REPORT
OF THE
SIXTIETH MEETING
OF THE
CARIBBEAN
METEOROLOGICAL
COUNCIL

❖❖❖❖❖

CHAIRPERSON:

Dr The Honourable Prime Minister
Ralph Gonsalves,
Minister of Foreign Affairs, National Security, Legal Affairs, and Information,
St Vincent and the Grenadines

VENUE AND DATE:

VIRTUAL PLATFORM
19-20 NOVEMBER 2020

1 OPENING OF THE SESSION AND ELECTION OF CHAIRPERSON

1.1. The Sixtieth Session of the Caribbean Meteorological Council was held on a Virtual Platform and hosted by the Government of St Vincent and the Grenadines on 19-20 November 2020. The milestone session was celebrated with the theme of "*Better Services for Societal Needs*". The Caribbean Meteorological Council is the governing and policy-making body of the Caribbean Meteorological Organization (CMO).

1.2. ***Mr Sehon Marshall*****,** Press Secretary, Office of the Prime Minister of **St Vincent and the Grenadines**, commenced the Opening Session of the Meeting by extending words of welcome after the Invocation and the playing of the National Anthem.

1.3. ***Dr Arlene Laing***, Coordinating Director of the CMO, thanked the Government of St Vincent and Grenadines for hosting and welcome all participants to the milestone 60th Council Session. Dr Laing then began outlining the history of the Caribbean Meteorological Organization. She introduced Special Guest, Retired Professor ***Dr John Lee***, who was one of the first trained forecasters in the British Caribbean. Dr Lee gave a brief reflection of the history of meteorological services in the Anglophone Caribbean from the 1940s to the early 60s, including the formation of the Caribbean Meteorological Council, the Caribbean Meteorological Service, and idea for the Caribbean Meteorological Institute. After Dr Lee's remarks, Dr Laing then presented more of the history leading to the establishment of the Caribbean Meteorological Organization. She then noted the Caribbean Meteorological Organization's fostering of scientific and technical cooperation among the Member States and its helping to develop resilience to extreme weather and climate. She also highlighted the National Meteorological and Hydrometeorological Services (NMHSs) of CMO Member States as a vital service to each country, whose primary mission was to save lives, livelihoods, and property but they also add value to the economies of the region and help the public and private sectors to make better decisions. She illustrated the weather, climate, and water prediction value chain and the role of Caribbean hydro-meteorological institutions, including the NMHSs and CIMH, at different prediction scales and their benefit to societal decisions. She ended her presentation with a montage of societal needs fulfilled by the CMO.

1.4. ***Prof Gerhard Adrian,*** President of the World Meteorological Organization addressed the Council, congratulating the Organization for reaching a significant milestone. He spoke of the global community cooperating to share essential data for the benefit for all nations and of the WMO's efforts to ensure a continuation of that tradition. He cited Dr Laing's presentation on the Caribbean perspective at the WMO Data Conference, which had more than seven hundred participants.

1.5. ***Prof Petteri Taalas***, WMO Secretary-General, congratulated the Council on its 60th Session and reminded the audience of his involvement in Finland's capacity development in the Caribbean. He gave a keynote presentation that began with a look at climate change and the prospect of more major hurricanes in a warmer climate. He also noted rising seas and their impact on small island developing states. He showed a map of major disasters from 1980 to 2018, and the uneven economic impact of i current global warming, with the Caribbean projected to experience a negative impact on its GDP and reduced food security. He also made a plea for Caribbean nations to improve their reporting of surface observations as WMO analysis showed many stations in the Caribbean not reporting over a sample six-hour period. He then outlined WMO's support for Region Association IV (North America, Central America, and the Caribbean), including current projects totaling 29.8M Swiss Francs (CHF). He cited capacity development related to the Hurricane Committee, Regional Climate Outlook Forums, support to draft a roadmap for operational hydrology in RA IV, survey of research priorities coordinated with Dr Laing, a member of the WMO Research Board. He also noted interactions with the Caribbean ocean community and with technical counterparts of the Food and Agriculture Organization (FAO) and Economic Commission for Latin America and the Caribbean

(ECLAC) relating to climate action on agriculture. He ended by noting that WMO's Long-term Goals 1 and 4 are supportive of CMO Member States.

1.6. The feature address was delivered by ***Dr the Honourable Prime Minister Ralph Gonsalves***, Minister of Foreign Affairs, National Security, Legal Affairs, and Information, of **St Vincent and the Grenadines**. In welcoming delegates to the 60th Session of the Caribbean Meteorological Council (CMC), Prime Minister Gonsalves expressed how pleased he was to host the Session. He then spoke of the critical role of weather, climate, and water information to the socio-economic development of the Caribbean, the impacts of climate change and adaptation needed to address those impacts. He remarked on the value of information provided by the National Meteorological Services about extreme weather events, especially for warnings on hurricanes and floods. He expressed his welcome to the WMO and his gratitude for the words expressed by the President and Secretary General of WMO and noted the important work of the WMO and the CMO. He described the enormously valuable weather and climate information provided to regional governments, to help them to prepare for extreme weather events and climate change. He emphasized the need for that value to be reflected in the national budgets.

1.7. After the feature address, ***Mr Billy Jeffers***, Manager of Meteorological Services, St Vincent and the Grenadines, delivered the Vote of Thanks to all speakers, the Honourable Prime Minister for chairing the session, the President and Secretary-General of the WMO, Special guest, Dr John Lee. He also expressed his gratitude to the organizers, in particular Mrs Andrea Best, the Office of the Prime Minister, the staff of the Ministry of Foreign Affairs, National Security, Legal Affairs, and Information, and the Organs of the CMO, and the Master of Ceremonies, Mr Marshall. He ended by thanking the Secretary-General of CARICOM, Honourable Ministers, special invited guests, and all participants for joining the opening of the 60th Council.

1.8. The Meeting elected ***Dr The Honourable Prime Minister Ralph Gonsalves*****,** Minister of Foreign Affairs, National Security, Legal Affairs, and Information, of **St Vincent and the Grenadines** as the Chair of the Caribbean Meteorological Council for its 60th session and the intercessional period until the next annual meeting of the Council. With the Minister having other obligations, the remainder of the Session was chaired by Permanent Secretary, ***Mr Hudson Nedd*****.**

2 ADOPTION OF AGENDA AND PROCEDURAL MATTERS

2.1. The 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 reported on the activities and issues concerning the CMO Headquarters Unit since the previous session of the Council. The Council first engaged in a brief review of the impacts of weather in the region, noting, in particular, the record-breaking number of hurricanes and tropical storms formed in 2020. especially two major hurricanes in the Western Caribbean in less than two weeks. Council was informed of the Coordinating Director acting as a liaison with a number of international organizations on behalf of Member States, to aid in hurricane preparedness. Specifically, liaising with NOAA/NWS International Training Desk to convey outlooks for heavy rainfall and organizing a tutorial on the experimental High-Resolution Rapid refresh (HRRR) Caribbean weather model guidance from the NOAA Earth System Research Laboratory.

3.2. The Council noted the historic concentrations of Saharan dust that blanketed the region in late June to early July 2020. The prolonged period of Saharan dust outbreaks in late June 2020 were among the highest concentrations observed in some 50 years. The outbreaks brought poor air quality, respiratory problems, reduced visibility, and contaminated rainwater to the entire Caribbean, parts of Central America, and the southern United States.

3.3. Additionally, Council noted and considered the implications of an increasing trend of record-breaking extreme heat in the Caribbean in recent years, as reported in the *State of Caribbean Climate*[1]*,* in climate analysis for 2020 by the WMO Regional Climate Centre and reported in the Meeting of the Directors of National Meteorological Services of CMO Member States on 18 November 2020. The Coordinating Director noted that Caribbean islands, for whom extreme heat is an unfamiliar type of hazard, will need to consider measures to protect public health, among other necessary adaptation.

3.4. Council approved of the efforts made by the Headquarters Unit to manage the effects of Coronavirus 2019 (COVID-19) pandemic on the functionality of the Headquarters Unit, National Meteorological and Hydrometeorological Services (NMHS), CARICOM Regional Response, and organization of CMO Meetings. Specifically, Council noted the Continuity of Operations established to enable the work of the Headquarters to continue while the staff worked remotely and the health protocols established to ensure the health and safety of the staff when the offices reopened in June.

3.5. Council noted that the Coordinating Director (CD) sought the assistance of the WMO Secretariat and the Services Commission for guidelines to support NMHS of our Member States, particularly for aeronautical meteorological services. The issues raised served as an impetus for the WMO personnel to meet with their equivalents on the International Civil Aviation Organization (ICAO) Meteorology Panel to develop specific guidelines. Further, CMO Member States were encouraged to respond to a WMO survey on the impacts of the pandemic on their operations and follow-up surveys in recent months.

3.6. Council also took note of the Coordinating Director contribution to the CARICOM *Regional Protocol for the Management of COVID-19, a* guidance document provided to the CARICOM Secretariat and Heads of Governments by the Regional Institutions and led by CDEMA. Specifically, the CD contributed to the sections on (i) *Disaster Risk Management and Climate Change*, (ii) *Transport*, and (iii) *Water*. The CD also provided information on the impact of Severe Cyclone Harold on Fiji in the South Pacific, which was the first region to face multiple impacts of a tropical cyclone during the COVID-19 pandemic.

3.7. Council was informed that in early July, the CMO Headquarter begun contingency planning with the Caribbean Institute for Meteorology and Hydrology (CIMH) to hold Virtual Meetings of the 60th CMC Session, 57th Meeting of the Board of Governors of CIMH, and 2020 Meeting of the Directors of National Meteorological Services.

[1] Climate Studies Group, Mona. 2020. State of the Caribbean Climate (Full Report). Produced for the Caribbean Development Bank. (In press)

3.8. Council noted that the CMO Headquarters, through an agreement with the WMO, is supporting National Meteorological and Hydrometeorological Services in developing comprehensive legislation for their operations; to clearly define their roles and responsibilities; the extent of their authority; their organizational structure and funding mechanisms. The Organization of Eastern Caribbean States (OECS) has been providing assistance with evaluation of the consultant candidates and review oversight of the project deliverables. The development of meteorological legislation was supported by the WMO *Climate Risk and Early Warning Systems (CREWS) Caribbean* project for the period 2020-2021.

3.9. Council noted the CMO Headquarters support for strengthening the capacity at the national level, the CMO Headquarters by collaborating with the WMO CREWS Caribbean Project to help CMO Member States to develop Strategic Plans, National Frameworks for Weather, Water, and Climate Services, and complementary Action Plans for their National Meteorological Services.

3.10. The Council discussed the CMO Headquarters attendance at the *WMO Executive Council 72nd Session* (EC-72), which was held on 28 September to 2 October 2020, on a virtual platform, and the implications of the decisions of the EC-72 for CMO Member States, including the implementation of the WMO Integrated Global Observing System (WIGOS) and the Global Basic Observation Network (GBON). Council was reminded of the *Country Support Initiative*, whereby WMO would support NMHSs in accessing development and climate financing.

3.11. Council recalled that the 18th WMO Congress held in June 2019, approved a new strategic plan and a major governance reform of the WMO. At the end of a two-year transition period an Extraordinary Session of the WMO Congress was scheduled for May to June 2021. WMO Members were encouraged to nominate experts to serve on the Technical Commissions, which were comprised of Standing Committees and Study Groups.

3.12. Council noted that the Coordinating Director, the WMO RA IV representative on the Research Board was leading the Concept Note on research "*Innovation in Regions*". Through a survey developed by the Coordinating Director, CMO Member States provided input on innovations in applied research in NMHSs, successful research partnerships, and the priority areas of focus for the WMO Research Board.

3.13. Council was reminded of the many activities of the CMO Headquarters and CIMH that are aimed at regional implementation of global programmes and initiatives, particularly those initiated by the WMO as they relate to the Caribbean region in general and CMO Member States in particular. Among these continues to be support for WMO regional activities related to the *WMO Integrated Global Observing System* (WIGOS). The CMO Science and Technology Officer continued to lead the Regional Task Team for the regional implementation of WIGOS. The CMO Headquarters, CIMH, and some of the National Meteorological Services have been working with the WMO Secretariat to advance the implementation of WIGOS. The CMO Headquarters and the Trinidad and Tobago Meteorological Services were working with colleagues in Canada and the United States of America (USA) on the development of a Regional WIGOS Centre for WMO RA IV. Further WIGOS activities was discussed under Agenda item 5.

3.14. Council noted the potential negative effects of new International Mobile Telecommunications technology on weather observations and forecasts, and the efforts of the CMO Headquarters to mitigated those impacts, following the resolution from the WMO Congress expressing its "serious concern at the continuing threat to several radio-frequency bands allocated to the meteorological aids, meteorological-satellite, Earth exploration satellite and radiolocation (weather and wind profiler radars) services posed by the development of other radio communication services." The CMO Headquarters made a formal appeal to the *Caribbean Telecommunications Union* (CTU) and the CTU gave favourable consideration to CMO's appeal. At the World Radio Communications

conference in 28 October to 22 November 2019, CTU Members supported proposals, that promote safety and safety related services, inclusive of meteorological and related environmental observations.

3.15. Council was informed that subsequently, the CMO was invited by the CTU to participate and make a presentation in the *International Telecommunication Union* (ITU) Regional Radiocommunication Seminar 2020 for the Americas, 13-24 July 2020. The meeting was an opportunity to address matters relating to radio frequency allocation for the transmission and observation of meteorological data and phenomena, respectively. The CMO Headquarters was represented by the Science and Technology Officer.

3.16. Council recalled the *Caribbean Weather Forecasting Initiative* of the *EUREC^{4}A* field study, an international field study to enhance understanding of trade wind clouds and improve prediction of weather and climate (see CIMH Principal's report to CMC59). The successful Forecasting Initiative was proposed by the CMO HQ and the University of Leeds and organized in collaboration with CIMH. It involved 16 forecasters in a pre-EUREC4A training and knowledge-exchange workshop (2-6 December 2019) and a Forecast test bed (20 January–14 February 2020) to support research operations. The participation of forecasters from across the region was a first for this type of field campaign in the Caribbean.

3.17. Additionally, in support of the *EUREC^{4}A* field campaign, Council noted that the Coordinating Director liaised with the Ministry of Foreign and CARICOM Affairs of the Republic of Trinidad and Tobago to help secure permission for a French research vessel to sail within the waters of Trinidad and Tobago. There was also coordination with the Ministry of Foreign and CARICOM Affairs on behalf of the Principal of CIMH, who had arranged for an observer from the *Institute for Marine Affairs* in Trinidad and Tobago to participate on a research ship.

3.18. Council noted that the CMO Headquarters proposed and organized a tutorial on the NOAA Experimental *High-Resolution Rapid Refresh (HRRR)-Caribbean Weather Model* for WMO RA IV on 26 August 2020, by the NOAA model developers. The HRRR an award-winning NOAA operational 3-km weather prediction model that provides crucial details of weather events that are evolving rapidly – leading to marked improvements in warning on severe weather. In response to a request from the Coordinating Director, the HRRR-Caribbean domain was expanded in August 2020 to cover all Caribbean islands and most of Central America.

3.19. Council took note that the CMO Headquarters continued to assist the WMO in developing new Marine Meteorology Service Delivery training to benefit regional forecasters by soliciting case examples from CMO Member States. The planned adaptation and delivery of the training for the Caribbean in 2020 was delayed due to budget and pandemic constraints.

3.20. Council was informed that the Coordinating Director co-authored an information box on "*Small Island Developing States' response to hazards, vulnerabilities and emerging threats*" in the *World Disasters Report 2020* of the *International Federation of Red Cross and Red Crescent Societies.*

3.21. The Council noted overtures made by the CMO Headquarters to the *American Chamber of Commerce* (AmCham) in Trinidad and Tobago, which expressed interest in collaborating on communication of warnings and preparedness in terms of public awareness and education. The CMO HQ provided AmCham with information on Caribbean climate change projections obtained from the Climate Studies Group at Mona and contacts for obtaining rainfall data for Trinidad and Tobago. AmCham saw the information as necessary to support business continuity planning as part of disaster risk reduction.

3.22. Council was asked to note that the CD was invited to the ***Commonwealth Science Conference, Caribbean Feeder Meeting***, which focused on extreme weather and climate forecasting; and extreme weather and its effect on human development. The conference, scheduled for 16-18 March in Jamaica, was cancelled due to the pandemic. Nevertheless, the CD's presentation was submitted to the conference organizers, with a list of priority areas and questions for the next conference.

3.23. Council took note of the *invitation to the CD* to present on a panel on Preparedness, on Small Island Developing States and underserved communities at the American Meteorological Society (AMS) Annual Meeting's ***WMO/NWS International Session*****,** themed, *Improving Communication and Preparedness in Vulnerable Regions and Underserved Communities*. She was also an *invited speaker* to the ***Tropical Meteorology and Tropical Cyclones Symposium,*** Session on *Women in the Tropics*, where she spoke on the contribution of Caribbean women to operations, education and training, research, and applications, from the 1940s to present.

3.24. Council noted the CMO Headquarters efforts with regard to *Indigenous Community Engagement* in CMO Member States. On the recommendation of the CD, Dr Garvin Cummings was invited to speak on the Guyanese Hydrometeorological Service's work with indigenous and other isolated communities on weather and climate impacts, at the *WMO/NWS International Session* in January 2020. The CD spoke on preparedness and building resilience to weather and climate extremes in the Commonwealth of Dominica, home of the *Kalinago* people, with input from the Dominican Meteorological Service. The Coordinating Director also encouraged the Meteorological Service in St Vincent and the Grenadines to engage with the *Garifuna* people, and represent the CMO at the *7th Garifuna International Conference* held in St Vincent and the Grenadines in March 2020. These were follow-on actions from the CD's participation in the September 2019 UNESCO workshop, on *Mobilizing indigenous and local knowledge solutions: addressing climate impacts and vulnerabilities: A perspective from the Caribbean region*.

3.25. Council noted the CMO Headquarters collaboration with the Caribbean Community Secretariat on aspects of the *Caribbean Community Strategic Plan 2020* and the establishment of a Results-based Management System (RBMS) by all community institutions.

3.26. The Headquarters Unit also prepared an Operational Plan 2020-2023 to implement the objectives articulated in the Strategic Plan 2020-2023. The revised Strategic Plan for 2020-2023 was submitted by the CMO HQ in December 2019 and approved by Member States in April 2020. The Plans were developed using a Results-based Management System as required for all Caribbean Community Institutions.

3.27. Council recalled its discussions over the last few years concerning the establishment of a *Caribbean Community Administrative Tribunal* (CCAT). The primary purpose of CCAT is to develop a dispute settlement process for Community institutions. In February 2019, the Heads of Government of the Caribbean Community adopted the CCAT Statute and the CCAT was launched on 17 February 2020. The Coordinating Director served on the Steering Committee for the establishment and launch of CCAT and spoke at the launch. The CMO HQ Finance and Administrative Officer served on the Logo Competition Evaluation Committee. At the first plenary of the CCAT, the CMO HQ Finance and Administrative Officer was nominated to serve on the Finance Committee.

3.28. Council also recalled that on the financial arrangements for the operations of CCAT, Council had agreed that the overall CMO contribution for both the CMO Headquarters and the CIMH be included in the budget of the CMO Headquarters and not in the budgets of both Organs. At CMC58, Council authorized the Coordinating Director to sign the legal documents submitting the

Organization to the jurisdiction of the CCAT. Given the differences in the size and governance of staff at the CIMH, compared with the CMO Headquarters, the Principal of the CIMH indicated at CMC59 that he would like the Council to revisit that decision. At CMC59, the Council rescinded the decision of CMC58 and decided that the Coordinating Director would sign on behalf of the Headquarters Unit and the Principal would sign on behalf of CIMH. The Headquarters Unit signed and submitted its Declaration to CCAT in February 2020.

3.29. Council was provided with background information on the *Caribbean Meteorological Foundation* (CMF), an Organ of the CMO that functioned only briefly during the 1990s, and asked to revisit discussions started at CMC58 on the re-implementation of the CMF. Council advised the CMO Headquarters to investigate the undertaking a formal review of CMO to determine the optimal structure and operations of the Organization and the functionality of CMF, especially in light of the ability of the CIMH to raise funds independent of the CMF. The 59th Council noted that further review on this matter was needed before Council could provide a policy on the way forward. The CMO Headquarters Unit was tasked with seeking resources for the undertaking of a review of the CMO, to provide guidance on the re-implementation of the Caribbean Meteorological Foundation (CMF). Before proceeding with another review, the 60th Council was advised to revisit the recommendations from the two previous reviews of the CMO (as a whole) and those from the recent review of the CIMH, to determine whether the recommendations of those reviews were approved for implementation by the Council.

