General, ***António Gutteres,*** at the 27th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC/COP 27) in November 2022 and approved by the Parties.

5.42 The Council was reminded of the four pillars of a multi-hazard early warning system (MHEWS), centred on people and having appropriate governance, institutional arrangements, multi-sector partnerships, and cultural context, are:

- Pillar 1 – Disaster risk knowledge and management (led by UNDRR)
- Pillar 2 – Detection, observation, monitoring, analysis, and forecasting (led by WMO)
- Pillar 3 – Warning dissemination and communication (led by ITU)
- Pillar 4 – Preparedness and response capabilities (led by IFRC)

5.43 Council noted that WMO leads the implementation of Pillar 2, and supports Pillars 1, 3 and 4, globally while the National Meteorological and Hydrometeorological Services have a similar role at the national and regional levels, with the support of the CMO and other partners.

5.44 Council was informed of the recently established Early Warnings for All Dashboard, where data for the four Pillars, as well as those for disaster risk reduction (DRR) strategies and cross-cutting enablers can be monitored and visualized, to track the progress of global indicators, implementation indicators, and MHEWS country capacity.

5.45 Council noted that the CMO Headquarters has been actively contributing to the national consultations for Antigua and Barbuda and Barbados, two of the priority countries for EW4All. The Council further noted other ***selected*** CMO Headquarters activities since CMC65, in support of *Early Warnings for all* including:

- Member, WMO RA IV Hurricane Committee; contributor to the Operational Plan
- Co-chairing the Severe Weather Forecasting Programme Eastern Caribbean Management Team, for high-impact severe weather that occurs any time of year, including drafting a Severe Weather Operational Plan and supporting the development of a new severe weather case catalogue and database in the Caribbean.
- Contributing to the Regional Early Warning System Consortium that is led by CDEMA
- Co-organized webinars on the *Common Alerting Protocol* (CAP*)*, May 2024

5.46 The Council was informed by the Secretary-General of the *Caribbean Telecommunications Union* (CTU) has been in discussions with the International Telecommunications Network (ITU) on the issuing of warnings through cell broadcast, which will contribute to *Early Warnings for All*. It was noted that the CTU will start working with five countries of the Organization of Eastern Caribbean States (OECS) that are Members of Eastern Caribbean Telecommunications Authority (ECTEL), with funding support from the World Bank.

5(d) WMO Integrated Global Observing System (WIGOS)

Implementation of Global Basic Observation Network (GBON)

5.47 The Council recognized that high quality and timely observations are fundamental to the accuracy of weather forecasting. Council noted that the CMO Headquarters helps Member States to become compliant with WIGOS and GBON requirements, thereby supporting real-time sharing and integrating of data, conducive to rapidly-evolving hazards, and in archives, for climate analysis, research, and risk knowledge.

5.48 Council recalled that the WMO *Global Basic Observing Network* (GBON) aims to ensure availability and international exchange of basic surface observation data, which underpin all weather, climate and water services and products for the public good of all nations. The GBON is designed, defined and monitored at the global level, with its implementation having **direct positive effect on the quality of weather forecasts, thus helping improve the safety and well-being of people around the world**.

5.49 Council also recalled that GBON implementation started on 1 January 2023. To support that process, the WMO *Infrastructure Commission* (INFCOM) developed a GBON Implementation Operating Plan, provided guidance materials for the initial composition of GBON, Members' GBON compliance and GBON global gap analysis (guidelines in References to GBON material).

5.50 Council further recalled that the *Systematic Observations Financing Facility* (SOFF) is a financing and technical mechanism to support the *Global Basic Observing Network* (GBON). The SOFF, which was formally launched at UNFCCC COP26, will allow developing countries to deliver their contribution to GBON. SOFF investment focuses on long-term observational data exchange as a measure of success. The intent is to support operating and maintenance costs of a country's basic observation infrastructure through results-based finance. It will **produce local benefits while delivering on a global public good – that of better global weather forecasts and climate information for all nations**. SOFF is a UN fund, co-created by WMO, UNDP and UNEP to close the most severe gaps, with priority given to Least Developed Countries and Small Island Developing States (SIDS).

5.51 More than 65 partner institutions are to provide systematic, standardized, and coordinated support to beneficiary countries to achieve compliance with the GBON. Belize, Grenada, and Guyana are the CMO Members in the first batch of beneficiaries of the SOFF. Barbados, Dominica, Jamaica, Saint Lucia, St Kitts and Nevis, St Vincent and the Grenadines, and Trinidad and Tobago are in the third batch.

5.52 Council was reminded that during its initial 3-year implementation period, SOFF has been prioritizing support to 55 SIDS and LDCs, including the CMO Member States listed above. SOFF support is being provided in three phases. In the Readiness phase, the country's hydrometeorological status are assessed, the GBON gap defined and a plan developed to close the gap. The Investment phase enables countries to close the GBON investment and capacity gap. The Compliance phase supports sustained GBON compliance and enables access to improved weather forecasts and climate analysis products.

5.53 Council noted that the CMO Headquarters' support to the implementation of SOFF in the CMO Member States through coordinating with the peer advisor institutions and advising Members during the SOFF Readiness phase, and sharing guidance and regional expertise to SOFF implementing partners such as the World Food Programme in the Caribbean and the Inter-American Development Bank (IDB). The CD travelled to Grenada in August 2023 for the launch of its Readiness Phase and the STO travelled to Barbados for regional consultation on SOFF in February 2024, with beneficiaries and implementation partners, and supported its Readiness Phase.

5.54 Council noted that CMO Headquarters has been advocating for a Regional Approach to SOFF implementation for greater efficiency and leveraging of existing infrastructure and regional arrangements. Recognizing that the Caribbean has an established upper air network that provides coverage for multiple countries, which precludes the requirement for an upper air station per country, the CMO Headquarters has been seeking an optimal strategy in collaboration with WMO, NOAA, and SOFF Beneficiary States. A regional SOFF workshop is being planned for RA IV in the first quarter of 2025.

5.55 Council was pleased to note that the support of the Science and Technology Officer (STO), has resulted in **CMO Members making significant progress towards reaching compliance with GBON**. As of November 2024, five CMO Members (Antigua and Barbuda, Barbados, Grenada, Guyana, and Trinidad and Tobago) were exchanging observations hourly for the full 24 hours. Other Members were exchanging data at 3-hourly and 6-hourly intervals or exchanging hourly for less than a 24-hour period. Council is referred to the report of the Annual Meeting of the Directors of Meteorological Service (Item 9) for further details.

5.56 Council recalled that the *WMO Integrated Global Observing System* (WIGOS) is an all-encompassing approach to the improvement of WMO's global observing systems, needed in all countries. WIGOS, together with *WMO Information System* (WIS), form the basis for the provision of **accurate, reliable and timely weather, climate, water and related environmental observations and products** by all Members and WMO Programmes, which would lead to improved service delivery. Both WIGOS and WIS are very essential to all technical and scientific activities of Meteorological Services in the Caribbean and worldwide.

5.57 The Council also recalled that WIGOS became operational in 2020 and that, as with all Member States of WMO, CMO Member States should be implementing WIGOS. The goal is for all Member States and their partners to benefit from a fully operational system. EC-78 has adopted all amendments to the Manual on WMO Integrated Global Observing System.

5.58 Council noted that National Meteorological and Hydrological Services have been stewards of the long-term observations that underpin climate knowledge, which in turn informs climate action. WMO Congress requested Members to implement **WIGOS, WIS, and the WMO Unified Data Policy, which ensures that core earth system data needed for prediction and analysis for the public good of all nations is of the highest quality**

5.59 Council recalled that in June 2023, CMO Headquarters hosted the WMO WIS2.0 in a Box Workshop for 19 participants from 15 countries, where participants learnt how to install and configure the software to enable ease of local and international data exchange. Due to the support of a core group of participants, CMO and WMO, by October 2023, CMO States were exchanging data nationally and internationally, and were among the first to pilot this new technology.

5.60 The Council was requested by the Coordinating Director to **formally recognized the contributions of Ms Kimberly Seaton and Mr Dwayne Scott for their dedicated service** to the operation of the Caribbean node of the WMO Information Systems. Their contributions have enabled the Caribbean to be on the leading edge of this new method of international data exchange that is facilitating data assimilation and improvements in the global numerical weather prediction models, which is for the public good of all nations.

5.61 Council recalled that CMO and WMO signed a Letter of Agreement whereby WMO provides cloud services to support a CMO Node of WIS for four years. Council noted that WMO has recommended affordable options for CMO Headquarters to maintain the WIS2.0 node after the period of the agreement with WMO.

5.62 The Council was also informed that in the next year the CIMH will be implementing a project to deploy 52 buoys to 16 Member States, with funding from the Caribbean Development Bank. The Principal of CIMH also informed that the Institute has hired an AI expert to apply AI technology to the energy sector, including wind forecasts for renewable energy.

Regional WIGOS Centre

5.63 Council was reminded that CMO Headquarters is ensuring the availability, accuracy, and timeliness of weather, climate, and water observations and related data and information from National Meteorological and Hydrometeorological Services

5.64 Council was pleased to note that, In December 2023**,** the United States, Canada, CMO Headquarters, Trinidad and Tobago and Costa Rica began **piloting a *Regional WIGOS Centre* for WMO RA IV** (North America, Central America, and the Caribbean) - to ensure the quality, accuracy, and timeliness of observations. Council noted that **CMO Headquarters and Trinidad and Tobago Meteorological Service are responsible for the data quality and metadata management for the English-speaking Caribbean, respectively**, and that the availability and quality of observational data of CMO Members has been improved as a result.

5(e) The Global Framework for Climate Services (GFCS)

5.65 The Council recalled that the ***Global Framework for Climate Services*** (GFCS), a United Nation (UN)-led initiative which started in 2012, spearheaded by WMO, is being implemented throughout the world to guide the development and application of science-based climate information and services in support of decision-making.

