The 2021 Virtual Wet Season Caribbean Regional Climate Outlook Forum (CariCOF)

May 26 & May 28, 2021

Report

International Research Institute for Climate and Society
EARTH INSTITUTE | COLUMBIA UNIVERSITY

1.0 Introduction

Since the 2012 CariCOF, the Caribbean Institute for Meteorology and Hydrology (CIMH) has been coordinating climate forecasting activities leading to a consistently growing body of climate forecasters who (i) contribute to the monthly production of consensus-based seasonal climate outlooks and (ii) engage with the user community, both national and regional to facilitate awareness-building within climate sensitive sectors.

In light of the global COVID-19 pandemic, all sessions were held virtually. In collaboration with the World Meteorological Organization (WMO), the International Research Institute for Climate and Society (IRI), and the National Oceanic and Atmospheric Administration (NOAA), the 2021 Wet/Hurricane Season CariCOF Stakeholders Forum took place on 26 and 28 May, 2021. This forum was preceded (25 May, 2021) by a session for meteorologists and climatologists from across the region to finalize the climate forecasts. The forecasts for the season were delivered on 26 May and a meeting engaging meteorologists/climatologists, researchers and sector practitioners -**Towards improved heat early warning information systems in the Caribbean: Research and Applications** - was held on 28 May. Training for meteorologists/climatologists on sub-seasonal climate prediction was held on 31 May, 1 June, 3 June, and 4 June 2021.

2.0 The CariCOF Delivery – 26 May 2021

The meeting commenced with a formal greeting by Mr Adrian Trotman, Chief of Applied Meteorology and Climatology and Head of the Caribbean Regional Climate Centre, (Caribbean RCC), CIMH, whereby greetings were extended to all online participants, and objectives highlighted. Mr Trotman then mentioned that, typically, the primary focus of wet/hurricane season CariCOFs would be on Disaster Risk Management, considering the threats of hurricanes and flooding to our Caribbean countries.

2.1 Welcome Remarks (Dr. David Farrell – Principal, CIMH)

Dr David Farrell, principal of the CIMH, welcomed participants to the virtual meeting. In his address, he spoke about the recent impacts experienced from the La Soufriere volcanic eruptions in St Vincent and the Grenadines, highlighting the type of climate services which can be provided to deal with volcanic hazards. He referred to this as “The changing realities”, as persons had to deal with the impacts of the volcanic ash.

2.2 Wet/ Hurricane season Climatology and recent Climate Conditions (Mrs. Shontelle Stoute, CIMH)

Mrs Stoute gave a summary of the events which transpired during the 2020 hurricane season, as well as an overview of the conditions of the previous season and the current state of the climate. She zeroed in on specific water emergencies which were declared in a few places, such as Saint Lucia, where a declaration was made on May 18th 2020, for water rationing; and in St Vincent and the Grenadines, where the Central Water and Sewerage Authority (CWSA) extended water rationing until May 29th2020. Belize on the other hand dealt with issues of flooding. Antigua experienced worsened drought as was reported on April 20th 2021 and April 29th 2021 and St Vincent experienced flooding along with lahars due to the recent volcanic activity. The year 2020 proved to be quite active for tropical cyclones, as there were 30 named storms, 13 hurricanes, 6 of them major(falling within categories 3 to 5), surpassing the list of assigned names, and having to resort to the Greek alphabet. Mrs Stoute then went on to look at how wet/dry and how warm/cool the 2020 season turned out to be. She then addressed the current state of the rainfall climate, with reference to the Standardised Precipitation Index (SPI) maps, produced monthly by the Caribbean Drought and Precipitation Monitoring Network (CDPMN).

Rainfall climatological graphs accessed from CAROGEN (CariCOF Outlook Generator) were then assessed for a number of places such as Belize, Antigua, Trinidad and Tobago, Barbados focusing on the accumulated rainfall for the period December to November. Rainfall accumulations were well below normal for Antigua by April but normal for the other mentioned stations.