3.30. Council was asked to consider the return on investment of the effort that would be required to re-establish the Foundation and whether the needs articulated by Member States could be met by other means. During the discussion, the ***Principal of CIMH***, explained that original purpose of the Foundation was envisioned at a time as the primary source of research funding at the Institute. However, since that period, the CIMH and the Headquarters Unit have been fulfilling some of the roles envisioned for the Foundation.

3.31. Council noted that, by 15 October 2020, the level of financial contributions received from Member States had decreased this year, standing at 53% compared with 74% at the same period in 2019. Given the socio-economic impact of the ongoing pandemic, a reduction is not surprising. Nevertheless, a few Member States were able to make contributions to arrears, including one Member clearing all outstanding arrears to the CMO Headquarters. Eight (8) Member States failed to meet their current obligations up to the time of this report. Details would be discussed under Agenda item 6(c). It is important to note that, with a lower than normal level of Member contributions, some approved activities had to be postponed, such as the hiring of a *Project Development Officer* and an in-person meeting of the *CMO Operational Radar Working Group.*

3.32. The Coordinating Director briefed the Council on some of the scientific, technical and training events in which technical staff of the CIMH and the Services participated and the Headquarters facilitated. Council noted that the schedule of activities undertaken by the CMO Headquarters had been quite heavy, despite the cessation of face-to-face meetings after March.

3.33. Council noted that ***Mr Evan Thompson***, Director of the Meteorological Service of Jamaica, is now the elected ***President of WMO RA IV*** and a Member of the WMO Executive Council.

3.34. Council noted the contributions ***Mr Venantius Descartes,*** who retired as the Director of the Saint Lucia Meteorological Service in 2019.

3.35. Council also remembered the contributions of ***Ms Sonia Nurse*** who retired as Director of the Barbados Meteorological Service in 2020.

3.36. Council also remembered the contributions of ***Ms Catherine Cumberbatch*** who retired as Chief Meteorologist of the Belize Meteorological Service in September 2020.

3.37. Council welcomed ***Mr Ronald Gordon,*** the new Chief Meteorologist of the Belize Meteorological Service.

3.38. Council observed a moment of silence in remembrance of the beloved, late Secretary of the CMO Headquarters, ***Mrs Beverly Patterson-Roberts***, who passed away on 7 January 2020.

3.39. **The Council**:

(i) **Noted** the activities and issues concerning the CMO Headquarters in 2020 as well as those issues concerning the wider Caribbean Community;

(ii) **Discussed** the impact of the 2020 hurricane season and other high impact weather on the region and, in particular, the impact on CMO Member States;

(iii) **Noted** the response of the CMO Headquarters Unit to the COVID-19 pandemic, in particular, the efforts made on behalf of the CMO Member States with the WMO and as part of the Regional Response by CARICOM Institutions.

(iv) **Noted** the official launch of the Caribbean Community Administrative Tribunal (CCAT) and the signing of the Declaration of Recognition of the Jurisdiction of the Caribbean Community Administrative Tribunal (CCAT) by the Coordinating Director on behalf of the CMO Headquarters in 2020**.**

(v) **Discussed** matters pertaining to the Caribbean Meteorological Foundation.

3(b) CIMH Principal's Report

3.40. The Principal made a presentation to the Council on the activities of the *Caribbean Institute for Meteorology and Hydrology* (CIMH). He noted the COVID-19 pandemic has touched the lives of almost every person on the planet and led to significant transformations in the way we live, interact socially, work and grieve for our loved ones. Many Member States of the Caribbean Meteorological were suffering significant economic contraction in 2020 and with a global inoculation programme against the virus still on the horizon, this contraction would likely continue into 2021 and possibly 2022.

3.41. The Council was informed that throughout 2020, the CIMH remained operational delivering products and services required by its stakeholders though at times through a modified service delivery mode. CIMH entered into a partial lockdown of its campus in mid-March 2020 just prior to the Government of Barbados issuing its national lockdown directive. It continued the training programme via an online mechanism, this was made in consultation with staff and students, all of whom indicated a desire to remain on the island to continue their studies. Staff were engaged by the Management of the CIMH to monitor their needs especially those who lacked adequate local support structures and any staff members that were required to travel during the lockdown period were issued special permits by the Government of Barbados. Further, staff visits to the campus were limited to 5 persons at all times.

3.42. After the lockdown period staff members are encouraged to continue to work remotely. The Institute hosted face-to-face lectures when online course delivery was not permissible. While off island travel was possible, business travel remains largely suspended with requests for travel considered on a case-by-case basis.

3.43. Council was informed that the deficit in funding for fiscal year 2020 has never been this significant in many years. As a result, CIMH was slowly exhausting its carry-over from the last year and would struggle to make it through 2021 with its current financial commitments as it was assumed that actual funds received would remain at a low level. The gains experienced over the last decade have been eliminated in a single year and CIMH was expecting a slow recovery that could take several years. This highlighted the risks in the current funding model and diversification of revenue streams from a diverse client base was required help mitigate such financial shocks.

3.44. As it has become the custom in recent years, the Principal addressed the value for money proposition as it relates to the values of the services the CIMH provides to the region. He noted that many of the services were critical to (i) building the region's resilience to climate and hydrological hazards, (ii) identifying new important opportunities and partnership that are improving sector performance and (iii) building current and future regional capacity.

3.45. The Principal highlighted CIMH's strategy for attracting investment and funding including exploring alignment between the CIMH's strategic objectives and those of major funding and development partner organizations inclusive of the (i) the Caribbean Development Bank's (CDB) Strategic Plan 2020-2024, (ii) the Green Climate Fund (GCF), (iii) the World Bank Group, (iv) the World Meteorological Organization (WMO), (v) USAID, (vi) Foreign Affairs Canada and (vii) the ACP-EU. The Principal also noted that CIMH's strategic objectives align with that of CARICOM and relevant Institutions of CARICOM.

3.46. The Principal informed the Council that its Strategic Plan 2020-2024 was presented during the meeting of the Board of Governors. Core elements of the plan include: (i) expansion of CIMH's training, research and development programmes; (ii) conversion of all existing face-to-face training courses to blended training courses with all new courses designed in a similar manner to reduce training costs for source participants; (iii) implementation and mainstreaming of the Caribbean Early Warning Information System Across Climate Timescales (EWISACTs) Regional Roadmap and Plan of Action 2020-2030 aimed at strengthening the development, delivery and utilization of climate services and information in climate sensitive sector to improve planning and decision making; (iv) sustainable expansion of regional hydro-meteorological and climate observation and early warning systems across the Caribbean to support the delivery of impact-based forecasts for a range of sectors including the disaster risk management sector; (v) development and implementation of a Regional Marine Forecast Support Centre designed to strengthen marine monitoring, decision-making and governance; (vi) further enhance resource mobilization to support CIMH and NMHS programmes across the region through expanded engagements with regional and international development partners; (vii) expand and enhance the capacity of all staff through training and attachments to support the expanding and changing needs of the CIMH; and (viii) enhance the management and administration of the CIMH using the recommendations of the *AshThom Inc*. (2017) consultancy report.

3.47. The Principal noted significant value that the CIMH continues to derive from international partnerships. In particular, he noted that it offered the chance to (i) share its expertise; (ii) build its own capabilities through partnerships and collaboration; and (iii) enhance its brand and reputation.

3.48. The Principal highlighted its continuing South-South partnership with the South Pacific, in particular, the arrangement through the CREWS funding mechanism, which was stalled but should be restarted in 2021.

3.49. The Principal stated that the ***EUREC^{4}A-ATOMIC-OA*** field campaign was completed successfully during the period mid-January thru mid-February 2020 after approximately 3.5 years of planning and consultation. The field campaign was centered on Barbados and it was facilitated by the Government of Barbados but supported by several governments including Guyana, Suriname

and Trinidad & Tobago. The EUREC^{4}A was the largest and most data intensive ocean/atmosphere field campaign ever conducted. He highlighted various capacity building aspects of the field campaign, including the participation of CIMH interns and forecasters on aircraft and research vessels, the outreach to school children, aimed at developing upcoming generations of scientists. He also reported on the symposium, "*From BOMEX to EUREC^{4}A*", which was held at CIMH and featured renowned scientists and retired Barbadian forecasters.

3.50. The **Council:**

(i) **Noted** the Principal's Report

3(c) CIMH Board of Governors' Report

3.51. The Chairman of the CIMH Board of Governors (BoG) presented to the Council, the following decision that was made at the 57th meeting of the Board, which took place on 16-17 November 2020.
3.52.

1. With reference to *Document 5.1 – Estimates of Expenditure for the Financial Year 2020*:

   (i) The BOG **agreed** to the Estimates of Expenditure of USD 3,853,392 (BBD 7,682,700), which was a decrease of 5.4 percent, to be presented to the Caribbean Meteorological Council. The decrease in funding reflected the CIMH's belt tightening initiatives to reduce expenditure in recognition of the challenges Member States could face servicing the budget in light of the unfavorable economic outlook for the Caribbean region for 2021 caused by the COVID-19 pandemic. As a result, the CIMH has opted to freeze new hires in 2021, including the replacement of staff who have separated from the CIMH and hiring into recently established positions. The impacts of this strategy will be report to the Board of Governors and the Council in November 2021.

3.53. The Chairman also informed the Council that there were a few other matters which were discussed but unable to reach a consensus - these included some staffing matters. The Chairman requested a copy of the report developed by *AshThom Inc.* in 2017 through funding from USAID that outlined a strategy for enhancing the management and administration of the CIMH. Board of Governors that he would revert to them in six (6) weeks to two (2) months after he had reviewed the report. The Chairman also reported on the proposed regional marine forecast support center outlined in the CIMH Strategic Plan 2020-2024. The Chairman noted that no decision was reached on the matter although it was recognized that the CIMH was already delivering products and developing capacity in the area of marine services.

3.54. The **Council:**

(i) **Noted** the decisions and recommendations emanating from the BoG-LVII meeting.

4 STATUS OF ACTIONS FROM THE PREVIOUS SESSION

4.1. 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 CMC59 (Anguilla) 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.

4.2. Council was reminded of two of the actions from CMC59, which would have lasting impacts on the National Meteorological Service of the Member States and to the general public of the Region. The actions were:

- Member States to ensure that their NMHSs complete activities in preparation for the Operational Phase of WIGOS starting in 2020;
- Member States of WMO to update enter the information for their National Focal Points in the WMO's Community Platform.

4.3. The **Council:**

(i) **Noted** the Status of Actions from CMC59.

5 SPECIAL CMO AND WMO ISSUES

5.1. The Coordinating Director briefed the Council on the following special CMO and WMO-related issues in connection with the following topics:

(A) Outcome/Highlights of the ***72nd Executive Council*** (EC) of the WMO
  (1) Transition to the new WMO Governance Structure and Strategic Plan
  (2) Budget and Financing for 2020-2023
  (3) Extraordinary Session of the World Meteorological Congress – Key Issues
  (4) Other Highlights

(B) WMO Integrated Global Observing System – Initial Operational Phase

(C) Reception of Geostationary Satellite Imagery in CMO Member States

(D) The Global Framework for Climate Services (GFCS)

(E) Issues emerging from the WMO Technical Commission and Research Board sessions in 2020

(F) Disaster Risk Reduction and Regional Severe Weather Forecasts and Warning Systems
  - Tropical Cyclone Programme
  - Global Multi-hazard Alert System (GMAS)
  - WMO Catalogue of Hazardous Events

(a) Outcomes/Highlights of the 72nd WMO Executive Council

5.2. Council was informed that the 72nd session of the Executive Council began implementing the priorities decided by the 18th Congress and the 71st Executive Council, including the setup of new panels to streamline its work, namely:

- Policy Advisory Committee
- Technical Coordination Committee
- Climate Coordination Panel
- Hydrological Coordination Panel
- Executive Council Panel of Experts on Polar and High-mountain Observations, Research and Services
- Capacity Development Panel

5.3. Council noted that *72nd Executive Council*, took place on a virtual platform from 28 September to 2 October 2020 under the chairmanship of the President of WMO, Professor *Gerhard Adrian* (Germany). The Coordinating Director, *Dr Arlene Laing*, an elected Member of the

Executive Council, led a strong delegation, comprising *Dr. David Farrell*, Principal of the CIMH, *Mr Glendell De Souza* of the CMO Headquarters, and *Mr John Tibbetts* of the Cayman Islands. The involvement of this team increased the regional input to the session.

A(1) TRANSITION TO THE NEW WMO GOVERNANCE STRUCTURE AND STRATEGIC PLAN

5.4. Council recalled the report to the 59th CMC of the WMO Strategic Plan 2020-2023 and the new governance structure aligned to the Strategic Plan. Details of the WMO governance reform are available at https://public.wmo.int/en/governance-reform. Council was also reminded that the 18th Congress established a Transition Team to lead the transition to the new governance structure. At the end of the two-year transition Congress will hold an *Extraordinary Session of Congress* in 2021.

5.5. Council noted that the Transition Team met in November 2019 to discuss the Commissions' substructures and their terms of reference and to prepare for the Joint Session of the Technical Commissions and the Research Board in April 2020. With the onset of the pandemic, those sessions were postponed and Members nominated experts as chairs and vice-chairs of the standing committees and study groups and approved the terms of reference by correspondence.

5.6. Council noted the selection of *Ms Kathy-Ann Caesar* of CIMH as the Co-Chair of Education, Training and Competencies (ET-ETC) under the Standing Committee on Aviation Services; *Dr Arlene Laing*, as a Member of the Study Group for the Global Basic Observation Network (GBON); and *Mr John Tibbetts*, Director General of Cayman Islands National Weather Service, as a Member of the Expert Team on Multi-Hazard Early Warning Systems (MHEWS) Technical Guidance (ET-MTG) under the Standing Committee on Disaster Risk Reduction.

5.7. Council was also informed that in December 2019*, Dr Arlene Laing* was nominated as the RA IV representative to the Research Board and a Member of its Management Team.

5.8. Members were **urged** to nominate experts via https://community.wmo.int/ to ensure that the Caribbean perspective is represented in decisions of these global bodies.

5.9. Council was reminded of the five Long Term goals for the 2020-2030 period set by the WMO Strategic Plan, of which Goals 1 and 4 were of particular interest to the CMO, which has aligned its strategic objectives to those goals that aim to benefit its Member States:

- Goal 1: *Better serve societal need*s: delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services
- Goal 2: *Enhance Earth system observations and predictions*: Strengthening the technical foundation for the future
- Goal 3: *Advance targeted research*: Leveraging leadership in science to improve understanding of the Earth system for enhanced services
- Goal 4: *Close the capacity gap* on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens
- Goal 5: *Strategic realignment of WMO structure and programmes* for effective policy- and decision-making and implementation

5.10. Council was reminded that under the new Executive Council structure, "Education and Training" was included in the *Capacity Development Panel.* Therefore, in 2019, the decision was

made to nominate to the Panel, *Dr David Farrell*, Principal of CIMH, which is a WMO Regional Training Centre. His nomination was confirmed in April 2020 and the panel held its first meeting on 26-27 August 2020 via videoconference. *Mr Evan Thompson,* President of RA IV represented the Presidents of Regional Associations on the *Capacity Development Panel*. Council noted their service on this vital panel.

A(2) BUDGET AND FINANCING FOR 2020-2023

5.11. Council was informed that at the WMO 72nd Executive Council and the preceding Financial and Advisory Committee (FINAC-39) meeting, the Secretary General reported that the WMO has **received only about 40% of contributions** up to 15 September 2020.

5.12. Council urged CMO Member States with significant arrears to WMO to make every effort to enter into an arrangement with WMO that would alleviate this situation. Failure to meet financial obligations to WMO for more than two consecutive year results in Member loss of eligibility to vote and nationals being unable to be elected to the constituent bodies of WMO (Resolution 37 of Cg-XI), among other consequences.

A(3) EXTRAORDINARY SESSION OF THE WORLD METEOROLOGICAL CONGRESS – KEY ISSUES

5.13. Council noted that the 72nd Executive Council (EC-72) decided that the Extraordinary Congress in 2021 would be held 31 May to 4 June 2021 in Geneva, pending the evolution of the COVID-19 pandemic. Council was informed of a few key issues to be decided on at the Congress in 2021.

5.14. Council recalled that the 18th Congress indicated that **priority should be placed on increasing regional capability**, under Long-term Goal 4 and its associated Strategic Objectives for 2020-2023. The Climate Coordination Panel, the Hydrological Coordination Panel, and the Capacity Development Panel were vehicles for WMO Regional Associations to input their priorities and needs across both the Commissions and the Research Board. Council was informed that coordination among the WMO bodies was needed to ensure that they are supporting, systematically and seamlessly, the **full value chain of systems and services to support Members.**

5.15. Council noted that EC-72 called for the effective coordination of the working groups of the regional associations; consideration of the structures of the Technical Commissions, sharing of workplans, and inviting of the presidents of the Commissions and the Research Board to regional meetings.

5.16. It was noted that, in alignment with the EC-72 Resolutions 3.3(1) and 3.3(2), the RA IV President and Management Group had started setting regional priorities and revising the working structures of RA IV. The new working structures would be presented for approval at the 18th Session of RA IV and Members of RA IV were asked to nominate chairs and vice chairs for the new subsidiary bodies. Members States of the CMO and WMO were **urged** to nominate experts, based on their relevant expertise within the Member State, and nominations were not restricted to NMSs.

5.17. Regional Associations were asked to open up their sessions to economic and political organs and to participate in their regional high-level events, thereby promoting a stronger regional policy and political footprint, Council noted. They were also invited to engage with regional UN organizations, other inter-governmental regional organizations, and donor organizations. An example of this new approach was the issuance of a *Regional State of Climate* report that was

based on the annual *State of the Climate* issued for the globe. For RA IV, Council noted that the WMO Regional Climate Centre at CIMH was involved in the development of the *Regional State of the Climate* report to be launched later this year.

5.18. Council recalled that the 18th WMO Congress in June 2019, agreed to review international data resolutions (WMO Resolutions 40, 25, and 60) and discuss emerging data issues at the 2020 WMO Data Conference. The decision was motivated by, among other things, the explosive growth in demand for weather, climate, water, atmospheric composition data and information. There was also the additional challenge of balancing open data sharing in an era where the private sector role in weather, climate, and water was expanding.

5.19. Council noted that basic concept of a new WMO Data Policy (tentatively named Resolution 42) was that essential datasets need to be exchanged to support global numerical modelling, which are a public good for all nations. As part of that effort to ensure skilful prediction, every Member State must maintain its contribution to a baseline observing network..

5.20. Council was advised that the revision of the WMO Data Policy was a major issue for the WMO that has implications for CMO Members. A draft revised unified Earth System data exchange policy was presented to the 72nd Executive Council for discussion. This means that, CMO Members need to take into account the need to establish and maintain the Global Basic Observation Network (GBON) to the extent that was environmentally feasible and where practically achievable and to make those observations accessible via WIGOS and WIS.

5.21. Council was asked to promote alignment of national policies and regulations concerning Earth system data sharing and exchange, nationally and internationally. Council was informed of the need for the National Meteorological Services to build partnerships to enhance the exchange of Earth system data amongst national and regional stakeholders in order to improve integration of data across disciplines and domains, which helps to strengthen all of them and facilitate effective response to emergencies and natural disasters.

5.22. Council was informed that the CMO Headquarters had encouraged Members to participate in four workshops hosted by the WMO in advance of the WMO Data Conference, which was held from 16-19 November 2020 by videoconference. Council noted that the Coordinating Director gave an oral presentation on the Caribbean perspective, as part of a panel at the Data Conference. The presentation was based on discussions at *Caribbean Symposium 2019: Operational Hydro-Meteorology Leadership Summit* (CMC59, Doc 11). The WMO Data Conference provided input for a resolution to be approved by the Extraordinary Session of Congress in 2021.

5.23. Council recalled that during the "*Hydrology Assembly*" at the 18th Congress, WMO was challenged to find the best mechanism for engaging with the operational hydrological community. During the transition period to complete the governance reform, the Hydrological Coordination Panel of the Executive Council was developing a Plan of Action and draft Declaration to be considered at the Extraordinary Session of Congress in 2021. Input to the plan were via surveys and events organized by RA IV hydrological advisers. The CMO Headquarters encouraged responses from NMHSs, national hydrology experts, and stakeholders.

5.24. Council was informed that the Regional Hydrological Advisers of RA IV met in two virtual forums in 2020 to discuss a Plan of Action and data policy for operational hydrology within WMO. Council was also asked to consider the vital importance of operational hydrology to address global water challenges, and emerging opportunities in the broader WMO interdisciplinary context.

5.25. Council was reminded of the **urgency** for Member States to formalize their hydrological advisers with the WMO in order for them to have a vote at the Extraordinary Congress in 2021.

5.26. Council recalled that the *Alliance for Hydromet Development* was announced at the 18th WMO Congress, by the WMO in partnership with the World Bank and other development partners. At EC-72, the Alliance welcomed the Climate Investment Fund (CIF) as a new partner. CMO Member States were reminded of opportunities available for resource mobilization through the Alliance, with help from the WMO.

