



The Caribbean Regional Climate Outlook Forum (CariCOF)
Bridgetown, Barbados
May 22nd – 25th, 2018

Report

Collaborators:





1. Introduction

Since the 2012 Caribbean Climate Outlook Forum (CariCOF), the Caribbean Institute for Meteorology and Hydrology (CIMH) has been coordinating climate forecasting activities leading to a consistently growing body of climate forecasters contributing to the monthly production of consensus-based seasonal climate outlooks, with engagement of the user community that allows awareness-building within those sector communities. At the 2012 CariCOF, it was also agreed that the bi-annual hosting of such forums, roving across the region, just prior to the beginning of the wet and dry seasons in the Caribbean, be pursued.

The World Meteorological Organization (WMO) Regional Climate Centre (RCC) for the Caribbean housed at the CIMH, in collaboration with its financial partners, delivered the 2018 Wet/Hurricane Season CariCOF from May 22nd to 25th. The partners include The United States Agency for International Development (USAID) through its Office of Foreign Disaster Assistance (OFDA), the WMO, and the Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience (PPCR), with technical assistance from the International Research Institute for Climate and Society (IRI) of Columbia University and the National Oceanic and Atmospheric Administration (NOAA) of the USA.

As has been customary for the Wet/Hurricane season forum, much emphasis was on disaster risk management. Training for meteorologists took place from 22nd – 23rd May with a focus on short-term seasonal (one-month periods) and sub-seasonal forecasting. The training was followed by the Stakeholder General Assembly on 24th - 25th May which featured the delivery of the seasonal forecasts as well as the 2018 hurricane season forecast. Also, at the stakeholder meeting the opportunity was given for multi-sectoral dialogue on the implications for and potential impacts of the 2018 hurricane season on the region's socio-economic sectors.

1.2 Participants

Participants to the workshop were from National Meteorological and Hydrological Services (NMHSs) across the Caribbean, the CIMH, international trainers and stakeholders from the climate sensitive sectors (see [Appendix I](#)). The agenda can be viewed at <http://rcc.cimh.edu.bb/caricof/>.

2. Pre-CariCOF Training

Meteorologists and climatologists across the region spent the first two days in training to work on providing sub-seasonal forecasts for the region. Sub-seasonal forecasts fall between a week to about a

Collaborators:





month, and can add valuable information to the traditional Caribbean seasonal (3-6 months) forecasts for decision making. Participants were informed of the sources of predictability of such sub-seasonal forecasts and also explored the likelihood of these forecasts for the Caribbean. They were also given the opportunity to conduct experiments to produce tailor made sub-seasonal forecasts for the region (heatwaves, wet days, and rainfall threshold exceedance).

The agenda for this training can be viewed at <http://rcc.cimh.edu.bb/caricof/>.

3. Opening Ceremony Addresses

3.1 Mr. Clairmont Williams (Deputy Director Ag., The Barbados Meteorological Service)

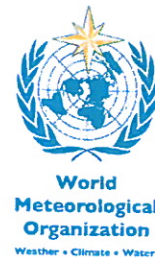
Mr. Williams extended a warm welcome to all visitors to the island of Barbados. He expressed the need for multi-sectoral dialogue in the wake of the devastation of the last hurricane season, which will be afforded over the next two days of this forum. Mr. Williams further articulated that addressing climate change and climate variability are regional and national priority issues, which continue to pose a significant risk to the Caribbean. Thus, early warning systems are seen as critical components of disaster risk reduction and adaptation. Since 2012, CariCOF has been placing significant effort in providing early warning information. Over the next two days, stakeholders such information for the 2018 wet and hurricane season will be made available to inform their decision making.

3.2 Dr. David Farrell (Principal, Caribbean Institute for Meteorology and Hydrology)

Dr. Farrell, in his address, made special mention to the United States Weather Service, which was instrumental in providing financial support to this CariCOF. The 2017 hurricane season significantly impacted the eastern Caribbean and this CariCOF would give an idea of the expectations of the coming hurricane season. This CariCOF should give priority to contextualizing severe weather events within the context of our climate as this would help in providing strategies to deal with such impacts. Dr. Farrell also indicated that there are several lessons learnt from the 2017 hurricane season and as such CIMH is collaborating with CDEMA, WMO and others on the Climate Risk Early Warning System (CREWS) Initiative. The CREWS Initiative is one which seeks to strengthen the Hydro-meteorological Systems as well as the Early Warning Systems globally, with a focus on Small Island Developing States (SIDS).