5.66 The priority areas for the GFCS are (i) Agriculture and food security (ii) Disaster risk reduction, (iii) Energy (iv) Health and (v) Water. The GFCS is currently being implemented through eight global projects, many with an emphasis on developing countries and Small Island Developing States. The CIMH Regional Climate Centre (RCC) includes tourism, which is a major economic sector for the Caribbean.

5.67 Through the CREWS Initiative, CMO Headquarters has been supporting the development of governance frameworks, legislation, and other mechanisms to support Members in developing Climate Services. That includes Strategic Plans and National Frameworks for Weather, Water, and

Climate Services and also supporting CIMH, as needed, in their implementation of the Climate Services and Related Applications (ClimSA) project.

5(f) Disaster Risk Reduction and Regional Severe Weather Forecasts and Warning Systems

Tropical Cyclone Programme

5.68 The Caribbean Meteorological Council is aware that activities within the WMO *Tropical Cyclone Programme* (TCP) are among the most important to the Caribbean and other tropical basins. The TCP is essential to help reduce the disaster risk associated with the tropical cyclones. The most critical regional activity under the TCP is the *Hurricane Committee*, serving the *North Atlantic, East Pacific and Caribbean Basin*. The Hurricane Committee has at its core, *the US National Hurricane Center*, which is one of WMO's primary *Regional Specialized Meteorological Centres* (RSMCs) for tropical cyclones.

5.69 Council was reminded that most Meteorological Services in CMO States are represented on the Hurricane Committee which, along with the relevant regional and national disaster management community, work continuously towards the reduction of disaster risks by tropical cyclones, particularly the loss of lives. The Hurricane Committee defines and routinely updates the warning system for tropical cyclones in the North America, Central America and the Caribbean region, including the areas of responsibility of the NMHSs in each Member State in the provision of tropical cyclone forecasts and warnings. The warning system includes back-up arrangements between Meteorological Services with warning responsibilities.

5.70 Council noted that the ***46th WMO RA IV Hurricane Committee*** met on 18-22 March 2024 in Panama City, Panama. In addition to the updating of the Operational Plan and report of impacts by Members, the following side events were focused on emerging and ongoing initiatives of WMO, UNDRR, UNESCO-IOCARIBE, and other partner organizations involved in observations, prediction, and research, and delivery and communication of tropical forecasts and warnings. A special session focused on tropical cyclone research, including modeling with artificial intelligence and its impact on weather prediction, which indicated skillful track forecasts but poor intensity forecasts.

5.71 Council noted that CMO Headquarters participated in two panels at the 46th Hurricane Committee, specifically:

- Ocean Panel, which recognized the critical need to consolidate a marine and ocean in situ observational network to support the forecasting process and services themselves. Dr Mike Brennan, Chair of the Committee, made a keynote presentation on tropical cyclone rapid intensification, Mr John Parker, Prof. Scott Glenn and **Mr Kenneth Kerr** presented on "Consolidating the value chain: From ocean observations to coastal inundation forecasting". The panel provided several recommendations for enhancing ocean observations to ensure a safe and well-predicted ocean.

- *"Hurricane Early Warnings For All'* Panel, which focused on ways in which the RA IV Hurricane Committee can support the implementation of EW4All by fostering cooperation and sharing good practices among regional stakeholders. **Dr. Arlene Laing** presented on the role of the CMO in supporting early warnings for all, providing insights into the ongoing collaboration efforts among regional organizations and UN agencies regarding EW4All.

WMO Severe Weather Forecasting Programme (SWFP) Eastern Caribbean

5.72 Council recalled endorsing a proposal by CMO and partners in 2015 to implement a WMO *Severe Weather Forecast Demonstration Project* (SWFDP) Eastern Caribbean, which was established

in 2016. In June 2019, the 18th WMO Congress designated the transition of the SWFDP to be the **Severe Weather Forecasting Programme (SWFP)** Eastern Caribbean (EC)**.** Météo-France Martinique hosts the ***Regional Forecast Support Facility*** (RFSF) of the SWFP EC, including the Extranet that serves NWP products and observations to support severe weather forecasts. Council was reminded that in 2021, it was agreed that products on the SWFP Extranet could be made available to NMHSs in Caribbean states outside of the formal EC domain.

5.73 The SWFP Regional Subprogramme Management Team (RSMT) is co-chaired by ***Mr Emmanuel Cloppet,*** Météo-France Antilles et Guyane, and ***Dr. Arlene Laing***, CMO Headquarters. Other CMO representatives on the RMST include ***Ms Kathy-Ann Caesar*** of the CIMH, as the training lead, and ***Mr Dale Destin***, Director of Antigua and Barbuda Meteorological Service, representing CMO National Meteorological Services. Since CMC65 (November 2023, Port of Spain), the RSMT met on 14 December 2023 (virtually) and on 19 March 2024 on the side of the 46th Hurricane Committee in Panama City, Panama in hybrid mode.

5.74 Council noted a major change in the SWFP since CMC65. In December 2023, the RSMT agreed to the **addition of Guyana to the SWFP Eastern Caribbean,** at the request of the ***WMO Standing Committee on DRR and Early Warning Services***, noting that Guyana is a priority country for the UN Early Warnings for All but there was no Severe Weather Forecasting Programme in RA III to support Guyana. It was also noted that through the CMO, Guyana had been receiving training on severe weather forecasting through training workshops in the Caribbean. Subsequently, the PR of Guyana submitted a formal request to the President of RA IV to be added to the SWFP Eastern Caribbean and the change in the programme was reported to the RA IV Management Group at its meeting in January 2024. Another major change for the SWFP in 2023, was the request for model forecast guidance products on excessive heat.

5.75 Council noted that at the meetings of the RSMT, presentations were made by the WMO *Standing Committee on Disaster Risk Reduction and Early Warning Services* on the UN *Early Warnings for All*. RFSF Martinique reported on the initial performance of the new AROME model, the **Caribbean's first operational high-resolution ensemble model** for explicit convection. The model has a 1.3km grid for the deterministic model and a 2.5km grid for the ensemble, able to resolve small island circulations. The RSFP continues provision of automatic products, including new excessive heat products.

5.76 In March 2024, Co-Chair, Dr Laing, reported to the 46th Hurricane Committee and the RSMT meeting on the activities of the SWFP, achieved through direct support to the SWFP and leveraging related workshops. The Dominican Republic nominated *Mr Wagner Rivera* to join the RSMT, following a previous decision to invite Dominican Republic to join the RSMT because of its role as a regional leader for Flash Flood Guidance System and the Coastal Inundation Forecasting Initiative.

5.77 Council was asked to **urge Members to nominate a Severe Weather Forecasting Programme focal point**. Directors were asked to encourage forecasters trained under the SWFP to train fellow forecasters on the competencies learnt and to use the SWFP-EC Extranet products.

5.78 Council noted that CMO Headquarters helped to organize and presented to a well-received NOAA WMO RA IV Workshop on an Interactive Analysis of Tropical Storm Philippe (2023), that was held on 4-7 June 2024, as a virtual workshop hosted by CIMH. That storm affected all of the Eastern Caribbean but was a very challenging storm to forecast as its track was affected by interaction with another tropical cyclone, Rina, resulting in a stalled system and interactions among different convection clusters mainly to the south of the centre of the storm.

5.79 Council noted that the Coordinating Director met with *Ms Virginie Schwarz*, Executive Director of Météo-France, on the side of the 78th WMO Executive Council, 10-14 June 2024, to review the

SWFP EC and other collaborative activities, per the formal *Working Arrangements* between CMO *and* Météo-France.

5.80 Council also noted the Plans for the Severe Weather Forecasting Programme Eastern Caribbean for 2024 to 2025, including:

- Forecaster exchange and attachments for familiarization with forecast areas of responsibility
- Technical Workshop on the use of the SWFP-EC Extranet, Communication, and Public Weather
  Service
- Enhancement of the severe weather case study catalogue including translation to other languages

5.81 CMO Headquarters hosted two interns sponsored by the CCRIF-SPC, during September to November 2024, to support the activities of the SWFP, specifically:

- Enhancement of the severe weather case catalogue for the Caribbean, with the addition of the geographic aspects. to enhance severe weather forecasting skill and contribute to monitoring of losses and damages. The Severe Weather Database is hosted by CIMH at https://cswd.cimh.edu.bb/ and mirrored on a server at CMO Headquarters
- Updating of the first draft Severe Weather Operational Plan, which was developed in 2021. The project focused on the transition of the SWFP to the operational phase at the regional and national level. Members were surveyed on their severe weather forecast plans and procedures, severe weather priority hazards, use of NWP, including ensemble products, forecast products used, primary observations, and methods of accessing the data used.

5.82 The Council noted that WMO requested CMO Headquarters to join meetings of RA IV in June and October 2024 to support the establishment of a Severe Weather Forecasting Programme (SWFP) Central America, to share lessons learnt from the implementation of the SWFP in the Caribbean.

5.83 The **Council**:

(i) **Noted** the decisions of the 78th session of the Executive Council (EC)

(ii) **Encouraged** Member States to be prepared to leverage resources through the funding mechanisms available to support *Early Warnings for All*

(iii) **Noted** the activities of the Research Board that support transition of research to operations

(iv) **Urged** CMO Member States to ensure that their NMHSs complete activities for the Operational Phase of WIGOS

(v) **Urged** CMO Member States to become compliant with GBON, which became operational at the start of 2023, following the guidelines from WMO

(vi) **Committed** Members' NMHSs maintaining their support and participation in the CMO WIS2.0 Node

(vii) **Formally commended** the work of **Mr Dwayne Scott**, National Meteorological Service of Belize, and **Ms Kimberly Seaton**, Trinidad and Tobago Meteorological Service (TTMS), for their dedicated service to the development and ongoing operation of the Caribbean WIS 2.0 node, for real-time national and international data exchange

(viii) **Noted** the activities on the Virtual *Regional WIGOS Centre* (RWC) as a collaboration among the US, Canada, CMO Headquarters and the Trinidad and Tobago Meteorological Service

(ix) **Continued** its strong support for the *Global Framework for Climate Services* and to **urge** Member States to actively participate in GFCS projects and activities

(x) **Noted** and **supported** the important work of the regional Hurricane Committee

(xi) **Noted** and **supported** the important work of the Severe Weather Forecasting Programme in the Caribbean

(xii) **Urged** Members to nominate National Focal Points for the Severe Weather Forecasting Programme, to help advance to the operational phase of the programme

6 FINANCIAL REPORTS

6(a) Status of Refundable Balances

6.1 By longstanding agreement between the UK Department of Transport and the CMO HQ, the UK Department of Transport reimburses the CMO HQ a percentage (73%) of the annual contribution paid to the WMO on behalf of the BCT, and refunds the full contribution due from the Members of the BCT, upon submission of an invoice with the accompanying annual audited Financial Statements of the CMO HQ.