5.27. Council was informed of the newly established *Systematic Observations Financing Facility* (SOFF), a financing and technical mechanism to sustain compliance to the Global Basic Observing Network (GBON) by less developed countries. The SOFF was formally endorsed by European Meteorological Institutions on 2 October 2020 at a side event to EC-72. SOFF investment would focus on providing long-term observational data exchange as a measure of success. The SOFF provides a mechanism for supporting operating and maintenance costs of a country's basic observation infrastructure through results-based finance. It aims to provide local benefits while delivering on a global public good – that of better global weather forecasts and climate information for all nations.

5.28. Council was reminded of Resolution 80 (Cg-18) - "*Geneva Declaration 2019: Building Community for Weather, Climate and Water Actions*" that set a high-level WMO policy on public-private engagement. On the recommendation of the Policy Advisory Committee, that policy framework was transformed into a set of guidelines for actions at the global, regional, and national-level by WMO and its Members **to promote effective engagement among public, private, academic, and civil society sectors to advance socio-economic benefits**. The 72nd Executive Council endorsed the *Guidelines for Public-private Engagement* (edition 2020). Members were urged to review and follow the guidelines for best practices in partnerships to aid in their development and delivery of services to meet societal needs.

5.29. Council was informed that the 72nd Executive Council voted to present the sixty-fifth IMO Prize to *Mr David Grimes*, recently retired WMO President (2011-2019), for his outstanding work in the global meteorology community including spearheading of the Global Framework for Climate Services (GFCS) and the Global Cryosphere Watch, among several achievements. The Prize is named after the WMO's predecessor organization, the *International Meteorological Organization.*

5.30. The WMO *Research Award for Young Scientists* was granted to *Dr B Rohith* (RA II, India) for his lead authorship of the paper, "Basin-wide sea level coherency in the tropical Indian Ocean driven by Madden–Julian Oscillation*"*, published in Nature Communication (2019). The Executive Council also noted the significance of the paper, "Statistical downscaling of the North Atlantic tropical cyclone frequency and the amplified role of the Caribbean low-level jet in a warmer climate", by *Ms Jhordanne Jones* (RA IV, Jamaica).

5.31. Council noted that *Dr Arlene Lain*g has been a Member of the Committee for the WMO Research Award for Young Scientists since the 71st Executive Council in 2019.

B. WMO INTEGRATED GLOBAL OBSERVING SYSTEM – INITIAL OPERATIONAL PHASE

5.32. Council recalled that for the last several years, significant discussions have been held on the *WMO Integrated Global Observing System* (WIGOS), an all-encompassing approach to the improvement and evolution of WMO's global observing systems, which was needed in all countries to consolidate progress in meteorological research, numerical modelling, and computer and communication technologies. Closely tied to WIGOS was the implementation of the *WMO Information System* (WIS). WIGOS, together with 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.

5.33. Council noted that WIGOS became operational in 2020 and that, as with all Member States of WMO, CMO Member States should be in full preparation for implementation. The goal was for all Member States and their partners to benefit from a fully operational system. Council noted that the focus was on getting the CMO Meteorological and Hydrometeorological Services ready in the first instance, while efforts continue to bring partner institutions and organizations on board as contributors to WIGOS.

5.34. Council was reminded that National Meteorological Services (NMS) are required to develop a National WIGOS Implementation Plan (N-WIP)—to describe how the NMS would partner with other national entities to create a comprehensive strategy for the implementation of a national observing system, to collect, manage and store meteorological, hydrological, and other relevant data. Council noted that the CMO Headquarters provided NMSs with a self-assessment template for the identification of gaps in their observing systems and examples of completed assessment to assist in the completion of their assessment. Further, NMSs of Members States that were not Members of WMO were provided with a form for the input of their data, which was required for the updating of their observational metadata which is stored on the WMO metadata database called Observing Systems Capability Analysis and Review (OSCAR)/Surface. The updating of the database was a requirement of establishing their N-WIP. Council was **urged to support their NMS in the development of a National WIGOS Implementation Plan** by facilitating and enabling the necessary data policies and partnerships to integrate information about data related to weather, climate, and water and the environment

5.35. Council recalled discussions of the concept of *Regional WIGOS Centres* (RWCs), as a vital part of the implementation of WIGOS. The Executive Council recognized the critical role of RWCs in advancing the implementation of WIGOS at the regional level by providing regional coordination, technical guidance, assistance and advice to Members and partner organizations, through regional WIGOS performance monitoring and incident management. Along with representatives from the United States and Canada, the CMO Headquarters and the Trinidad and Tobago Meteorological Service have been collaborating the development of a virtual RWC for RA IV. Council was informed that a Concept Note of the virtual RWC was approved by the RA IV Management Group in January 2020 and that an implementation plan was being developed by the ad-hoc working group.

C. RECEPTION OF GEOSTATIONARY SATELLITE IMAGERY IN CMO MEMBER STATES

5.36. Council recalled that the new generation of Geostationary Operational Environmental Satellite (**GOES-16**) was successfully launched in November 2016. GOES-16 became the operational **GOES-East** weather satellite positioned at 75.2 degrees West, providing coverage over the Atlantic Ocean from the west coast of Africa, North and South America and the Caribbean. Its sister satellite, **GOES-17**, covers the Americas and parts of the Pacific and both were equipped with new lightning mapping capability that allows forecasters to track lightning over the entire hemisphere. This was important because intensification in lightning activity may indicate a storm was becoming increasingly severe.

5.37. Council was reminded that CMO Headquarters and CIMH continue to be directly involved with WMO and the US National Weather Service in coordinating the operational use of the GOES data among CMO Member States. Due to the vast data volume and faster satellite transmission than the previous systems, Meteorological Services in the region have either installed or are

exploring their options among three pathways to receive the new satellite data and/or imagery, namely:

1. Direct readout from the GOES ReBroadcast (GRB);
2. Various commercial data services via the Internet;
3. Data via GEONETCast-Americas - the western hemisphere component of a near real-time global network of satellite-based data dissemination systems.

5.38. Council recalled that in 2018, the Cayman Islands installed a full GOES ReBroadcast (GRB) ground station, the first such system in the Anglophone Caribbean. The Cayman Islands National Weather Service indicated a willingness to share its GOES imagery with the NMHSs of other BCT Members. Additionally, a GRB ground station was installed in Tobago, with selected images being shared publicly via the website of the Trinidad and Tobago Meteorological Service since September 2020.

D. THE GLOBAL FRAMEWORK FOR CLIMATE SERVICES (GFCS)

5.39. Council recalled that the ***Global Framework for Climate Services*** (GFCS), a UN-led initiative spearheaded by WMO, was being implemented throughout the world to guide the development and application of science-based climate information and services in support of decision-making at national, regional and global levels. Council further recalled that, in 2018, a change in the governance of the GFCS was recommended after the 70th WMO Executive Council endorsed a Mid-term Review of the GFCS. Via Resolution 20 (Cg18), the governing structure for the GFCS was changed from an *Intergovernmental Board on Climate Services*, which was accountable to the WMO Congress, to the *Climate Coordination Panel* (CCP) which reports to the WMO Executive Council. The new CCP includes the following: (i) Subgroup on the WMO contribution to the GFCS, (ii) Subgroup on climate policy and (iii) GFCS Partners Advisory Committee (PAC), the mechanism for stakeholder engagement in GFCS. All the substructures have met at least once. The CCP is led by the President of the WMO and became active in 2020.

5.40. 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. In this regard, several of the GFCS Projects involve the CIMH, which is implementing the five GFCS pillars plus other sectors of importance, such as tourism, at the regional level.

E. ISSUES EMERGING FROM THE WMO TECHNICAL COMMISSIONS AND RESEARCH BOARD IN 2020

5.41. Council noted that the first session of the Commission for Observation, Infrastructure and Information Systems (INFCOM-1) was held as a Virtual meeting on 9-13 November 2020 and attended by *Dr Arlene Laing* and *Mr Glendell De Souza*, representing the British Caribbean Territories (BCT). Among the issues raised by the delegates was the selection process for experts to serve in sub-structures of the Commission; with the expressed desire to ensure appropriate balance among regions, countries, and gender. With the change from eight to two Commissions, there was concern about the reduction in opportunity for a broad cross-section of Members to participate in the Commissions. In the current process experts have been nominated by their Permanent Representatives (PRs) using the WMO Community Platform but the process for selection thereafter is not clear. The Executive Policy Advisory Committee would be reviewing the process for the selection of experts to serve.

5.42. Council was informed that delegates of INFCOM-1 recognized the huge challenge of implementing WIGOS and requested the WMO Secretariat to provide support to Members and

Regional Associations in implementing WIGOS through its operational phase, especially to less developed countries, within available resources. Also extensively discussed were the requirements for the Global Basic Observation Network, a critical part of WIGOS that specifies the contribution of Members to a baseline surface and upper-air observing network.

5.43. Council noted that the WMO Research Board met by videoconference on 20 December 2019 and 6-8 April 2020 to discuss its Terms of Reference and development of Concept Notes on research goals. The Concept Notes articulate the high-level scientific priorities and key activities needed in a manner that was attractive and accessible to the broad scientific community and to partners who were not familiar with WMO, including funding agencies and stakeholders; facilitate interactions within WMO; enable the research programmes to work more effectively on cross-cutting aspects; and provide an inclusive framework for partners of WMO. The *Science for Services* Concept Note is the overarching umbrella for the other concept notes, including the Concept Note on *Innovation in Regions*, led by the Coordinating Director.

5.44. Council was informed that in response to the COVID pandemic and the questions about seasonal and environmental impacts, the WMO Research Board convened a WMO-WHO *SARS-CoV-2/COVID-19 Task Team***.** In her role as a Member of the Research Board, Dr Arlene Laing nominated *Dr David Farrell*, Principal of CIMH to the Task Team, because of CIMH's experience in research on climate and health impacts. It was intended that the Task Team would respond to the real-time challenge of providing decision support and relevant knowledge on climate-weather-air pollution drivers and determinants of the SARS-CoV-2/COVID-19 pandemic.

5.45. The SARS-CoV-2/COVID-19 Task Team supported the organization of the international virtual *Symposium on Climatological, Meteorological and Environmental Factors in the COVID-19 Pandemic* (4-6 August), under the auspices of the WMO, WHO, and the American Geophysical Union (AGU). The Coordinating Director participated in breakout sessions of the Symposium.

F. DISASTER RISK REDUCTION AND REGIONAL SEVERE WEATHER FORECASTS AND WARNING SYSTEM

F(1) TROPICAL CYCLONE PROGRAMME

5.46. Council recognized that activities within the WMO *Tropical Cyclone Programme* (TCP) were among the most important to the Caribbean and other tropical basins, with the most critical regional activity being the WMO *Hurricane Committee*, serving the *North Atlantic and Caribbean Basin*. The Hurricane Committee has at its core, *the US National Hurricane Center*, which was one of WMO's primary *Regional Specialized Meteorological Centres* (RSMCs) for tropical cyclones. Most Meteorological Services in CMO Member States are represented on 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 in terms of loss of lives.

5.47. Council noted that the 42nd Hurricane Committee met via videoconference, for the first time, on 31 March and 3 April, in a session with a shortened agenda of critical decisions. The Operational and Technical Plans for 2020 were updated and finalized. Decisions about the retirement of names of hurricanes was tabled until the next face-to-face meeting of the Committee, which was expected to be in 2021 in Panama, which was the 2020 host country before the pandemic travel restrictions.

5.48. Of note in terms of observations was the voluntary increase in the number of rawinsonde launches by NOAA and Météo-France to offset the loss of aircraft observations due to the dramatic reduction in commercial air traffic due to the pandemic.

5.49. Council further noted that the Hurricane Committee featured a special guest, *Ms Sally Edwards*, Regional Regional Advisor, *Pan American Health Organization* (PAHO), who spoke about the challenge of managing the overlapping COVID-19 pandemic and a predicted active hurricane season. She described the concerns of conflicting response actions for the pandemic and hurricane preparedness, e.g., where distancing and extra sanitization mitigate the spread of COVID-19, and the need for people at risk from tropical cyclone impacts to evacuate to shelters and the potential lack of adequate utilities, including water. She stressed the need of unprecedented support from the meteorological community and the need for closer cooperation and better communication in providing hurricane warning services for Disaster and Health agencies, under such unprecedented challenges. Chair of the Hurricane Committee and Director of the US National Hurricane Center (NHC) described actions at the NHC to ensure continuity of operations.

F(2) GLOBAL MULTI-HAZARD ALERT SYSTEM (GMAS)

5.50. Council recalled that the 18th WMO Congress supported the establishment of a Global Multi-hazard Alert System framework for compiling information from existing or planned national and regional systems and boost impact-based forecasting services, which focus on what the weather will do rather than purely on what the weather will be. The GMAS framework was expected to leverage good examples of global, regional, and sub-regional platforms that provide alerts of natural hazards. Council **urged** CMO Members to "sustain their engagement in strengthening their MHEWS and to contribute to regional and transboundary multi-hazard early warning mechanisms (platforms, advisory systems) by also providing in-kind support."

5.51. Council noted that information about the implementation of GMAS was presented to the RA IV Management Group meeting in June 2020. Implementation was predicated on the adaptation of the Common Alerting Protocol (CAP) across the globe. Advisories and warnings issued via the CAP would be used by GMAS to populate the global map.

F(3) WMO METHODOLOGY FOR CATALOGUING HAZARDOUS EVENTS (WMO-CHE)

5.52. Council recalled that the 17th WMO Congress resolved to develop *identifiers for cataloguing extreme weather, water and climate events* (Cg17, Resolution 9) and the 70th Session of the Executive Council recommended an approach for cataloguing high-impact events (Recommendation 1). Those decisions support monitoring of the implementation of international initiatives such as the Sendai Framework for Disaster Risk Reduction 2015−2030, the Paris Agreement on climate change, and the United Nations Framework Convention on Climate Change (UNFCCC) Warsaw International Mechanism for Loss and Damage associated with climate change impacts, and the 2030 Agenda for Sustainable Development with its 17 Development Goals (SDGs).

5.53. The WMO coordinated catalogue of hazardous weather, climate, water, and space weather events was adopted by the 18th Congress. Council encouraged Members to contribute to the WMO catalogue as well as to the CIMH Climate Impacts Database.

5.54. The **Council**:

(i) **Noted and discussed** the key issues emanating from the 72nd session of the Executive Council (EC) of the World Meteorological Organization;

(ii) **Urged** CMO Member States to ensure that their NMHSs complete activities in preparation for the Initial Operational Phase of WIGOS, which began in 2020;

(iii) **Discussed** and **provided guidance** on the proposed Virtual *Regional WIGOS Centre* (RWC) as a collaboration among the US, Canada, CMO Headquarters and the Trinidad and Tobago Meteorological Service;

(iv) **Discussed** and **provided guidance** on the major revision of WMO Data policy and related resolution to be decided by the Extraordinary Congress in 2021;

(v) **Noted** efforts being made with regard to coordination among hydrological advisers and agencies within RA IV; and the important issues on hydrology emerging from the 2020 sessions of WMO Executive Council, Technical Commissions and Research Board;

(vi) **Urged** Member States to formalize their hydrological advisers with the WMO in order to have a vote at the Extraordinary Congress in 2021.

(vii) **Urged** WMO Members to nominate experts to the WMO Expert database to expand Member participation in WMO constituent bodies.

(viii) **Urged** Member States to **complete the process** for reception of GOES-16 weather satellite data and products;

(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 work of WMO Regional Association IV and **urged** Members to contribute to the RA IV Operating Plan.

(xii) **Encouraged** CMO Member States to contribute to Global Multi-Hazard Alert System framework, the WMO Catalogue of Hazardous Events, and contribute events to the CIMH Climate Impacts Database.

(xiii) **Encouraged** CMO Member States to take advantage of resources available through the Alliance for Hydromet Development.

(xiv) **Encouraged** Member States to consult the WMO *Guidelines for Public-Private Engagement* (2020 edition) in developing partnerships to enhance their capacity to meet demand for services and to participate in the WMO Open Consultative Platform.

6 FINANCIAL REPORTS

6(a) Status of Refundable Balance

6.1. Council was reminded that the annual contribution to the WMO due from the British Caribbean Territories (BCT) is paid by the CMO Headquarters on behalf of the British Government. This contribution is included in the annual budget of the CMO Headquarters and hence, in the individual CMO Member State's contribution to the CMO Headquarters. A percentage (73%) of this amount is refunded to the CMO by the UK Department of Transport upon submission of an invoice with the accompanying annual audited Financial Statements of the CMO Headquarters. Therefore, this amount is refunded to the Member States that are also Member States and Territories of the WMO.

6.2. By Members' consent, these funds are held by the CMO Headquarters Unit to assist Members in attending important Meteorological/Hydro-meteorological Meetings, participating in training opportunities, and purchasing spares. During 2020, a few Member States accessed these funds very effectively in pursuit of these objectives. Apportionment of any refund received was based on the assumption that all Member States are meeting the annual contributions to CMO on a

regular basis. In reality, however, some Member States were in arrears of contributions to the CMO Headquarters. Therefore, although the Refundable Balance reports the amount available to the Member State, access to draw-down was linked to their financial status with the Organization and may be restricted.

6.3. In keeping with a decision made during the 47th session of the Council (2007), each session of the Council is provided with both the current status of the Refundable Balances held at the CMO Headquarters on behalf of CMO Member States, as well as, the amount available for draw-down by each Member State.

6.4. The current status of the Refundable Balances held at the CMO Headquarters on behalf of CMO Member States at 30 September 2020, as well as, the amount available for drawdown, is shown below:

BRITISH CARIBBEAN TERRITORIES	**TTD**	**USD * BALANCE**	**USD AVAILABLE FOR USE**
Anguilla	143,784	21,147	21,147
BVI	119,766	17,614	17,614
Cayman Islands	158,571	23,322	23,322
Montserrat	84,801	12,472	12,472
Turks and Caicos Islands	220,018	32,359	32,359
	726,940	**106,914**	**106,914**
CMO MEMBERS OF WMO			
Antigua & Barbuda	22,949	3,375	TBD**
Barbados	55,517	8,165	8,165
Belize	555	82	82
Dominica	21,272	3,129	TBD**
Guyana	12,026	1,769	1,769
Jamaica	246,643	36,275	36,275
Saint Lucia	20,342	2,992	2,992
Trinidad and Tobago	8,487	1,248	1,248
	387,791	**57,035**	**50,531**
TOTAL	**1,114,731**	**163,949**	**157,445**

* USD equivalent calculated at rate of exchange at September 30th, 2020

** TBD means "To Be Determined" in light of paragraph 7.

6.5. The Council was reminded of the request made to the CMO Headquarters Unit to present three proposals for calculating the quantum of the refundable balance, which was available to a Member State that was in arrears.

6.6. The **Council**:

(i) **Noted** the status of the Refundable Balances Account;

(ii) **Reviewed** the three proposals and **approved** the third proposal (**ANNEX III**) presented by the Headquarters Unit for objectively quantifying the refundable balance available to Member States that were in arrears.

6(b) CMO HQ - Auditor's Report

6.7. The financial statements for fiscal 2019 were audited by the Auditor General's Department of Trinidad and Tobago during June to September 2020. The audited financial statements for 2019 were presented to Council by the Finance and Administrative Officer.

6.8. **The Council**

(i) **Reviewed** and **accepted** the audited Statement of Accounts for 2019, noting with satisfaction that the CMO Headquarters received an unqualified audit report;

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

6(c) Statement of Contributions and Arrears (CMO HQ & CIMH)

6.9. Each year, the Coordinating Director of the CMO and the Principal of the CIMH are challenged to hold the operating budgets of their institutions to a minimum with the hope that all Member States would meet their annual contributions towards these budgets in a timely manner.

6.10. 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 continued to experience delays in remittances, part payment and in some cases, non-payment of current contributions by some Member States, hampers the implementation of programmes and activities planned for Organization.

6.11. There has been a persistent shortfall of contributions remitted to the CMO Headquarters and CIMH, which, in previous years averaged 25% and 30% of the approved annual budget, respectively. The implications arising from delays and non-payment of contributions may soon begin to impact the operations of the Headquarters Unit and the CIMH. Monies held by the CMO for Member States which operate Rawinsonde and radar stations, as well as the Refundable Balances, have been classified as "*restricted cash*" in the Statement of Financial Position at the end of 2018 and are therefore not available to the Headquarters for use in operations. In light of the delays in receipt of remittances and the consequent shortfall in annual contributions, it was imperative that arrangements be put in place to ensure the availability of funds to meet operating expenses of the Headquarters on a timely basis in the absence of overdraft facilities with the banks to meet any temporary deficit in cash flow.

