



CARIBBEAN METEOROLOGICAL ORGANIZATION

CARIBBEAN METEOROLOGICAL COUNCIL
SIXTY-FIRST SESSION
18-19 NOVEMBER 2021, VIRTUAL PLATFORM

Doc. 4(a)

THE COORDINATING DIRECTOR'S REPORT - 2021 ON CMO HEADQUARTERS UNIT ACTIVITIES

(Submitted by the Coordinating Director)

1. This document highlights activities of the CMO Headquarters since the 60th Session of the Council, held virtually on 19-20 November 2020, and hosted by the Government of St Vincent and the Grenadines. Factors affecting operational aspects at the Headquarters and other matters of interest are also mentioned for information and guidance where appropriate. Details of some activities and developments, where necessary, will be dealt with under separate agenda items. Some activities previously summarized in the CMO Headquarters 2021 Interim Report will be reported in more detail.

High Impact Tropical Weather Events

2. Since the last session of the Caribbean Meteorological Council in November 2020, the major weather impacts in our region for 2021 were hurricanes, tropical storms, and other tropical disturbances. The cascading and compounded effects of hydrometeorological and geological hazards in the Caribbean were evident following the explosive eruption of **La Soufrière** volcano on the island of St Vincent in April, and a 7.2 earthquake in Haiti in August. Elsewhere in the region, Member States that had been severely impacted in recent seasons continued in a recovery mode in 2021, as the Caribbean was spared from the landfall of major hurricanes, unlike recent record-breaking seasons.

3. In the Caribbean/Atlantic basins, this season was forecasted to be above average and has been true to the forecast. For the Caribbean, the season began with **Hurricane Elsa**, which was the first hurricane of the Atlantic 2021 hurricane season (Figure 1). In the Lesser Antilles, Elsa mostly affected Barbados, Saint Lucia (where there was one death), and St Vincent and the Grenadines. The latter sustained damages due to lahars (dense mixture of volcanic debris and water), which destroyed some critical infrastructure (**ANNEX I**). Downgraded to a tropical storm, Elsa later drenched Jamaica, Cayman Islands, Haiti, and Cuba, where it made landfall. By the end of September, there were 20 named storms, above the 30-year (1991-2020) average, which is 9-10 named storms by the end of September. The 2021 season, by 15 October, had seen four major hurricanes, of which only two made landfall as major hurricanes, Grace and Ida. **Grace** (Figure 1), brought flooding and landslides to the Greater Antilles as a tropical storm, before making landfall in Mexico as a Saffir-Simpson *Category-3 hurricane*. The islands of the Greater Antilles experienced heavy rainfall, flash flooding, riverine floods, and landslides from then Tropical Storm Ida, which worsened due to the precursor heavy rains of Tropical Storm Grace. **Hurricane Ida** intensified into a Category-4 hurricane over the Gulf of Mexico, with winds of 150 mph, before making landfall in Louisiana. Post-landfall rains from Ida were deadly, especially in New York City. **Hurricane Larry** remained over the Atlantic as a long-lived Category-3 hurricane before making landfall in Newfoundland. **Hurricane Sam**, which attained sustained winds of 150 mph, remained over the open ocean. Both of these major hurricanes generated large swells that affected the Lesser Antilles, the Bahamas, the Greater Antilles, and Bermuda. Tropical Storm warnings were also posted for Bermuda.

4. A preliminary summary of the 2021 Atlantic Tropical cyclone activity, to date, is shown in **ANNEX I**. While it was an active season, many of the named systems were tropical storms or minimal hurricanes. The CMO Headquarters monitored the warnings issued by the main forecast offices in the region, along with the local alerts by the individual Meteorological Services as usual. The CMO Headquarters also conveyed to potentially affected states, the rainfall outlooks provided by the International Training Desk at the US Weather Prediction Center. The rainfall outlooks are supplementary information that is also shared with the NHC.

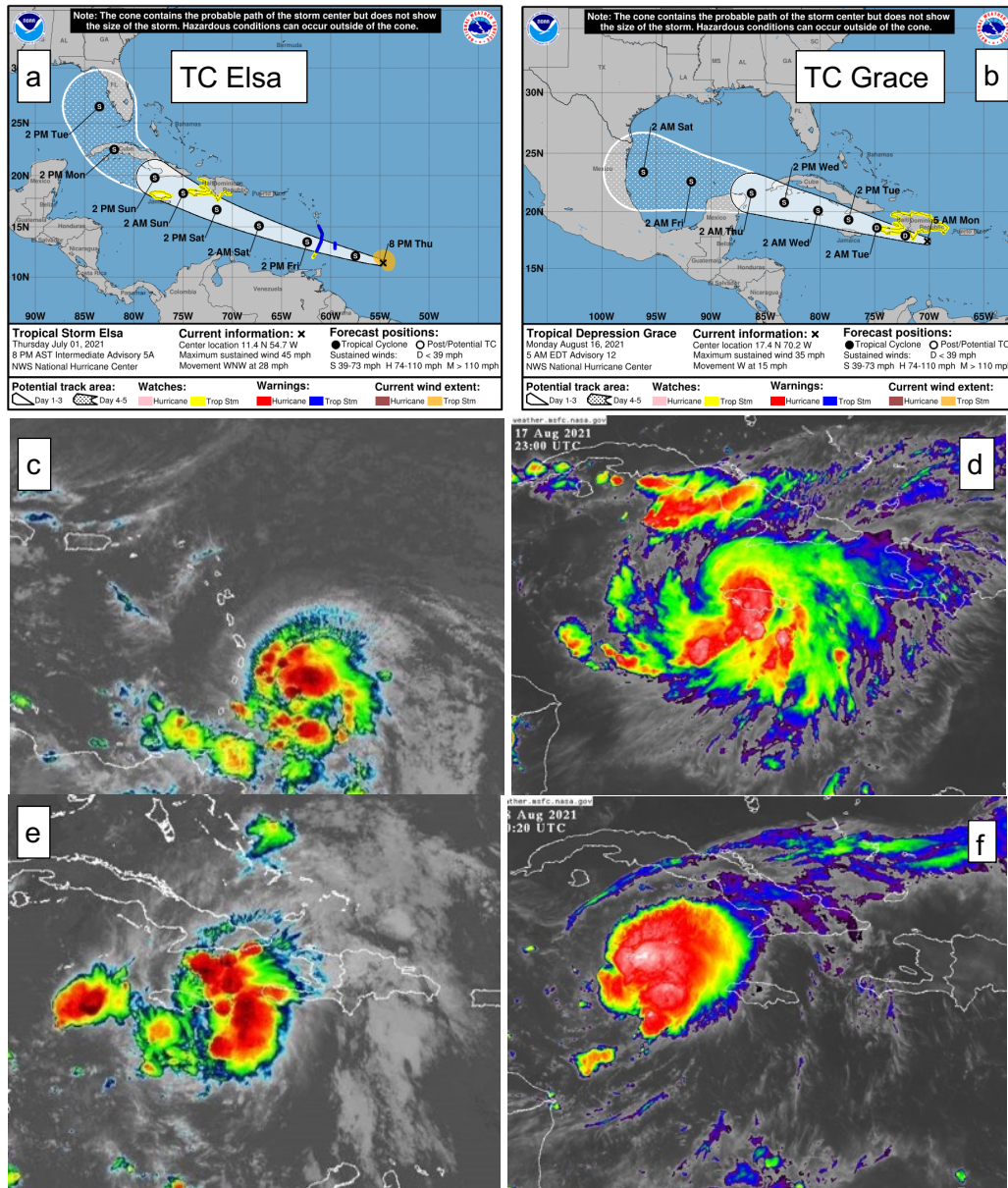


Figure 1. Forecast track of the eye of TC Elsa (left) and TC Grace (right) and respective GOES-16 Enhanced IR images. Track maps are courtesy of NOAA National Hurricane Center. Satellite images are courtesy of NOAA/NESDIS and NASA Marshall Space Flight Center.

5. The year was also marked not only an active Atlantic tropical cyclone season but also episodes of heavy concentrations of Saharan dust. The regular appearance of widespread Sahara dust was often trailing the many tropical cyclones of 2021. At the recent WMO Extraordinary Congress (11-22 October), during a session on Sand and Dust Storms, Members noted the importance of increasing monitoring and prediction capability in the region to support integrated health services and the Global Atmospheric Watch (GAW).

6. During the latter half of May 2021, Guyana experienced historical floods with over 6900 households affected (<https://reliefweb.int/report/guyana/guyana-floods-dref-plan-action-nmdrgy003>) due to heavier than normal rainfall, coupled with high tides and already overflowing rivers and creeks. On 24 May, the National Weather Watch Centre experienced a significant electrical event, causing a loss of power, internet, and damage to the Weather radar. On 26 May 2021, Guyana Hydrometeorological Service reported 138.7 mm of rain in Kumaka, Region 1, in 24 hours. The floods, which covered roof tops in some areas, have resulted in the loss of thousands of farms and destruction of other buildings and infrastructure (ANNEX I).

7. The Council is reminded to consider the implications of record-breaking heat in several islands, during 2020, as reported in the WMO *State of Climate in Latin America and the Caribbean*, which was developed with contributions from CIMH and scientists in CMO Member States. Caribbean islands, for whom extreme heat is an unfamiliar hazard, will need to develop measures to protect public health, particularly of the elderly and very young, among other necessary adaptation.