6.2. By Members' consent, these funds are held at the CMO HQ to assist Members in attending important meteorological and/or hydro-meteorological meetings, participating in training opportunities and purchasing spare parts. During 2024, six (6) Member States accessed these funds to date, namely Anguilla, Belize, Cayman Islands, Montserrat, Trinidad and Tobago, and the Turks and Caicos Islands.

6.3 At the 60th session of the Council (2020), it was agreed that a Member State in arrears of contribution to the CMO HQ shall, after meeting its full contribution for two successive years, have access to the amount credited to its Refundable Balance account for the first of these years. Access to successive years' refundable balances shall be dependent on liquidating the arrears due for additional years.

6.4 The status of the Refundable Balances held at the CMO HQ on behalf of CMO Member States, as well as the amount available for drawdown at 31 October 2024, based on the decision taken at CMC60 (2020) was presented to the Council under Agenda Item Doc. 6(a) for consideration and is summarised in USD below:

BRITISH CARIBBEAN TERRITORIES	BALANCE @ 01/11/2024	BALANCE AVAILABLE	FINANCIAL STATUS	COMMENT
Anguilla	48,880	48,880	Current	
British Virgin Islands	54,470	54,470	Current	
Cayman Islands	1,919	1,919	In Arrears	2024 O/S
Montserrat	33,601	33,601	Current	
Turks and Caicos Islands	46,124	46,124	Current	
	184,994	**184,994**		
CMO MEMBERS OF WMO				
Antigua and Barbuda	6,812	-	In Arrears	11 years of short payments (2010 - 2019 and 2023) and 3 years non-payment (2020-2022).
Barbados	15,062	15,062	Current	
Belize	376	376	Current	
Dominica	3,922	1,156	In Arrears	16 years of non payment since 2001. Full payment received for 2004, 2006, 2014 and 2017-2020.
Guyana	4,799	4,799	Current	
Jamaica	50,429	50,429	Current	
Saint Lucia	3,199	3,199	Current	
Trinidad and Tobago	1,222	1,222	Current	
	85,821	**76,243**		
TOTAL	**270,815**	**261,237**		

Based on Rate of Exchange at 01 November 2024

6.5 **The Council**

Noted the status of the Refundable Balances based on the decision taken at CMC60 with respect to availability of funds for drawdown by Members States in arrears of contribution to the CMO Headquarters.

6(b) CMO HQ Auditor's Report

6.6 The financial statements of the Caribbean Meteorological Organization – Headquarters Unit (CMO HQ) are audited by the Auditor General's Department of Trinidad and Tobago. The audited financial statements of the CMO HQ for 2023, as issued by the Auditor General, were presented to the Council under Agenda Item Doc. 6(b) for consideration.

6.7 **The Council**

(i) **Reviewed and accepted** the audited financial statements for 2023.

(ii) **Reaffirmed** the continued use of the Auditor General's Department of Trinidad and Tobago for the provision of audit services for the Headquarters of the CMO, as provided by the Government of the Republic of Trinidad and Tobago.

6(c) CMO HQ and CIMH Statements of Contributions and Arrears

6.8 The financial provisions contained in Article 22 of CMO Acts, which established the *Caribbean Meteorological Organization* (CMO) in all sixteen Member States, stipulate that the expenses of the Organization shall be borne by Members States as apportioned by the Ministerial level *Caribbean Meteorological Counc*il (CMC) responsible for approving the budgets of both organs of the CMO, namely the *Headquarters Unit* (CMO HQ) and the *Caribbean Institute for Meteorology and Hydrology* (CIMH). Once approved, it is hoped that all Member States would honour their commitment to meet their annual contributions towards these budgets in a timely manner.

6.9 A detailed statement of contributions and arrears to the CMO HQ, as at 01 November 2024, was presented to the Council under Agenda Item Doc. 6(c)-1. A similar document on the arrears to the CIMH at the 30 September 2024 was presented to the CIMH Board of Governors (18 and 19 November 2024) and presented to the Council under Agenda Item in Doc 6(c)-2.

6.10 The Summary of Total Arrears, Assessment and Receipts to the CMO Headquarters, at 01 November 2024, showed that total contributions received in 2024 was USD731,835 representing payment towards 30% of the arrears outstanding for prior years and 77% of the contributions approved for 2024. For the first time in many years, there has been an overall decrease in the arrears of contribution, albeit small (1%). This decrease was driven by those Member States that liquidated their arrears to the CMO HQ and the Rawinsonde and Radar Networks in 2024.

6.11 The Statement of the Status of Contributions and Arrears to the CIMH budget for 2024, showed that, as at 30th September 2024, approximately 40.5 % of Contributions for 2024 was received, and 4.5 % of arrears was received. The implications of this financial situation on the programmes and activities of the CIMH was first discussed at the CIMH Board of Governors meeting held on (18 - 19 November 2024) before being presented to this session of Council.

6.12 At CMC65 (Trinidad and Tobago, 2023) the Council directed that a tiered system of sanctions be developed to treat with Member States in arrears of contribution. A proposal was tabled at the CMC66 (held virtually, 2024) and after much discussion, the Council directed that the points raised during discussion be considered and a revised proposal be submitted to the Council. This was presented at as a separate item, CMC67, Doc.6(d).

6.13 **The Council**

(i) **Examined** the detailed Statement of Contributions and Arrears to the CMO Headquarters and the Caribbean Rawinsonde and Radar Networks at 01 November 2024.

(ii) **Examined** the Statement of Contributions and Arrears to the CIMH at 30 September 2024 which was presented in USD at the rate of 1.99375.

6(d) Proposed Consequences for Members in Arrears

6.14 The CMO Headquarters Unit and Caribbean Institute for Meteorology and Hydrology proposed tiered consequence for Members in Arrears of Contributions as directed by the **65th Caribbean Meteorological Council (CMC65, Port of Spain, November 2023)**, as excerpted below:

EXCERPT – Final Report of the 65th Caribbean Meteorological Council

"6(c) <u>Statement of Contributions and Arrears (CMO HQ & CIMH)</u>

6.8 Council was reminded that the financial provisions contained in Article 22 of the CMO Acts, which established the *Caribbean Meteorological Organization* (CMO) in all sixteen Member States, stipulate that the expenses of the Organization shall be borne by Members States as apportioned by the Ministerial level *Caribbean Meteorological Counc*il (CMC) responsible for approving the budgets of both organs of the CMO, namely the *Headquarters Unit* (CMO HQ) and the *Caribbean Institute for Meteorology and Hydrology* (CIMH). Once approved, it is hoped that all Member States would honour their commitment to meet their annual contributions towards these budgets in a timely manner.

6.9 The Council has repeatedly urged Member States to make regular payments toward the current approved budget and to establish a plan to liquidate arrears in a phased manner. Notwithstanding these pleas, CMO HQ and CIMH continue to experience delays in remittances, part payment and in some cases, non-payment of current contributions by some Member States. This has resulted in an increase in overall arrears year on year which hampers the implementation of programmes and activities planned for both the CMO HQ and the CMH.

6.10 **The Council**

(i) **Examined** the detailed Statement of Contributions and Arrears to the CIMH at 30 September 2023 and the CMO HQ at 30 October 2023;

(ii) **Agreed** that measures should be taken with respect to Member States the CMO HQ and CIMH who appear to make no effort to honour obligations to meet either the current contribution assessed, or to liquidate any portion of the arrears outstanding; and

(iii) **Directed** the CMO HQ and the CIMH to present a tiered system of consequences to be considered for implementation by a Special Session of the Council."

6.15 The 67th Council noted the report of discussions and the decision of the **66th Session of the Caribbean Meteorological Council (Virtual, August 2024)**, excerpted below:

EXCERPT – Final Report of the 66th Caribbean Meteorological Council

"A vigorous and extended discussion of the matter was conducted by the Council, with most of the Members present agreeing that there should be consequences for Members being in arrears. However, questions arose about the effects of the proposed consequences on other Members and specific procedures, including suspension of voting rights and impact on quorum; whether affected Members would be involved in the meeting discussions; whether arrears would continue to accrue when services are suspended; and about whether consideration could be given to in-kind contributions. A request was made for assessment of the restriction on training to be considered in a more granular manner because of the ripple effect on Members who are downstream beneficiaries of the training.

The Council:

(i) **Noted** the proposed recommendations for tiered consequences for Members in arrears

(ii) **Requested** that the CMO HQ and CIMH review and consider the recommendations raised by Members at this 66th Council and revert a revised version for resolution by CMC67."

6.16 The 67th Council noted the report of discussions and the decision of the **66th Session and the revised version of the proposed consequences.** The 67th Council engaged in a substantive discussion that extended into the second day of its session.

6.17 **The Council**

(i) **Examined** the proposed tiered system of consequences

(ii) **Recommended** that legal advice be sought to understand the implications of the establishment of the consequences relative to the Agreement for the Establishment of the Caribbean Meteorological Organization

(iii) **Agreed to form a Task Force to** negotiate directly with the Members in Arrears

(iv) **Recommended** that the **Task Force** be comprised of the Chair of the Council, the Principal of CIMH, and the Coordinating Director of the Headquarters Unit

(v) **Recommended** that a Special Session of the Council be convened before the next regular session of the Council, to seek a solution that would be of benefit to the entire region.