In terms of the temperature, cooler conditions were observed across some territories in April as compared to March.

2.3 What usually happens during the wet season (Dr. Cédric Van Meerbeeck, CIMH)

Dr Van Meerbeeck stated that we need to know what typically happens during the wet season, pointing out that the Caribbean wet season generally extends from around May/June to November with a wetter latter half and varying in length across the region. Dr. Van Meerbeeck indicated that the region experiences a Heat Season from May to October, with peaks around August and September for most territories, and with the hurricane season peaking in September, making reference to the Atlantic Tropical Cyclone Climatology map (1851 to 2013), as well as the Caribbean heat season map.

Dr Teddy Allen, assistant Climatologist at the CIMH, then asked a number of questions, “What to expect in the coming months?” “Will it look any different this year?” “Will it be it warmer or cooler?” And are there any factors driving different climate conditions this year? He mentioned that persistent,

unusually warm sea surface temperatures in the western Caribbean and Sub Tropical North Atlantic boosts heat, humidity, hurricane season activity and flood potential in northern parts of the region. He also mentioned the possible return to La Nina by the second half of the wet/ Hurricane season, which enhances rainfall and flood potential. The key messages of the outlook are as follows:

June: Steady increase in **rainfall** and **wet days**, decrease in **dry spells**, few **heatwaves**.

From July: Impact potential arising from **heat stress**, **tropical cyclone activity** and **flooding rains** becoming very high in August and September.

Heat: intense, but less than in 2019 & 2020. Transition into the cool season in November.
Tropical cyclone activity: above-average, particularly high during the peak season (August to October).
Potential for flooding/flash floods and related hazards: remaining high until the end of November (except in the Guianas).

<u>Prepare for</u>: Floods and cascading hazards, heat stress in humans and in animals, wind and storm surge impacts, and compound hazards.

Dr Allen then took a look at weekly exceedance probability sub-seasonal forecasts of at least 25mm of rainfall for the period 26th May to 1st June 2021 (the first week after the forum) and the probability of at least 100mm rainfall between June 2 and June 8th for week 2. These were assessed for the region.

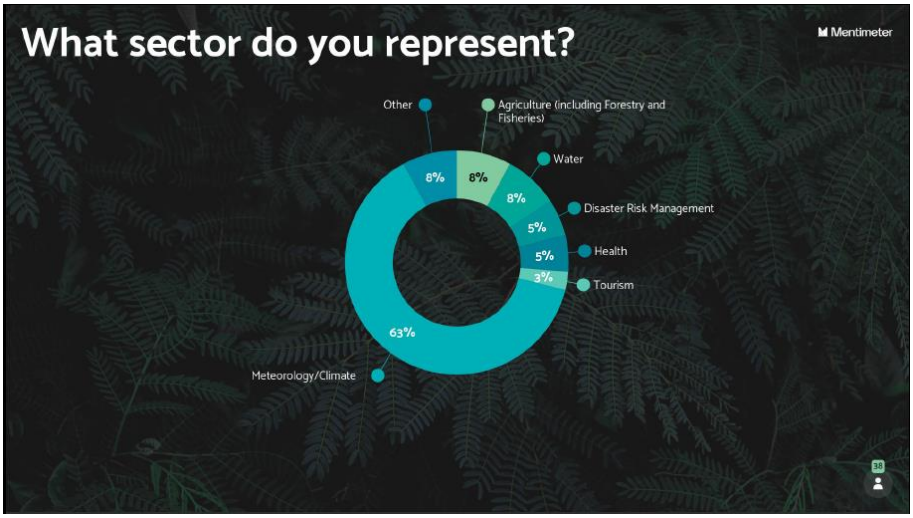
In terms of drought, Dr. Allen pointed out the possibility of short term drought by the end of August and long term drought by the end of November, stating that this will have implications for agriculture and the depletion of groundwater and other large reservoirs.