Multiple Hazards: Volcanic Eruptions, Heavy Rains, Hurricanes, Earthquake, and Pandemic

8. The *La Soufrière* on St Vincent erupted explosively on 9 April 2021 (Figure 2), displacing some 16,000 people, destroying all vegetation in the red zone and 80% of vegetation in the orange zone (the main agricultural area of the island). Prior to and during the eruptions, the CMO Headquarters aided coordination among the National Meteorological Services in St Vincent and the Grenadines and Barbados, in particular, including requests to NOAA/NESDIS for GOES satellite rapid scan of the eruption. The small area rapid scan showed minute-by-minute views of the eruption domain. CMO Headquarters provided instructions for Cayman Islands National Weather Service and the Trinidad and Tobago Meteorological Services to generate volcano satellite products using data from their geostationary satellite receivers. The Coordinating Director also solicited expert guidance from former research collaborators in volcanology at the University of South Florida and the US Geological Survey.

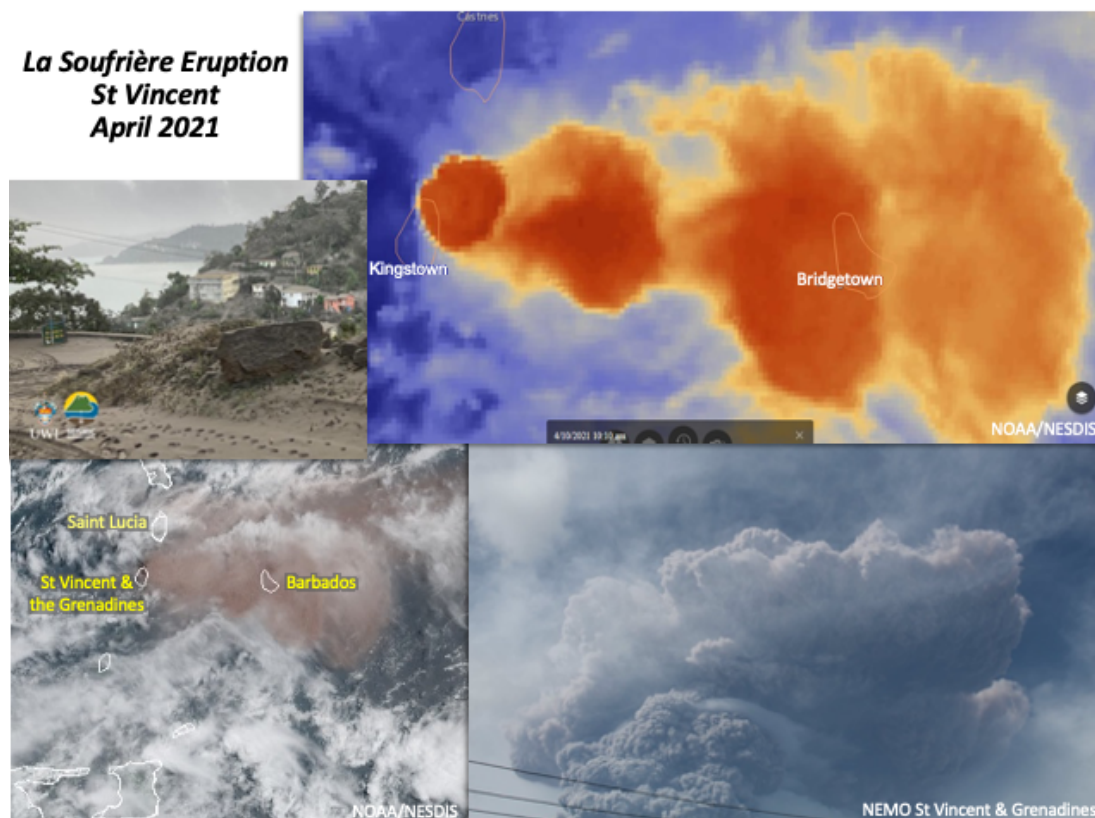


Figure 2. Clockwise from upper left: *La Soufrière* volcanic ash deposits (UWI Seismic Research Centre), GOES-East enhanced IR image (NOAA/NESDIS), GOES-East geo-colour image (NOAA/NESDIS), and photograph of the eruption (National Emergency Management Organization, NEMO, St Vincent and the Grenadines).

9. Heavy rainfall on 17 April was forecasted by the Meteorological Service of St Vincent and the Grenadines, which warned of the dangers of rain-soaked ash and landslides. A significant rain event occurred on 27-28 April caused lahars (dense mixture of volcanic ash and water), as did the passage of a tropical wave on 17 June 2021. The resulting mudflows destroyed infrastructure and many buildings in its path. More destructive mudflows and flash flooding followed with the passage of **Hurricane Elsa** over the north of St Vincent on the morning of 2 July (ANNEX I). Elsa, which had maximum sustained winds of 75 mph, with higher gusts, also had caused wind damage, with more than 40 damaged roofs reported to National Emergency Management Office (NEMO) in St. Vincent and the Grenadines.

10. The CMO Headquarters and the WMO *Climate Risk and Early Warning Systems* (CREWS) organized a special session at the 43rd *Hurricane Committee* on regional coordination and cooperation on multi-hazard early warning and response. Presentations were made by the Principal of CIMH and the Coordinating Director, who showcased the role of the National Meteorological Services in St Vincent and the Grenadines and Barbados. A WMO news article noted the need for the Caribbean to prepare for the compound effect of hydrometeorological and geological hazards, coincident with the COVID-19 pandemic, <https://public.wmo.int/en/media/news/caribbean-rolls-out-multi-hazard-preparations-hurricane-season>.

11. In just over a week in August, the Greater Antilles, experienced two tropical storms (Fred and Grace), and a 7.2 earthquake rocked the nation of Haiti and raised concerns for tsunamis. For Haiti, which was already dealing with the impact of the pandemic and other socio-economic and political turmoil in 2021, the hydrometeorological and geological hazards greatly aggravated the disastrous conditions.

12. In late October 2021, the region was affected by both Saharan dust and a volcanic plume from the *La Palma* eruption in the Canary Islands (ANNEX I), where the latter primarily affected visibility. The transport of ash from Spain to the Caribbean was confirmed by ground-based remote measurements from NASA's Aerosol Robotic Network observations from Spain, in September and Puerto Rico, in October.

13. In light of the multiple hazards faced by our Member States in 2021, it is more important than ever to highlight the essential role of the National Meteorological and Hydrometeorological Services in ensuring effective multi-hazard early warning systems for the Caribbean. To that end, the Coordinating Director convened meetings with the Directors of affected CMO Member States and collaborated with them on the submission of three abstracts to the 102nd Annual Meeting of the American Meteorological Society (AMS) to be held 23-27 January 2022 as a hybrid event. Council is asked to note that all three abstracts were accepted for presentation in a session on "Disasters within Disasters" at the 10th Weather Ready Nations Symposium.

Management of the Coronavirus 2019 (COVID-19) Pandemic

14. The CMO Headquarters Unit continued to manage the effects of Coronavirus 2019 (COVID-19) pandemic on the functionality of the Headquarters Unit and its support to National Meteorological and Hydrometeorological Services (NMHS), CARICOM, and the global community. Throughout the period of the pandemic, the CMO Headquarters (HQ) continued to fulfil its responsibilities to CMO Member States and supporting the Caribbean Institute for Meteorology and Hydrology (CIMH), as requested, while adjusting its working arrangements in accordance with the public health regulations of the Government of the Republic of Trinidad and Tobago. This included periods of all staff working remotely or on 50% rotation in the office.

15. With regard to the Caribbean Meteorological Council Session and Related Meetings: The CMO Headquarters Unit agreed with CIMH on hosting Virtual Meetings of the 61st CMC Session, 58th Meeting of the Board of Governors of CIMH, and 2021 Meeting of the Directors of Meteorological Services.

Legislation, Strategic Plans, National Frameworks for weather, climate, and water, & Roadmap

16. Bearing in mind the importance and multi-faceted nature of the functions of our National Meteorological and Hydrometeorological Services, the increasing demands for their services, and the wide range of their customer base, it is essential that their operations be underpinned and guided by comprehensive legislation. Therefore, through an implementing arrangement with the WMO, the CMO Headquarters hired a legal consultant to develop Model Meteorological Legislation and Policy for National Meteorological Services of the English-speaking CARICOM. In June 2021, the Model Meteorological Legislation and Policy were endorsed by CMO Member States. Eight national bills are scheduled to be adapted from the model legislation. The project is supported by the WMO *Climate Risk and Early Warning Systems (CREWS) Caribbean* project and Environment and Climate Change Canada, for the period 2020-2021. The development of the meteorological legislation has been coordinated in collaboration with the Organization of Eastern Caribbean States (OECS).

17. One of the main challenges identified as affecting the implementation of the CARICOM Strategic Plan is the capacity of Member States to implement regional initiatives at the national level. To aid in strengthening the capacity at the national level, the CMO Headquarters collaborated 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. Eight strategic plans were developed with the assistance of a consultant. Details will be provided under Agenda Item 11.

18. The CMO Headquarters contributed to the development of a Strategic Roadmap for Multi-Hazard Early Warning Systems in the Caribbean, through the CREWS Caribbean Project, and will be contributing to the Priority Activities, including as lead coordinator on the development of a multi-sensor precipitation grid over the Eastern Caribbean with the Barbados weather radar as one of the primary data sources. The project includes CIMH, as the technical lead, and the National Meteorological Services of Barbados, Saint Lucia, and St Vincent and the Grenadines.

WMO Matters

19. While the multiple hazards of hurricanes, volcanoes, and pandemic were dominant in 2021, many of the activities of the CMO Headquarters were aimed at regional implementation of global programmes and initiatives, particularly those emanating from the **World Meteorological Organization** (WMO) as they related to the Caribbean, generally, and CMO Member States, in particular. As one of the pillars of its mandate, the Caribbean Meteorological Organization must actively participate in WMO activities at the highest possible level in order to ensure that the interests of small developing states are accounted for and to guide and advise the CMO Member States in their own related activities.