6.12. Council had an exhaustive discussion of the Statements of Contribution and Arrears submitted by the CIMH and the CMO HQ. Member States noted their responsibility to liquidate the debt to the Organs of the CMO. Council was reminded that the debt to the Organs of the CMO has limited their ability to access project funding from their international partners in the past and this would continue in the foreseeable future unless a mechanism was realized to liquidate the debt over time.

6.13. The **Council**

(i) **Examined** and **discussed** the **Statements of Contributions and Arrears** to the CMO Headquarters and the CIMH

(ii) **Proposed** that CMO HQ and the CIMH would produce a paper with regard to financing of the organs of the CMO and submit the paper to the Member States delegates present at the 60th Meeting for ratification by the second week in January 2021

(iii) **Proposed** that the Delegates of the Member States to the 60th Meeting were to submit the ratified paper to the responsible Ministers; to identify the national commitment for the way to liquidate the debt to the organs of the CMO.

(iv) **Proposed** to hold a Ministerial Meeting by the end of March 2021 to commit to a way forward for liquidating the debt to the organs of the CMO.

(v) **Noted** that the negotiations between the CMO Headquarters and the Government of Jamaica, aimed at reaching an agreement for a one-time partial debt swap, was not necessary due to the liquidation of the debt by the Government of Jamaica.

7 CMO OPERATIONAL PLAN

7.1. Council recalled that at its 59th session (Anguilla, November 2019), the CMO Headquarters presented to Council its "***Strategic Plan 2020-2023 - Strengthening capacity, adding value, and building resilience in the Meteorological and Hydrometeorological Services of the Caribbean***". That Strategic Plan (CMC59, Doc 7) was approved by Member States in April 2020 after revision. The 60th Council was presented with the corresponding ***Operation Plan 2020-2023*** for approval.

7.2. **The Council**:

(i) **Discussed** and approved the CMO ***Operational Plan 2020-2023*****,** shown in **ANNEX IV**;

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

8(a) CMO HQ Budget Estimates for 2021

8.1. Budget estimates for the operating costs for the CMO Headquarters Unit and contributions to the Caribbean Rawinsonde and Radar Networks for 2021 were presented to the Council.

8.2. It was noted that although Trinidad and Tobago, the home of the CMO Headquarters Unit, continued to experience pressure on its foreign exchange reserves, the anticipated decline of the local currency has not been reflected in the official exchange rates listed at the commercial banks. This relative stability of foreign exchange rates was factored into the estimates of expenditure for 2021 which is predicated on a USD rate of TTD 7.00 to USD 1.00 while the XCD rate has been adjusted to TTD 2.62 to XCD 1.00.

8.3. The CMO Headquarters continued to occupy the present premises despite the expiration of the lease in February 2017, no provisions for the cost of rental are included in the estimates of expenditure for 2021.

8.4. At TTD X,XXX,XXX.XX, or USD XXX,XXX.XX, the overall estimates of expenditure proposed for 2021 was 4.3% lower than the approved budget for 2020.

8.5. **The Council:**

(i) **Approved** the budget of **TTD** X,XXX,XXX.XX**, equivalent to USD XXX,XXX.XXX, a reduction of 4.3% from the 2020 budget**, as detailed in **ANNEX V,** with Member contributions as indicated in **ANNEX VI**;

(ii) **Approved** temporary drawdowns from the restricted cash balances held for Member States operating the Caribbean Rawinsonde and Radar Networks, should the need arise in 2021;

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

(iv) **Also Urged** Members to inform the CMO Headquarters of their transfer of funds, including the amount and date.

8(b) CIMH Budget Estimates for 2021

8.6. The Chairman of the Board of Governors informed the Council that the CIMH presented the Estimates of Expenditure for the financial year 2021 to the Board of Governors for its consideration. The Board approved the Estimates of Expenditure of BBD X,XXX,XXX.XX or USD X,XXX,XXX.XX, a decrease of 5.4 percent over the approved budget of 2020.

8.7. The Council:

(i) **Approved** the Estimates of Expenditure for 2021 of **BBD X,XXX,XXX.XX** or **USD X,XXX,XXX.XX**, as presented by the Board of Governors. Member States' contributions based on that figure are indicated in **ANNEX VI**.

9 ANNUAL MEETING OF THE DIRECTORS OF METEOROLOGICAL SERVICES

9.1. The Caribbean Meteorological Council considered the Report of the Annual Meeting of Directors of Meteorological Services, held on 18 November 2020, presented by Mr Glendell De Souza, Science and Technology Officer of the CMO Headquarters. The Report provided the Council with a summary of the deliberations and recommendations of the Meeting of Directors of Meteorological Services on a wide range of technical and scientific topics, which would have an impact on future costs, policy decisions, training opportunities and service delivery. The following two items were drawn to the attention of Council:

1. TRAINING

The CIMH was tasked with reviewing the duration of the Senior-level Meteorological Course during the 2018 and 2019 Meeting of Directors of Meteorological Services, in an effort to reduce the course duration to a period of 9-12 months. The presentation of the results of the review did not find favour with some of the Directors. Therefore, the Meeting agreed to convene a subcommittee composed of representatives from the CIMH and all interested Directors. The subcommittee must submit a report by the end of the first quarter of 2021 to all of the Directors.

2. OPERATIONAL MATTERS

WIGOS Implementation

The Meeting noted that most of meteorological services of CMO Members States had not implemented the prerequisites to operationalize WIGOS. Further, the Meeting was informed that the problem of silent stations noted in the reports of the Annual Global Monitoring, by the Main Telecommunication Network, could be as a result the type of dissemination associated with the meteorological observed elements in the metadata of the stations in OSCAR/Surface. Assistance with updating metadata in OSCAR/Surface was offered by the Science and Technology Officer of the Caribbean Meteorological Organization Headquarters Unit on request.

ICAO Meteorological Information Exchange Model (IWXXM)

The Meeting recalled that at its 2018 and 2019 meetings there was discussion on the ICAO Meteorological Information Exchange Model (IWXXM) as a data format for reporting aeronautical meteorological information in XML/GML. As at 5 November 2020, all aeronautical observations, forecasts, significant weather alerts and forecasts and volcanic ash advisories must be transmitted in IWXXM format.

9.2. The Council:

(i) **Reviewed** and **amended** the draft of the DMS2020 Report;

(ii) **Noted** that human and financial resources would be needed to have National Meteorological Services to operationalize WIGOS, encode and decode aeronautical meteorological information in IWXXM format

(iii) **Also Noted** the intended convening of the small committee to review the proposed SLMT course and to report to all Directors.

10 CMO WEATHER RADAR NETWORK

OPERATIONAL STATUS

10.1. Council recalled that the CMO Weather Radar Network currently comprised of five German-made radars in Belize, Barbados, the Cayman Islands, Guyana and Trinidad and Tobago. The radar that was installed in Jamaica in 1999, has been decommissioned and a new radar was to be installed in the same location. This network, along with other pre-existing radars in other Caribbean islands, provided the Caribbean with a modern sophisticated tool that complements other surface, upper-air and satellite-based weather observing platforms as part of the regional early weather warning system.

10.2. The radars in the CMO Member States were critical regional infrastructure, with a significant impact on weather surveillance, forecasts and warnings in the Caribbean. The reliance on the system had been growing within and outside of the region and, under the auspices of the *World Meteorological Organization* (WMO), plans had been in place to integrate, in stages, the data from these radars with all other radars in the entire Caribbean basin as part of a larger weather surveillance system. For a CMO-wide or the larger Caribbean-wide radar network to properly function, all radar-operating States needed to work steadily to ensure reliability of their individual radar operations.

10.3. Council noted that radar data availability continued to be an issue for parts of the CMO radar network in 2020 but with some progress on procurement of parts and repairs. The easternmost of the radars, in Barbados, was repaired with service support from the manufacturer, after several prolonged periods of outage. During August 2020, the radar was restored to mechanical functionality and a follow-up service visit in November dealt with calibration and other preparation to return the radar to full operations. After functioning without issues for several years, the radar in Trinidad has been non-functional since February 2020, with replacement parts ordered in July 2020. One of the parts has 9-month delivery schedule, so that radar was not expected to return to operations until 2021. The radar in Belize began experiencing problems in September 2020, which necessitated replacement of four parts, of which two were procured from the repository at CIMH and two are being procured directly from the manufacturer. The project to replace the radar in Jamaica with a new S-band, dual-polarized Doppler radar was advancing towards a scheduled installation, testing, and acceptance by the first quarter of 2021, having been delayed by the pandemic from an August 2020 schedule. The new radar would be installed at the same site as the previous Doppler radar and was expected to be in full operation before the secondary peak rainfall season in May 2021. Funding was provided by the World Bank project for Improving Climate Data and Information Management, under the *Pilot Program for Climate Resilience* (PPCR). The old radar would be made available for research at The University of the West Indies (Mona) Department of Physics in Jamaica.

10.4. Council was also informed that the Bahamas has been implementing its own radar project, with part of the network completed in 2019, in time to monitor the record-breaking major Hurricane Dorian. The network when completed would cover the entire Archipelago, as well as portions of the Turks and Caicos Islands. Council noted that the discussions between the Bahamas and CMO Headquarters suggested that once these radars materialized, consideration would be given to integrating them into the regional composite.

X-BAND RADAR PROJECT IN SAINT LUCIA

10.5. Council recalled about a Geo-Information Centre (GIC) being implemented in Saint Lucia by agreement between the Government of Saint Lucia and the Government of Italy. The GIC installations were being implemented by the Caribbean Community Centre for Climate Change (5Cs). The project included the installation of an X-band radar, which has a radius of 120 km and was to be cited within line of sight of the Hewanorra Airport in Vieux Fort, Saint Lucia.

10.6. The Government of Saint Lucia provided a suitable site to locate the radar. The civil works carried out to date, included; (i) construction of an access road, (ii) building of a one-room structure and platform to house the radar and accompanying equipment. The radar equipment was shipped from Italy and stored with the Ministry of Infrastructure, Ports, Energy and Labour. The proposed radar installation has been shifted to 2021 due to travel restrictions as a result of COVID-19 pandemic. The training on the use of the radar was carried out virtually and further training was planned after the installation was completed.

10.7. Council recalled that the Saint Lucia Meteorological Service appealed for assistance from CMO with the maintenance of the radar and its application for their monitoring and forecast services. The CMO Headquarters included staff from Saint Lucia Meteorological Service in the Operational Radar Working Group and they were slated to participate in the first workshop of the group.

OPERATIONS OF THE REGIONAL RADAR COMPOSITE AND OTHER REGIONAL AND INTERNATIONAL OBLIGATIONS

10.8. The session once again discussed and **urged** display of radar data on the websites of the National Meteorological Services, including data from the radar composite image developed by the

Barbados Meteorological Service. The wider use of weather radar data by national television media was also ***encouraged***.

10.9. Council recalled that there were two regional radar composites in operation. The first was the composite system generated at the French Meteorological Service (Météo-France) Centre in Martinique, which was developed through an agreement between Météo-France and the CMO. The Météo-France composite normally includes radars from the Cayman Islands, Jamaica, Guadeloupe, Martinique, Barbados, Trinidad, Guyana and French Guiana. The second composite was developed separately by the Barbados Meteorological Service. From a practical point-of-view, the Barbados-generated composite was more widely used composite regionally, including by the US National Hurricane Center in Miami and other Caribbean States

10.10. Radar composites are a regional priority under the ***WMO Integrated Global Observing System*** (WIGOS). The CMO Headquarters has been asked several times by the WMO Region IV management and by the WMO WIGOS Project Office in Geneva about the sustainability of the Barbados-generated composite, since WIGOS was now in its operational phase in 2020. As discussed during the last few Council sessions, the Barbados composite was not yet the subject of a formal arrangement or long-term commitment by Barbados, which was necessary for it to be part of WIGOS. The CMO Headquarters believes that this excellent effort by the Barbados Meteorological Service should have firm national commitment and become an official service provided by Barbados.

10.11. Council was informed that the full volume radar data from the Cayman Islands and Belize were assimilated into the numerical weather models of the *NOAA/National Centers for Environmental Prediction* (NCEP), through participation in the NOAA *Multi-Radar Multi-Sensor* (MRMS). This program benefits the region by improving the initial conditions in the NCEP models, such as the Global Forecast Systems (GFS) model, which have been utilized by many Meteorological Services. MRMS develops specific products for transportation, hydrometeorology, and severe weather. The original data received from individual radars was not shared outside of NOAA/NCEP. The CMO HQ were working with the MRMS project leaders to identify other potential collaborators as well as a mechanism by which CMO Member Services could receive training on the use of MRMS products in operations.

10.12. As part of the CREWS Caribbean Pilot Project implementation, the CMO Headquarters restarted discussions with the NOAA MRMS team and the World Bank CREWS Consultant for hydrology on the development of a Gridded Precipitation dataset comprised of radar, rain gauges, and satellite estimated precipitation, which would be a valuable regional resource for early warning systems, climate monitoring, and risk analysis for flooding.

10.13. Council was reminded that the CMO Radar Network has considerable potential for climate risk analysis and other scientific applications. Approaches for better utilizing of Caribbean radars and archived data, including setting up easy access to the full data archives; more usage would increase benefit to the region. For example, an archive of high-resolution radar rainfall estimates is valuable for understanding rainfall variability on the scale of small watersheds and provides improved flash flood guidance and knowledge of climatological extremes. With climate change, the Caribbean was expected to experience high variability in precipitation and radar information would offer guidance on the “new normal” for setting infrastructure standards and other necessary adaptation. An archived dataset with the combined point accuracy of rain gauge data and the superior resolution of the full radar data would be a valuable regional resource.

10.14. Council noted that the CMO Headquarters had organized the first workshop, which was scheduled for 11-12 May 2020 at CMO Headquarters. However, due to the COVID-19 pandemic and the closure of the borders of Trinidad and Tobago, the meeting was canceled. It would be rescheduled for the first half of 2021.

REVIEW OF CMO RADARS AND UPGRADING RADARS TO DUAL POLARIZATION

10.15. The Council was informed that the majority of radars being installed were equipped with dual-polarization capability, i.e., having both horizontally and vertically polarized beams. Dual-polarization was now the operational standard in the US National Weather Service, after a series of upgrades. Indeed, the Cayman Islands radar, installed in 2013, has dual-polarization and the new radar to be installed in Jamaica would be a dual-polarized radar. The advantages of dual-polarization, compared with current weather radars, are:

- the effective removal of non-meteorological echoes, typically called clutter;
- significantly better quantitative rainfall estimates;
- the differentiation between very heavy rain and hail, which will improve flash flood watches and warning; and
- the potential to increase lead time for flash flood hazard warnings, because of greater confidence in dual-polarimetric radar data

10.16. It was recalled that the CMO Headquarters received Council's support to pursue funding for a capital project, with internationally-funded and tendered process, to obtain the necessary equipment to upgrade the CMO radars to dual polarization. To that end, the Headquarters Unit began discussions with the Caribbean Development Bank about pursuing international climate grant financing.

10.17. As a precursor to that activity, the CMO Headquarters was coordinating with the World Bank CREWS Caribbean Project on a review of the CMO Radar Network. The CMO Science and Technology Officer (STO) was scheduled to work with the World Bank consultant on the study. The consultant's visit to Trinidad and Tobago was scheduled to coincide with the first workshop of the Operational Radar Working Group. Both activities were postponed due to the pandemic. The findings of the review would inform a proposal being drafted to seek funds to upgrade the CMO radars to dual polarization.

REPAIR RESPONSE AND RADAR SPARE PARTS

10.18. Council was reminded that the CMO radars are now past ten years since installation and are increasingly malfunctioning, creating gaps in the regional warning system. Hence the need for more consistent maintenance and repairs of the radars, as was originally agreed at the outset of the CMO radar project. Local meteorological services cannot always affect rapid repairs due to budget constraints, the sometimes-high cost of parts, and the unpredictability of failures. The CMO Radar and Rawinsonde funds provides some support and the Operational Radar Working Group would aid in meeting some of the maintenance needs. These efforts do not always solve the need for having a more rapid response to unforeseen problems and the need for a larger spare parts repository. Setting up a fund and system for managing rapid repairs could eliminate many months of down time. Some funding could be negotiated in exchange for data access; akin to the approach of National Meteorological Services in other regions.

10.19. **The Council**:

(i) **Noted** the status of the weather radars in the CMO Member States;

(ii) **Reiterated** its call for the Meteorological Service operating radars to fully publicize their websites; for all Services to provide a link on their websites to relevant radars and composite loops, and to work towards the greater use of live radar data by national television stations in the region;

(iii) **Urged** Barbados to make a formal long-term commitment to the regional radar composite that it has developed and to ensure its availability for contribution to the regional components of the *WMO Integrated Global Observing System* (WIGOS);

(iv) **Encouraged** the Meteorological Services operating radars to participate in the NCEP Multi-Radar Multi-Sensor (MRMS) activities for the benefit of the region and the wider meteorological community;

(v) **Encouraged** the archiving data from CMO radars at CIMH and access to the full set of radar data for flash flood guidance, climate services, and other scientific applications;

(vi) **Discussed** and **provided guidance** on the matters related to upgrading the weather radars.

11 OTHER PROJECT UPDATES AND PROPOSALS

11(a) WMO Severe Weather Forecasting Programme (SWFP)

11.1. Council recognized the need to improve the weather warning system, particularly for episodes of severe weather that may not be the result of a tropical cyclone and could occur at any time of year. Council recalled that, in November 2015, it endorsed a proposal by CMO and partners to implement a WMO ***Severe Weather Forecasting Demonstration Project*** (SWFDP) in parts of the Caribbean, with an aim, among others, to foster greater collaboration among National Meteorological Services and Disaster Management Agencies. Since that time, significant strides have been made towards the implementation of what has been named the ***Severe Weather Forecasting Programme*** (SWFP) - Eastern Caribbean.

11.2. The Regional WMO Management structure has established the *Regional Sub-programme Management Team* (RSMT) for the development and implementation of the SWFP. The Coordinating Director co-chairs the RSMT with an expert from France. Other CMO representatives on the RSMT include Ms Kathy-Ann Caesar of the CIMH and Mr Dale Destin, Director (Ag) of the Antigua and Barbuda Meteorological Service. It was recalled that the WMO Severe Weather Forecasting Programme was being developed along the following lines:

(i) The SWFP would cover all the islands from Trinidad in the south to Puerto Rico in the North, to Dominican Republic and Haiti in the West;

(ii) The Météo-France Centre in Martinique would serve as the *Regional Forecast Support Facility* (RFSF) for the Project;

(iii) The CIMH would provide technical support for the SWFP.

11.3. Council recalled that the SWFP implementation in the Eastern Caribbean was made possible by seed funding from Canada through its CREWS (Climate Risk and Early Warning Systems) Project. The SWFP was being developed in four phases: 1) Overall Planning; 2) Implementation plan development and execution; 3) Demonstration and 4) Operational (no longer a project).

11.4. Council was informed that the SWFP-EC is now in its pre-operational Demonstration phase, initiated in 2019, with global and regional model forecast guidance being used to monitor potential severe weather by the *Regional Forecast Support Facility* (RFSF–Martinique). Access to the Extranet, which became operational 24/7 in 2019, has been provided to all National Meteorological Services in the project domain.

11.5. Training on skills in the use of numerical weather prediction models (NWP) and regional collaboration among forecasters across the region was conducted in December 2019, as a part of a *Caribbean Weather Forecasting Initiative* to support the EUREC^{4}A field study.

11.6. Council noted that in January 2020, the *Regional Subprogramme Management Team* met to examine progress made at the *Regional Forecast Support Facility* (Météo-France Martinique), including the development of the Web-based platform for data/products sharing, to produce severe weather guidance, and to ensure real-time coordination.

11.7. A report by the Caribbean Catastrophic Risk Insurance Facility (CCRIF) Intern, who was hosted by the CMO HQ in 2019, was presented to the Management Team. That report documented the severe weather warning needs of each state and territory and helped to define areas of responsibility for non-tropical cyclone severe weather warnings during the hurricane season, as well as recommended operating procedures between the *Regional Specialized Meteorological Center* (RSMC)–Miami/US Hurricane Center and the *RFSF*-Martinique.

11.8. The Management Team met virtually on 19 June 2020 and invited guests from the International Weather Ready Nations (WRN), Flash Flood Guidance System (FFGS), and Coastal Inundation and Forecast Initiative (CIFI) to encourage coordination among these related projects being implemented in the Caribbean.

11.9. Council recalled that the WMO Expert Group on the SWFP identified the *Caribbean Meteorological Organization* (CMO), through its Headquarters and other Organs, as the regional entity to support the SWFP in the operational phase.

11(b) CREWS Caribbean: *Strengthening Hydro-Meteorological and Early Warning Services in the Caribbean*

11.10. Council recalled the presentations from CMC58 about the *Climate Risk and Early Warning System* (CREWS) Caribbean Project, co-funded by the CREWS Initiative, and *Environment and Climate Change Canada* (ECCC). The aim of the CREWS-Caribbean project was to strengthen and streamline regional and national systems and capacity related to weather forecasting, hydrological services, multi-hazard, impact-based warnings and service delivery for enhanced decision-making in CARICOM countries.