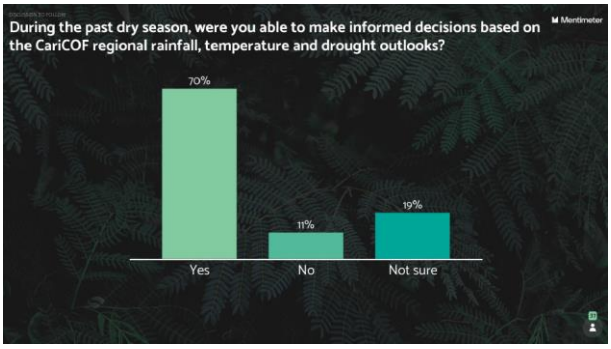
In terms of the heat, he went on to look at how hot the next 3 to 6 months would be for the peak of the heat season, in particular for the Bahamas and the Greater Antilles between July and September.

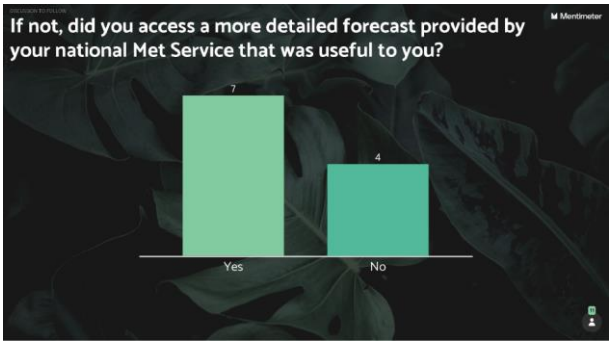
Dr Van Meerbeeck then addressed the question, “How good are the forecasts?”. To answer this question, he looked back at previous forecasts (rainfall, temperature and drought) and compared what was forecasted to what actually happened. He pointed out that the forecasts did well for most of the Caribbean.

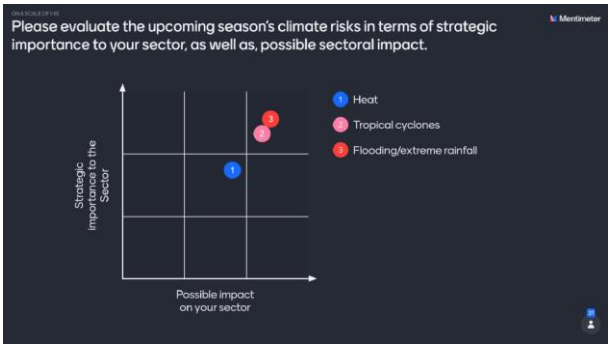
The discussion segment of the seasonal climate outlooks presentation was led by Dr. Roché Mahon and Ms Jodi-Ann Petrie. The discussion was interactive with meeting participants answering several

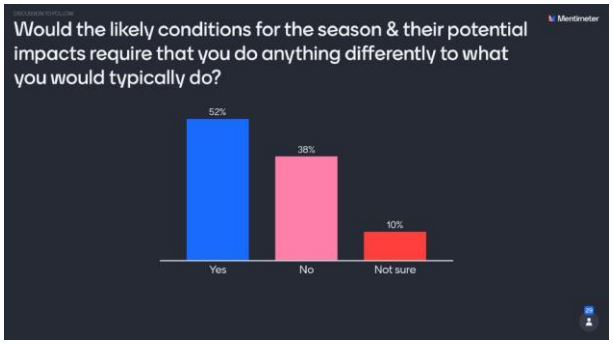
questions relevant to the forecasts via Mentimeter – an online polling platform. After each question poll was served, further discussion was encouraged as appropriate. The results for the Mentimeter polls are displayed in the charts below:











3.0 Towards improved heat early warning information systems in the Caribbean: Research and Applications – 28 May 2021

3.1 Introduction

Mr Adrian Trotman of the CIMH extended greetings to all the participants attending the virtual meeting.