20. Therefore, the Coordinating Director, as a member of the **WMO Executive Council** since 2018, maintains an experienced team of senior Advisors and Experts that have become very involved in WMO's programmes and activities. The Coordinating Director, as the Permanent Representative of the British Caribbean Territories with WMO, also ensures the participation of relevant regional experts in the technical work of the WMO for the benefit of the entire CMO Membership.

21. The Coordinating Director continues to serve as the RA IV representative to the **WMO Research Board** (RB), having been selected as the RA IV Research and Modelling Focal Point at the 18th Session of RA IV in February 2021. She is the lead author of the Concept Note on *Innovation in Regions* and liaises with regional institutions and WMO Research Programmes and leads on other activities that support the research priorities of North America, Central America and the Caribbean. In June 2021, she began serving on the WMO *Staff Pension Committee*.

The Science and Technology Officer, *Mr Glendell De Souza*, was selected as the Chair of the **WMO RA IV Services Committee**, a new regional subsidiary body that is aligned with the WMO Services Commission.

22. The Coordinating Director, the Permanent Representative of the British Caribbean Territories with WMO, led a delegation of 12 experts (**ANNEX III**) to the **WMO Extraordinary Congress 2021**, which was held by video conference on 11-21 October 2021. In preparation for the Congress, the Coordinating Director provided information about the major decisions of the Congress, to the Governments of the WMO Members of CMO Member States and encouraged the participation of their Permanent Representatives and Hydrological Advisers in the Congress. All but one of the WMO Members was represented at the Congress. One delegation included the Honourable Minister that oversees the Meteorological Service and three delegations included hydrological advisers. It should be noted that two Members are not compliant with WMO General Regulation 6, with regard to the formalizing of their Permanent Representative with WMO. Council is asked to **urge** to WMO Members to formalize their Permanent Representatives and Hydrological Advisers with WMO.

23. The outcomes of the WMO Extraordinary Congress 2021 and the **WMO Executive Council's** 73rd and 74th Sessions will be covered in detail under Agenda Items 3 and 8. Nevertheless, it is useful to mention a few major issues that the CMO Headquarters and the CIMH have been involved in that will have immediate impact on CMO Member States. Among these is the implementation of the **WMO Unified Data Policy**; the **Global Basic Observation Network (GBON)**, which will help to improve global weather prediction and climate services; and the **Systematic Observations Financing Facility (SOFF)**, which will allow SIDs to be able to implement and sustain their contribution to GBON. The WMO Extraordinary Congress also made major decisions about water: the **WMO Vision and Strategy for Hydrology** and its associated Plan of Action as well as the **WMO Water Declaration and Water and Climate Coalition**. Council will recall the report of the 18th WMO Congress approving a Country Support Initiative, whereby WMO will support NMHSs in accessing development and climate financing. Additionally, special emphasis has been placed on support for regional operations and capacity development as well as greater and controlled engagement with the private sector and academia. The implementation of the *Global Framework for Climate Services (GFCS)* regional and the development of *National Frameworks for Weather, Water, and Climate Services* continues as WMO long-term goals to ensure user-oriented and sector specific services. The CMO Headquarters has continued to be active in supporting WMO regional activities and guiding national action for the **WMO Integrated Global Observing System (WIGOS)**. Members are reminded of the compulsory implementation of the WIGOS, which became operational in 2020. Disaster Risk Reduction and early warning systems to build resilience to climate change remain as major issues for the Congress.

24. A Virtual **Regional WIGOS Centre** in Regional Association IV (North America, Central America and the Caribbean) (RA IV), was proposed, as a collaborative effort of the United States National Weather Service, Environment Canada, the CMO Headquarters Unit, and the Trinidad and Tobago Meteorological Service, and endorsed by the RA IV Management Group in January 2020. The RWC functions are to monitor and evaluate the availability, timeliness, and quality of observation data, where the CMO HQ and TTMS would cover the English-speaking Caribbean. A workshop on Regional WIGOS Centres was held for RA IV on 8-9 December 2020. The RWC working group is currently developing an implementation plan.

25. The Coordinating Director co-authored the article "*No Member left behind – Part 1. A developing country perspective on data exchange in meteorology*", for a special issue of the *WMO Bulletin* focused on the WMO Unified Data Policy (<https://public.wmo.int/en/resources/bulletin/no-member-left-behind-part-1-developing-country-perspective-data-exchange>).

Development of National Meteorological Services in CMO Member States

26. CMO Headquarters has been working with the new Director of Meteorology of the Turks and Caicos Island (TCI) Airport Authority, **Dr Holly Hamilton**, on the development of their National Meteorological Service. CMO HQ organized meetings with the Director, CIMH, and with the Bahamas Department of Meteorology (BDM) to schedule attachments in the BDM forecast office. Additional guidance was provided on human and technical capacity development and collaborations with the TCI Department of Disaster Management and Emergencies. Among the activities being discussed is the acquisition of a weather radar as part of a collaborative with the Department of Disaster Management and Emergencies (DDME) and other stakeholders in TCI and in coordination with the Bahamas Department of Meteorology.

27. The Coordinating Director was asked by the *Ministry of Public Utilities* of the Republic of Trinidad and Tobago to chair the "*Trinidad and Tobago Meteorological Service (TTMS) Transformation Committee*". The Committee was tasked with developing a legal framework for the transformation of the TTMS, following a review of its Strategic Development Plan 2015-2024, operations, human resources, public weather services, and observation network. Prior to the establishment of the Transformation Committee, the Coordinating Director organized a meeting of the TTMS with CIMH and WMO to discuss advancing the strategic goals of the TTMS.

28. CMO Headquarters has been supporting the development of the St Kitts and Nevis National Meteorological Services following their new Strategic Plan that was developed with support from the WMO-CMO implementing arrangement. The arrangement is also supporting the development of national Meteorological legislation adapted from the Model Meteorological Bill. The CD and STO have provided reviews of proposals for advancing the goals of the Strategic Plan through a *Green Climate Fund Readiness project*. The national project is being developed with the support of the Caribbean Community Climate Change Centre (5Cs).

29. The CMO Headquarters is also advising the St Kitts Meteorological Service on the transitioning of the *Terminal Aerodrome Forecasts* (TAFs) for St Kitts, currently provided by the US National Weather Service Office in San Juan, Puerto Rico, to forecasters in St Kitts and Nevis. The transition is also being supported by CIMH training resources for continuing professional development.

Capacity Development and Outreach

30. CMO Headquarters solicited funding from the US National Weather Service International Affairs, which generously supported nine forecasters from CMO Member States to attend the AMS Short Course on *GOES-R/JPSS Hands-on Training to Process, Display, and Analyze Satellite Data Products*, held on 17-18 March 2021.

31. The Coordinating Director was invited to present a seminar at the University of Leeds, on *Caribbean Weather Prediction Challenges and Opportunities* on 2 March 2021. Council will recall that the University of Leeds and CMO Headquarters proposed the *Caribbean Weather Forecasting Initiative*, as a part of the *EUREC⁴A* international field campaign (see the CIMH Principal's report for further information on *EUREC⁴A*). The Initiative trained forecasters in a December 2019 workshop, co-organized with CIMH, to support the field operations with a "Forecast testbed", with a second workshop planned for 2022.

32. The Coordinating Director, organized and chaired a session on **Trade wind weather** as part of the *Post-EUREC4A Symposium*, held on 16 February 2021. The session facilitated knowledge-exchange on preliminary EUREC4A research results related to weather forecasting.

33. The Coordinating Director gave a keynote presentation on the benefits of the Climate Risk and Early Warning Systems (CREWS) Initiative to the Caribbean during the VII Regional Platform for Disaster Risk Reduction (**DRR**) in the Americas and the Caribbean, 1 November 2021.

34. In support of capacity development and adaptation to climate change, the Coordinating Director served as an External Examiner for The University of the West Indies, Department of Physics, Doctoral Thesis of *Mr Jayaka Campbell*.

35. 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 is scheduled for 2022.

Symposia organized

36. CMO Headquarters, in collaboration with Varysian Ltd, organized the Second Caribbean Symposium on Hydro-Meteorology, from 15-17 December 2020, on a virtual platform. The symposium had more than 100 attendees; featured key experts in international operational hydrometeorology and hydrology; and roundtable discussions on topics such as “Advancing partnerships between meteorological and hydrological agencies in the Caribbean”, “Progress in data capture and sharing”, and “Defining and growing stakeholder services”. Further details are provided below and under Agenda Item 11.

37. The CMO Headquarters and the WMO hosted the first ever Symposium on Lightning and Lightning Safety Awareness from 19-20 May 2021, on a virtual platform. With over 130 international participants from 28 countries, several prominent international presenters spoke on lightning safety, lightning injuries, public education and communications, engineering, lightning detection, and lightning protection. Participants included stakeholders from aviation, health, sports, energy, and other sectors. Following the symposium, the Coordinating Director was invited to present at the International Lightning Safety Day Preparation Conference, on 28 May 2021 and also authored an article about the symposium in *Meteoworld*, <https://public.wmo.int/en/resources/meteoworld/symposium-lightning-and-lightning-safety-awareness>.

Support to the Regional and Global Water Agenda

38. Since the 60th meeting of the CMC, the CMO Headquarters has embarked on a number of activities to support the regional and global water agenda. Firstly, CMO Headquarters, in collaboration with Varysian Ltd, organized the Second Caribbean Symposium focused on Operational Hydro-Meteorology (***HydroMet Caribbean***), from 15-17 December 2020, on a virtual platform. This second symposium focused on operational hydrology, aimed at guiding the integration of operational hydrological services into the WMO as well as the development and enhancement of hydrological services in CMO Member States and WMO RA IV (North America, Central America, and the Caribbean, in general). CMO speakers at the Symposium included ***Dr David Farrell***, Principal of CIMH, and ***Dr Garvin Cummings***, Chief Hydrometeorologist, Guyana Hydrometeorological Services. Further information on the symposium is provided under Agenda Item 11.