7 SPECIAL CMO ISSUES

7(a) Review of Caribbean Community (CARICOM) Institutions

7.1 Council recalled the matter of the Review of Caribbean Community Institutions (RCCI) as reported to the 64th and 65th Sessions of the Council. As noted previously, at the first Intersessional Meeting of the 61st Council, held virtually on 1 February 2022, Council was informed that the Caribbean Community (CARICOM) would conduct a review of its Community Institutions (CIs) to determine their efficacy and to make them "fit for purpose".

7.2 The Council noted the concerns raised by the CMO Headquarters during its 65th session about the inadequacies of the review process and its strong objections to the recommendations made about the future of the CMO Headquarters.

7.3 Council noted that a written position had been requested of the Members of the Council with the intent of submission to the CARICOM Secretariat, for onward submission to the Community Council of Ministers. It was further noted that Council was requested to provide guidance on the way forward for the Organization given the very consequential recommendations and the impact on the CMO Headquarters Unit, in particular. However, no written response was provided by Members.

7.4 Council further noted that, no further information had been received from the CARICOM Secretariat on the Review of Caribbean Community Institutions since the meeting on 30 August 2023, although queries had been made to the Secretariat on the matter.

7(b) Arrangements for Meteorological Forecast and Warning Services among CMO Member States

7.5 Council was reminded that since the inception of the CMO in 1973, the Council agreed on the responsibilities of the NMHS of the States with Forecast and Warning Offices for those States without such offices. The arrangements have been modified in the intervening years but the fundamental premise of major cooperation and collaboration among all nations, on which the CMO was established, remains. The 50th session of the Council re-formalized the forecast and warning arrangements. The 51st Session of the Council reiterated Resolution 2 of the 50th Session of Council and reconsolidated the interface between its own arrangements and those of the WMO-led Regional Hurricane Operational Plan.

7.6 Council recalled that questions were raised by the Antigua and Barbuda Meteorological Service about the formalities of the process and related costs for the services provided. So, Council agreed to form a committee to review and discuss cost recovery as a part of regional forecasting arrangements and make a recommendation to the Council. The Committee met on 25th February 2022 and elected Guyana and Belize to serve as Co-Chairs. The Committee expressed the view that the Antigua and Barbuda Meteorological Service (ABMS) should be having discussions with the respective Civil Aviation Authority of the four States to whom they provide services, instead of the various Meteorological Services, since the Civil Aviation Authorities are end users. The committee presented the draft recommendations for Council to consider (CMC63, Report)

7.7 The Council was reminded that ICAO requires that all meteorological services providers implement a quality management system (QMS) and that, prior to implementing cost recovery for aeronautical meteorological services, a QMS must be implemented.

7.8 The Council was also reminded that at the 65th Council (November 2023, Port of Spain), Antigua and Barbuda shared a summary of the recommendations following the assessment of ABMS ability to provide aeronautical service to British Overseas Territories in the Caribbean. The assessment followed meetings with the ***UK Met Office***, representing ***Air Safety Support International*** (ASSI), ***Eastern Caribbean Civil Aviation Authority*** (ECCAA) and the CMO Headquarters.

7.9 Council recalled the decision of the 65th Council to form a committee, to be chaired by Saint Lucia, to consider the previous recommendations and deliver a final recommendation with regard to the matter of cost recovery, for aeronautical meteorology, to the regional forecasting arrangements The Coordinating Director provided the chair of the special committee with the background documents and relevant excerpts of CMC reports. The committee had not yet met but was awaiting the outcome of the Antigua and Barbuda engagement with ASSI and CMO.

7.10 Council took note of updates on the matter. Since CMC65, CMO Headquarters participated in three meetings with UK Met Office, ASSI, and ABMS to discuss support to the ABMS for implementing QMS for aviation services, modernizing weather analysis and visualization software, and other human and technical capacity development. The CMO Headquarters' Science and Technology Officer (STO) travelled to Antigua in January 2024 for one of the meetings, while the other meetings (December 2023 and May 2024) were held virtually. CMO Headquarters assisted ABMS in developing a proposal on "*Requirements of the ABMS Regarding Provision of Aeronautical Services to the British Over Seas Territories (BOT) in the Caribbean*", which was presented to ASSI. The proposal was part of the rationale for seeking funding through the UK Foreign, Commonwealth & Development Office (FCDO) to support the ABMS to provide services to Anguilla, the Virgin Islands, and Montserrat.

7.11 Council noted that in November 2024, ASSI informed ABMS and CMO that the FCDO has approved funding for the Antigua and Barbuda Meteorological Service to receive technical and human capacity development for three years. Details of the arrangements are still to be worked out but CMO

Headquarters is expected to assist with some aspect of project management, while ECCAA will be responsible for auditing the service.

7.12 Council recalled the request from Grenada for the CMO Headquarters to make representation to the Government of Grenada for Grenada to join WMO. One impetus for the request is for Grenada to be responsible for its own tropical cyclone forecast and warnings, which are currently provided by Trinidad and Tobago Meteorological Service. It was noted that since Grenada is not a Member of WMO, it cannot have Membership in the WMO RA IV Hurricane Committee, whose Members receive support from WMO for training and travel to the annual meeting of the Hurricane Committee, for example. Grenada is seeking the support of CMO Headquarters to make representation to the Government of Grenada for its Membership in the WMO.

7.13 Council noted that the Coordinating Director completed this action item in May 2024. The parent Ministry for the Grenada Meteorological Service was provided a detailed rationale of the benefits of WMO Membership, all the required documentation, including the prorated annual contribution for Membership and the one-time fee. The up-to-date information was provided after personal consultation with the Member Services Department and External Affairs while at the WMO Secretariat in Geneva.

7.14 **The Council**

(i) **Noted** the status of the response of the Council and the CARICOM Secretariat to the Review of Caribbean Community Institutions.

(ii) **Noted** and **discussed** ongoing activities with regard to the regional forecast and warning arrangements, including capacity development in Antigua and Barbuda Meteorological Service to support its forecast and warning services to British Overseas Territories in the Caribbean

(iii) **Noted** the CMO Headquarters support for the Membership of Grenada with WMO

8 CMO BUDGETS (HEADQUARTERS UNIT, CRN AND RADAR, CIMH)

8(a) CMO HQ - Estimates of Expenditure for 2025

8.1 Budget estimates for the operating costs for the CMO Headquarters Unit and contributions to the Caribbean Rawinsonde and Radar Networks for 2025 were presented to the Council under Agenda Item Doc. 8(a) for consideration.

8.2 The 2025 budget proposed for the CMO HQ did not factor any change in the rates of exchange used in previous years since, in keeping with the decision of Council at CMC55 (Belize, 2015) invoices are now issued in USD, therefore any change in the rate of exchange will have an equal and offsetting effect on both revenue and expenditure in local currency.

8.3 The estimates of expenditure presented for 2025 included the new CARICOM Secretariat salary scales for staff at the J1 – S5 levels and other recommendations based on the recently completed Compensation Survey. The proposed estimate of expenditure for 2025 was projected to be 13.3% higher than 2024 as staff-related cost is the largest, single line item of the operating budget. In an effort to cushion the impact on Member States, a proposal to utilize a portion of the accumulated surpluses from prior years to provide decreasing levels of support to Member States over a three-year period was presented to Council. Under this proposal Member States will be offered 75% support in

the first year, followed by 50% support in the second year, 25% in the third year and no support in the fourth year as they adjust to the increased operating cost.

8.4 **The Council**

(i) **Accepted** the new salary scales provided by the CARICOM Secretariat, as well as the Special Retention Allowance approved, based on the Compensation Survey completed in October 2023 and made effective retroactively to 01 January 2024;

(ii) **Approved** the payment of retroactive salaries and other salary-related costs, estimated at **TTD XXX,XXX.XX, equivalent to USDXX,XXX.XX, in 2024** utilising unbudgeted interest income and any unspent balances for 2024, should these amounts be inadequate to meet the full cost, any shortage may be drawn from past surpluses;

(iii) **Approved** the drawdown of reserves reported as Accumulated Fund in the accounts of the CMO HQ to lend support to Member States over the next three years at decreasing rates as outlined in CMC67 Doc 8(a) paragraph 21. This amount shall not exceed the sum of **TTDX,XXX,XXX.XX**, **equivalent to USDXXX,XXX**, in total for the three-year period 2025 - 2027

(iv) **Approved** the initial budget of **TTD X,XXX,XXX.XX, equivalent to USDXXX,XXX.XX**

(v) **Approved** the first drawdown of **TTDXXX,XXX.XX, equivalent to USDXX,XXX.XX**, in 2025 to adjust the initial budget of TTD X,XXX,XXX.XX, equivalent to USDXXX,XXX.XX for an adjusted budget of **TTD X,XXX,XXX.XX** or the equivalent of **USD XXX,XXX.XX** as detailed in **Annex III** with Member contributions as indicated in **Annex IV.**

(vi) **Urged** Members to give priority to meeting annual contributions on a timelier basis, and to make every effort to liquidate arrears to the Organization on a phased basis;

(vii) **Reminded** Members that when forwarding their contributions to CMO Headquarters by bank transfers, to deposit funds into the account noted on the invoice and to advise the CMO HQ of remittance.

8(b) CIMH - Estimates of Expenditure for 2025

8.3 The Estimates of Expenditure of the CIMH for Fiscal Year 2025 (FY2025) were presented for examination and approval by the Council after a detailed consideration by the Board of Governors (BoG) of the CIMH. The estimates cover the finances required to allow the Institute to effectively fulfill its mandate to the region. Significant reductions to the Institute's Estimates of Expenditure may negatively impact planned and ongoing activities.