11.11. The implementing partners are the WMO, the *Global Facility for Disaster Reduction and Recovery* (GFDRR), the *United Nations Office for Disaster Risk Reduction* (UNDRR), and the *World Bank Group* (WBG). The primary regional implementing partners were the Caribbean Disaster and Emergency Management Agency (CDEMA), CIMH, and CMO Headquarters Unit. The Project has three components: Component 1) Development of regional strategy for EWS; Component 2) Institutional Strengthening and streamlining of early warning and hydro-meteorological services; and Component 3) Support for Piloting High Priority National Activities.

11.12. The CMO Headquarters and the WMO signed an Implementing Agreement for the partial delivery of CREWS-Caribbean Project Component (2) with a project entitled, *Building Resilience to High-Impact Hydro-meteorological Events through Strengthening MHEWS in Small Island Developing States (SIDS) in the Caribbean*. The project was supporting the following activities being implemented by the CMO HQ, with funding of $263,000 USD. Both projects were expected to be completed by the second quarter of 2021.

- Meteorological Legislation
  A project to draft a Legislative template for National Meteorological Services in CMO Member States was implemented with support from the Organization of Eastern

Caribbean States (OECS). After an open call and evaluation of submissions, a consultant was hired in August 2020 and the draft Legislative template was in the process of development. The same consultant has also been developing related Policy to accompany the legislation.

- National Strategic Plans and Framework for Weather, Water, and Climate Services
  The CMO HQ initiated a project to develop National Strategic Plans, Framework for Weather, Water, and Climate Services and complementary Action Plan for National Meteorological and Hydrological Services of eight CMO Member States that requested assistance with developing strategic plans. The consultant was tasked with "*The development and endorsement of Strategic Plans (SPs) for the National Meteorological and Hydrological Services, a Framework for Weather, Water, and Climate Services (FWCS) and a complementary Action Plan for the countries: Anguilla, Antigua and Barbuda, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, St Vincent and the Grenadines using the WMO National Strategic Plan Template and Guide*." The implementation was coordinated with the CIMH, which was developing Climate Services at the national level through their projects. Consultations with national focal points and national stakeholders began in September 2020.

11.13. Council noted that four pilot projects have been proposed under Component (3) of the CREWS Caribbean Project to be implemented by various regional organizations including CIMH, CDEMA, the CMO Headquarters, Météo-France, Caribbean Telecommunication Union (CTU), among others:

- Pilot activity 1: Establishment of the Caribbean Operational Plan for Hydromet Hazards
- Pilot activity 2: Development of a Multi-sensor Precipitation Grid
- Pilot activity 3: Support the Transition to Impact-Based Forecasting
- Pilot activity 4: Development of a Regional Emergency Alert System

11.14. The CMO Headquarters would be significantly involved in Pilot Activities 1 and 2, where Pilot activity 1, the Caribbean Operational Plan for Hydromet Hazards aims to build upon the successful, cooperative Hurricane Operational Plan that is applied routinely and updated annually by the Hurricane Committee chaired by NHC Miami under the auspices of the WMO Tropical Cyclone Programme. The goal was to help develop a set of harmonized Operational Plans for each hydro-meteorological hazard.

11.15. Council was informed that Pilot Activity 2 would rely on the Caribbean Radar Network to prepare a regional precipitation grid that would integrate radar and satellite derived rainfall estimates, calibrated with locally observed rain gauge data. The precipitation grid would be shared among participating countries and be used to drive forecasting systems such as the Flash Flood Guidance System (FFGS) and be useful to disaster management, water resources managers, agriculture, energy and other sectors that increasingly demand more accurate and timely access to rainfall information. Since there was benefit to the entire region, the hope was that a number of countries would be willing to participate in a sub-regional pilot that could be incrementally extended as beneficial experiences were shown. The CMO Headquarters initiated discussions with experts from the NOAA Multi-Radar Multi-sensor (MRMS) Program, that created multi-radar, multi-sensor precipitation operational products using radar data from Puerto Rico, Florida, Mexico, Belize and Cayman Islands.

11(c) EUREC4A-UK-CMO Caribbean Weather Forecasting Initiative

11.16. Through a partnership between the Caribbean Meteorological Organization (CMO) and the University of Leeds, a *Caribbean Weather Forecasting Initiative,* would support *EUREC^{4}A-ATOMIC-OA*, an international field study that would be led led by institutions from France, Germany along with the CIMH. The field campaign was held 20 January to 20 February 2020 and based out of Barbados. The *Caribbean Weather Forecasting Initiative*. was supported by a grant from the Natural Environment Research Council (NERC), United Kingdom, and the WMO Climate Risk and Early Warning Systems (CREWS) Caribbean Project.

11.17. Council noted the benefits to the National Meteorological Services in the Caribbean**,** which gained enhanced capability in understanding local weather, such as localized storms, through a training workshop and a weather forecast test-bed during the field campaign. A pre-EUREC^{4}A, knowledge exchange workshop, organized by the CMO Headquarters, University of Leeds, and CIMH on 2-6 December 2019, brought together researchers and 16 forecasters from 14 Caribbean States and Territories. During the forecast testbed, 20 January to 14 February, forecasters worked in dispersed teams, collaborating via online communication systems to deliver weather forecasts to support research operations A follow-up workshop was planned for 2021, to consolidate knowledge of forecasting concepts for the Caribbean and lessons learned during the forecast testbed.

11.18. Council was advised that the project was partially funded through an agreement between WMO and CMO Headquarters Unit, as it supports the Severe Weather Forecast Programme by developing collaboration practice among regional forecasters and helping forecasters to understand the strengths and limitations of high-resolution weather models.

11(d) Caribbean Hydro-Meteorology Symposium 2020

11.19. Council noted that, in response to challenges articulated by Directors of NMHSs, the CMO Headquarters Unit co-organized a symposium, in November 2019, focused on operational hydro-meteorology in the Caribbean. The symposium was motivated by requests from Directors for guidance in dealing with various issues, including growing demands for new weather and climate services and the data requirements that underpin those services.

11.20. Council noted subsequent action by the CMO Headquarters following the 2019 symposium. Specifically, the CMO Headquarters encouraged Member States to participate in the workshops preceding the WMO Data Conference. Subsequently, the Coordinating Director shared information from the 2019 symposium in an oral presentation, entitled, "*A Caribbean Perspective on Data and Partnerships for National Hydro-Meteorological Services and Key Stakeholders*", at the WMO Data Conference on 17 November 2020.

11.21. Council also recalled that the Met Directors found the 2019 symposium very valuable and desired to have follow-up symposia. Therefore, the CMO Headquarters organized, with Varysian Ltd, a Virtual Caribbean Hydro-Meteorology Symposium 2020 scheduled for 15-17 December 2020. The 2020 symposium would include a special focus on operational hydrology, which would help to inform the integration of operational hydrological services into the WMO and development of hydrological services in CMO Member States.

11(e) Lightning Detection System

11.22. Council recalled that, the CMO Headquarters indicated its interest in establishing a ground-based *Lightning Detection System* in the region in partnership with the Meteorological Service of France [Météo-France]. The CMO Headquarters studied this system and was of the opinion that such a system was very necessary in the Caribbean. In various publications and presentations, it

had been shown how ground-based systems use triangulation from sensors at multiple locations to determine location of the lightning flash. Therefore, for this higher resolution to be achieved, it would be necessary to install some lightning sensors along the island chain. At the 59th Session (Anguilla, 2019), Council approved the initiation of a project to develop a *CMO Lightning Detection Network*.

11.23. Council noted that over the years, the CMO Headquarters received proposals from a number of lightning-detection suppliers. The CMO Headquarters proposed that the Council consider a capital project approach, in which international funding could be sought, in the same way as was done for the CMO Radar Project, through an internationally-tendered process, in which the equipment purchased and installed under such a project would be owned and operated by the CMO for the benefit of all CMO Member States and the region in general. Council recalled that before a final decision could be made on *Lightning Detection System*, the *Geostationary Lightning Mapper* (GLM), which had just become available on the new GOES satellites, should be evaluated during 2018 and 2019 prior to deciding on the CLDN. Studies conducted over North America that compared the GLM with the Vaisala's National Lightning Detection Network and Earth Networks Total Lightning Network, provided guidance for how to proceed. For operational forecasting, it was optimal to have lightning observations from both the GLM and a ground-based network of sensors. The GLM provides high quality observations over data sparse regions (e.g., the ocean) and while ground-based networks are excellent at locating cloud-to-ground flash strikes. Some Member States, such as Belize and Jamaica, have begun exploring setting up sensors, which can become part of a regional network.

11.24. Council noted the importance of lightning safety awareness, particularly in light of recent lightning deaths in Jamaica in 2020 and injuries of some Jamaican National footballers by lightning during an international match in 2019. With the support of well-known lightning safety experts at NOAA and elsewhere, the CMO Headquarters has started discussions with the Meteorological Service of Jamaica about developing a lightning safety awareness forum

11.25. **The Council:**

(i) **Noted** the progress made towards the WMO *Severe Weather Forecasting Programme* (SWFP) in the Eastern Caribbean and **strongly supported** regional participation in its implementation;

(ii) **Also Noted** and **strongly supported** the developments regarding the WMO CREWS-Caribbean project to strengthen the National Meteorological and Hydrometeorological Services of CMO Member States through the development of model legislation and policy as well as National Strategic Plans with National Frameworks for Weather, Water, and Climate and Action Plans for beneficiary Member States;

(iii) **Further Noted** planned pilot activities under the CREWS Caribbean project including harmonized operational plans for multiple hydrometeorological hazards, modelled after the Hurricane Operational Plan and a high-resolution timely regional precipitation grid to aid decisions by hydro-meteorologically sensitive sectors;

(iv) **Also Noted** the success of the *Caribbean Weather Forecasting Initiative* in advancing of forecaster skill, knowledge exchange with researchers, and the valuable contribution of forecasters in CMO Member States to an international field study;

(v) **Noted** the upcoming second Caribbean operational hydro-meteorology symposium for Directors of National Meteorological Services and other key stakeholders, which follows on the successful 2019 symposium; this time focused on integration of hydrology and on public, private, and academic partnerships to enhance weather and climate services in the Caribbean;

(vi) **Noted** the recent developments in connection with enhancing lightning safety awareness and an operational ground-based lightning detection system.

12 OTHER MATTERS

12(a) Human Resources Committee

12.1. The Council recalled the matter of retroactive payments in relation to the CIMH Principal's terms of employment, which were to be negotiated by the Human Resources (HR) Committee. The HR Committee Chair reported on the HR Committee meeting with the CIMH Principal on 6 November 2020 and provided background on decisions of the 59th Council to peg the salary of the CIMH Principal to the Deputy Principal of The University of the West Indies, Cave Hill. The HR Committee met again on 9 November 2020 to agree on the particular methodology to be used to determine the specific payment amounts. The final amounts were then communicated to the CIMH Principal. The HR Committee Chair indicated that questions about the amounts had been raised by the CIMH Principal when he received the requisite information just prior to the start of the CMC Session.

12.2. Following extended discussion, the proposal was referred again to the HR committee, which was advised to meet before the end of November to renegotiate and resubmit a revised proposal to the Council by 11 February 2021. The Council would then make a decision by correspondence.

12(b) Rental of the CMO Headquarters Offices

12.4. Council was reminded of the *Agreement Between the Government of the Republic of Trinidad and Tobago and the Caribbean Meteorological Organization Relating to the Privileges and Immunities to be Granted in Connection with the Headquarters Unit of the Caribbean Meteorological Organization*, specifically Article 11 - *Provision of Headquarters Premises*, Item 1, which states:

> *1. The Government hereby undertakes to provide a permanent Headquarters premises which shall include a suitable and adequate building for the Headquarters Unit.*

12.5. In this regard, the Council was informed that the lease for the premises currently occupied by the CMO HQ, between the Landlord and the Ministry with responsibility for Meteorology in Trinidad and Tobago, expired in February 2017 and has not yet been renewed. The last update from the Ministry with respect to the status of the lease was provided February 2019. At the close of the 2020 fiscal year in Trinidad and Tobago, on 30 September 2020, the Landlord had not been paid for twelve full months. However. in October 2020 payment was received for four months rental.

12.6. Council was reminded of a similar discussion at CMC47 (St Vincent, 2007) and the CMO HQ was required moved to its current location in March 2008 and paid the rent until 2012 at which time the Government of the Republic of Trinidad and Tobago refunded all rents paid by the Headquarters Unit. Council was informed that unlike the situation in 2008 to 2012, the Headquarters Unit does not have funds to pay the rent or relocation to a new location, neither was it budgeted.

12(c) Trustee for Terminal Benefit Fund

12.7. The Council was reminded of the CMO Headquarters Staff Terminal Benefit Fund Plan, which initially required the Headquarters Unit to provide for a lump sum payment to members of staff upon retirement. The Trust Deed for the Plan was amended in 2014, to include members of staff

who were on contract and the Trust Deed was amended again 2017 to provide the payment on the death of an employee.

12.8. The Trust Deed which was established in 1996 requires three signatories to the account which manages the Plan. Two (2) of the signatories represented the employer and the third represented the employees. From the inception of the Trust Deed, the signatories are the Coordinating Director, the Director of the Trinidad and Tobago Meteorological Service and the Administrative Officer, CMO HQ (at present the Finance and Administrative Officer).

12.9. Unfortunately, the Plan has only two (2) signatories since early 2019, when the former Director of the Trinidad and Tobago Meteorological Service retired. Despite, representation being made to have the incumbent Director of the Trinidad and Tobago Meteorological Service become a signatory to the Plan since 2019, this has not occurred.

12.10. In November 2016, CMO HQ lost a member of staff who died intestate and In October 2020 her spouse submitted Letters of Administration to claim her estate. However, at present, we do not have the required two (2) signatories to the Terminal Benefit Account held for this former employee within the borders of Trinidad and Tobago.

12.11. Council was invited to note the present list of Trustees to the Terminal Benefit Deed signed in 1995 and to acknowledge that the Trust Deed was operating with less than the required number of Trustees. Further, Council was asked to provide guidance on a way forward with respect to the appointment of a second Employer's Trustee for the management of the Terminal Benefit Staff Fund. Council discussed the situation and the **Principal Delegate of Trinidad and Tobago**, stated that the legal department of the Ministry with responsibility for the Meteorological Service would be requested to expedite its review of the Trust Deed to have the matter resolved speedily.

12(d) Regional Forecasting Arrangements

12.12. Council noted requests by Barbados, Dominica, St Vincent and the Grenadines, and Antigua and Barbuda for a review of regional forecasting arrangements to be tabled for discussion at the 61st Session of the Council, which was anticipated to be an in-person session.

12(e) CMO Headquarters Long-service awards

12.13. Council noted the CMO Headquarters long-service awards presented to: Mr Glendell De Souza for 15 years of service and Mrs Natalie Araujo O'Brien, Mrs Debra Spencer, and Mrs Natasha Figaro-Boyce, respectively, for their five years of service.

12.14. **The Council:**

(i) **Directed** the HR Committee to seek professional advice in the accounting field and to re-negotiate with the CIMH Principal on the matter of retroactive payments

(ii) **Directed** the HR committee to meet again by the end of November 2020 and resubmit a revised proposal to Council by February 11, 2021.

(iii) **Noted** the current status of the lease arrangements for the premises occupied by the CMO HQ;

(iv) **Provided** guidance on a way forward on the payment of rent for the premises occupied by the CMO HQ.

(v) **Discussed** the matter of the CMO Headquarters Trustees and **agreed** to the **offer** of the **Principal Delegate of Trinidad and Tobago** to have the legal department of the Ministry with responsibility for the Trinidad and Tobago Meteorological Service expedite its review of the Trust Deed, in order to have the matter resolved speedily.

(vi) **Agreed** to table discussions of regional forecasting arrangements to the 61st Session of Council

(vii) **Noted** the long-service awards presented to staff of the CMO Headquarters.

13 DATE AND VENUE OF CMC61 (2021)

13.1. Council invited Member States to indicate their willingness to host the next sessions of the CMC. The delegate from Guyana expressed an interest in hosting the Council for its 61st Session in 2021. The Cayman Islands had indicated their willingness to host in 2021, however, that was no longer possible. 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 2022 and in 2023, the latter being the 50th anniversary of the Agreement to establish the CMO.

Close of Meeting

13.2. There being no other business, the Meeting ended at 1429LST with an exchange of courtesies.

****

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

6. FINANCIAL REPORTS
   - (a) Status of Refundable Balances
   - (b) CMO HQ - Auditor's Report
   - (c) Statement of Contributions and Arrears (CMO HQ & CIMH)

8. CMO BUDGETS (Headquarters Unit, CRN and Radar, CIMH)
   - (a) CMOHQ Budget Estimates for 2021
   - (b) CIMH Budget Estimates for 2021

END OF DAY ONE

5. SPECIAL CMO AND WMO ISSUES
   - (A) Outcome/Highlights of the ***72nd Executive Council*** (EC) of the WMO
     - (1) Transition to the new WMO Governance Structure and Strategic Plan
     - (2) Budget and Financing for 2020-2023
     - (3) Extraordinary Session of the World Meteorological Congress – Key Issues
     - (4) Other Highlights
   - (B) WMO Integrated Global Observing System – Initial Operational Phase
   - (C) Reception of Geostationary Satellite Imagery in CMO Member States
   - (D) The Global Framework for Climate Services (GFCS)
   - (E) Issues emerging from the WMO Technical Commission and Research Board sessions in 2020
   - (F) Disaster Risk Reduction and Regional Severe Weather Forecasts and Warning Systems
     - Tropical Cyclone Programme
     - Global Multi-hazard Alert System (GMAS)
     - WMO Catalogue of Hazardous Events

7. THE CMO HEADQUARTERS OPERATIONAL PLAN

9. ANNUAL MEETING OF THE DIRECTORS OF METEOROLOGICAL SERVICES

10. CMO WEATHER RADAR NETWORK

11. OTHER PROJECT UPDATES AND PROPOSALS

    (a) Severe Weather Forecast Programme (SWFP)

    (b) Climate Risk and Early Warning Systems (CREWS) Caribbean Project

    (c) EUREC4A Caribbean Weather Forecasting Initiative

    (d) Lightning Detection System

12. OTHER MATTERS

13. DATE AND VENUE OF FUTURE CMC SESSIONS

END OF DAY TWO

_____

ANNUAL MEETING OF THE CARIBBEAN METEOROLOGICAL COUNCIL
VIRTUAL MEETING
19TH-20TH NOVEMBER 2020

CMC60
LIST OF DELEGATES

ANGUILLA

Mr Sherman Williams
Chief Executive Officer
Anguilla Air & Sea Ports Authority – Met Service
Clayton J. Lloyd International Airport
Wallblake Estate
The Valley
Anguilla
Tel: 1 264 584 9654
Fax: 1 264 497 8345
Email: sherman.williams<at>aaspa.ai

Mr Jeffrey Jennings
Meteorological Supervisor
Anguilla Air & Sea Ports Authority – Met Service
Clayton J. Lloyd International Airport
Wallblake Estate
The Valley
Anguilla
Tel: 1 264 2451 Ext 4121 /
1 264 476 6302
Fax: 1 264 497 8345
Email: **Foody333<at>gmail.com**

ANTIGUA AND BARBUDA

Mr Edson Joseph
Permanent Secretary
Ministry of Public Utilities, Civil Aviation, Transportation & Energy
c/o PO Box 1051
St. John's
Antigua and Barbuda
Tel: 1 268 464 7508
Fax: 1 268 462 4606
E-mail: **jedson84<at>gmail.com**

Mr Dale Destin
Director of Meteorology (Ag)
Antigua and Barbuda Meteorological Service
Ministry of Public Utilities, Civil Aviation and Transportation
c/o PO Box 1051
St. John's
Antigua and Barbuda
Tel: 1 268 463 0634
Fax: 1 268 462 4606
E-mail: **dale_destin<at>yahoo.com**

BARBADOS

Mr Terry Bascombe

Permanent Secretary (Ag)
Ministry of Agriculture and Food Security
Graeme Hall
Christchurch
Barbados
Tel: 1 246 253 6198
Fax:
Email: **tbascombe<at>agriculture.gov.bb**

Mr Brian Murray

Acting Director
Barbados Meteorological Services
Ministry of Agriculture & Food Security
Graeme Hall
Christ Church
Barbados
Tel: 1 246 239 0117
Fax: 1 246 535 0029
E-mail: **BMurray<at>agriculture.gov.bb**

BRITISH VIRGIN ISLANDS

Ms Paulette Cruz

Air Traffic Services Manager (Ag)
British Virgin Islands Airports authority
T B Lettsome International Airport
Beef Island
British Virgin Islands
Tel: 1 284 394 8000
Fax:
E-mail: **pcruz<at>bviaa.com**