39. The CMO Headquarters contributed to the WMO consultations to identify the needs and gaps relevant to the long-term ambitions for hydrology identified by the 18th WMO Congress in 2019. The Coordinating Director urged CMO Member States to formalize their Hydrological Adviser with WMO and to participate in the development of the Action Plan for Hydrology. The result was that a number of CMO Member States actively participated in the RA IV Hydrological Forums and the Hydrological Assembly at the WMO Extraordinary Congress 2021. Council is asked to **ensure that each WMO Member has a formally designated Hydrological Adviser with WMO**.

40. Further, the Coordinating Director provide input to various forums of the *Global Water Partnership–Caribbean* (GWP-C), including their Stakeholder Consultations on development of a *Regional Action Framework for Integrated Water Resources Management* (IWRM) for the CARICOM Region. CMO Headquarters engagement with regional organizations is synergistic with the global

water agenda, including the **Water and Climate Coalition** that was formed by WMO, five other UN agencies, and international organizations such as the GWP.

Marine Meteorology, Ocean Science, and Services

41. The paramount role of the oceans in the sustainable development of Small Island Developing States was highlighted in an article by the Coordinating Director, the Principal of CIMH, and President of WMO Regional Association V (South-West Pacific) and Director of Tonga Meteorological Services. The article, in a special issue of WMO Bulletin published on 23 March 2021 (https://public.wmo.int/en/resources/bulletin/Products_and_services/oceanic_science_SIDS), noted the contributions of the Organs of the CMO and the National Meteorological and Hydrometeorological Services to the “science for sustainable development” value chain, and the tangible benefits to the region’s safety and economy.

42. The Coordinating Director was one of five presenters at the *WMO RA IV Ocean Side Event* to the 18th Session of WMO Regional Association IV (North America, Central America, and the Caribbean). Held on 10 February 2021, the event attracted over 100 registered participants, including RA IV delegations and external participants. The Coordinating Director described the short and long-term research priorities in the region and the importance of linking research innovation and services to customer needs in the maritime industry, fisheries, offshore industry, search and rescue operations, and other sectors.

Disaster Risk Reduction and Climate Adaptation

43. The Coordinating Director was an invited speaker to the *Climate Adaptation Summit 2021*, a global conference on 25-26 January 2021, which highlighted adaptation efforts needed to respond to the effects of climate change. At the conference, the UN Secretary General **Antonio Guterres** called for “a breakthrough on adaptation and resilience”. After consulting with Member States on their activities and priorities for early warning systems and climate change, the Coordinating Director spoke of the value of investing in early warning and early action; on becoming resilient to extreme weather and adapting to climate change, including the need to enhance the human and technical resources of Caribbean National Meteorological and Hydrological Services and to recognize their value to economic development.

44. In addition to the activities reported above, the CMO Headquarters Unit continues to advance disaster risk reduction in cooperation and coordination with Caribbean Disaster and Emergency Management Agency (CDEMA), CIMH, and other regional institutions. Through the Regional Early Warning System Consortium led by CDEMA, CMO HQ aided in the development of a Multi-Hazard Early Warning System Checklist. Additionally, the Coordinating Director is serving on the Steering Committee of a project by WMO and CDEMA to strengthen early warning operational arrangements between National Disaster Organizations and National Meteorological and Hydrological Services. Other related activities are described under Agenda Items 8 and 11.

CARICOM-CARIFORUM Related Activities

45. The CMO Headquarters continued its 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.

46. Council is asked to note that the Coordinating Director participated in various CARICOM climate-related activities in 2021, starting with the CARICOM Heads of Institutions Climate Coordination Activities in January 2021 and continuing through the recent Pre-COP26 Ministerial Preparation Meeting held on 22 October. The Coordinating Director shared with the CARICOM Secretariat, the related activities and decisions of the WMO and its Members, including the *Global Basic Observation Network*, which is vital for weather forecasting and climate services, and the *Systematic Observation*

Finance Facility (SOFF), intended to support least developed countries with sustaining their basic observation network and international data exchange via the WMO Unified Data Policy.

47. The Coordinating Director provided oral and written contributions to the 11th Meeting of CARICOM and the UN System on 21-22 July. A document was provided on the critical matter of data sharing for the public good, including disaster risk reduction, weather prediction, climate services and climate action, other policy making, and advancing economic development.

48. Council is asked to note that CMO Headquarters has been contributing to the development of the CARIFORUM Post-Cotonou Regional Programming, by providing reviews of the draft programming and participating in the CARIFORUM regional consultation meetings in 2021.

49. The CMO Headquarters Finance and Administrative Officer, ***Mrs Natalie Araujo-O'Brien***, continues to serve on the CARICOM RBM Leadership Group and the Finance Committee of the Caribbean Community Administrative Tribunal (CCAT).

Headquarters Unit Matters

50. On a Headquarters staff-related matter, the Council will recall that, because of the small size of the staff complement, the Headquarters Unit does not have a staff pension fund, but instead operates a Headquarters ***Staff Terminal Benefit Fund***. The Fund was established in 1995 “for the purpose of securing lump sum payments of moneys for such of its present and future employees employed at the Headquarters Unit in Trinidad and Tobago”. The Fund requires three Trustees as signatories, which have been since inception: the Coordinating Director, the Director of the Trinidad and Tobago Meteorological Service and the Administrative Officer. For convenience and expediency, the third trustee has always been the incumbent Director of the Trinidad and Tobago Meteorological Services with approval from the parent Ministry. However, since the retirement of the former Director of the TTMS in 2018, the third Trustee position has been vacant. The CMO Headquarters is proposing to Council that a representative from another Member State be selected to serve as a Trustee. Supporting documents are provided in **Annex II**.

51. In late 2022, the Science and Technology Officer (STO), ***Mr Glendell De Souza***, will be retiring, after serving with great dedication as a pioneer in the position since 2005. The one-time costs to the budget of the Headquarters of the STO succession will be discussed under Agenda Item 7. The proposed process for the succession of the STO will be discussed under Agenda Item 12.

Status update on Strategic Objectives

52. Council will recall the approval of the *Strategic Plan 2020-2023* and the *Operational Plan 2020-2023* of the CMO Headquarters by the 59th Council and 60th Council, respectively. An update on the Status of the Strategic Plan outcomes and related activities is presented in **Annex III**. Congress is asked to note the activities that are helping to achieve the intermediate outcomes under each Strategic goal. These include legislation and Strategic Plans and related Actions Plans which directly support three of the Strategic goals; the upgrading of National Meteorological Services; enhancement of early warning systems and disaster risk reduction; support for the implementation of the WMO Integrated Global Observation System (WIGOS); contributions to establishing regional priorities for marine meteorology and ocean services; contributions to the development of the WMO Unified Data Policy, and the framework for the Global Basic Observation Network, among several activities.

Other Matters

53. Council is asked to note that, by 15 October 2021, the level of financial contributions received from Member States had decreased this year, standing at 30% compared with 53% at the same period in 2020. Given the socio-economic impact of the ongoing COVID-19 pandemic, a reduction is not surprising. Nevertheless, six Member States made their full contribution by 15 October. Ten (10)

Member States failed to meet their current obligations to the budget of the CMO Headquarters up to the time of this report. Details will 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*, which was approved by Council at CMC59 (Anguilla, 2019). Activities to support the development of Member States have had to be delayed or curtailed because of the lack of support to the CMO HQ budget.

54. The CMO Headquarters is supporting the CIMH in its implementation of the Intra-ACP Climate Services and Related Applications (ClimSA) Programme on behalf of the CMO. ClimSA is an initiative of the Organisation of the African, Caribbean and Pacific States (OACPS) funded under the 11th European Development Fund (EDF) to strengthen the climate services value chain. See the Principal's report for further details.

55. **ANNEX IV** to this Document indicates meetings and other events attended (or scheduled attendance) by officers of the CMO Headquarters in 2021. This schedule of activities undertaken by the CMO Headquarters to-date was relatively heavy this year, comprising of primarily of a mix of CMO and WMO-related regional implementation activities. Several regional meetings were related to disaster risk and Multi-Hazard Early Warning Systems in the Caribbean. The Headquarters Unit formally congratulated newly-appointed Ministers, who oversee the National Meteorological and Hydrometeorological Services; introducing each to the CMO and its role in supporting Member States.