8.4 The FY2025 Estimates increased by 5% relative to the Estimates approved for FY2024.

8.5 **The Council**

(i) **Approved** the budget of **BBD X,XXX,XXX.XX** equivalent to **USD X,XXX,XXX.XX** for the CIMH**,** as presented by the Board of Governors with Member contributions as detailed in **Annex III;**

(ii) **Urged** Members to give priority to meeting annual contributions, as well as liquidating any arrears of contribution due to the CIMH;

(i) **Also Urged** Members to inform the CIMH of their transfers of funds, including the amount and date.

9 MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES

9.1 The Caribbean Meteorological Council considered the Report of the Annual Meeting of Directors of Meteorological Services, held on 20 November 2024, presented by Mr. Kenneth Kerr, Science and Technology Officer of the CMO Headquarters. The Report provided the Council with a summary of the deliberations and recommendations of the Directors on a wide range of technical and scientific topics, which would have an impact on future costs, policy decisions, strategic planning, training opportunities and service delivery.

Status of Actions from the Previous Meeting

9.2 There were several action items that warranted reporting within the operational matters section. As a result, only two (2) items were reported on in this section. The Science and Technology Officer, Mr. Kenneth Kerr, reported that the CMO Headquarters hosted the Capacity Building Workshop on Numerical Weather Prediction to Improve Operational Readiness, which was funded by the WMO. The workshop was attended by twenty-three (23) participants from the Caribbean, Costa Rica, CIMH, University of the West Indies-St Augustine, and University of Costa Rica. On the other item, Mr. Kerr informed the meeting that only Guyana and Dominica did not sign the WIS 2.0 agreement with the CMO Headquarters. Both Members were requested to sign the agreement and return it to the CMO Headquarters.

OPERATIONAL MATTERS

Early Warning for All Implementation

9.3 Council was informed that it was reiterated to Directors that the WMO Road Map for "The Early Warnings for All Initiative" should be used to update, align, and accelerate their respective work programmes and action plans to implement early warning services for all country-relevant hazards contained in the priority hazards list and thus advance the EW4All goal. Additionally, they were encouraged to share with the WMO successful examples where their NMHSs have gained visibility and authority within their governments and to promote early warning systems to increase public awareness about the importance of EWS and how to respond to them.

Operational Readiness NWP Capability

9.4 Council was made aware that on the completion of the Caribbean NWP Capacity Development and Operational Readiness Workshop in Support of EW4All, all CMO Member States left the workshop with an NWP PN-tool configured to national circumstances and that Directors were encouraged to provide computing resources to integrate the WRF-based PN Tool in their real-time operational forecasting to strengthen their NMHS operational capacity.

Multi-Hazard Impact-Based Forecasting and Warnings and Common Alert Protocol

9.5 Council was reminded that WMO was supporting multi-hazard impact- and risk-based forecasts and warnings (IBFWS) by providing Members with IBFWS training workshops and expansion of the IBFWS eCourse for priority hazards, as well as support for warning dissemination tools through the implementation of the Common Alert Protocol (CAP). To this end, Council noted the planned in-country CAP implementation workshops scheduled to be held during the first quarter of 2025 in Grenada, Saint Lucia, and Dominica, as a collaboration of the WMO and CMO Headquarters.

Strengthen Marine and Ocean Services

9.6 Council was informed that only five (5) CMO Member States NMHSs provided dedicated marine weather forecasts on a daily basis, with only two (2) attaining the level of competency in terms of information provided. Further, the remaining eleven (11)) provided marine information that was integrated into their public weather forecasts. Furthermore, Grenada had a good template, which satisfied WMO competency. Directors were encouraged to update and/or implement their marine services.

Status of WIGOS Implementation

9.7 Council was informed that while there had been significant gains made in implementing WIGOS and that all 16 Members had NFPs in OSCAR-Surface, WIGOS and WDQMS, while 9 Members had developed National WIGOS Station Identifiers systems, there was still a lack of Members with National WIGOS Implementation Plans.

Regional WIGOS Center Monitoring and Activities

9.8 Council was updated on the data availability and quantity monitoring the CMO-BCT and Trinidad and Tobago Meteorological Services were performing in the distributed Regional WIGOS Center operating in pilot. This effort has improved the availability and quality of observational data off CMO Members WIGOS stations.

Global Basic Observation Network (GBON)

9.9 Council was informed that transitioning to full GBON station-level compliance among CMO Member States NMHSs remained challenging was there was a combination of manual and Automatic Weather Stations (AWS) from which observation data were reporting for GBON. This complicates achieving full GBON compliance for some Members. GBON-declared stations with hourly frequency reporting increased to thirteen (13) but only five (5) were fully complaint, i.e., reporting observations for all 24 hours. The fully compliant Members were Antigua and Barbuda, Barbados, Grenada, Guyana, and Trinidad and Tobago.

WIS 2.0 Operational Phase

9.10 Council was made aware that Directors were reminded that starting **1 January 2025, WIS 2.0 would begin its operational phase**, with full transition expected by 2030. It was also noted that Directors of the NMHSs of Antigua and Barbuda, Jamaica, and Saint Lucia were encouraged to take action to increase the level of hourly data exchange from their observation stations.

9.11 Council was informed that Directors were asked to support the formation of a CMO Operational WIS 2 Node Execution Team (COWNET) consisting of WIS 2.0 trained personnel from Members National Meteorological Service, with Belize and Trinidad and Tobago as co-leads, and with at least five additional participants from Members with national WIS 2.0 Nodes on the CMO WIS 2.0 Node. Further, the role of COWNET will be to manage and troubleshoot issues on the CMO WIS 2.0 Node when they arise, with support from WMO experts. Council was also informed that the Directors did not object to this recommendation. Accordingly, Council was asked to endorse and support this recommendation.

NMS Belize SURFACE Climate Database Management System and WIS 2.0

9.12 The NMS of Belize development of the NMSB Climate Database Management System (CDMS) called System for Unified Real-time Forecasting of Atmospheric and Climatic Events (SURFACE-CDMS) had reached a mature stage with plans for piloting of the CDMS by April 2024 and beta release by November 2025. Council was informed that SURFACE CDMS was innovative work from the region that will automate the exchange of data and satisfy the CDMS needs of CMO Members NMHS. Directors were asked to support the testing of the CDMS and its operational integration at their NMHS for the sustainability of the CDMS. Further, this would require the endorsement of the Council.

Business Continuity Management

9.13 Council was informed that the WMO had provided a document with guidelines to assist NMHSs in maintaining operations during disasters or crises. Directors were encouraged to consider hazardous scenarios in BCM and use the *WMO Business Continuity Management Guidelines for WMO Members* to develop plans to secure continuous operations and operational resilience to disruptive events.

9.14 **The Council**

(i) **Discussed** and **approved** the formation of the CMO Operational WIS 2 Node Execution Team (COWNET) consisting of WIS 2.0 trained personnel from the CMO Member States National Meteorological Services with Belize and Trinidad and Tobago as co-leads, and at least five additional participants from Members with national WIS 2.0 Nodes on the CMO WIS 2.0 Node.

(ii) **Agreed** that the role of COWNET will be to manage and troubleshoot issues on the CMO WIS 2.0 Node when they arise, with support from WMO experts.

(iii) **Endorsed** the decision of Directors to agree to supporting the integration of the Belize National Meteorological Service SURFACE-CDMS within their WIS 2.0 node and using the SURFACE-CDMS operationally for climate data management and operations.

10 CMO WEATHER RADAR NETWORK

10.1 Council recalled that the Caribbean Weather Radar Network consisted of a mixture of 8 radar systems from CMO Member States at varying stages of their life cycle, which are located in Barbados, Belize, the Cayman Islands, Guyana, Jamaica, Saint Lucia, and Trinidad and Tobago. Council also recalled that the CMO Headquarters was the initial implementing entity for five (5) of the radars. Further, the four radars in Belize, the Cayman Islands, and Trinidad and Tobago were aged radars with more than 10 years in operations, whereas the Barbados radar was upgraded in 2022 with dual polarization technology with funding from the Government of Barbados.

10.2 Council noted that improved weather data quality from upgraded systems is vital to several applications and will benefit a number of weather-sensitive economic sectors such as disaster preparedness, agriculture, water, media, marine services and fisheries, construction, aviation, tourism, transportation, and retail.

10.3 The Council was reminded that the weather radars are an important component of modern weather forecasting and warning that must **operate 24 hours a day, 7 days a week, 365 days per year and are not set-and-forget operations**. Rather, they require regular check-ups, and calibration and radar experts are available to provide planned preventative maintenance and unplanned maintenance. The Council was reminded of the operational fragility of aged radars and that operating and maintaining a weather radar is a complex and costly endeavor and one fraught with challenges that can be overwhelming for the Member countries that own and operate them. Therefore, it is

important that there is a shared regional vision aimed at working together to maintain and sustain the radars on the network collectively.

10.4 Council was informed that, after approximately four years of radar outage, the Trinidad and Tobago's weather radar was successfully repaired and returned to operations in July 2024, with a recommissioning of the radar on 6 July 2024. The radar repair process for Trinidad and Tobago was a surmountable challenge with unique learning experiences for all involved. Prolonged radar outage caused the repair work to be needed for major components of the radar, including the antenna control unit, transmitter unit, waveguide, dish motors, gearboxes, and receiver unit. Additionally, there was poor internet at the radar site due to its remoteness, while there was a need to order custom-made parts due to the age of the radar, which in some instances took up to nine months from order to supply. During the radar outage, the Government of Trinidad and Tobago used the period to fully refurbish and strengthen the structure and compound housing the radar.

10.5 On completion of the repair work, Trinidad and Tobago was provided with a set of best practices by the manufacturer, Leonardo, to keep the radar functioning until the upgrade. These comprised having a maintenance contract in place, which includes helpdesk support, preventive maintenance, conducted 1 to 2 times per year, and procurement of spare parts and consumables. The radar in Tobago continues to function without any hardware or software issue and remains up-to-date in terms of manufacturer maintenance schedules and software licenses. However, challenges with irregular voltage at the office building continue to affect the radar.