CAYMAN ISLANDS

Mr John Tibbetts

Director General
Cayman Islands National Weather Service
#44 Pinto Dr.
George Town
Grand Cayman
Cayman Islands
Tel: 1 345 925 8548
Fax:
E-mail: **john.tibbetts<at>gov.ky**

DOMINICA

Mr Marshall Alexander

Senior Meteorological Officer
Dominica Meteorological Service
Ministry of Environment, Rural Modernisation
& Kalinago Upliftment
6 Floor, Financial Centre
Kennedy Avenue
Roseau
Dominica
Tel: 1 767 225 6995
Fax:
E-mail: **marshallalexander<at>hotmail.com**

GRENADA

Dr the Honourable Clarice Modeste-Curwen

Minister
Ministry of Tourism, Civil Aviation, Climate Resilience & the Environment
Ministerial Complex
Sir Eric Matthew Gairy Botanical Gardens
Tanteen
St. George's
Grenada
Tel: 1 473 440 6917
Fax: 1 473 444 1574
E-mail: **dr.cmodeste<at>gmail.com**

Ms Desiree Stephen

Permanent Secretary
Ministry of Tourism, Civil Aviation, Climate Resilience & the Environment
Ministerial Complex
Sir Eric Matthew Gairy Botanical Gardens
Tanteen
St. George's
Grenada
Tel: 1 473 440 6917
Fax: 1 473 444 1574
E-mail: **ps<at>tourism.gov.gd**

Mr Hubert Whyte

Manager of Meteorology
Grenada Airports Authority
Maurice Bishop International Airport
Ministry of Civil Aviation and Tourism
4th Floor Botanical Gardens
St. George
Grenada
Tel: 1 473 444 4142
Fax: 1 473 444 1574
E-mail: **hwhyte<at>gaa.gd**

GRENADA CONT'D

Ms Cecil Mitchell

Forecaster/ Meteorologist
Grenada Airports Authority
Maurice Bishop International Airport
Ministry of Civil Aviation and Tourism
4th Floor Botanical Gardens
St. George
Grenada
Tel: 1 473 444 4142
Fax: 1 473 444 1574
E-mail: **cemitchell<at>gaa.gd**

Mr Kurt Williams

IT Manager
Grenada Airports Authority
Maurice Bishop International Airport
Ministry of Civil Aviation and Tourism
4th Floor Botanical Gardens
St. George
Grenada
Tel: 1 473 534 5263
Fax: 1 473 444 1574
E-mail: **kwilliams<at>gaa.gd**

GUYANA

Ms Delma Nedd

Permanent Secretary
Ministry of Agriculture
18 Brickdam
Starbroek, Georgetown
Guyana
Tel: 1 592 227 5527
Fax: 1 592 226 1460
E-mail: **ps.moagy<at>gmail.com**

Dr Garvin Cummings

Chief Hydrometeorological Officer
Hydrometeorological Service
Ministry of Agriculture
18 Brickdam
Starbroek, Georgetown
Guyana
Tel: 1 592 225 4247
Fax: 1 592 226 1460
E-mail: **garvincummings<at>gmail.com**
garvincummings<at>yahoo.com

JAMAICA

Honourable Pearnel Charles Jr

Minister
Ministry of Housing, Urban Renewal, Environment & Climate Change
Kingston
Jamaica
Tel: 1 876 577 3611
Fax: 1 876 960 8990
E-mail: **pearnel.charles<at>mhruecc.gov.jm**

Mr Evan Thompson

Director
Meteorological Service
Ministry of Housing, Urban Renewal, Environment & Climate Change
65 ¾ Half-Way-Tree Road
Kingston 10
Jamaica
Tel: 1 876 577 3611
Fax: 1 876 960 8990
E-mail: **e.thompson<at>metservice.gov.jm**

Mrs Jacqueline Spence-Hemmings

Climate Branch Head
Meteorological Service
Ministry of Housing, Urban Renewal, Environment & Climate Change
65 ¾ Half-Way-Tree Road
Kingston 10
Jamaica
Tel: 1 876 582 2822
Fax: 1 876 960 8990
E-mail: **j.spence<at>metservice.gov.jm**

MONTSERRAT

Mr Joseph Irish

Airport Manager / Department Head
National Meteorological Service
Ministry of Communications, Works, Energy & Labour
John A Osborne Airport
Gerald's Montserrat
MSR1110
Montserrat
Tel: 1 664 495 1572
Fax:
E-mail: **irishj<at>gov.ms**

SAINT LUCIA

Mr Calvin Lee

Deputy Permanent Secretary
Ministry of Infrastructure, Ports, Energy & Labour
Union, Castries
Saint Lucia
Tel: 1 758 468 4303
Fax: 1 758 453 2769
E-mail: **clee<at>gosl.gov.lc**
calvinlee758<at>gmail.com

Mr Andre Joyeux

Director
Saint Lucia Meteorological Services
Ministry of Infrastructure, Ports, Energy & Labour
Union, Castries
Saint Lucia
Tel: 1 758 721 7140
Fax: 1 758 453 2769
E-mail: **andre.joyeux<at>govt.lc**

ST KITTS AND NEVIS

Honourable Mr Lindsay Grant

Minister
Ministry of Tourism, Transport & Ports
P.O. Box 878
Pelican Mall
Bay Road
Basseterre
St. Kitts
Tel: 1 869 465 2521 ext 1496
Fax: 1 869 465 8124
E-mail: **lindsay.grant<at>stkittstourism.kn**

Mrs Carlene Henry-Morton

Permanent Secretary
St. Kitts Tourism Authority
Ministry of Tourism, Transport & Ports
P.O. Box 878
Pelican Mall
Bay Road
Basseterre
St. Kitts
Tel: 1 869 662 4394
Fax: 1 869 465 8124
E-mail: **carlene.henrymorton<at>stkittstourism.kn**

ST KITTS AND NEVIS CONT'D

Mr Elmo Burke - Senior Meteorological Officer
St Christopher Air & Sea Ports Authority
Ministry of Tourism, Transport & Ports
R.L. Bradshaw International Airport
Golden Rock
St Kitts
Tel: 1 869 465 8121/8122/8123
Fax: 1 869 465 8124
E-mail: **elmo.burke<at>scaspa.com**

ST VINCENT AND THE GRENADINES

Dr the Honourable Ralph Gonsalves
Prime Minister & Minister
Ministry of Foreign Affairs, Legal Affairs, National Security & Information
St Vincent and the Grenadines
Tel: 1 784 456 1703
Fax: 1 784 458 4786
E-mail: **pmosvg<at>vincysurf.com**

Mr Hudson Nedd
Permanent Secretary
Ministry of Foreign Affairs, Legal Affairs, National Security & Information
St Vincent and the Grenadines
Tel: 1 784 456 1703
Fax: 1 784 458 4786
E-mail: **huddyned<at>yahoo.com**

Mrs Andrea Best
Director of Airports (Ag)
Airports Department
Ministry of Foreign Affairs, Legal Affairs, National Security & Information
E.T. Joshua Airport
Arnos Vale
St Vincent and the Grenadines
Tel: 1 784 493 6800
Fax: 1 784 458 4786
E-mail: **andreabest.airportsat>gmail.com**

Mr Billy Jeffers
Meteorological Services Manager
St Vincent & the Grenadines Meteorological Services
Airports Department
Ministry of Foreign Affairs, Legal Affairs, National Security and Information
E.T. Joshua Airport
Arnos Vale
St Vincent and the Grenadines
Tel: 1 784 491 3026
Fax: 1 784 458 4786
E-mail: **billy_jeffers_363<at>hotmail.com**

Mr Sehon Marshall

Press Secretary
Office of the Prime Minister
Administrative Centre
Bay Street
Kingstown
St. Vincent
Tel: 1 784 492 6464
Fax:
E-mail: **sehon.marshall<at>gov.vc**

TRINIDAD AND TOBAGO

Ms Nicolette Duke

Permanent Secretary
Ministry of Public Utilities
One Alexandra Place
#1 Alexandra Street
St Clair
Trinidad and Tobago
Tel: 1 868 628 9500
Fax:
E-mail: **nduke<at>mpu.gov.tt**

Mr Shakeer Baig

Assistant Director
Trinidad and Tobago Meteorological Service
Rawinsonde Building
Piarco Airport
Piarco
Trinidad and Tobago
Tel: 1 868 494 3206
Fax: 1 868 669 4009
E-mail: **shakbaig<at>hotmail.com**

TURKS AND CAICOS ISLANDS

Dr Holly Hamilton

Incoming Director of Meteorology
Turks and Caicos Islands Airports Authority
Providenciales International Airport
Providenciales
Turks and Caicos Islands
Tel: 1 649 243 8584
Fax: 1 649 941 5996
E-mail: **hhamilton733<at>gmail.com**

Ms Tiffany Henfield

Meteorological Officer
Turks and Caicos Islands Airports Authority
Providenciales International Airport
Providenciales
Turks and Caicos Islands
Tel: 1 649 231 9092
Fax: 1 649 941 5996
E-mail: **tiffanyhenfield<at>tciairports.com**

INSTITUTIONS/ORGANIZATIONS

CARIBBEAN METEOROLOGICAL ORGANIZATION HEADQUARTERS UNIT

Dr Arlene Laing
Coordinating Director
#27 O'Connor Street, Woodbrook
PO Box 461, Port of Spain, 170513
Trinidad and Tobago
Tel: 1 868 622 4711
Fax: 1 868 622 0277
E-mail: **ALaing<at>cmo.org.tt**

Mr Glendell De Souza
Science and Technology Officer
#27 O'Connor Street, Woodbrook
PO Box 461, Port of Spain, 170513
Trinidad and Tobago
Tel: 1 868 622 4711
Fax: 1 868 622 0277
E-mail: **GDe_Souza<at>cmo.org.tt**

Mrs Natalie Araujo-O'Brien
Finance and Administrative Officer
#27 O'Connor Street, Woodbrook
PO Box 461, Port of Spain, 170513
Trinidad and Tobago
Tel: 1 868 622 4711
Fax: 1 868 622 0277
E-mail: **Naraujo-OBrien<at>cmo.org.tt**

CARIBBEAN INSTITUTE FOR METEOROLOGY AND HYDROLOGY

Dr David Farrell
Principal
Caribbean Institute for Meteorology and Hydrology
Husbands, St James
Barbados
Tel: 2464251362
Fax: 1 246 424 4733
E-mail: **dfarrell<at>cimh.edu.bb**

Mrs Cheryl Joyette
Senior Administrative Officer
Caribbean Institute for Meteorology and Hydrology
Husbands, St. James BB 23006
Barbados
Tel: 1 246 425 1362
Fax: 1 246 424 4733
E-mail: **cjoyette<at>cimh.edu.bb**

CARIBBEAN INSTITUTE FOR METEOROLOGY AND HYDROLOGY CONT'D

Ms Andrea Applewhaite

Senior Administrative Officer
Caribbean Institute for Meteorology and Hydrology
Husbands, St. James BB 23006
Barbados
Tel: 1 246 851 2869
Fax: 1 246 424 4733
E-mail: **adapplewhaite<at>gmail.com**

CARIBBEAN COMMUNITY (CARICOM)

Ambassador Irwin LaRoque

Secretary-General
CARICOM Secretariat
Turkeyen Georgetown
Guyana
Tel: 1 592 222 0001
Fax:
E-mail: **osg<at>caricom.org**

Mr Neville Bissember

Adviser
Office of the Secretary-General
CARICOM Secretariat
Turkeyen Georgetown
Guyana
Tel: 1 592 222 0001
Fax:
E-mail: **neville.bissember<at>caricom.org**

Mr Douglas Slater

Assistant Secretary General
Office of the Secretary-General
CARICOM Secretariat
Turkeyen Georgetown
Guyana
Tel: 1 592 222 0001
Fax:
E-mail: **douglas.slater<at>caricom.org**

Ms. Amrikha Singh

Programme Manager
CARICOM Secretariat
Turkeyen Georgetown
Guyana
Tel: 592 246 233 3048
E-mail: **amrikha.singh<at>caricom.org**

Mr Kareem Sabir

Senior Project officer
Sustainable Development
CARICOM Secretariat
Turkeyen Georgetown
Guyana
Tel: 592 222 000 10006
E-mail: **kareem.sabir<at>caricom.org**

CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY

Elizabeth Riley

Executive Director (Ag)
Resilience Way,
Lower Estate
St. Michael,
BARBADOS
Tel: 1 246 434 4880
Fax: 1 246 271 3660
Email: **elizabeth.riley<at>cdema.org**

WORLD METEOROLOGICAL ORGANIZATION (WMO)

Prof Gerhard Adrian

President
World Meteorological Organization
7bis, avenue de la Paix,
Case postale 2300
CH-1211 Geneva 2
Switzerland
Tel: 1 698 062 4200
Fax:
E-mail: **gadrian<at>wmo.int**

Prof. Petteri Taalas

Secretary General
World Meteorological Organization
7bis, avenue de la Paix,
Case postale 2300
CH-1211 Geneva 2
Switzerland
Tel: 1 417 951 67124
Fax:
E-mail: **ptaalas<at>mo.int**

Dr Lucio Filipe

Director Regional Strategy Office
Case Postale No. 2300
7bis, Avenue de la Paix
CH-1211 Geneva
Switzerland
Tel: 1 227 308 579
Fax:
E-mail: **flucio<at>wmo.int**

Ms Mary Power

Director of Member Services and Development
World Meteorological Organization
7bis, avenue de la Paix,
Case postale 2300
CH-1211 Geneva 2
Switzerland
Tel: 1 417 925 17306
Fax:
E-mail: **MPower<at>wmo.int**

WORLD METEOROLOGICAL ORGANIZATION (WMO) CONT'D

Mr Rodney Martinez

Sub-Regional Representative
WMO Office for North and Central America & the Caribbean
Apartado Postal 7-3350-1000
San Jose
Costa Rica
Tel .: +41(0)22 730 81 11
Fax: 011-506-256-8240
E-mail: **rmartinez<at>wmo.int**

METEOROLOGICAL SERVICES OF SURINAME

Ms Sukarni Mitro

Director
Meteorological Services of Suriname
Magnesiumstraat 41
Paramaribo
Suriname
Tel: 597 491 143 / 597 498 209
Fax:
E-mail: **sukarnimitro<at>gmail.com**

METEOROLOGICAL DEPARTMENT OF ST. MAARTEN

Mr Joseph N. Isaac

Department Head
Meteorological Department of St. Maarten
Ministry of Tourism, Economic Affairs, Traffic and Telecommunication
10 Modesta Drive
Simpson Bay
St Maarten
Tel: 1 721 520 3140
Fax:
E-mail: **joseph.isaac<at>sintmaartengov.org**

BERMUDA WEATHER SERVICE

Dr Mark Guishard

Director
P.O.Box GE 123
ST George's
GE BX
Bermuda
Tel: 1 441 293 5067
Fax:
E-mail: **Mguishard<at>airportauthority.bm**

THE UNIVERSITY OF THE WEST INDIES (MONA CAMPUS)

Dr Tannecia Stephenson

Head
Department of Physics
Climate Studies Group at Mona
The University of the West Indies
Mona Campus
Kingston
JAMAICA
Tel: 1 876 927 2480
Fax:
E-mail: **tannecia.stephenson02<at>uwimona.edu.jm**

THE UNIVERSITY OF THE WEST INDIES (ST AUGUSTINE CAMPUS)

Dr Ronald Roopnarine

Lecturer (Agri-Environmental Disaster Risk Resilience)
Department of Food Production
Faculty of Food and Agriculture
Tel: 1 868 721 4799
Fax:
E-mail: **ronald.roopnarine<at>sta.uwi.edu**

THE UNIVERSITY OF THE WEST INDIES (CAVE HILL CAMPUS)

Dr John Charlery

Senior Lecturer
Department of Computer Science, Mathematics & Physics
UWI Cave Hill
Bridgetown
Barbados
Tel: 1 246 417 4363
Fax:
E-mail: **john.charlery<at>cavehill.uwi.edu**

WORLD BANK

Dr Jeffrey Keeler

Chief Consultant
Dr Radar Consulting
Meteorological Radar Services
2521 Broadway Suite 307
Boulder
Colorado
United States of America
Tel: 1 303 444 7675
Fax:
E-mail: **rjkeeler<at>gmail.com**

WORLD BANK CONT'D

Dr Melanie Kappes

Disaster Risk management Specialist
Climate, Risk & Early Warning Systems (CREWS)
The World Bank
1818 H Street
NW Washington DC
20433
USA
Tel:
Fax:
E-mail: **mkappes<at>worldbank.org**

NATIONAL BROADCASTING CORPORATION RADIO STATION

Mr Richmond Hill

NBC Radio
P.O. Box 705
Richmond Hill
Kingstown
St. Vincent and the Grenadines
Tel: 1 784 457 1111 / 1 784 457 2705
Fax:
E-mail: **programming<at>nbcsvg.com**

VINCY CULTURE CONNECTION CHANNELTV (VC3)

Mr Rohan Morgan

Technical Director
Victoria Park
Kingstown
VC0100
Kingstown
St. Vincent and the Grenadines
Tel: 1 784 455 2617
Fax:
E-mail: **203vc3tv<at>gmail.com**

RETIRED PROFESSOR OF METEOROLOGY

Dr John Lee

447 Kemmerer Road
State College, PA
United States of America
Tel: 1 814 234 1752
Fax:
E-mail: **johnd1929<at>comcast.net**

SUPPORT STAFF

Ms Avalon Sharpe

Secretary
Caribbean Meteorological Organization Headquarters
#27 O'Connor Street, Woodbrook
PO Box 461, Port of Spain, 170513
Trinidad and Tobago
Tel: 1 868 622 4711
Fax: 1 868 622 0277
E-mail: **asharpe<at>cmo.org.tt**

Ms Rosslyn Thompson

Accounts Clerk
Caribbean Meteorological Organization Headquarters
#27 O'Connor Street, Woodbrook
PO Box 461, Port of Spain, 170513
Trinidad and Tobago
Tel: 1 868 622 4711
Fax: 1 868 622 0277
E-mail: **rthompson<at>cmo.org.tt**

_____

ANNEX III

PROPOSALS FOR DRAWDOWN OF FUNDS FROM REFUNDABLE BALANCES

Introduction

By agreement between the CMO Headquarters and the Government of the United Kingdom, the CMO Headquarters, through the Coordinating Director, represents the British Caribbean Territories (BCT) of Anguilla, British Virgin Islands, Cayman Islands, Montserrat and the Turks and Caicos Islands at the World Meteorological Organization (WMO). The annual contribution to the WMO due from the BCT countries is paid by the CMO Headquarters on behalf of the British Government. This contribution is included in the annual budget of the CMO Headquarters and hence, in the individual CMO Member State's contribution to the CMO Headquarters.

By agreement, the UK Department of Transport refunds 100% of the contribution paid by the members of the BCT to the CMO HQ, as well as, 73% percent of the contribution paid by the CMO HQ to the WMO on behalf of the BCT. By Members' consent, these funds are held by the CMO Headquarters Unit to assist Members in attending important Meteorological/Hydro-meteorological Meetings, participating in training opportunities and purchasing spares. In keeping with a decision made during the 47th session of the Council (St. Vincent, 2007), each session of the Council is provided with both the current status of the Refundable Balances held at the CMO Headquarters on behalf of CMO Member States, as well as, the amount available for draw-down by each Member State.

At CMC59 (Anguilla, 2019) the Council noted the status of the Refundable Balances and requested the Headquarters Unit to produce three proposals for objectively quantifying the refundable balance available for drawdown by Member States that are in arrears[2].

Council approved the third of the three proposals (shown below).

Proposal 3

This proposal seeks to link access to draw-down on the Refundable Balance held for a Member State to the numbers of years for which contributions may be in arrears, while encouraging Members to make an effort to liquidate arrears on a phased basis.

A Member State that is in arrears of contributions to the CMO Headquarters shall, after meeting its full annual contribution to the budget of the CMO Headquarters 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 balance accrued to them shall be dependent on liquidating the arrears due for additional years.

Example

1. After two successive years of contribution by a Member State to the budget of the CMO Headquarters, i.e., 2018 and 2019 in 2020, that Member shall have access to draw-down on the Refundable Balance credited to its account for the year 2018;
2. If that Member makes contribution for 2020 in 2021 that Member shall have access to draw-down on the Refundable Balance credited to its account for the years 2018 and 2019.

***Note**: In this proposal a Member States cannot access prior Refundable Balances which may have accrued to them unless the arrears are liquidated.*

[2] *http://www.cmo.org.tt/docs/CMC60/CMC59_FINAL_REPORT.pdf*, paragraph 6.7, sub-item (ii).