56. The CMO Headquarters continues to promote the participation in as many scientific, technical and training events as possible by the National Meteorological and Hydrometeorological Services and the CIMH, particularly those sponsored by the WMO and its partners that have a special relevance to the region. The list below shows the events that the Coordinating Director was able to facilitate from December 2020 to October 2021:

Virtual Meetings and Workshops

- (i) **Caribbean Meteorological Organization (CMO) Headquarters Unit and Varysian Ltd** *Caribbean Hydro-Meteorological Symposium 2020*, 15-17 December 2020 [*Multiple participants*]
- (ii) **WMO Webinar on COVID-19, Meteorological and Air Quality Factors**, 12 January 2021 [*Multiple participants*]
- (iii) **AMS/GOES-R/JPSS** Short course on *GOES-R/JPSS Hands-on Training to Process, Display, and Analyze Satellite Data Products*, 17-18 March 2021 [*Multiple participants*]
- (iv) **WMO Secretary-General Briefing**, 6 May 2021 [*J Tibbetts, K Powery, Cayman Island/BCT*]
- (v) **WMO /NOAA/NWS Workshop on Hurricane Forecasting and Warning**, 26-30 April 2021 [*C Mitchell, Grenada; D Martin, St Kitts and Nevis*]
- (vi) **ACS Caribbean Territorial Information Platform for Disaster Prevention (PITCA) Technical Training**, 5-7 April 2021 [*Multiple participants*]
- (vii) **CMA, The International Distance Training Course on Short-term Climate Monitoring and Prediction in Disaster Prevention and Mitigation**, 11-21 May 2021 [*K Caesar, A Sealy, CIMH/BCT*]
- (viii) **CMO/WMO Symposium on Lightning and Lightning Safety Awareness**, 19-20 May 2021 [*Multiple participants*]

- (ix) **WMO Training on Climatological Standard Normals** [*Multiple participants*]
- (x) **WMO CREWS-Canada Sub-Project Workshop on Impact-based Forecast and Warning Systems**, 26-30 July 2021 [*S Boyce, CIMH/BCT*]
- (xi) **WMO 3rd Leadership and Management Programme for Senior Management of National Meteorological and Hydrological Services**, 3 to 6 August and from 10 to 13 August 2021 [*H Hamilton, Turks and Caicos Islands/BCT*]
- (xii) **WMO Common Alerting Protocol (CAP) Implementation Workshop**, 13-14 October 2021 [*C Hicks, S Leonard, S Armstrong-Jones, K August, British Virgin Islands/BCT; H Hamilton, Turks and Caicos Islands/BCT; Multiple persons, Grenada, St Vincent and the Grenadines*]
- (xiii) **WMO Regional Climate Centre (RCC)-Washington International Training Workshop**, 8-10 November 2021 [*J Pryce, Grenada*]

Action Proposed to Council:

57. The Council is invited to:
- (i) **Note** the activities and issues concerning the CMO Headquarters in 2021, in particular, the implementation of legal mandates and strategic plans in Member States, the response of the CMO Headquarters Unit to the multiple hazards of COVID-19 pandemic, volcanic eruption, and hydro-meteorological hazards, the engagement with disaster risk reduction and the hydrology community, as well as those issues concerning the wider Caribbean Community;
 - (ii) **Discuss** the impact of the 2021 hurricane season, other high impact weather, volcanic eruption, on the region and, in particular, the impact on CMO Member States;
 - (iii) **Nominate** a third Trustee for the CMO Headquarters Staff Terminal Benefit Fund, as shown in **ANNEX II**.
 - (iv) **Note** the progress on the CMO Headquarters Strategic Plan 2020-2023.

CMO Headquarters
November 2021

High Impact Hazardous Events of 2021

Preliminary Atlantic Tropical Cyclone Tracks

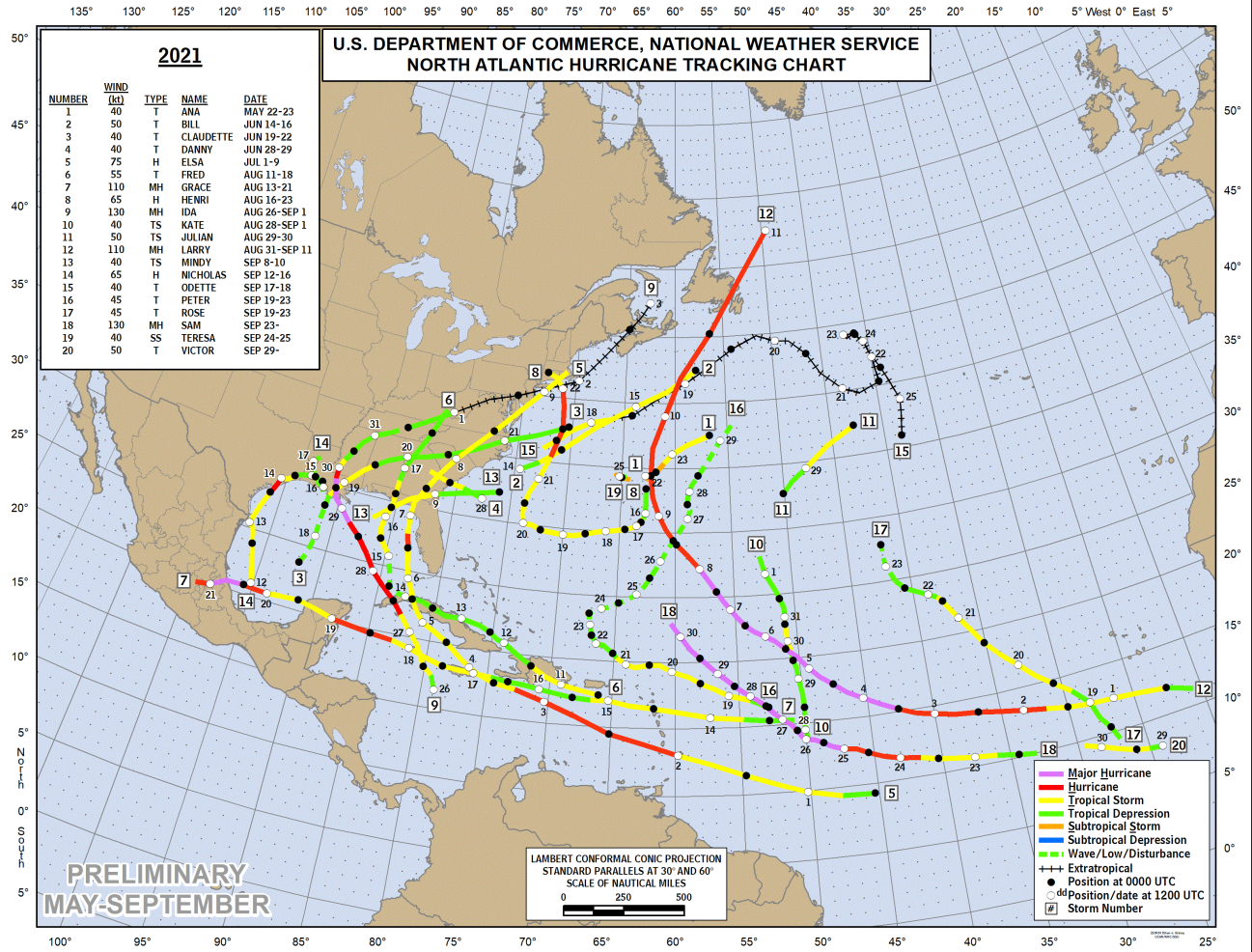


Figure A1. Atlantic Tropical Cyclone Tracks for 2021, up to 30 September 2021



Figure A2. Guyana Floods, May 2021 (left) Courtesy of Office of the President of Guyana. (right) Courtesy of Guyana Hydrometeorological Service.



Figure A3. (Left) Infrastructure damaged by lahars due to heavy rainfall on 28 April (Courtesy, Nation News). (left) Home destroyed by lahars in the Red Zone in June 2021 (courtesy of Meteorological Service of St Vincent and the Grenadines)

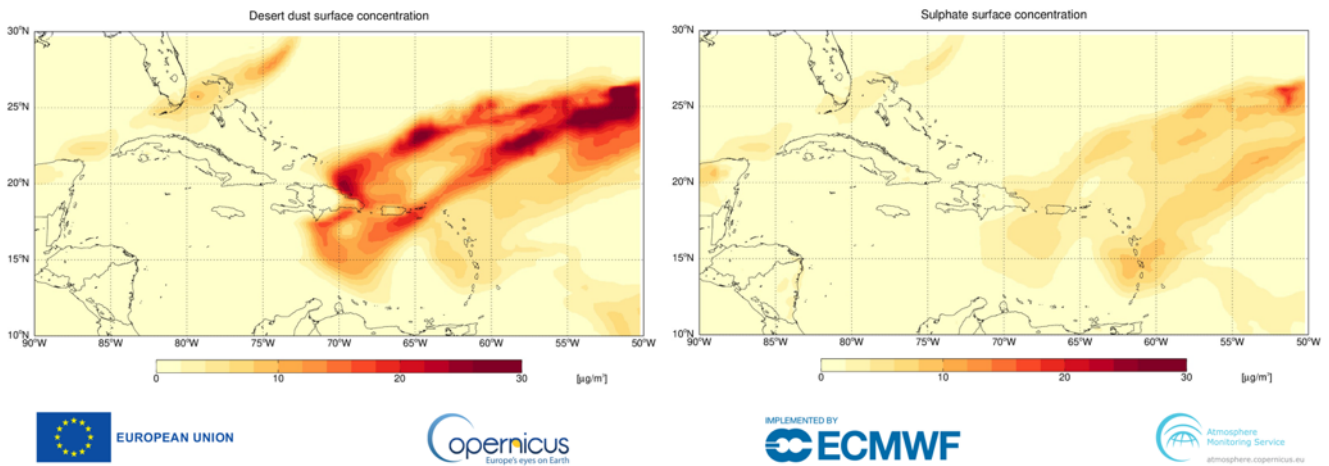


Figure A4. Copernicus Atmosphere Monitoring Service (CAMS) analysis of Saharan dust (left) which coincided with the arrival of SO₂ plumes from La Palma volcano (right) in the Caribbean as of 9th October. Figure Credit: Copernicus Atmosphere Monitoring Service/ECMWF.

SELECTION OF THIRD TRUSTEE FOR THE CARIBBEAN METEOROLOGICAL ORGANIZATION HEADQUARTERS STAFF TERMINAL BENEFIT FUND PLAN

Because of the small size of the staff complement, the Headquarters Unit does not have a staff pension fund, but instead operates a Headquarters **Staff Terminal Benefit Fund**. The Fund was established in 1995 “for the purpose of securing lump sum payments of moneys for such of its present and future employees employed at the Headquarters Unit in Trinidad and Tobago”.