10.6 Barbados radar is operational and continues to improve the ability of the Barbados Meteorological Service (BMS) to track severe weather events and issue early severe weather warnings. The radar is integrated with the BMS unmanned surface vessels (USV), which roam the ocean's surface, collecting oceanographic and atmospheric data. This enhances the capability of the BMS to monitor and warn of impending severe weather.

10.7 Council was made aware that in order to sustain the radar, the BMS employed a number of best practices, including the technical team of the BMS performing weekly physical checks at the radar site. When physical visits are not possible, the advanced software-based maintenance and control platform that is built into the radar system is used to check on the radar functionality. In addition, bi-annual visits by the technicians from Leonardo and procuring spare parts are budgeted for annually. The BMS plans to upgrade the servers at the radar site during 2025 and to acquire additional spare parts for the radar in an effort to minimize downtime.

10.8 Council was informed that the weather radar in Belize is in working condition but is experiencing some challenges, including the microwave signal generator not being fully functional, the test equipment requiring calibration, an inoperative hand-held antenna control unit, and the absence of essential spares, such as the waveguide dehydrator, which are not currently in the inventory. As best practices to keep the radar functioning, Belize maintains the temperature and humidity in the radar room are at optimal levels, that is, below 25 degrees Celsius and 60%, respectively. It also performed scheduled preventative maintenance servicing and calibration procedures as recommended by the manufacturer.

10.9 Council was provided an update on the Cayman Islands radar, which returned to an operational state in May 2024 following repairs performed by Leonardo technicians after a major radar outage in June 2023. Following the repair work, the Government of the Cayman Islands, on the recommendation of Leonardo, signed a one-year technical support service contract with Leonard. This contract includes two (2) annual preventative maintenance site visits by Leonardo's technicians, one (1) corrective maintenance site visit by Leonardo's technicians, one hundred (100) hours of helpdesk support. It also involves participation in Leonardo's spare parts pool, which puts the Cayman Island on the list of radar operators that will enable it to get ahead of others not in the pool to access spare

parts when needed. Additionally, there are 5 days of hardware and 5 days of software training at the Leonardo factory for the Cayman Island radar technician. Another best practice employed was performing audits of the Cayman Island radar spare parts inventory to determine the status of critical spare components and have them replaced. Importantly, the audit was conducted during the visit of Leonardo's technician to ensure that what was deemed as critical spares were appropriate.

10.10 Since June 2024, Guyana Hydro-meteorological Service (GHMS) has been experiencing radar outage due to mechanical damage to the radar antenna. A Leonardo technician visited in July to start the repair process.

10.11 Jamaica continues to experience weather radar outage as the radar manufacturer failed to restore the radar to an operational state. The Government of Jamaica has initiated steps to repair the radar, utilizing its allocated radar funds in the CMO Radar and Rawinsonde Network funds held by the CMO Headquarters.

10.12 At the start of the 2024 Dry Season, a decision was taken to turn the Saint Lucia radar off as a measure to protect the magnetron. The radar remains offline due to a lack of sufficiently trained staff to turn the system back on.

10.13 The Sint Maarten radar continues to function without any issues with both Barbados and Météo-France Martinique provided with the radar data for use in their radar composite. The best practices used by Sint Maarten to sustain the radar functionality include having a five-year maintenance contract with Vaisala, which includes site visits by the service provider technicians if needed, remote access, and 24-hour support. There is also a three-year spare parts agreement with the company to ensure easy access to spare parts for corrective maintenance.

10.14 Both the Guadeloupe and newly installed Martinique radars are operational. However, there have been challenges with the Martinique radar associated with the network and air conditioning system at the radar site. The best practices used to sustain the radar include preventative maintenance checks every other week, and remote monitoring every morning (except on weekends, but forecasters can call the technician if needed). Every three years in-depth maintenance is performed by a visiting team of experts from France, and there is a maintenance contract with service providers for the air conditioning system and generators.

10.15 Council was asked to recognize the excellent work that the BMS continued to produce with the generation of the Caribbean Radar composite maps every 15 minutes. The radar mosaic has been expanded and includes additional radars from Tobago, St Lucia, St Maarten, and the Dominican Republic. Success of the radar composite led to US NOAA showing an interest in using Caribbean radar composite data in the data assimilation system of one of NOAA's new Numerical Weather Prediction models. Council was informed that through the efforts of the WMO Regional Office and the CMO Headquarters, a meeting was held between the BMS and NOAA, where the feasibility of having the Caribbean composite radar data assimilated into NOAA's NWP model system was discussed. Further, NOAA was invited to deliver a presentation to Members of the CMO Operational Radar Group, which demonstrated improvement in the skill of the weather prediction model with assimilation of radar data from the Cayman Islands. However, in order for NOAA to use the region's radar data in its NWP models, the radar data must be compatible with NOAA's requirement and be in one common

10.16 The Council was provided with an update on the progress made in regard to the CMO Headquarters work with CDB, CREWS Secretariat, Green Climate Fund, and WMO to scale-up Caribbean Hydrometeorological and Multi-Hazard Early Warning Services in Belize and Trinidad and Tobago. A first draft of the GCF Simplified Approval Process Funding Proposal (FP) for the project was uploaded on 13 November 2024 to the GCF Portfolio Performance Management System (PPMS) Platform for GCF review. The major activity of the FP was the upgrade of the Doppler Weather Radar

systems in Belize and Trinidad and Tobago with dual polarization technology. However, there were several other activities spanning the four components and value chain of early warning systems, including the provision of technical support, staff training, remote support, and service level agreement contracts.

10.17 The Council was reminded that wireless devices like local area telecommunication networks and surveillance cameras cause severe interference for weather radars and are a significant contamination source for weather radar data. Further, given the limitation of the available radio frequency spectrum, the frequency band used by weather radars needs to be protected at national levels from frequency encroachment and interference.

10.18 The Council was informed that the CMO Operational Radar Group (CORG), which is co-chaired by Mr Brian Murray of Barbados Meteorological Service and Dr Ashford Reyes of CIMH, met four (4) times during the year and has recommended the following for the Council's consideration, in keeping with its Terms of Reference:

- Agree to the implementation of a common weather radar data format across radars in the CMO network, in line with WMO standards, for use and exchange at national, regional, and international levels.

- Agree that Members with radars should consider and respond to the request from NOAA to share their radar data with NOAA to improve the model output and inform the CORG of their decision.

- Endorse the CORG decision to develop a test/pilot program as a short project to identify the needs to get Members radar data integrated into the NOAA model initialization process.

- Encourage Members with dual-polarization radars to consider, where possible, inviting other Member States NMHSs radar engineers or technicians to attend their calibration session when the Leonardo engineers visit to enable hands-on exposure and training.

- Encourage members with radars to strengthen the lightning suppression and dissipation at their radar sites as a priority, given the impact that lightning has had on the radars on the network and given the recommendations in the radar technical study report by Dr. Jeffrey Keeler, World Bank Radar Consultant.

- Encourage Members NMHSs to involve themselves in national radio frequency matters and work closely with national radio authorities in the interest of radio frequency protection for meteorological weather radars.

10.19 **The Council**:

(i) **Noted** the contribution of the radars in the CMO network, the fragile nature of aged radar systems, their status, and the challenges faced by CMO Member States operating radars.

(ii) **Urged** CMO Members with radars to implement best practices for sustainable radar operations and to engage in regular radar preventative and corrective radar maintenance programmes, and human resource capacity development in radar capability.

(iii) **Supported** the CMO Headquarters in advancing its project to upgrade the radars in Belize and Trinidad and Tobago to dual polarization status through the Green Climate Fund-CREWS Scaling-up Framework.

(iv) **Encouraged** Members with radars to strengthen the lightning suppression and dissipation at their radar sites as a priority.

(v) **Further encouraged** Members to get their NMHSs involved in national radio frequency matters and to work closely with national radio authorities in the interest of radio frequency protection for meteorological weather radars**.**

(vi) **Noted**, and **urged** Members with radars to **act on** the recommendations of the CORG to improve management of radars; data transmission, archiving and retrieval; sharing of core radar products for public safety; and secure the digital assets and the physical radar site.

(vii) **Requested** the re-establishment of Memoranda of Understanding for the Weather Radar Network Warning System in the Caribbean Region with the Members operating radars and the CMO Headquarters, to ensure sustainability of the network.

(viii) **Agreed** with the CORG to the implementation of a common weather radar data representation across radars on the network, in line with WMO standards.

(ix) **Further agreed** that Members should consider and respond to the request from NOAA to share their radar data with NOAA to improve the model

11 OTHER PROJECT UPDATES AND PROPOSALS

11.1. The Council recalled receiving previous updates on project activities related to non-tropical cyclone severe weather forecasting, the adaptation of model meteorological legislation and strategic planning, implementation of the Common Alerting protocol (CAP), lightning safety and awareness, and Quality Management System (QMS) compliance baseline assessment at the Sixty-Fifth and Sixty-Sixth Sessions of the CMC in November 2023 and August 2024, respectively. The Council was reminded that at the 65th Session in Port of Spain, Trinidad it urged Members to enact the model legislation developed prepared under the initial Climate Risk and Early Warning Systems (CREWS Caribbean Project, to continue developing and reviewing strategic plans and frameworks for weather, water, and climate services, and to sustain the Severe Weather Forecasting Programme (SWFP) for the Eastern Caribbean.

11.2. The Council also reflected on progress updates received at the virtual 66th Session, on the CREWS Caribbean Project Phase 2 (CREWS Caribbean 2.0), noting preliminary discussions with regional and international partners and the drafting of an Implementing Arrangement with WMO. T

11.3. The Council also noted progress in developing the Green Climate Fund (GCF) Simplified Approval Process (SAP) CREWS Scaling Up Project through the onboarding of a consultant to develop the Funding Proposal. Council further noted attempts to resolve the findings of a QMS baseline assessment and other activities supported by the CMO HQ, such as the SERVIR Amazonia and Smart Seas Projects, the Community Hydrological Observers Programme, and public engagements through the Project Development Officer (PDO) were also reviewed. The Council then received the following updates on the current status and ongoing progress of projects and activities being delivered by CMO HQ on behalf of Member States.