3.2 Welcome Remarks: Dr. David Farrell

Dr David Farrell, Principal of the CIMH gave the official welcoming remarks.

3.3 The Caribbean Heat Season: Improving early warning information for decision-making (Dr. Cédric Van Meerbeeck, CIMH and Dr Roche Mahon, CIMH)

Dr Van Meerbeeck stated that "heat is our new reality", pointing out that the year 2020 turned out to be a record breaking year. He then proceeded to look at the number of heatwave days during the period July to September

2020, what actually happened vs. what was forecasted. He showed that the forecast issued in June 2020 indicated a high chance for heatwaves lasting 30 days or more, which was actually observed in the period July to September.

Dr Roche Mahon remarked that heat is an significant problem both at the societal and professional levels. She stated that heat affects Caribbean societies at micro and macro levels. In terms of domestic / household impacts all sectors have reported overwhelmingly negative fainting episodes, this information reported in Jamaica. It was also pointed out that the national meteorological and hydrological services (NMHS) and the CIMH are primary providers of heat early warning information. However, sectoral gatekeepers such as The Office of Disaster Preparedness and Management (ODPM), Trinidad and Tobago where heat advisories were issued, National Emergency Management Agency (NEMA) in Nevis who conducted a campaign on excessive heat, just to name a few, are important when it comes to amplifying these messages. Also, not enough is known about how end users apply heat early warning information. Dr Mahon indicated that the Agricultural sector is known to utilise the bulletins produced by Caribbean Institute for Meteorology and Hydrology (CIMH) when it comes to scheduling their planting dates in the fields, however, clearer guidance needs to be given to the end users as more research is needed.

The question was then asked "What should Caribbean NMHSs and the CIMH do to improve the content of its information packages?" Dr Mahon indicated the importance of;:

- simplifying the information provided
- the application of heat early warning information on all time scales
- linking heat to human health providing information to vulnerable persons, e.g. the elderly
- the need for a better understanding of the thresholds.
- making sure that heat information is readily available and accessible

Dr Van Meerbeeck then spoke about the timescales of climate information for heat early warning. He indicated that climatology and trends are used in long term planning in the agricultural sector and the field of architecture. He further indicated that long term planning involves preparedness, alertness and response. He stressed on the importance of improving heat alertness, by use of a heat stress monitor, which is based on a heat index and also the provision of a one to three day heat impacts forecast.

3.4 Caribbean heat events during the Atlantic Hurricane Season: the hurricane heat trail effect (Dr Theodore Allen, CIMH)

Dr Allen started his presentation with reference to the 2017 category 5 hurricane Irma, with 185 mph winds. He then asked the question "is advection from the moist tropic to blame?" also, "why does water vapour (humidity) matter? He noted that high humidity equates to a high heat sensation. He proceeded to take a look at the heat index map of hurricane Maria 2017, pointing out that if a snapshot is taken at each point of its passage and then averaged; the average heat index is obtained. Dr Allen ended by assessing the maps of the hurricane heat trail snapshots.

3.5 Recent experiences of cascading extreme events in the Caribbean: Lessons from Puerto Rico (Dr. Pablo A. Méndez Lázaro, University of Puerto Rico -Medical Sciences Campus)

Dr Lázaro spoke about the unfortunate events of 2020, such as drought, covid-19, the Sahara dust events as well as earthquakes, and also pointed out hurricanes Irma and Maria in 2017. He attributed some of the challenges encountered with these events to bad political decisions made. He further described Puerto Rico as a territory with a lot of limitations due to lockdowns and water rationing. He proceeded to take a look at the ecosystem services, stating that climate-related hazards are affecting the health of the most vulnerable, as only people in the high income communities can buy air conditioners. He pointed out that extreme heat events in Puerto Rico, are becoming more frequent and longer in duration and they are too severe for human tolerance. Dr Lázaro informed participants that air surface temperatures will continue to rise and things will get worse than what they are right now. The coolest parts of San Juan were then identified - areas close to rivers, water bodies and forests as land and sea breezes are felt in these areas, helping to reduce temperatures. He concluded that the most sensitive and vulnerable groups need to be identified such as the people below the poverty level, the unemployed and those without health insurance.