At CMC35 (1995), a paper was presented to the Council on the Terminal Benefit Fund which showed “The deed for the Fund was formally signed by the Coordinating Director of the CMO, the Director of the Trinidad and Tobago Meteorological Services and a staff member of the Headquarters, as Trustees.” The first two named Trustees have been nominated by the Employer (the Caribbean Meteorological Organization) and the last Trustee (hereinafter referred to as “the representative Trustee”) has been nominated by the employees (Appendix).

The Headquarters Unit handles the routine monthly deposits into the Fund and all inherent record keeping. The balances held in the Fund are subjected to examination by the auditors appointed by the Auditor General Department of Trinidad and Tobago during the annual audit exercise. Any non-routine change to the Fund must be taken to the Council for decision.

The administrator of the Fund is the Trinidad and Tobago Unit Trust Corporation (T&TUTC) and with respect to signing authority, **all instructions to the administrator must be signed by two trustees and any two trustees may sign together**. For convenience and expediency, the third trustee has always been the incumbent Director of the Trinidad and Tobago Meteorological Services with approval from the parent Ministry.

However, since the retirement of the former Director of the TTMS in 2018, the third Trustee position has been vacant. According to the terms of the Fund (Section 6 shown in the **Appendix** below), “The Trustees shall be at liberty to act notwithstanding the existence of any vacancy for the time being on their body.” While the service of the third trustee is rarely ever required, there may be the occasion that either the first or second trustee is not available; or there may be the need to give instructions to T&TUTC related to either one of the trustees for which, ideally, that person should not sign, despite being authorized to do so.

Therefore, the CMO Headquarters is proposing that the Council **nominates a third Trustee to fill the current vacancy**.

Appendix: Relevant Text of the Staff Terminal Benefit Fund

Sections related to the composition of the Trustees are highlighted in grey.

-----Start of first excerpt of Original Text -----

“The Staff Terminal Benefit Fund of March 27th, 1995

THE CARIBBEAN METEOROLOGICAL ORGANIZATION HEADQUARTERS
STAFF TERMINAL BENEFIT FUND

THIS TRUST DEED is made the 27th day of March in the year of Our Lord One thousand Nine hundred and Ninety-Five Between the **CARIBBEAN METEOROLOGICAL ORGANIZATION** having its Head Office at the Caribbean Meteorological Organization Headquarters, St. Ann’s Avenue, Port of Spain, (Hereinafter called the “Employer”) of the One Part and **C.E. BERRIDGE** of 14 Grenada Avenue, Federation Park, Port of Spain, Coordinating Director of the Employer, **STEVE POLLONAI**S, Director Meteorological Services of Trinidad and Tobago, Piarco Airport and **LYNN NIMBLETT**, Employee of the Caribbean Meteorological Organization Headquarters (hereinafter called “the Trustees” which expression shall include any new or substituted Trustee appointed under the terms hereof) of the Other Part.”

WHEREAS

A. The Employer has determined to establish a **STAFF TERMINAL BENEFIT FUND PLAN** (hereinafter called “the Plan”) for the purpose of securing lump sum payments of moneys for such of its present and future employees employed at the Headquarters Unit in Trinidad and Tobago.

B. The employer has agreed to undertake to pay every month fifteen percent of each employee's salary into the Plan which will be payable in a lump sum, upon an employee satisfying the conditions of service listed at clause 1.

C. The first two named Trustees have been nominated by the Employer and the last Trustee (hereinafter referred to as “the representative Trustee”) has been nominated by the employees and they have agreed to act as first Trustee of the Plan.

-----End of first excerpt -----

-----Start of second excerpt-----

6. (a) The Trustees shall not be less than three in number, one of whom shall be an employee selected by the Employees.
- (b) The Two Trustees appointed by the Employer may be removed at a meeting called for that purpose by a resolution of the Caribbean Meteorological Council, ten days notice of such meeting to be given to the Employees and Trustees.
- (c) The representative Trustee appointed by the Employees may be removed at a meeting called for that purpose and the employees present at the meeting shall form a quorum and a simple majority of those present and voting shall decide the matter for which the meeting was called.
- (d) Any Trustee may resign upon given thirty (30) days notice at any time to the Employer.
- (e) The Trustees shall be at liberty to act notwithstanding the existence of any vacancy for the time being on their body.
- (f) If a vacancy shall arise among the Trustees, the same shall be filled by the Employer and/or the Employees within six (6) months after such vacancy has occurred.

-----End of second excerpt-----

Status of Progress on Strategic Plan 2020-2023

1. Support to Regional Strategic Goals for 2020-2023 and beyond

Programme	Partners (if any)/Contact Organizations	Status	Remarks
<p>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</p>	<p>Canada, Costa Rica, Jamaica, USA, and WMO</p>	<p>Regional governance reform continued through 2021. New subsidiary bodies formalized and began operating in 2021. CMO HQ solicited and nominated various experts to the new committees. CMO STO chairs Services Committee. CD is Research and Modelling Focal Point.</p>	<p>Regional Strategic Goals for 2024-2027 have been developed with input from CMO HQ and other regional experts</p>
<p>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.</p>	<p>Canada, Costa Rica, Jamaica, USA, and WMO</p>	<p>(i) Operational Plan completed and approved in 2021 (ii) 18th RA IV Session was successful (iii) Several high-level dialogues held with RA III and RA IV, including co-organizing events with ECLAC and UNDRR. Coordinating Director provided CMO perspective as keynote speaker, presenter, or panelist in various forums</p>	
<p>CARICOM/CARIFORUM Strategic Programming CMO Headquarters continues to contribute to regional programming and strategic planning by CARICOM</p>	<p>CARICOM Institutions, Secretariat</p>	<p>CMO HQ provided input to Post-Cotonou Regional Programming. Focuses on Environmental Resilience</p>	

2. Expected Outcomes 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.

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
<p>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 Cabinet 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.</p>	<p>WMO, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern Caribbean States (OECS) Sponsors – CREWS, Environment and Climate Change Canada</p>	<p>Model Meteorological Legislation and Policy endorsed in June 2021. Two bills adapted under original project. CMO requested amendment for reallocation of travel funds. Six more meteorological bills being drafted since September 2021</p>	<p>CMO - WMO Implementing Arrangement scheduled to end in Q4 of 2021. Limited to technical assistance with adapting model legislation & policy</p>
<p>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 December 2021.</p>	<p>WMO, NMHSs of CMO Member States, their Relevant Government Ministries, & stakeholders, CIMH. Sponsors – CREWS, Environment and Climate Change Canada</p>	<p>Strategic Plans completed for eight Member States. At least two being used in national development plans. One being implemented as part of GCF Readiness Project. CMO HQ advising on implementation, reviewing</p>	

<p>Severe Weather Forecast Programme-Eastern Caribbean CMO HQ and Météo-France Martinique, co-chair the Regional Sub-programme Management Team (RSMT), guiding implementation of the SWFP-EC by which NMHSs access new numerical weather products, radar products, and lightning monitoring, and more;</p> <p>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;</p> <p>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</p>	<p>Météo-France, NOAA, Environment and Climate Change Canada, WMO, CIMH</p>	<p>ToRs, and other support.</p> <p>24/7 operational <i>Regional Forecast Support Facility in Martinique</i> testing guidance issued for a variety of cases during 2021.</p> <p>In March 2021, NWS International Office supported nine forecasters in AMS short course on satellite meteorology, in response to proposal from CMO HQ</p> <p>CIMH organized Severe Weather Forecasting and Hurricane Forecasting Competency workshop, 8-12 November in collaboration with CMO HQ, Meteo-France, NHC, and U of Leeds. 16 forecasters trained.</p>	<p>Other SWFP Training activities postponed from 2021 to 2022, e.g., attachment to RFSF and forecaster exchanges</p>
<p>EUREC⁴A-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 EUREC⁴A 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. Supported goas of the SWFP.</p>	<p>University of Leeds, WMO, CREWS, UK Met Office, CIMH, Meteo-France</p>	<p>EUREC⁴A-UK and CMO experts continued knowledge exchange in webinars during 2021. Collaboration on journal article outlined. Lessons learned from Forecast testbed shared during SWFP workshop in November 2021. Funding available for 2nd workshop, postponed from July 2020.</p>	<p>In person workshop is preferred but dependent on lifting of travel restrictions</p>
<p>Regional Hurricane Warning System Coordination of CMO Member States' involvement in the Atlantic-Caribbean Hurricane Warning System, including back-up arrangements among</p>	<p>NOAA/NHC, CDEMA, and WMO</p>	<p>Two CMO HQ-nominated forecasters trained during NHC 2021 workshop.</p>	<p>Back-up arrangements in CMO States</p>

<p>States. Coordination of annual training activities with the US National Hurricane Center.</p> <p>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.</p>	<p>TCI Airport Authority; TCI Department of Disaster Management and Emergencies; Bahamas Department of Meteorology, CIMH</p>	<p>CMO HQ co-organized session at 43rd Hurricane Committee on responding to multiple-hazards of 2021 in the Caribbean.</p> <p>Arranged for Director of Meteorology to participate in March session of 43rd Hurricane Committee, although formal start in position was May 2021. CIMH arranged refresher operational training. CMO facilitated management and leadership training for Director in August. Coordinated with Bahamas Department of Meteorology to arrange on-the-job training, started in October. Advised on MoU between TCIAA and DDME. Advised on new radar project, a collaboration of DDME, TCIAA, and other stakeholders, to be coordinated with Bahamas Met Dept radar network.</p>	<p>reaffirmed at 43rd Hurricane Committee</p> <p>Major multi-year activity for TCI and CMO.</p>
<p>Development of St Kitts and Nevis Meteorological Service CMO Headquarters has been supporting the development of the St Kitts and Nevis Meteorological Service, (i) with a new Strategic Plan; (ii) drafting of a national meteorological bill, with the support of WMO; (iii) reviews of proposals for implementing their Strategic Plan via a <i>Green Climate Fund Readiness project</i>; (iv) Supporting St Kitts and Nevis in transitioning of St Kitts <i>Terminal Aerodrome Forecasts</i> (TAFs) from the US National Weather Service to forecasters in St Kitts and Nevis.</p>	<p>CCCCC, GCF, Government of St Kitts and Nevis, CIMH</p>	<p>ToR has been distributed for consultancy to develop Standard Operating Procedures for the Met Service operations. In November 2021, St Kitts will start a transition period of producing TAFs in real-time and comparing operational TAFs. Forecasters will embark on refresher training on writings TAFs.</p>	<p>End of current operational arrangement has not yet been specified.</p>