11(a) Climate Risk and Early Warning Systems (CREWS) Caribbean Project Phase 2 (CREWS Caribbean 2.0): Strengthening Hydro-Meteorological and Early Warning Services in the Caribbean

11.4. The Council recalled that *CREWS Caribbean 2.0* focuses on achieving the UN-mandated '*Early Warnings for All* (EW4ALL)' Initiative, which extends to March 2027, with an approved budget

of US$7 million allocated to the Caribbean region to strengthen Multi-Hazard Early Warning Systems (MHEWS) governance, improve disaster risk knowledge, strengthen National Meteorological and Hydrometeorological Services (NMHSs) and National Disaster Risk Management Offices (NDRMOs) capacities, support warning dissemination and communication, and develop inclusive and gender-responsive approaches in the development of Early Warning Systems (EWSs).

11.5. The Council was pleased to note that the CMO HQ received a favourable independent legal assessment of the draft Implementing Arrangement (IA) with the WMO, with recommendations that were resolved in consultation with the WMO. The Chair of the CMC delegated authority to the Coordinating Director, Dr. Arlene Laing, to implement the project activities on behalf of the CMO. The final IA, budgeted at **US$583,150** was signed on 11 November 2024.

11.6. The Council was informed that the IA being implemented by the CMO HQ will support Member States and NMHSs through:

- Development or adjustment of Standard Operating Procedures (SOPs) between NMHSs and NDRMOs;
- Development of National Strategic Plans and Frameworks for Weather, Water, and Climate Services;
- Regional and National Severe Weather Forecasting workshops;
- Familiarization missions for operational forecasters on a limited basis;
- Development of capacities for lightning detection and awareness building;
- Capacity-development in the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) 2.0;
- Regional and National workshops to strengthen collaboration and mutual understanding among NMHSs, NDRMOs, and the Media; and
- National Common Alerting Protocol (CAP) implementation workshops.

11(b) Green Climate Fund (GCF) Simplified Approval Process (SAP) for Climate Risk Early Warning Systems (CREWS) Scaling up Hydrometeorological and Multi-hazard Early Warning Systems in Belize and Trinidad and Tobago Project

11.7. The Council recalled that the CMO HQ has been collaborating with the ***Caribbean Development Bank*** (CDB) to upgrade Doppler Weather Radars in Belize and Trinidad and Tobago, and to strengthen regional Multi-Hazard Early Warning Systems (MHEWS). This initiative is supported through grant funding from the ***Green Climate Fund*** (GCF**) Simplified Approval Process** (SAP) and the Scaling Up Framework of the CREWS Initiative, which facilitates access to a maximum of US$25 million for Early Warning Systems. The Council noted that the CMO Headquarters' successful completion of prior CREWS projects qualified the organization for this funding mechanism.

11.8. The Council was informed that a "Write-Shop" was hosted in Port of Spain in January 2024 to develop the project concept note, which has since been advanced into a draft **GCF Funding Proposal (FP)**. A consultant was engaged to lead the development of the FP, with two rounds of consultations conducted with stakeholders from Belize and Trinidad and Tobago. These consultations included broader discussions in September 2024 and focused engagements with National Meteorological and Hydrological Services (NMHSs), National Disaster Risk Management Offices (NDRMOs), and Nationally Designated Authorities (NDAs) in October 2024.

11.9. Council noted that the draft FP was submitted to the GCF and the NDAs of Belize and Trinidad and Tobago on 13 November 2024 for the Climate Investment Committee (CIC2) endorsement. It is now under review, with feedback expected from the GCF, the CREWS Initiative, and its Implementing Partners – WMO and UNDRR. Non-Objection Letters (NOLs) from the NDAs of both countries are also required to facilitate the final submission, which is anticipated by January 2025.

11.10. The Council noted that the project aims to leverage **US$24.93 million** in grant funding to deliver 13 outputs and execute 42 activities. While Belize and Trinidad and Tobago are the primary beneficiaries, the broader Caribbean region will benefit from reduced disaster risks and increased climate adaptation. The project targets the following outcomes and co-benefits:

(i) Outcome 1: Strengthened MHEWS governance at national levels.

(ii) Outcome 2: Improved disaster risk knowledge at regional, national, and community levels.
    i. Co-benefit 1: Increased access to education.

(iii) Outcome 3: Enhanced NMHS capabilities in detection, monitoring, forecasting, and warning of hazards.

(iv) Outcome 4: Strengthened early warning communication, preparedness, and response capacities.
    i. Co-benefit 2: Greater gender equality.

11.11. The Council noted the direct benefits to CMO Member State NMHSs, including:
(i) Institutionalization of Impact-based Forecasting and MHEWS;
(ii) Implementation of high-resolution Numerical Weather Prediction Models;
(iii) Upgrading of Doppler Weather Radar Systems;
(iv) Modernization of ICT systems for forecasting, early warning, and alerting;
(v) Implementation of Quality Management Systems (QMS);
(vi) Strengthening of communication systems; and
(vii) Capacity-building for NMHS staff in MHEWS, observations, analysis, and forecasting.

11(c) Quality Management System (QMS) Implementation

11.12. The Council recalled discussions from *CMC63* (Grand Cayman, November 2022) regarding the ***International Civil Aviation Organization*** **(ICAO)** requirements for all meteorological service providers to implement a **Quality Management System (QMS),** which supports the pursuit of cost recovery for services to international air navigation. In response, the Council instructed the CMO HQ to undertake a programme of actions, including baseline assessments of Member States' QMS status, with the goal of establishing a regional project to facilitate QMS certification. The Council was subsequently updated on the baseline assessment survey results at CMC65 and on efforts to develop a grant-funded project at CMC66.

11.13. The Council was informed that since then, the CMO HQ has refined earlier concepts and prepared a draft concept note to enhance regional and Member State NMHS capacities for implementing and sustaining effective QMS. The CMO HQ plans to pursue grant funding opportunities through the WMO Education and Training Office to execute the activities outlined in **Annex V**, which include:
(i) Leadership training for NMHS/QMS leaders to implement and document ISO 9001:2025-compliant QMS;
(ii) Auditor certification training for NMHS personnel to become QMS Lead Auditors;
(iii) Assessment of existing QMS documentation used by NMHSs and the development of model QMS documentation; and
(iv) Hosting a regional workshop to adapt model QMS documentation to national contexts.

11(d) Lightning Detection System and Lightning Safety Awareness

11.14. The Council recalled that during its 59th Session (Anguilla, 2019), it approved the CMO HQ's initiation of a project to develop a CMO Lightning Detection Network, and noted with satisfaction that

ground-based lightning detection will be established as part of the **CREWS Caribbean 2.0** project through the WMO-CMO IA.

11(e) The International Relations of Tropical Storms in the Caribbean

11.15. The Council was informed of a project titled '*The International Relations of Tropical Storms in the Caribbean'*, a collaboration between King's College London (KCL) and the University of the West Indies (UWI), funded by the UK Economic and Social Research Council. The project will examine barriers to international cooperation on hurricanes and tropical storms in the Caribbean, explore the impacts of climate change and global dynamics on meteorological collaboration, and investigate historical factors contributing to regional vulnerabilities.

11.16. The Council noted that archival research will be conducted at institutions such as the WMO, CMO HQ, CIMH, CARICOM, and the West Indies Federation archives. The project will also analyze how expert practices, institutional processes, and international relations influence cooperation on tropical storms, through interviews with approximately 90 individuals from organizations involved in prediction, early warning, disaster response, and resilience-building. Researchers will map networks of expertise from the Caribbean Meteorological Council and WMO, identify challenges to international cooperation, and highlight best practices and strategies to improve collaboration.

11.17. The Council welcomed the participation of the Coordinating Director on the project's advisory board, which includes experts such as Professor Frans Berkhout (KCL), Professor Michael Taylor (UWI-Mona), and Professor Amanda Lynch (WMO). The project is led by Dr. Nicholas Michelsen (KCL) and co-led by Dr. Suzette Haughton (UWI).

11(f) Advancing Alternative Energy Education within the Ministry of Education CSEC and CAPE Science and Mathematics Syllabi

11.18. The Council was informed that the CMO HQ received a request from the Faculty of Science and Technology (FST) at The University of the West Indies, St. Augustine, to partner on a project to promote alternative energy education in the CSEC and CAPE Science and Mathematics curricula. The project aims to raise awareness about alternative energy and align with the goals of these syllabi. The FST has also invited the Ministry of Education and the Trinidad and Tobago Meteorological Service to join the effort.

11.19. The Council learnt that the project will engage secondary school students in activities like measuring, analysing, and reporting meteorological data that supports climate resilience and alternative energy, in alignment with the WMO's goal to improve meteorological data systems. The FST plans to apply for funding from the Trinidad and Tobago Green Fund to install automatic weather stations (AWS) in schools across the country. The project includes training teachers and students on using and maintaining the AWS, with data available for school projects, with the intent of integrating alternative energy education into the school curriculum and building climate resilience knowledge.

11.20. **The Council:**

(i) **Noted** updates on the development of projects and activities to strengthen NMHS operational and management capacity, early warning systems, and consequently, climate adaptation and sustainable development in Member States.

(ii) **Noted** the CMO Headquarters' invitation to partner with the Faculty of Science and Technology (FST), UWI St Augustine on a project, Advancing Alternative Energy Education within the Ministry of Education CSEC and CAPE Science and Mathematics Syllabi in Trinidad and Tobago.

(iii) **Supported** the CMO Headquarters Unit in the implementation of activities under the CREWS Caribbean Project Phase 2.

(iv) **Supported** the CMO Headquarters Unit pursuit of grant funding to support Member States' implementation of Quality Management Systems for their National Meteorological and Hydrometeorological Services.

(v) **Endorsed** the CMO Headquarters Unit's efforts to develop and implement the GCF-SAP-CREWS Scaling Up Project, including the upgrades to Doppler Weather Radars, and the strengthening of MHEWS in Belize and Trinidad and Tobago.