Collaborators:





4. Presentations

4.1 Wet/Hurricane Season Climatology of the Caribbean; Review of the 2017 Wet/Hurricane Season in the Caribbean (Wazita Scott, CIMH)

The first presentation of the CariCOF is usually one in which the climatology of the season in focus is presented, as well as a look back at the last year's season. This presentation was made by CIMH's Assistant Climatologist Ms. Wazita Scott.

Generally, the wet season runs from May/June until November/December with the earlier start and end occurring in those territories in the south-east of the region. The exceptions of this are, the Guianas where there are two wet and two dry seasons and the ABC Islands that are predominantly dry throughout most of the year with a short wet season of 3-4 months. The northward migration of the Inter-Tropical Convergence Zone (ITCZ), the northward migration of the sub-tropical high pressure (Bermuda Azores High), Sea Surface Temperatures (SSTs) between 27⁰ C – 30⁰ C, and the migration of tropical waves and other disturbances are the factors which influence the wet/hurricane season.

Ms. Scott presented a map and charts showing the rainfall totals and temperatures usually expected within the wet/hurricane season across the region.

The 2017 hurricane season was a record breaking one which saw the highest number of major hurricanes since 2005. All ten of the season's hurricanes occurred consecutively, which was the highest since the satellite era and tied with 1851 for the highest number of consecutive hurricanes in the Atlantic Basin. Hurricanes Irma and Maria together were the costliest on record. The La Nina phenomenon has been partly attributed to this active hurricane season as well as giving rise to above normal rainfall totals, especially in the Northern Caribbean.

4.2 Wet/Hurricane Season Climate Outlook (Wayne McGeary, Barbados Meteorological Service)

Mr. McGeary in his delivery of the wet/hurricane season outlook gave the following messages:

- The period June, July, August is not expected to be particularly wet, except for the Guianas, whereas the latter half of the wet season may be wetter than usual over most of the Greater Antilles.
- This hurricane season is expected to be near normal with NOAA's Climate Prediction Centre predicting 10-16 named storms, 5-9 hurricanes of which 1-4 would be major hurricanes.
- If there is the return of the El Nino the period September, October, November would be drier than usual from the Windward Islands and? southwards. The El Nino could also reduce hurricane activity.

Collaborators:





- August to October will realise the usual intense heating conditions with the possibility of heatwaves.

4.3 Discussion – Expected Climate Impacts from the Forecast

After the delivery of the 2018 wet/hurricane season outlook, participants were invited to discuss the information, and the responses are captured below.

Alex Ifill (Barbados Water Authority) – Mr. Ifill sought clarification on whether the forecast for the period June, July, August was suggesting the possibility of drought or just a period of dryness for Barbados.

Dr. Van Meerbeeck stated that there could be drought however, not with significant severity.

Mr. Trotman suggested that those in the region of concern should pay more attention to their resources in the event of any drought arising.

Mr. Glendell DeSouza (Caribbean Meteorological Organization) – Mr. DeSouza queried whether those in the disaster management sector were clear on what was being communicated by the forecast.

Mr. Andrew George (National Disaster Office, St. Lucia) – Mr. George believes that the main concern of the forecasts is how accurate they are. He recognises that those who produce the forecasts are getting better at the task. Mr. George also believes that there is sometimes also a measure of complacency with the public when the forecast does not predict an over active hurricane season. He therefore emphasises a more consistent message from the forecast reminding persons that where the forecast suggests an underactive or normal season they must always be prepared.

Ms. Houlida Peters (St. Vincent and the Grenadines) – Ms. Peters expressed that they use the forecast information as it is very important. They also sensitize the public of the information, encouraging them to be prepared at all times. She alluded to 2010 where the forecast products were extremely useful during the drought followed by sufficiently wet conditions. Ms. Peters' concern is that the forecast products are not reaching the end users and their level of understanding to such products.

4.4 Short-term Forecasts (Dr. Cedric Van Meerbeeck – CIMH, Dr. Simon Mason – IRI, Ms. Sarah Diouf – NOAA)

This presentation focused on what can be added to the seasonal forecast on a sub-seasonal scale. This sub-seasonal scale can provide valuable information for early warning alerts for specific events (e.g.

Collaborators:





heatwaves) and aid advanced preparedness. Forecasts can be made at different time scales, up to 4 weeks, because of the sources of predictability for the time scale. For example, the current weather allows you to forecast the weather for the days ahead, and sea surface temperatures allow you to predict what can happen within months. With respect to sub-seasonal forecasts the source of predictability comes from, for example, the Madden-Julian Oscillation (MJO), which has its strongest effects across the Caribbean in the winter months.