<p>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.</p>	<p>NMHSs, NOAA, WMO, World Bank</p>	<p>Ongoing. CMO Headquarters will provide input to the implementation plans for a Priority Activity of CREWS Caribbean aimed at enhancing alerting communication system</p>	<p>Driven by continuous advances in systems technology.</p>
<p>Risks Limited economic resources to support the activities, especially in light of the ongoing pandemic and the resulting shrinking of economies worldwide</p> <p>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</p>	<p>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.</p> <p>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.</p>		

<p>Strategic Priority 2: Support climate-smart decision making to build resilience and adaptation to climate risk.</p>			
<p>Ultimate Outcome 2 Climate services and information integrated into policy and decision-making framework for building socioeconomic resilience and reducing climate risk.</p>			
<p>Intermediate Outcome 2 Enhanced 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.</p>			
<p>Key Focus Areas in 2020-2023</p>			
<ul style="list-style-type: none"> 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. 			
<p>Activities</p>			
<p>Programme</p>	<p>Partners (if any)/Contact Organization</p>	<p>Status</p>	<p>Remarks</p>
<p>Drafting of Legislation for National Meteorological Services CMO Headquarters is leading a project to draft a</p>	<p>WMO, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of</p>	<p>Model Meteorological Legislation and Policy endorsed in June 2021. Two bills adapted under</p>	<p>CMO - WMO Implementing Arrangement</p>

<p>Template Meteorological Bill for adapting by CMO Member States without a legal mandate for their Meteorological Services. A Policy Document and draft Cabinet memoranda will be developed to accompany the Legislation.</p> <p>Strategic Plans with National Framework for Weather, Water, and Climate Services and Complementary Action Plan</p> <p>CMO Headquarters is leading a project to develop National Strategic Plans in eight CMO Member States that requested assistance with Strategic Planning. Project has been coordinated with CIMH from inception, as CIMH is already developing frameworks for climate services at the national level through their projects. Project period: April 2020-December 2021</p>	<p>Eastern Caribbean States (OECS) Sponsors – CREWS, Environment and Climate Change Canada</p> <p>WMO, NMHSs of CMO Member States, their Relevant Government Ministries, & stakeholders, CIMH. Sponsors – CREWS, Environment and Climate Change Canada</p>	<p>original project. CMO requested amendment for reallocation of travel funds. Six more meteorological bills being drafted since September 2021</p> <p>Strategic Plans completed for eight Member States. CIMH is using the Strategic Plans, which include Frameworks for Weather, Water, and Climate, for its projects to develop or enhance climate services in specific beneficiary Member States.</p>	<p>is scheduled to end by Q4 of 2021.</p> <p>CMO - WMO Implementing Arrangement scheduled to end by Q4 of 2021.</p>
<p>Risks</p> <p>Limited human resources and workforce competency to deliver climate services, particularly for the smaller Meteorological Services</p> <p>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</p>	<p>Mitigation Measures</p> <p>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.</p> <p>Encourage NMHS to work with CIMH to develop the scientific and technical skills of their staff</p> <p>Encourage NMHSs to seek partnerships for climate service delivery among sectors for whom climate and water data are vital</p>		

<p>Strategic Priority 3: Support the strengthening and maintenance of observation networks and information services</p>
<p>Ultimate Outcome 3 Enhanced observations and integrated information services for impact-based forecasting and decision-support for both routine activities and high-impact events.</p>
<p>Intermediate Outcome 3 An 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.</p>
<p>Key Focus Areas in 2020-2023</p>
<ul style="list-style-type: none"> • 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
<p>WMO Integrated Global Observation System (WIGOS) – Initial Operational Phase</p> <p>(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</p> <p>(ii) WIGOS National Implementation Plans CMO Headquarters is providing guidance and templates for Member States to use in developing their National Implementation Plans.</p> <p>(iii) WMO Integrated Global Observation System (WIGOS) – Regional WIGOS Centre 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-</p>	<p>CIMH, WMO, NMHSs of CMO Member States and other national entities with surface observing stations</p> <p>WMO, NMHSs of CMO Member States and other national entities with surface observing stations</p> <p>WMO, NOAA, Environment Canada, TTMS</p>	<p>WIGOS Initial Operational Phase from 2020-2023. 73rd WMO Executive Council approved Guide to WIGOS, effective 1 October 2021. Draft guide reviewed by STO and other CMO experts on WMO Commissions</p> <p>Same as above</p> <p>Collaboration of CMO HQ and TTMS endorsed by Council in 2018. Concept Note was approved by WMO RA IV Management Group in January 2020. RWC Workshop held, 8-9 December 2020. Currently developing Implementation Plan.</p>	<p>Requirements and guidelines provided by the WMO Infrastructure Commission.</p> <p>Only a small percentage of CMO Member States have been implementing WIGOS</p> <p>Technical tools developed by WMO and Centres in other regions. Extra resources needed for Caribbean part of RWC</p>

<p>speaking Caribbean.</p> <p>(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. The Coordinating Director served on the WMO Study Group for GBON and coordinated interactions between the WMO and regional government officials on the financing facility that is to support the implementation of GBON</p> <p>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.</p>	<p>CIMH, CCCCC, NOAA, WMO, NMHSs of CMO Member States and other national entities with surface observing stations</p> <p>WMO, NOAA, National Governments, NMHSs and Stakeholders</p>	<p>GBON regulations and guidelines were approved by WMO Extraordinary Congress in 2021. Except for Guyana, GBON land observation requirements can be met by existing network of CMO Member States, but not marine observations. CMO HQ advocated for marine observations to be in GBON, which opens opportunity for support from the SOFF.</p> <p>Ongoing</p>	<p>Systematic Observations Financing Facility (SOFF) aims to support countries to meet GBON requirements</p> <p>Project driven, with funds from national and international sources.</p>
<p>Risks Limited technical and human resources and workforce competency to fully implement WIGOS, particularly for the smaller Meteorological Services.</p> <p>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.</p>	<p>Mitigation Measures Delegating more of the CMO Science and Technology Officer's time to assist Member States with WIGOS implementation.</p> <p>CMO to advise Caribbean Meteorological Council and other Government entities on the importance of the services of NMHS and WIGOS.</p>		

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 4 Improved 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

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
<p>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 Cabinet 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.</p>	<p>WMO, Relevant Government Ministries, NMHSs of CMO Member States and their stakeholders, Organization of Eastern Caribbean States (OECS) Sponsors – CREWS, Environment and Climate Change Canada</p>	<p>Model Meteorological Legislation and Policy endorsed in June 2021. Two bills adapted under original project. CMO requested amendment for reallocation of travel funds. Six more meteorological bills being drafted since September 2021</p>	<p>CMO - WMO Implementing Arrangement to end in Q4 of 2021. Limited time for technical assistance with adapting model legislation & policy</p>
<p>Strategic Plans with National Framework for Weather, Water, and Climate Services and Complementary Action Plan CMO Headquarters is leading a project to develop</p>	<p>WMO, NMHSs of CMO Member States, their Relevant Government Ministries, & stakeholders, CIMH. Sponsors – CREWS, Environment and</p>	<p>Strategic Plans completed for eight Member States. At least two being used in national development</p>	

<p>National Strategic Plans in eight CMO Member States that requested assistance with Strategic Planning. The project began in April 2020 and will end in December 2021.</p> <p>Support Members in enhancing 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 Member States.</p> <p>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.</p> <p>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. 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, Member of WMO-WHO Integrated Health Services, Chair and Vice-Chair of the RA IV Services Committee, Chair and Vice-Chair of the RA IV Infrastructure Committee. Former CIMH staff</p>	<p>Climate Change Canada</p> <p>CBU, NOAA, UN Disaster Risk Reduction (UNDRR)</p> <p>Varysian Ltd, WMO, NMHSs of CMO Member States, CIMH, Stakeholders in the Public, Private, and Academic Sectors, and Civil Society</p> <p>CMO Member States, CIMH, WMO</p>	<p>plans. One being implemented as part of GCF Readiness Project. CMO HQ advising on implementation, reviewing ToR, and other support.</p> <p>CMO HQ facilitated participation of Member States in UNDRR/CBU training.</p> <p>The proposal that was submitted to the American Chamber of Commerce in Trinidad and Tobago will be revisited. Additional opportunities for funding are being sought</p> <p>The first symposium was held in November 2019 in Barbados. The second was held as a virtual event in December 2020. A third is being planned for 2022.</p> <p>Ongoing</p>	
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<p>member recently joined WMO Secretariat as a Scientific Officer, the first Caribbean person in that type of position for several years.</p>			
<p>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.</p>	<p>Mitigation Measures Recruit new mid-career persons and take advantage of training in management and leadership for early-career persons to develop management expertise. Also mentoring of early career scientists and encouragement to develop scientific skills as well as international relations, policy, foreign language, etc ...</p>		