ANNEX III

OPERATIONAL PLAN 2020-2023

STRENGTHENING CAPACITY, ADDING VALUE, AND BUILDING RESILIENCE IN THE METEOROLOGICAL AND HYDROMETEOROLOGICAL SERVICES OF THE CARIBBEAN

CMO HEADQUARTERS UNIT

A. Introduction

1. Weather, climate, and water are at the heart of the environmental issues affecting the planet and hydro-meteorological disasters are increasingly costly to economies worldwide. The integration of weather, water, climate, and related environmental Information into policy making and societal action are critical to building resilience and realizing sustainable development goals in the Caribbean.

2. Meteorological and Hydrometeorological Services (NMHSs) in the Caribbean and the across the globe must provide accurate information, analyses and timely forecasts of hazardous weather-related conditions that affect the sustainable development of their nations in the short term. As the world deals with the ongoing Coronavirus 2019 (COVID-19) global pandemic, weather, climate, and water services provide warnings on hazardous weather that can exacerbate the spread of the virus or drought conditions and water management to ensure adequate sanitation or the relationship of outbreaks with seasonality.

3. Additionally, the provision of climate services supports the long-term policy and strategic planning by governments, the private sector, and civil organizations. Generally, the demands for the provision of national meteorological services are viewed and will continue to be viewed primarily in terms of the response to governments' obligations to protect the safety of life, livelihood, and property of their citizens.

4. However, there are very specific and direct contributions of meteorological information, demands for which are increasing rapidly, to enhancing socio-economic benefits in such weather- and climate-sensitive sectors as:

- Air, land and sea transport;
- Agriculture;
- Water resources;
- Tourism;
- Planning and Development;
- Conventional and alternative sources of energy;
- Insurance and related areas;
- Disaster management;
- Health; and
- Environmental protection.

5. At the same time, the NMHSs must provide appropriate data and the scientific-basis for studies on the long-term potential impacts of both natural and human-induced climate changes on the environment. The contribution of meteorology and related sciences to these global studies is driven by the constant adaptation to and use of technological changes and opportunities.

6. Meteorological Services cannot operate in isolation and cooperation between all countries at all levels is fundamental. The atmospheric and related processes and phenomena, with which an NMHS must deal in order to fulfil its mission at the national level, do not recognize political boundaries, and their detection and tracking and the provision of advice to national communities on their likely impacts require continuous trans-border cooperation. The provision of data, information, products and services by NMHSs to meet national requirements and international commitments is fundamentally dependent on the maintenance of a high level of international cooperation.

7. Since no country can be fully self-reliant in this respect, any national strategy for the provision of meteorological and related services should build upon, and itself contribute to the strengthening of the framework of regional and international cooperation. There are two primary international conventions that affect meteorological services worldwide, namely, those of the ***World Meteorological Organization*** (WMO) and the ***International Civil Aviation Organization*** (ICAO).

8. These two United Nations specialized agencies set the international standards for meteorological activity. Global programmes in meteorology and related sciences, to which all nations must subscribe,

are coordinated internationally through the WMO, which in turn is a very close collaborator of the ICAO and similar organizations. For this reason, the NMHS must also participate actively in regional and international cooperation through the programmes and activities of the WMO. There is a very important mutually reinforcing relationship between the role, effectiveness and visibility of individual NMHSs, on the one hand, and the integrated operation of the entire WMO system, on the other. The strengthening of NMHSs contributes significantly to a more effective WMO and, in turn, an enhanced WMO can greatly assist the strengthening of NMHSs and the effectiveness of their services to their national communities.

9. This level of cooperation can be very difficult for small or relatively small countries to achieve. It is equally difficult for large international bodies to deal effectively with a large number of very small countries with differing needs, peculiarities and capabilities. For this reason, the ***Caribbean Meteorological Organization*** (CMO) is one of several regional organizations around the world that are considered critical to the overall global coordination of meteorological and hydrological activities of the WMO. This is particularly true because of the large number of Small Island Developing States (SIDS) in the Caribbean. Formal collaboration between CMO and WMO is governed by a set of "Working Arrangements".

B. Role of the World Meteorological Organization

10. The World Meteorological Organization (WMO), a Specialized Agency of the United Nations with 193 Member States and Territories, is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the weather and climate it produces, the resulting distribution of water, and related environmental issues. Since its establishment in 1950, WMO has been central in facilitating international collaboration and cooperation for: establishing interoperability, observations, data and knowledge exchange; setting standards; coordinating scientific and technical methods; and capacity development for the benefit of its Member States and their National Meteorological and Hydrological Services (NMHSs). WMO facilitates the gathering, processing and sharing of information, expertise and technology to create cost-effective solutions for the provision of weather, climate, water and related environmental services delivered by Members' NMHSs.

11. Under the WMO framework, NMHSs deploy, operate and sustain essential infrastructure in a coordinated manner to deliver a wide range of services that support decision-making on current and emerging issues. Consequently, WMO and its Member States also support the work of the broader international community and their Conventions or Treaties such as the United Nations Framework Convention on Climate Change and the UN Convention to Combat Desertification, and the 2030 Agenda for Sustainable Development which has 17 Sustainable Development Goals (SDGs). This collaborative framework results in a much more efficient use of global resource.

12. Under its collaborative framework, WMO provides world leadership in expertise and international cooperation to enable the delivery and use of high-quality authoritative weather, climate, water and related environmental services by its Members States for the improvement of the well-being of societies of all nations. It does so through the coordination of standards and practices among its Members States and its core values of commitment and loyalty in international service; professionalism, objectivity, impartiality, excellence and team spirit; integrity and mutual respect, cultural sensitivity and non-discrimination.

13. WMO's core mission is described in its Convention:

(a) To facilitate worldwide cooperation in the establishment of networks of stations for the making of meteorological observations as well as hydrological and other geophysical observations related to meteorology, and to promote the establishment and maintenance of centres charged with the provision of meteorological, hydrological and related services;

(b) To promote the establishment and maintenance of systems for the rapid exchange of meteorological, hydrological and related information;

(c) To promote standardization of meteorological, hydrological and related observations and to

ensure the uniform publication of observations and statistics;

(d) To further the application of meteorology to aviation, shipping, water problems, agriculture and other human activities;

(e) To promote activities in operational hydrology and to further close cooperation between meteorological and hydrological services;

(f) To encourage research and training in meteorology, hydrology and, as appropriate, in related fields, and to assist in coordinating international aspects such as research and training;

(g) To provide guidance to national regulations on provision of official meteorological information and advises, through the Common Alerting Protocol and Register of Alerting Authorities.

14. During the previous Strategic Period (2016-2019), the WMO Members States and their National Meteorological and Hydrological Services made remarkable progress on WMO priorities and in implementing both capacity development and service delivery strategies. For example:

- The WMO played a key role in the establishment and implementation of the Global Framework for Climate Services (GFCS), bringing operational climate services a step closer to their full potential;
- Significant advances among the NMHSs were made in implementing quality management systems and competency standards to improve the efficiency and safety of civil aviation;
- Global and regional plans were developed for implementing the WMO Integrated Global Observing System (WIGOS) and global and regional centres enhanced their capabilities to support the WMO Information System (WIS);
- The WMO has expanded techniques to monitor space weather and provide information on changes that may be detrimental to satellite communication systems and air transportation;
- The provision and use of severe weather and flood forecasts have been improved in some regions through the implementation of Severe Weather Forecasting Programmes (SWFP), Flash Flood Guidance Systems (FFGS), and Coastal Inundation Forecast Initiatives (CIFI) involving disaster management authorities, civil defence, and NMHSs.

15. For the current Strategic Period (2020-2023), the WMO conducted major governance reform aimed at fulfilling its vision for 2030, to "*see a world where all nations, especially the most vulnerable, are more resilient to the socioeconomic consequences of extreme weather, climate, water and other environmental events; and underpin their sustainable development through the best possible services, whether over land, at sea or in the air."* That vision includes the following five long-term goals:

- Goal 1: Better serve societal needs: delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services
- Goal 2: Enhance Earth system observations and predictions: Strengthening the technical foundation for the future
- Goal 3: Advance targeted research: Leveraging leadership in science to improve understanding of the Earth system for enhanced services
- Goal 4: Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens
- Goal 5: Strategic realignment of WMO structure and programmes for effective policy- and decision-making and implementation

Details of the overarching priorities, long-term goals, activities, and anticipated outputs are described in the WMO Strategic and Operational Plans, available at https://public.wmo.int/en/about-us/vision-and-mission.

These initiatives support the delivery of effective services by NMHSs, for the safety of life and property and underpinning sustainable development.

C. The Caribbean Meteorological Organization and its Role

16. The **Caribbean Meteorological Organization** (CMO) is a functionally autonomous agency within the CARICOM family. It originated out of the old British Caribbean Meteorological Service, which was established in **1951**. This Service later became the Caribbean Meteorological Service after the break-up of the Federation. But with the establishment of many National Meteorological Services after independence, the Caribbean Meteorological Service was subsequently transformed into the CMO in **1973**, so that the joint activities could continue.

17. The CMO comprises the following ***sixteen (16) Member States***:
Anguilla, Antigua and Barbuda, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands.

18. The CMO undertakes the coordination of the joint scientific activities of the respective National Meteorological and Hydrometeorological Services, the establishment of joint technical facilities and systems, the provision of joint training and research facilities, and the promotion of a reliable severe weather warning system to safeguard the region. The CMO provides support and advice to governments in the development of their NMHSs and in dealing with issues of an international nature affecting weather, water and climate, and represents the regional meteorological community's interests in relation to international civil aviation matters. The CMO also works closely with regional agencies involved in disaster preparedness, response and relief.

19. There are four Organs of the CMO:

(i) The ***Caribbean Meteorological Council*** (CMC) is the *Governing Body* of the Organization, comprising government Ministers responsible for meteorology or their representatives. The CMC meets annually to, among others, set policy, approve joint projects and budgets.

(ii) The ***CMO Headquarters,*** located in Port of Spain, Trinidad and Tobago, is headed by a Coordinating Director. Support and the provision of advice to governments, the coordination of joint activities, project formulation and implementation and the coordination of international activities are among the functions undertaken by the Headquarters.

(iii) The ***Caribbean Institute for Meteorology and Hydrology*** (CIMH), located in Barbados, is the CMO's technical and training arm. The CIMH, originally the Caribbean Meteorological Institute, provides training for the region's weather observers and technicians, weather forecasters, specialists in hydrology, agrometeorology and other related disciplines. The CIMH provides training to the Major in Meteorology in the Faculty of Science and Technology Bachelor of Science degree, in cooperation with the University of the West Indies Cave Hill Campus, and collaborates with the UWI in a number of related post graduate programmes. The CIMH also serves as the CMO's research and climate centre, as well as the regional instrument calibration and maintenance centre. Through agreements between the CMO and the World Meteorological Organization (WMO), the CIMH has also been designated as a WMO *Regional Training Centre* (RTC), *a WMO Instrument Calibration Centre*, a WMO *Centre of Excellence* in Satellite Meteorology, and a WMO *Regional Climate Centre* (RCC) for the Caribbean.

(iv) The ***Caribbean Meteorological Foundation*** (CMF) was established to raise funds for the promotion, through the CIMH, of the study and research of meteorology and allied sciences.

20. Since its inception, the CMO has developed a series of initiatives and projects for the development and benefit of its Member States. CMO, either through the Headquarters or the CIMH, collaborates closely with institutions of CARICOM and has established a number of strategic partnerships with regional and international organizations and agencies (WMO, NOAA, ACS, CDEMA, among others),

as well as funding agencies and countries (the European Commission, the World Bank, Finland, among others), to enable the National Meteorological and Hydrometeorological Services (NMHSs) of Member States to improve their involvement in and contribution to the sectors shown in section A above. Some of the partnerships focus on key areas such as early warning systems, meteorological telecommunications and observing networks, human resources development, and data management for climate change impact studies. Since the early 70's, the CIMH has participated in the development and execution of collaborative programmes and projects on applications of meteorology and hydrology. For example, CIMH is undertaking applied research into weather and climate simulation, an aim of which is to provide an additional basis to (i) inform the decision-making process of CDEMA during weather-related emergencies, (ii) support disaster risk reduction and (iii) support the development of climate services and change adaptation strategies for the region.

21. This document provides details of the *CMO Headquarters* Operational Plan for the strengthening of Meteorological and hydrological services in the CMO Member States for the period 2020-2023. Operational or strategic plans and programmes of the CIMH are produced separately.

D. CMO Headquarters Operational Plan 2020-2023

22. The programmes and projects being undertaken or planned by the CMO Headquarters, as approved by the Caribbean Meteorological Council, have legal and planning framework aspects as well as observational and scientific data information components involving the use of new or modern technologies. Many projects of this nature, which involve CMO Member States, will be closely linked to the programmes and activities of the WMO and partner organizations. Significant changes at the regional and international levels are influencing various socio-economic sectors served by Meteorological and Hydrological Services of Member States of CMO, including food production, disaster risk reduction, water resource management, health, energy, and tourism, resulting in ***escalating or changing demands for services***:

23. As articulated in the **Strategic Plan 2020-2023** submitted by the CMO Headquarters, its involvement in regional strategic planning is necessary to ensure that the NMHSs of its Member States are better prepared for the following priorities and outcomes:

Strategic Priorities	Expected Outcomes
Enhance disaster preparedness and reducing losses of life and property from extreme hydrometeorological events and severe weather	Support for delivery of authoritative, accessible, user-oriented, and fit-for-purpose information and services to reduce the disaster risk of hydrometeorological extremes.
Support climate-smart decision making to build resilience and adaptation to climate risk	Climate services and information integrated into policy and decision-making framework for building socioeconomic resilience and reducing climate risk.
Support the strengthening and maintenance of observation networks and information services	Enhanced observations and integrated information services for impact-based forecasting and decision-support for both routine activities and high-impact events
Enhance the socioeconomic and national security value of weather, climate, hydrological, and related environmental services.	Enhanced service delivery capacity of Members to ensure availability of essential information and services needed by governments, economic sectors, and citizens

These priorities match the WMO strategic priorities and long-term goals, specifically:

- *Long Term Goal 1: Better serve societal needs: delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services*
- *Long Term Goal 4: Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens*

Priorities are also aligned to the strategic priorities of donor organizations with whom the CMO Headquarters has initiated discussions, including the Caribbean Development Bank's (*environmental sustainability*) and the World Bank Global Facility for Disaster Risk Reduction.

24. The Operational Plan is organized by outcomes and priorities defined in the Strategic Plan and includes programme activities and projects to achieve Expected Outcomes. The Operating Plan will be updated and adjusted as required.

1. Strategic and Operational Planning at the Regional Level

Programme	Partners (if any)/Contact Organizations	Status	Remarks
CMO's participation in a **WMO Regional Management Group** to align RA IV working structures with the WMO Strategic Plan (2020-2023) goals to support National Meteorological and Hydrological Services in North America, Central America and the Caribbean	Canada, Costa Rica, Jamaica, USA, and WMO	Commenced in 2019 at Regional Management Group meeting and continued through 2020	Activities have begun on Regional Operating plan (2020-2023)
CMO's participation in the (i) development of a Regional Operating Plan; (ii) organization of the 18th RA IV Session and (ii) high-level dialogue between RA III and RA IV.	Canada, Costa Rica, Jamaica, USA, and WMO	Commenced in June 2020	

2. Expected Outcomes and Key Performance Indicators for NMHSs in CMO Member States

Strategic Priority 1: Enhance disaster preparedness and reducing losses of life and property from extreme hydrometeorological events and severe weather			
Ultimate Outcome 1 Support for delivery of authoritative, accessible, user-oriented, and fit-for-purpose information and services to reduce the disaster risk of hydrometeorological extremes.			
Intermediate Outcome 1 Enhanced capability of Members to develop, deliver, and utilize accurate and reliable weather, climate, water and related environmental impact-based forecasting services to mitigate against extreme hydrometeorological events.			
Performance Indicators	Baseline 2019	Target 2021	Target 2023
1.1.1 Number of Members participating in a Common Alerting Protocol (CAP) for warnings and alerts 1.1.2 Number of Members with a MHEWS integrated in a national Disaster Risk Reduction management system			
1.2.1 Number of forecasters trained in the SWFP concept 1.2.2 Number of Members participating in the SWFP 1.2.3 At least one verification measure implemented for severe weather forecasts 1.2.4 Users feedback on the usefulness of severe weather forecasts			
1.3.1 Number of Members providing national flood and drought monitoring and prediction services 1.3.2 Number of Members making use of RCCs and/or RCOFs 1.3.3 User/stakeholder assessment of the relevance, usefulness and timeliness of outlooks/alerts for extreme climate events			

1.4.1 Number of Members using (a) web applications and (b) social media in warning delivery 1.4.3 Number of Members using online platforms for integrating weather, water, and climate hazards with socio-economic data 1.4.4 Number of Members with agreements between NMHSs and private sector/academia actors on (a) EWS service delivery and (b) maintenance of networks for EWSs			
1.5.1 Number of Members with backup communication and power systems 1.5.2 A revised regional EWS with backup assignments for forecast and warnings			

Key Focus Areas in 2020-2023

- Support implementation of impact-based forecast and warning products and services
- Strengthen national capacity in multi-hazard early warnings through enabling legislation that clarifies the roles and responsibility of NMHSs
- Support Members' delivery of authoritative national weather, water, and climate information products and services, through enabling legislation authorizing those functions.
- Support the development of national strategic plans, national frameworks for weather, water, and climate services, and action plans
- Support the upgrading of meteorological services in the Turks and Caicos Islands
- Support the enhancement of weather services via uptake of modern technology in service delivery and quality management principles.
- Provide guidance on the adoption of international standards, quality control mechanisms and recommended practices.
- Provide guidance to NMHSs for the implementation of redundant communications systems that should be used in WMO RA IV (North and Central America and the Caribbean)
- Assist in the mobilization of resources involving development agencies and national governments for disaster risk reduction

ACTIVITIES

Programme	Partners (if any)/Contact Organization	Status	Remarks
Drafting of Legislation for National Meteorological Services CMO Headquarters is leading a project to draft a Template Meteorological Bill for adapting by CMO Member States without a legal mandate for their Meteorological Services. A Policy Document and draft memoranda will be developed to accompany the Legislation. As part of the agreement with the WMO, two Meteorological Bills are to be submitted for enactment by 2021.	WMO, CREWS-Caribbean, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern Caribbean States (OECS)	Project started in April 2020. Legal consultant, hired in August 2020, has been conducting consultations with Member States. Assessment report and draft Template Legislation to be submitted by December 2020.	CMO HQ - WMO Implementing Agreement is scheduled to end by Q2 of 2021.
National Strategic Plans with National Framework for Weather, Water, and Climate Services and Complementary Action Plan CMO Headquarters is leading a project to develop	WMO, CREWS-Caribbean, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern	Consultant, hired in September 2020, has been conducting	CMO HQ - WMO Implementing

National Strategic Plans in eight CMO Member States that requested assistance with Strategic Planning. The project began in April 2020 and will end in March 2021.	Caribbean States (OECS), CIMH	surveys of NMHSs and stakeholders. Draft Plans are due in January 2021.	Agreement is scheduled to end by Q2 of 2021.
Severe Weather Forecast Programme-Eastern Caribbean CMO HQ and Météo-France Martinique, co-chair the Regional Sub-programme Management Team (RSMT), guiding the implementation of the SWFP-EC by which NMHSs access new numerical weather products, radar products, and lightning monitoring; Improving service delivery of seamless and accurate warnings of hazardous weather that may not be the results of a tropical cyclone and could occur at any time of year, in collaboration with relevant national organizations; Training of forecasters in severe weather forecast concepts and cascading-scale of global to regional to local scale and in collaborative forecasting using online platform	Météo-France, NOAA, Environment and Climate Change Canada, WMO, CIMH	Ongoing. All NMHSs in the programme have access to the forecast products via the Extranet of the 24/7 operational *Regional Forecast Support Facility in Martinique.*	Other SWFP Training activities postponed from 2020 to 2021
EUREC^{4}A-UK-CMO Caribbean Weather Forecasting Initiative CMO Headquarters collaborated with the University of Leeds to propose a Caribbean Weather Forecasting Initiative, including two workshops and a Forecast Testbed as part of EUREC^{4}A field campaign. The first workshop and testbed were organized in collaboration with CIMH. The first workshop was held prior to the field campaign to train forecasters on providing briefing to support research operations.	University of Leeds, WMO, CREWS, UK Met Office, CIMH	Workshop and Forecast testbed during EUREC^{4}A field study supported SWFP goals. CMO HQ and University of Leeds have funding for a 2nd workshop, postponed from 2020 to 2021.	
Regional Hurricane Warning System Coordination of CMO Member States' involvement in the Atlantic-Caribbean Hurricane Warning System, including back-up arrangements among	NOAA/NHC, CDEMA, and WMO	Ongoing	Back-up arrangements in CMO States reaffirmed at

States. Coordination of annual training activities with the US National Hurricane Center.			Annual Hurricane Committee
Development of a new Meteorological Service in the Turks and Caicos Islands CMO Headquarters assistance for a complete multi-stage development of a new National Meteorological Service from a small ad-hoc meteorological operation in support of Civil Aviation. New internal structure will include observational systems and network, telecommunications, data collection, dissemination and storage; instrument maintenance; multi-level training programmes.	TCI Airport Authority; TCI Department of Disaster Management and Emergencies; NMHS of Bahamas, CIMH	Draft roadmap plans were developed, including a new leadership position. Thus, a Director of Meteorology is scheduled to start in May 2021, having finished operational training at CIMH and received approval for on-the-job training with the Bahamas Dept of Meteorology	Major multi-year activity for TCI and CMO.
Ongoing upgrades of Communication Systems and Infrastructure Guidance/Assistance to Member States on the correct communications systems to be procured and the necessary data protocols, formats and information pathways to share the information generated regionally and internationally.	NMHSs, NOAA, WMO, World Bank	Ongoing. A Pilot project of CREWS Caribbean is aimed at enhancing alerting communication system	Driven by continuous advances in systems technology.
Risks Limited economic resources to support the activities, especially in light of the ongoing pandemic and the resulting shrinking of economies worldwide The continuing risk of hurricanes and other hazards that can have major impacts the socio-economic development of Member States and would limit the available funding that supports the programmes	**Mitigation Measures** Support the setting of priorities for a basic level of services that are the most critical to support and conduct interim analysis of Member State capacity to implement the programmes and activities. Encourage NMHSs to seek partnerships among sectors for whom weather, water, and climate data are vital. It is hoped that the legislation being developed will provide mechanism for those engagements.		