3.5 Enabling heat-health early warning in Africa (Dr. Wassila Thiaw, NOAA)

Dr Thiaw pointed out that heatwaves are increasing globally, and presently the world is experiencing record breaking heat. He reported that the period 2016 to 2020 were the 5 warmest years on record. According to NOAA, the record set in 2016 was tied 2020. He indicated that Africa is one of the regions most affected by heat due to, inter alia, increased outdoor activities as well as poor infrastructure. It was also pointed out that health conditions can deteriorate with increasing number of heat waves, hence we need to understand the importance of stakeholder engagement . Dr Thiaw made the participants aware of health practitioners in various parts of Africa preparing health risk maps. He then drew our attention to existing heat alerting systems, for example;

	Alert	Health Risks
	Extremely dangerous: Heat Strokes	Aggravation of cardiovascular diseases
	Dangerous: Heat Strokes	Fatigue, severe dehydration, fainting, cramps
	Very Uncomfortable: Care Required	Dehydration, confusion, headache, dizziness
	Watch	Negligible

Dr. Thiaw placed emphasis on the importance of enabling heat health early warning strategies, with the use of meteorological forecast tools, such as heat wave risk maps and bulletins. It was concluded that heatwave forecasts with lead times of 1 and 7 days, or even a month are a low hanging fruit because of the high predictability of temperature. Hence heat waves can be predicted with confidence.

3.6 Impact based threshold development for heat-health in Grenada (Ms. Sally Edwards, PAHO)

Ms Edwards stated that heat kills more people than any other climate related hazard. She pointed out some of the heat illnesses experienced such as heat cramps, exhaustion, stroke and dehydration, placing great importance on prevention by keeping cool as well as keeping our bodies hydrated. She reported that heat stress is more common amongst the old and the poor. Such concern led to the exploration of impact based thresholds for heat health effects in Grenada as a SIDS pilot. Ms Edwards proceeded to make a data request, indicating that a minimum of 10 years of daily temperature, humidity and wind speed data would be required for the project. Also, a minimum of 3 years of daily epidemiological data related to all causes of mortality, cardiovascular disease and other relevant heat related health outcomes. She also identified those falling into high risk categories, such as persons over the age of 60 with obesity, or persons with cardiovascular and pulmonary diseases. It was pointed out that the real challenge is trying to get health data, especially daily data, as in most cases it is still on paper in books rather than in digital form that would support analysis.

3.8 Strengthening Climate Resilience in the Caribbean: Early Warning Systems for Health (Dr. Laura-Lee Boodram, CARPHA)

Dr Boodram's focus was on that of disease prevention. She reported that since the 1970's, climate change has been linked to over 140,000 deaths annually, noting that the Caribbean has experienced an increase in the average annual air temperature, as well as a rise in sea level. She also pointed out the frequent and intense extreme climatic events in the Caribbean, such as hurricanes, floods and drought. Dr. Boodram further indicated that there is a strong link between climate variables, infectious disease transmission and spread. She stressed the importance of early warning systems for health, which brings together climatic variables and disease data

for future health/ disease prediction. In terms of the data required, spatial and temporal coverage of critical weather variables such that simple correlation and trend analysis can be undertaken, that can support action under a response plan. She also pointed out episodes of a rising risk of malaria due to rising temperatures in areas which were once malaria free. Dr Boodram concluded that in terms of monitoring and evaluation, there will always be chances that the system will fail to predict an epidemic - i.e. chances of a false alarm are always a possibility - hence we should bear in mind that early warning is no guarantee of prevention.

3.9 Discussion

The main issue discussed was that of data challenges. In particular, health data was of concern, as data was mainly paper based as opposed to the desired electronic format which enables it to be more easily utilised.