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

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

Programme	Partners (if any)/Contact Organization	Status	Remarks
<p>Multi-sensor Precipitation Grid</p> <p>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).</p> <p>World Bank CREWS is implementing the Precipitation Grid as Priority Activity 1 of the CREWS Caribbean Project. The outcome of the project is a sub-regional prototype precipitation grid to serve various weather, climate, and water sensitive sectors.</p>	<p>CIMA Foundation, CIMH, Barbados Meteorological Service, Saint Lucia Meteorological Services, Meteorological Service of St Vincent and the Grenadines, Flash Flood Guidance System in Saint Lucia</p> <p>Sponsor: World Bank CREWS Caribbean</p> <p>World Bank CREWS-Caribbean, Radar host countries, Development partners, CIMH, Regional NMHSs</p>	<p>CMO HQ is leading the coordination of the project with funding from the World Bank.</p> <p>CMO HQ helped to develop ToR for technical proposals</p>	<p>External funding support for this activity will be sought.</p>
<p>Lightning Detection System and Lightning Safety Awareness</p> <p>Development of a regional system – enhancement of warning system; augment satellite and radar systems.</p> <p>Organizing a workshop on lightning safety awareness,</p>	<p>WMO, NMHSs with interest in lightning safety and their stakeholders, including Civil Aviation, Agriculture, Outdoor recreation sector, Youth and Sport Organizations,</p>	<p>CMO and WMO hosted first-ever Symposium on Lightning and Lightning</p>	<p>Funding to be sought for lightning detection</p>

<p>with participation of experts in lightning safety, health, education, and mitigation efforts</p> <p>Maintenance and Upgrade of CMO Radars</p> <p>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.</p> <p>(a) Review/Feasibility study of Radar Network:</p> <p>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 proposal to upgrade the radars.</p>	<p>Other Private Sector</p> <p>Radar host countries, NMHSs, and CIMH. Collaboration with national hydrological and agricultural agencies with rain gauges, WMO Flash Flood Guidance Systems, World Bank</p>	<p>Safety awareness in May 2021, with 131 participants from 28 countries. Discussions held with lightning detection companies & with CIHMET, which implemented a network among the NMHSs in Central America in 2019.</p> <p>Proposal under development. Government of Barbados approved funding to upgrade radar in Barbados in 2022</p> <p>CMO Operational Radar Working Group to meet in 2022</p> <p>Coordinating Director met with consultant while working remotely in the US. Visit of consultant delayed due to pandemic</p>	<p>network across the Caribbean</p>
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2020/2021 CMO HQ Missions

(Not related to the CMC meetings)

December 6-8	WMO Regional WIGOS Centre Workshop [CD, STO]
December 14	WMO RA IV 27th Management Meeting [CD, STO]
December 15-17	Caribbean Hydro-Meteorology Symposium , Co-organized by CMO HQ, Chaired by CD [CD & STO]
January 10-15	101 st American Meteorological Society (AMS) Annual Meeting, Virtual [CD] <i>in conjunction with</i>
January 8	WMO/NWS International Session [CD, STO]
January 11	CIMH Pilot Programme for Climate Resilience (PPCR) Webinar [CD]
January 12	WMO Webinar - COVID Meteorological and Air quality factors [CD]
January 14	CARICOM 2nd Joint Meeting of Secretary-General, Heads of Community Institutions – Climate Change Activities [CD]
January 25	REAP, CREWS, WMO and IFRC Climate Adaptation Summit, Disaster Risk Management Anchoring Event, “Getting ahead of the climate curve: investing in early warning and early action” [CD - <i>Invited Speaker</i>]
January 28-29	WMO Research Board Meeting [CD]
January 21	WMO Severe Weather Forecast Programme (SWFP) Eastern Caribbean, Management Team Meeting, Virtual Platform [CD–Co-Chaired, K Caesar, CIMH/BCT]
February 8-11	WMO 18th RA IV Session , [CD, STO, P/CIMH, J Tibbetts]
February 9	Global Water Partnership – Caribbean (GWP-C) Consultation – Principles for Addressing Water-Related DRR during COVID-19 [CD]
February 16	Post-EUREC ^{4A} Symposium, <i>Session on Trade Wind Weather</i> [CD - Chair and Organizer]
February 22-26	WMO First Session of the Commission for Weather, Climate, Water and Related Environmental Services and Applications (SERCOM-1 (II)) , [CD, STO, J Tibbetts, Cayman Islands/BCT; A Trotman, K Caesar, C Van MeerBeeck, CIMH/BCT]
Mar 15-17 & May 4-6	WMO RA IV 43rd Hurricane Committee Meeting [CD, STO; J Tibbetts, Cayman Islands; H Hamilton, Turks and Caicos Islands/BCT; K Caesar, CIMH/BCT; E Burke, St Kitts and Nevis; G Tamar, Grenada]
March 16	<i>Hydromet Latin America</i> [CD]
March 23	GWP-C Caribbean Science Symposium on Water [CD]
April 8	CARICOM Heads of Community Institutions – Strategic Plan 2020 [CD]
April 14	28 th RA IV Management Group meeting [CD, STO]
April 12-16	WMO Commission for Observation, Infrastructure and Information Systems (INFCOM) , [CD, STO]
April 23	WMO Research Board Management Meeting [CD]
April 29	UNFCCC, Subsidiary Body Chairs Meeting with Observer Organizations [CD]

May 11	World Climate Research Programme (WCRP) Forum for WMO RA IV [CD]
May 12	Trinidad & Tobago Meteorological Service Wet Season National Climate Outlook Forum (NCOF) [CD, STO]
May 20	CARIFORUM – Post-Cotonou Regional Programming [CD, STO]
May 24, Aug 6, 10	CARICOM Secretariat Donor Information Management System (DIMS) Training [STO]
May 26, 27	WMO Open Consultative Platform [CD - <i>Invited Panelist</i>]
May 27	International Lightning Day Preparation Conference [CD- <i>Invited Presenter</i>]
May 26, 28	CIMH Caribbean Climate Outlook Forum (CariCOF) [CD, STO]
June 1	WMO Research Board Management Meeting [CD]
June 1-2	Caribbean PPCR Conference and Annual Caribbean Climate Modelling Consortium Meeting [CD]
June 7	CREWS Haiti Extraordinary Project Steering Committee Meeting [CD]
June 14-25	WMO 73rd Session of the Executive Council [CD, STO, P/CIMH, G Cummings]
June 28	WMO Global Atmospheric Watch Symposium [CD]
July 7	Platform of Latin America and the Caribbean for climate Action on Agriculture (PLACA)/WMO/CGIAR-CCAFS , Information Resources for the Agriculture Sector in Latin America and the Caribbean Region Webinar [CD]
July 15	29 th RA IV Management Group meeting [CD, STO]
July 19	GWP-C 1 st Stakeholder Consultations on development of a <i>Regional Action Framework for Integrated Water Resources Management (IWRM)</i> for the CARICOM Region [CD]
July 21-22	11th Meeting of CARICOM , its Associated Institutions & UN System [CD]
July 22–30	WMO Executive Council Delegate to UN Joint Pension Board Session [CD]
July 30	ODPM Office of Disaster Preparedness and Management Trinidad & Tobago development of a National Comprehensive Disaster Management Policy [STO]
August 17	WMO/ECLAC High-level Conference “ <i>Working together for weather, climate, and water resilience in Latin America and the Caribbean</i> ” [CD - <i>Invited Panelist</i> , STO]
August 17	WMO Launch of the <i>Report on the State of the Climate in Latin America and the Caribbean 2020</i> [CD & STO]
August 30-31	WMO Pre-Cg-Ext Consultations for RA III & RA IV [CD & STO]
September 13	GWP-C 2 nd Stakeholder Consultations on development of a <i>Regional Action Framework for Integrated Water Resources Management (IWRM)</i> for the CARICOM Region [CD]
September 23	WMO RA IV Infrastructure Committee [CD, STO, K Powery–Chair of the Committee, A Porter – Vice Chair, Cayman Islands/BCT]
September 24	WMO RA IV Services Committee [STO – Chair of the Committee & CD]
September 27	World Bank/CREWS Caribbean : Multi-sensor Precipitation Grid [CD, STO]
October 6	WMO Research Board Management Meeting [CD]
October 6	CREWS Caribbean 4th Project Steering Committee [CD]
October 8	WMO Watchkeeper Services Commission [STO]

October 8	WMO Collaborative Mechanism - Creation of Portal to Share Global Weather Events [STO]
Oct 11- 22	WMO Extraordinary Congress 2021 [CD, STO; P/CIMH; J Tibbetts, A Porter, Y James, Cayman Islands/BCT; K Caesar, A Sealy, A Trotman, CIMH/BCT]
October 13	WMO/UNDRR , Launch of the Center of Excellence for Climate and Disaster Resilience [CD]
October 22	CARICOM Ministerial Preparatory Meeting ahead of the COP26 of the UNFCCC [CD]
October 25	WMO 74 th Session of the Executive Council [CD, STO]
October 27	WMO RA IV Webinar Unidata Internet Data Distribution [CD]
October 29	ODPM , Office of Disaster Preparedness and Management, Trinidad & Tobago development of a National Comprehensive Disaster Management Policy [CD & STO]
November 1, 4	UNDRR/CDEMA/Jamaica , VII Regional Platform for Disaster Risk Reduction (DRR) in the Americas and the Caribbean [CD–Keynote speaker and Learning Lab presenter]
November 8-12	CIMH Severe Weather Forecasting Programme – Eastern Caribbean and Hurricane Forecaster Competency Virtual Workshop [CD – Co-organizer, Presenter]

November 24	CIMH - 2021 Dry Season Caribbean Climate Outlook Forum [CD] <i>in conjunction with</i>
November 29	CIMH - 2021 CariCOF Stakeholders Forum [CD]
December 5-7	<i>Hydromet Latin America Symposium 2021</i> , Virtual Platform [CD]
December (TBD)	WMO SWFP Eastern Caribbean [CD, K Caesar, CIMH/BCT]