STRATEGIC PRIORITY 2: SUPPORT CLIMATE-SMART DECISION MAKING TO BUILD RESILIENCE AND ADAPTATION TO CLIMATE RISK.
Ultimate Outcome 2 Climate services and information integrated into policy and decision-making framework for building socioeconomic resilience and reducing climate risk.

Intermediate Outcome 2Enhanced capability of Members to develop, access and utilize accurate, reliable climate, water and related environmental services to best support the policy-making and actions that mitigate against climate risks and build socioeconomic resilience.			
Performance Indicators	Baseline 2019	2021	2023
2.1.1 Number of Members with basic system for delivering climate services			
2.2.1 Number of Members making use of RCCs and/or RCOFs 2.2.2 Number of Members organizing NCOFs 2.2.3 Number of users accessing climate services through web platforms or other methods of service delivery 2.2.4 User/stakeholder assessment of the relevance, usefulness and timeliness of climate information			
2.3.1 Number of Members contributing to the climate impacts database of the WMO RCC at CIMH			

Key Focus Areas in 2020-2023

- Support Members' in delivery of authoritative national climate information products and services in the priority areas of the CIMH-led Early Warning Information Systems Across Climate Time Scales (EWISACTS) to adapt and respond to climate variability and change through draft legislation that authorizes their provision of climate services.
- Support the development of national strategic plans, national frameworks for weather, water, and climate services, and action plans
- Encourage participation of NMHSs in a climate service information system enabling all Members to access, and add value to, the best available regional climate information products and methodologies.

ACTIVITIES

Programme	Partners (if any)/Contact Organization	Status	Remarks
Drafting of Legislation for National Meteorological Services CMO Headquarters is leading a project to draft a Template Meteorological Bill for adapting by CMO Member States without a legal mandate for their Meteorological Services. A Policy Document and draft memoranda will be developed to accompany the Legislation. As part of the CMO agreement with the WMO, two Meteorological Bills are to be submitted for enactment by 2021.	WMO, CREWS-Caribbean, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern Caribbean States (OECS)	Project started in April 2020. Legal consultant, hired in August 2020, conducting consultations with Member States. Assessment report and draft Template Legislation due by December 2020.	CMO HQ - WMO Implementing Agreement is scheduled to end by Q2 of 2021.
National Strategic Plans with National Framework for Weather, Water, and Climate Services and Complementary Action Plan	WMO, CREWS-Caribbean, Relevant Government Ministries, NMHSs of CMO	Consultant, hired in September 2020, has been	CMO HQ - WMO

CMO Headquarters is leading a project to develop National Strategic Plans in eight CMO Member States that requested assistance with Strategic Planning. The project began in April 2020 and will end in March 2021.	Member States and their stakeholders, Organization of Eastern Caribbean States (OECS), CIMH	conducting surveys of NMHSs and stakeholders. Draft Plans are due in January 2021.	Implementing Agreement is scheduled to end by Q2 of 2021.
Risks Limited human resources and workforce competency to deliver climate services, particularly for the smaller Meteorological Services The continuing risk of hurricanes and other hazards that can have major impacts the socio-economic development of Member States and would limit the available funding that supports the programmes	**Mitigation Measures** Support the setting of priorities for a basic level of services that are the most critical to support and conduct interim analysis of Member State capacity to implement the programmes and activities. Encourage NMHS to work with CIMH to develop the scientific and technical skills of their staff Encourage NMHSs to seek partnerships for climate service delivery among sectors for whom climate and water data are vital		

STRATEGIC PRIORITY 3: SUPPORT THE STRENGTHENING AND MAINTENANCE OF OBSERVATION NETWORKS AND INFORMATION SERVICES			
Ultimate Outcome 3 Enhanced observations and integrated information services for impact-based forecasting and decision-support for both routine activities and high-impact events.			
Intermediate Outcome 3An integrated observational network optimized to ensure effective national coverage and accessibility for risk monitoring and numerical weather prediction. High quality fit-for-purpose measurements feeding a continuous data exchange underpinned by best practices in data management and data processing mechanisms.			
Performance Indicators	Baseline 2019	2021	2023
3.1.1 Percentage of the regional Earth system covered by observations (especially hydrosphere) 3.1.2 Number of Members complying with WMO observation standards 3.1.3 Number of Members implementing national observing system WIGOS			
3.2.1 Number of Members with national network monitoring and data management systems established 3.2.2 Number of Members implementing data exchange policies, as per WMO Resolutions			
3.3.1 Approved Terms of Reference for the Radar Operations Working group 3.3.2 Initial meeting/workshop held 3.3.3 Online platform initiated for collaboration, troubleshooting, and information exchange			
3.4.1 Number of Members using online platforms, such as DEWETRA, for integrating observations, model forecasts, with hydrological and socio-economic data for decision support and collaboration. 3.4.2 Number of Members with agreements between NMHSs and private sector/academia			

actors on(a) service delivery and (b) maintenance of networks			

Key Focus Areas in 2020-2023

- To encourage and support international exchange of data, along with strengthened monitoring of compliance within WMO RA IV
- Provide advice on the development of data management systems and practices through WMO Information System (WIS) to help ensure that all observational data and key products are properly archived.
- Help facilitate international exchange of data, along with strengthened monitoring of compliance.
- Assist in the development of data management systems and practices through WMO Information System (WIS) to help ensure that all observational data and key products are properly archived
- Creating and operationalizing of the CMO Operational Radar Working Group
- Supporting the use of information technology for impact-based forecast and warnings.
- Supporting the use of guidance material to facilitate integration of externally-sourced observations into the impact-based forecast process.
- Provide leadership in promoting the principles on which global meteorology is built, emphasizing authoritative voice, common standards, data and product sharing among NMHSs of Member States.

ACTIVITIES

Programme	Partners (if any)/Contact Organization	Status	Remarks
WMO Integrated Global Observation System (WIGOS) – Initial Operational Phase (i) **WIGOS Station Identifiers** This service will involve the provision of advice and guidance to help Members integrate the new WIGOS Station Identifiers (WSI) into their monitoring systems. CMO Headquarters will help support NMHSs who are responsible for the establishment of WSI schemas, observational data product integration, and end user awareness and transition	CIMH, WMO, NMHSs of CMO Member States and other national entities with surface observing stations	WIGOS Pre-operational phase was from 2016-2019. Initial Operational Phase is expected to be from 2020-2023	Requirements and guidelines provided by the WMO Infrastructure Commission.
(ii) **WIGOS National Implementation Plans** CMO Headquarters is providing guidance and templates for Member States to use in developing their National Implementation Plans.	WMO, NMHSs of CMO Member States and other national entities with surface observing stations	Same as above	Only a small percentage of CMO Member States have been implementing WIGOS
(iii) **WMO Integrated Global Observation System (WIGOS) – Regional WIGOS Centre**	WMO, NOAA, Environment Canada, TTMS	Collaboration of CMO HQ and TTMS endorsed by	Some technical

Regional WIGOS Centres ensure the quality of surface observation (accuracy, availability, and timeliness). A Regional WIGOS Centre has been approved by WMO RA IV Management Group as a virtual centre to be hosted by NOAA, Environment and Climate Change Canada, the CMO Headquarters, and Trinidad and Tobago Meteorological Service. The CMO Headquarters and TTMS will be responsible for the WIGOS Data Quality Monitoring for the English-speaking Caribbean.		Council in 2018. Concept Note was approved by WMO RA IV Management Group in January 2020. Currently developing Implementation Plan.	tools developed by WMO and Centres in other regions. Extra resources needed for Caribbean part of RWC
(iv) **Global Basic Observation Network (GBON)** CMO Headquarters will help support NMHSs to be compliant with the requirements to contribute essential observations and data exchange for the public good of all nations - improved weather forecasts and climate services.	CIMH, CCCCC, NOAA, WMO, NMHSs of CMO Member States and other national entities with surface observing stations	GBON regulations and guidelines to be approved by WMO Extraordinary Congress in 2021. Many GBON requirements can be met by existing network of CMO Member States. Members with large uninhabited or sparsely populated areas can request exemption or assistance to meet requirements	Systematic Observations Financing Facility (SOFF) aims to support countries to meet GBON requirements
Ongoing Installation of Remote Sensing Equipment and the Sharing of Data CMO Headquarters providing guidance/assistance to Member States on the procurement of remote sensing systems (terrestrial and space-based), data protocols and formats. Also providing guidance to Member States on the Integration of national observing platforms into the global observing systems.	WMO, NOAA, National Governments, NMHSs and Stakeholders	Ongoing	Project driven, with funds from national and international sources.
Risks Limited technical and human resources and workforce competency to fully implement WIGOS, particularly for the smaller Meteorological Services.	**Mitigation Measures** Delegating more of the CMO Science and Technology Officer's time to assist Member States with WIGOS implementation. CMO to advise Caribbean Meteorological Council and other Government entities on the		

Under WIGOS, NMHSs are to be integrators of weather, climate, water, and environmental data, who identify surface observations at the national level and make outreach to other data holders. Data policy at the national level may not support this activity and NMHSs will need the support of their governing bodies.	importance of the services of NMHS and WIGOS.

STRATEGIC PRIORITY 4: ENHANCE THE SOCIOECONOMIC AND NATIONAL SECURITY VALUE OF WEATHER, CLIMATE, HYDROLOGICAL, AND RELATED ENVIRONMENTAL SERVICES			
Ultimate Outcome 4 Enhanced service delivery capacity of Members to ensure availability of essential information and services needed by governments, economic sectors, and citizens			
Intermediate Outcome 4Improved access to regional and global monitoring and prediction systems and utilization of weather, climate and water information and services that brings tangible benefits to Members			
Performance Indicators	Baseline 2019	2021	2023
4.1.1 Number of NMHSs with strategic plans and national frameworks for weather, climate, and water services 4.1.2 Number of NMHSs with legal basis for their operation 4.1.3 Number of NMHSs with enhanced human and technical capacity to provide a range of services.			
4.2.1 Number of NMHS staff trained at WMO training centres and/or through fellowships 4.2.2 Number of NMHSs whose staff have adequate (to be defined) level of core competencies to meet national and international mandate 2.2.4 User/stakeholder assessment of the relevance, usefulness and timeliness of climate information			
4.3.1 Number of NMHSs receiving international capacity development assistance 4.3.2 Number of Members benefiting from catalysed development projects 4.3.3 Number of Members with legal basis for public-private partnerships			
Key Focus Areas in 2020-2023			
• Facilitate development of draft legislation to aid Member States with respect to technical, institutional, and human resources, enabling them to provide needed weather, climate, water and related environmental services • Facilitate the development of national strategic plans and operational plans for NMHSs to boost their service capabilities and, hence, their socio-economic value • Liaise between Member States and WMO to support the assessment of the economic benefits of NMHSs. • Support Members to understand and acquire the qualification and competencies required for effective service delivery, focused on WMO standards and recommendations. • Coordinating with WMO on new integrated weather service delivery, such as their marine service delivery training initiative, to which the CMO Headquarters has been contributing. • Facilitate the establishment of principles and guidance for successful partnerships with public sector, private sector, or academia to improve			

and expand services and develop markets for services. Expand on dialogue started during the Caribbean Symposium 2019: Operational Hydro-meteorology Leadership Summit.

- Support improvement in the communication skills of NMHSs and uptake of modern technology in service delivery.
- Help NMHSs to become more visible by amplifying their news

ACTIVITIES

Programme/Activities	Partners (if any)/Contact Organization	Status	Remarks
Drafting of Legislation for National Meteorological Services CMO Headquarters is leading a project to draft a Template Meteorological Bill for adapting by CMO Member States without a legal mandate for their Meteorological Services. A Policy Document and draft memoranda will be developed to accompany the Legislation. As part of the CMO agreement with the WMO, two Meteorological Bills are to be submitted for enactment by 2021.	WMO, CREWS-Caribbean, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern Caribbean States (OECS)	Project started in April 2020. Legal consultant, hired in August 2020, conducting consultations with Member States. Assessment report and draft Template Legislation due by December 2020.	CMO HQ - WMO Implementing Agreement is scheduled to end by Q2 of 2021.
National Strategic Plans with National Framework for Weather, Water, and Climate Services and Complementary Action Plan CMO Headquarters is leading a project to develop National Strategic Plans in eight CMO Member States that requested assistance with Strategic Planning. The project began in April 2020 and will end in March 2021.	WMO, CREWS-Caribbean, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern Caribbean States (OECS), CIMH	Consultant, hired in September 2020, has been conducting surveys of NMHSs and stakeholders. Draft Plans are due in January 2021.	CMO HQ - WMO Implementing Agreement is scheduled to end by Q2 of 2021.
Support Members in enhancing the communication skills of NMHSs The CMO Headquarters developed a proposal to enhance the communication of warnings and other information from NMHSs and to aid media and disaster managers to better understand hydrometeorological hazards. Discussions were initiated with the Caribbean Broadcast Union (CBU) and the American Chamber of Commerce to develop a workshop in 2020, that expanded regionally, a national plan by Grenada's Manager of Meteorology. The proposal was tabled due to the pandemic. In the interim, the CBU developed an online self-paced course in media communication that was opened to meteorologists in a number of CMO	CBU, NOAA, UN Disaster Risk Reduction (UNDRR)	The proposal has been submitted to the American Chamber of Commerce in Trinidad and Tobago	

Member States. **Partnerships to advance Caribbean Hydro-Meteorology** The CMO Headquarters has been working with private sector in hydro-meteorology to promote dialogue in Caribbean Symposia on Operational Hydrometeorology and to identify successful partnerships that demonstrate the value of weather, climate, and water services to society. **Recruitment of experts to advance Caribbean Hydro-Meteorology** The CMO Headquarters has been working with CIMH and Member States to identify persons to serve on national and international bodies to help raise the profile of Caribbean Hydro-meteorology services. For example, the CMO is now represented in the Presidency of WMO RA IV, on the WMO Executive Council, the Chair of Expert Teams in WMO Aviation Services, among others	Varysian Ltd, WMO, NMHSs of CMO Member States, CIMH, Stakeholders in the Public, Private, and Academic Sectors, and Civil Society CMO Member States, CIMH, WMO	The first symposium was held in November 2019. The second is being planned as a virtual symposium in December 2020. Ongoing	
Risks Limited pool of persons from whom to choose, so some persons are asked to serve in multiple capacities, which is detrimental to their ability to be effective.	**Mitigation Measures** Recruit new mid-career persons and take advantage of training in management and leadership for early-career persons to develop management expertise.		

3. Additional Projects and Proposals to Enhance Capabilities of Weather, Climate, and Water services in Member States

Strategic Priority 1: Enhance disaster preparedness and reducing losses of life and property from extreme hydrometeorological events and severe weather Strategic Priority 2: Support climate-smart decision making to build resilience and adaptation to climate risk Strategic Priority 3: Support the strengthening and maintenance of observation networks and information services Strategic Priority 4: Enhance the socioeconomic and national security value of weather, climate, hydrological, and related environmental services
Ultimate Outcome 1 Support for delivery of authoritative, accessible, user-oriented, and fit-for-purpose information and services to reduce the disaster risk of hydrometeorological extremes Ultimate Outcome 2 Climate services and information integrated into policy and decision-making framework for building socioeconomic resilience and reducing climate risk Ultimate Outcomes 3 Enhanced observations and integrated information services for impact-based forecasting and decision-support for both routine activities and high-impact events Ultimate Outcome 4. Enhanced service delivery capacity of Members to ensure availability of essential information and services needed by governments, economic sectors, and citizens

Programme	Partners (if any)/Contact Organization	Status	Remarks
(i) **Maintenance and Upgrade of CMO Radars** CMO has been drafting a proposal to upgrade the current CMO radars to dual-polarization, which is now the operational standard for weather radars. The CMO Headquarters is working with development partners, such as the Caribbean Development Bank, to access appropriate funding sources. A pivotal role in the maintenance of the radar network is the CMO Operational Radar Working Group, led by the CMO Science and Technology Officer and comprised of regional technicians sharing knowledge and troubleshooting issues with expert input as necessary.	World Bank CREWS-Caribbean, Radar host countries, Development partners, CIMH, Regional NMHSs	Proposal under development, in consultation with the Caribbean Development Bank	External funding support for this activity will be sought.
(a) ***Review/Feasibility study of Radar Network***: A feasibility study of the current radars will be conducted by a radar expert hired by the World Bank, who will be supported by the CMO Headquarters. Study results will guide the	Radar host countries, NMHSs, and CIMH. Collaboration with national hydrological and agricultural agencies with rain gauges, WMO Flash Flood Guidance Systems, World Bank	Visit of consultant, scheduled to coincide with first meeting of the Operational Radar Working Group in May 2020	

proposal to upgrade the radars. (b) ***Multi-Radar Multi-Sensor Precipitation Grid*** CMO Headquarters initiated discussions with NOAA in 2018 on the expansion of their Multi-radar Multi-sensor (MRMS) Caribbean to aid in monitoring hazardous weather and in contributing to climate resilience building by creating a dataset of rainfall variability and climate change to guide adaptation and mitigation. Discussions also included support for radar training in collaboration with CIMH (CMC58, Final Report). Recent discussions were continued with the World Bank CREWS to take advantage of the expertise of the MRMS team to support the CREWS Caribbean Pilot Project to develop a regional precipitation grid to serve various weather, climate, and water sensitive sectors.	NOAA, World Bank CREWS Caribbean, WMO Flash Flood Guidance Systems, CIMH	was delayed due to pandemic Technical proposals to be developed. The precipitation grid is one of the pilot project planned for CREWS Caribbean	National and external funding to be sought
(ii) **Lightning Detection System and Lightning Safety Awareness** Development of a regional system – enhancement of warning system; augment satellite and radar systems. Organizing a workshop on lightning safety awareness, with participation of experts in lightning safety, health, education, and mitigation efforts.	NMHSs with interest in lightning safety and their stakeholders, including Civil Aviation, Agriculture, Outdoor recreation sector, Youth and Sport Organizations, Other Private Sector	Proposals to be developed	

_____

List of Acronyms and Abbreviations

ACS	Association of Caribbean States
CARICOM	Caribbean Community
CDEMA	Caribbean Disaster Emergency Management Agency
CIMH	Caribbean Institute for Meteorology and Hydrology (of CMO)
CMC	Caribbean Meteorological Council (of CMO)
CMF	Caribbean Meteorological Foundation (of CMO)
CMO	Caribbean Meteorological Organization
ECMWF	European Centre for Medium-Range Weather Forecasts
GFCS	Global Framework for Climate Services
ICAO	International Civil Aviation Organization
ISO	International Organization for Standardization
Météo-France	National Meteorological Service of France
NHC	National Hurricane Center (USA)
NMHS	National Meteorological and Hydrological Services
NOAA	The National Oceanic and Atmospheric Administration *(*USA*)*
QMS	Quality Management System
RCC	Regional Climate Centre
RTC	Regional Training Centre
SIDS	Small Island Developing States
UWI	University of the West Indies
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization

HEADQUARTERS UNIT ESTIMATES 2021

INTENTIONALLY LEFT BLANK

HEADQUARTERS UNIT ESTIMATES 2020 – NOTES

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

REGIONAL CONTRIBUTION TO CMO HEADQUARTERS AND CIMH BUDGETS - 2021

INTENTIONALLY LEFT BLANK