A suite of sub-seasonal products (for the Caribbean, Central America and Mexico) from the United States of America Regional Climate Centre (USRCC) in Demonstration Phase includes weekly forecasts of precipitation, temperature and wind; three to four week forecasts of precipitation and temperature; monthly forecasts; and tailored forecasts (of heatwave days, dry spells, wet spells, very wet spells and extreme wet spells). The USRCC have plans to develop sub-seasonal products relating to climate and health. Essentially the NOAA Climate Prediction Centre will continue to closely work with CIMH to identify forecast products, at all timescales, that could be useful for the Caribbean.

Dr. Van Meerbeeck presented an experimental sub-seasonal (monthly) heatwave forecast for the Caribbean. This forecast provided most useful information when focus is made on the warmest time of the year.

4.5 Sector Related Climate Information

4.5.1 Caribbean Cooling Initiative (Loreto Duffy-Mayers, Caribbean Cooling Initiative)

This initiative focuses on the Caribbean because of several factors:

- Its vulnerability to adverse climate conditions;
- Hotels and tourism are key economic drivers and consumers of electricity;
- Its tropical climate in addition to the population and GDP growth increases cooling demand;
- Electricity is expensive with the importation of fuel therefore incentives are needed to minimise waste.
- The vision to reduce electricity use by 22 per cent by 2029 (Paris Climate Agreement)
- Existing National Sustainable Energy Policy
- Its success with solar water heaters

Collaborators:





There are however financial barriers to becoming energy efficient. To overcome such the objective of the initiative is to develop a financial strategy that encourages enterprises to invest in energy efficient cooling technologies increasing their productivity and reducing negative environmental impacts. The key actors to be engaged include businesses (e.g. hotels), technology providers, financial institutions, national and regional associations, insurers/guarantors, and local authorities. The development of a national cooling strategy would involve assessing the market, developing a roadmap for adopting the model, assessing the recommendations for potential financial mechanisms, developing additional opportunities to address cooling demand, and link to any existing national policies.

4.5.2 Heat and Health Forecasts (Hannah Nissan, IRI)

The impacts of heat on sectors must be considered when attempting to build a climate service for heat in the Caribbean. Which are relevant – human health, economic, energy, infrastructure, agriculture, tourism? Maybe surprisingly, heat kills many people across the globe and in 2015 four of the ten most deadly natural disasters were attributed to heatwaves.

In an experiment on heatwave days forecast the conclusions were:

- Extremely hot days and warm spells can only be forecast with a few days' notice
- Less intense hot days may be predictable at sub-seasonal and seasonal lead times

In going forward, to have an effective heat plan there is the need to better understand vulnerability to assess impacts. Even though gathering such data is timely this, along with building partnerships, is very important.

4.5.3 Sand and Dust Storm Alerting (Dr. Ashford Reyes, CIMH)

A significant amount of desert dust travels to the Caribbean annually from the Sahara region with concentrations often exceeding the WHO and the United States Environmental Protection Agency (EPA) standards. This gives rise to serious implications for human health in the region. Thus, the CIMH has embarked on providing dust and air quality forecasts for the Caribbean using a Weather Research and Forecasting model coupled with Chemistry (WRF-Chem).

The most recent dust episode (March 28th – April 3rd, 2018) affected the Eastern Caribbean and there was public interest in dust levels based on the perceived effects on respiratory health. Dr. Reyes presented forecast maps depicting this dust episode. The WRF_Chem predicts dust episodes five to seven days in advance. and Future plans include higher resolution model runs as well as the

Collaborators:





improvement of verification of the forecasts using in situ observations at various locations (for example Ragged Point in Barbados, Martinique, Guadeloupe, Cayenne etc.).

4.5.4 Probability of Exceedance for Agriculture (Shontelle Stoute, CIMH)

The computation of the probability of exceedance of various climate thresholds using the Climate Predictability Tool (CPT) is very useful information which the farmer can use in his on-farm decision making. The farmer can make use of information on the likelihood of exceeding various rainfall totals or temperatures that can impact of production. Mrs. Stoute in her presentation illustrated the usefulness of such information using various scenarios for planting sweet potato, Irish potato, pumpkin and cucumber over three- and two-month periods across the Caribbean.

4.6 Atlantic Hurricane Season in Focus

4.6.1 Assessing the 2017 Hurricane Season (Dr. David Farrell, CIMH)

In a review of the 2017 hurricane season Dr. Farrell highlighted the lessons learnt from the season. He first reported that the CREWS Initiative has provided financial support towards the implementation of a lessons learnt activity from the from hurricane season. There were some critical lessons learnt from the National Hydro-Meteorological Services (NMHSs) and National Disaster Management organisations (NDMOs) practitioners. There were also important lessons learnt regarding gender differences. At present work plans have been submitted and it is noted that the consultancy will not only focus on the 2017 season but will also look back several years to see how the services and systems have adapted after impacts. Dominica, the British Virgin Islands, Turks and Caicos, Sint Maarten, Anguilla, and Antigua and Barbuda will be visited by the project consultant, with a final report to be submitted by July 2018. The findings of the draft report will inform the preparation of a five million USD proposal to the CREWS board in June 2018.