(vi) **Encouraged** the cooperation of Members with the study on the international relations of tropical cyclones in the Caribbean to be conducted by the University of the West Indies and Kings College of London.

12 STRATEGIC AND OPERATIONAL PLANNING

The Council noted the activities accomplished in support of the current Strategic Plan of the CMO Headquarters and the draft strategic planning document initiated by CMO Headquarters for its next strategic period.

12.1 The **Council**:

(i) **Noted** the progress being made on the strategic planning by the CMO Headquarters and CIMH

(ii) **Requested** the CMO Headquarters Unit and CIMH to accelerate the completion of the CMO Strategic Plan.

(iii) **Noted** that the Strategic Plan should include succession planning and be delivered to the Council no later than 31 December 2024.

13 OTHER MATTERS

13(a) Human Resources (HR) Committee

13.1 Two new members, Saint Lucia and the Virgin Islands, were selected to serve on the HR Committee, alongside the Chair of the HR Committee, which is the Chair of the Board of Governors of the CIMH.

13.2 **The Council**

(i) **Noted** the new members of HR Committee, Saint Lucia and The Virgin Islands.

13(b) HR Salary Matter: CMC63, Item 12 (a)

13.3 **The Council**

(i) **Noted** the outstanding HR matter from CMC63, Item 12 (a).

(ii) **Noted** that the decision of the 63rd Council on CMC63 Item 12(a) should be conveyed to the relevant party by the Chair of the Council.

13(c) CMO Contribution Formula

13.4 At 65th Council, Antigua and Barbuda had requested a review of the CMO Contribution Formula at the next meeting of the Council. The matter has been tabled for the next annual session of the Council.

13.5 **The Council**

(i) **Noted** the request from Antigua and Barbuda for a review of the CMO Contribution Formula to be delivered at the earliest meeting of the Council.

13(d) Any other business

13.6 **The Council**

(i) **Decided** to approve the Draft CMC67 report, after reviewing the report as an in-session document.

14 DATE AND VENUE OF THE CMC ANNUAL SESSION IN 2025

14.1 Council invited Member States to indicate their willingness to host the next sessions of the CMC. Members that have not hosted in recent times were invited to seek authorization to host, and to extend an invitation to the Council for the meetings in 2025.

Delegates from Guyana, Saint Lucia, and Jamaica have offered to consult with their governments.

14.2 **The Council**

(i) **Accepted** the generous offer of the delegates from Guyana, Saint Lucia, and Jamaica to consult with their respective Governments, regarding hosting the Annual CMC and related meetings in 2025.

Close of Meeting

14.3 There being no other business, the Meeting ended at **_15:00_ pm AST** with an exchange of courtesies.

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15 **P R O V I S I O N A L A G E N D A**

1. OPENING OF SESSION AND ELECTION OF CHAIRMAN

2. ADOPTION OF AGENDA AND PROCEDURAL MATTERS

3. CMO EXECUTIVE REPORTS

   (a) Coordinating Director's Report
   (b) CIMH Principal's Report
   (c) CIMH Board of Governors' Report

4. STATUS OF ACTIONS FROM PREVIOUS SESSION

5. SPECIAL WMO ISSUES

   (a) Outcomes/Highlights of the 78th Session of the World Meteorological Organization (WMO) Executive Council (EC)
   (b) Issues emerging from meetings of the WMO Technical Commissions and Research Board in 2024
   (c) UN Early Warnings for All
   (d) WMO Integrated Global Observing System, Global Basic Observation Network and Systematic Observation Finance Facility (SOFF)
   (e) The Global Framework for Climate Services (GFCS) and other Services
   (f) Disaster Risk Reduction and Regional Severe Weather Forecasts and Warning Systems
      - Tropical Cyclone Programme
      - Severe Weather Forecasting Programme

6. FINANCIAL REPORTS

   (a) Status of Refundable Balances
   (b) CMO HQ - Auditor's Report
   (c) Statement of Contributions and Arrears (CMO HQ & CIMH)
   (d) Proposed Consequences for Members in Arrears
   (e) Report on Status and Activities of Ad-hoc Finance Committee

7. SPECIAL CMO ISSUES

   (a) Review of Caribbean Community (CARICOM) Institutions

(b) Arrangements for Meteorological Forecast and Warning Services among CMO Member States

(c) CMO Headquarters Succession Planning

8. CMO BUDGETS (Headquarters Unit, CRN and Radar, CIMH)

(a) CMOHQ Budget Estimates for 2025

(b) CIMH Budget Estimates for 2025

9. REPORT OF ANNUAL MEETING OF THE DIRECTORS OF METEOROLOGICAL SERVICES

10. CMO WEATHER RADAR NETWORK

11. OTHER PROJECT UPDATES AND PROPOSALS

(a) Climate Risk and Early Warning Systems (CREWS)

(b) Severe Weather Forecasting Programme (SWFP)

(c) Green Climate Fund (GCF)/CREWS Scaling Framework

(d) Lightning Detection and Safety Awareness

(e) The International Relations of Tropical Cyclones

12. CMO HEADQUARTERS STRATEGIC AND OPERATIONAL PLANNING

13. OTHER MATTERS

14. DATE AND VENUE OF FUTURE CMC SESSIONS

67TH ANNUAL MEETING OF THE CARIBBEAN METEOROLOGICAL COUNCIL
21-22 NOVEMBER 2024

CMC67
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HEADQUARTERS UNIT ESTIMATES 2025

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REGIONAL CONTRIBUTION TO CMO HEADQUARTERS AND CIMH BUDGETS - 2025

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QUALITY MANAGEMENT SYSTEMS (QMS) IMPLEMENTATION PROPOSED CAPACITY DEVELOPMENT ACTIVITIES – LOGFRAME/THEORY OF CHANGE

Impact: Enhanced regional transportation safety, disaster preparedness, economic resilience, and fulfilment of international obligations	
Outcomes: 1. Increased regional capacity in quality management systems (QMS) for meteorological and hydrometeorological services leading to improved transportation safety and disaster preparedness. 2. Improved compliance with international conventions, customer requirements, standards, and recommended practices, towards economic resilience. 3. Strengthened regional coordination for QMS implementation, ensuring long-term sustainability.	
Outputs: 1. NMHS and QMS leadership with increased QMS implementation knowledge and skills 2. Regional pool of internationally accredited certified QMS Lead Auditors 3. Summary report on current operational and support processes documentation, with action plan for regional harmonization 4. Model QMS and QMS documentation 5. QMS documentation tailored to national/operational circumstances of NMHSs 6. Regional QMS Audit Strategy and Plan	
Barriers: 1. Limited human resources available to focus on QMS in NMHSs and Regional Institutions 2. Lack of available financial resources to allocate to QMS implementation 3. NMHS personnel do not possess practical skills in quality control and assurance for meteorology	
Risks: 1. Inability of NMHSs to conduct cost-recovery activities for meteorological services provided to international air navigation 2. Travel blacklisting of countries by airlines over failure to comply with ICAO safety and quality management requirements 3. Economic losses by Caribbean countries due to decreases in tourist arrivals and loss of Air Navigation Services and Ground Handling Fees by airports 4. Continued non-compliance with ICAO Standards and Recommended Practices and WMO Technical Regulations 5. Uncertain or poor-quality meteorological observations being exchanged internationally and assimilated by global and regional numerical weather prediction models 6. Reduced accuracy and reliability of numerical weather predictions and weather forecasts by NMHSs 7. Reductions in investments into NMHSs by Governments 8. Erosion of trust in NMHSs by the public and key sectors 9. Decreased preparedness by exposed communities and increased disaster-related losses.	
Activities: 1. Capacity development training for NMHS/QMS leaders in implementing and documenting an ISO 9001:2015 QMS 2. Certified Quality Management Systems Lead Auditor training 3. Evaluation of current QMS documentation systems and practices in the Caribbean 4. Development of model QMS and QMS documentation 5. Workshop to tailor model QMS and QMS documentation to national/operational circumstances, and to develop a regional QMS audit strategy and plan	
Implementation Period:	Three (3) years

The project is designed to enhance regional transportation safety, disaster preparedness, economic resilience, and compliance with international obligations by strengthening QMS across Caribbean NMHSs. This will be accomplished by increasing NMHS leadership's knowledge and skills in QMS implementation, establishing a regional pool of certified QMS Lead Auditors, and developing tailored QMS documentation for regional harmonization. These outputs will directly support the project's outcomes of increasing regional capacity for QMS, improving compliance with international conventions and standards, and strengthening coordination for the long-term sustainability of QMS efforts. Additionally, better compliance with international standards will foster economic resilience as NMHSs will better meet customer and regulatory requirements, enhancing their ability to support critical economic sectors like aviation and tourism and keep Caribbean Small Island and Coastal Developing States on the sustainable development pathway through better support for disaster preparedness.

The project's activities are designed to mitigate key barriers and risks identified by NMHSs. To address limited human resources and practical QMS skills in NMHSs, the project offers targeted capacity development through ISO 9001:2015 QMS training, workshops, and certified QMS Lead Auditor programs. These activities will equip NMHS personnel with the skills necessary for effective QMS implementation and foster a pool of certified auditors who can maintain and verify QMS compliance across the region.

Financial constraints on QMS implementation are addressed through regional collaboration and resource sharing, as organized in the Regional QMS Audit Strategy and Plan, which reduces the individual financial burden on NMHSs. This collective approach strengthens regional coordination, ensuring that QMS efforts are sustainable and scalable. The development of tailored QMS documentation and a regional QMS audit strategy further ensures that implementation can be adapted to national circumstances, reducing development costs and leveraging economies of scale.

The project also mitigates risks associated with non-compliance with ICAO standards, which could lead to travel blacklisting and economic losses by vulnerable Caribbean economies. By improving QMS implementation, NMHSs will increase the quality of weather and climate service delivery, which is critical for international civil aviation and disaster preparedness, but also mitigates the erosion of public trust and ensures continued government investment.

Subject to change/updates