Dr. Farrell invited persons from the NMHSs and stakeholders from impacted countries to share on the resilience of their services following the 2017 hurricane season.

4.6.2 Previewing the 2018 Hurricane Season (Dr. Cedric Van Meerbeeck)

Dr. Van Meerbeeck presented the update of the 2018 hurricane forecast from the leading forecasting agencies which suggested near normal activity for the season (Colorado State University's prediction was for a slightly above normal season).

Collaborators:





Sea surface temperature (SST) anomalies across the Atlantic in early March had been indicating slight warming. However, models suggest an El Nino during the peak season (August to October) that would likely suppress tropical cyclone activity.

Collaborators:





Inter-American
Development Bank



USAID
FROM THE AMERICAN PEOPLE

Appendix I: Participant List

| Country | Last Name | First Name | Country | Last Name | First Name |
|---|-----------------|------------|------------------------------------|-----------------|---------------|
| Antigua Meteorological Service | Burke | Bevon | St. Lucia Meteorological Service | InBaptiste | MaClean |
| Aruba Meteorological Service | Irausquin | Lothar | St. Maarten Meteorological Service | Etienne-LeBlanc | Sheryl |
| Bahamas Meteorological Service | King | Arnold | St. Vincent Meteorological Service | Mcdonald | Joan |
| Barbados Meteorological Service | McGeary | Wayne | Suriname Meteorological Service | Mitro | Sukarni |
| Belize Meteorological Service | Gordon | Ronald | Trinidad Meteorological Service | Muhammad | Asalma |
| Cayman Islands Meteorological Service | Gall | Winston | IRI | Mason | Simon |
| Cuba Meteorological Service | Alpizar | Milena | NOAA | Diouf | Sarah |
| Curacao Meteorological Service | Boekhoudt | Joffrey | NOAA | Kamsu Tamo | Pierre Honoré |
| Dominica Meteorological Service | Carrette-Joseph | Annie | IRI | Nissan | Hannah |
| Dominican Republic Meteorological Service | Manuel Medina | Jose | CARDI | Hall-Hanson | Rasheeda |
| Grenada Meteorological Service | Springle | Wayne | CARICOM | Wallace | Malcolm |
| Guyana Hydro-Meteorological Service | Dhiram | Komalchand | CARPHA | Robertson | Lyndon |
| Haiti Meteorological Service | Victor | Rudolph | CCCC | Jones | Albert |
| Jamaica Meteorological Service | Brown | Glenroy | CCREEE | Gardner | Devon |
| St. Kitts Meteorological Service | Benjamin | Vincere | UN Environment | Duffy-Mayers | Loretto |

Collaborators:



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





| Country | Last Name | First Name | Country | Last Name | First Name |
|--|-----------|------------|--|-----------|----------------|
| CMO | DeSouza | Glendell | Montserrat | Gerrald | Gerren |
| UWI-CSGM | Whyte | Felicia | Turks and Caicos Islands | Henfield | Tiffany |
| Caribbean Water and Wastewater Association | Hosein | Candi | Antigua | Fleming | Sharmer |
| CaFAN | Thompson | Errington | Dominica | Pascal | Fitzroy |
| Barbados Meteorological Service | Williams | Clairmonte | Guyana | Paul | Owen |
| District Emergency Management, Barbados | Harewood | Robert | St. Lucia | George | Andrew |
| District Emergency Management, Barbados | Johnson | Joyann | St. Kitts Disaster Management Agency | Dyer | Brian |
| Caribbean Tourism Organisation | Charles | Amanda | St. Vincent Disaster Management Agency | Peters | Houlda |
| Caribbean Tourism Organisation | Pemberton | Kennedy | Trinidad | Anderson | Denise |
| Barbados Water Authority | Ifill | Alex | Food and Agriculture Organisation | Duncan | <u>Martina</u> |
| Pan American Health Organisation | Polson | Karen | Food and Agriculture Organisation | Barelli | <u>Daniele</u> |
| Caribbean Disaster and Emergency Management Agency | Riley | Elizabeth | Caribbean Development Bank | Saunders | <u>Paul</u> |
| Ministry of Health, Barbados | Daniel | Steve | Ministry of Tourism, Barbadosa | Franklin | <u>Allan</u> |
| Anguilla | Jennings | Jeffrey | | | |
| British Virgin Islands | Castro | Miguel | | | |

Collaborators:



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





Collaborators:



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

