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CariCOF 2017 Dry Season - Seasonal forecast training workshop

27-28 November 2017, Georgetown, Guyana

WORKSHOP REPORT

The 2017 Dry Season pre-CariCOF forecasters' training was held on November 27th and 28th in Georgetown, Guyana, ahead of the Forum held on November 29-30. The CariCOF, including the training workshop, was facilitated by the WMO Caribbean Regional Climate Centre (Caribbean RCC) at the Caribbean Institute for Meteorology and Hydrology (CIMH), the International Research Institute for Climate and Society (IRI) and the U.S. National Oceanic and Atmospheric Administration (NOAA). It was made possible through a number of projects that contain a focus on climate capacity building in the Caribbean region. The workshop received financial support from the Government of Canada through Environment and Climate Change Canada (ECCC) under the Programme for implementing the Global Framework for Climate Services (GFCS) at national and regional scales; from the Inter-American Development Bank (IDB), through its Climate Investment Funds (CIF) under the Pilot Program for Climate Resilience (PPCR) executed by the University of the West Indies (UWI) – Mona Campus; from the African, Caribbean, Pacific Group of States (ACP) through the Caribbean Development Bank (CDB), the Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company (CCRIF SPC), and the World Meteorological Organization (WMO).

Day 1 Dry spells calculations and the Climate Services Toolkit

The first presentation, entitled "Contextualising seasonal forecasts with sub-seasonal information of excessive rainfall and dry spells" was facilitated by the Caribbean Institute for Meteorology and Hydrology (CIMH) and presented by Dr. Cedric Van Meerbeeck. The presentation served as an introduction to one of the main areas of training touched on during the training workshop. His presentation discussed three topics:

- Towards forecasting flash flood potential
- Towards dry spell prediction for agriculture at seasonal timescales
- Towards CariCOF forecasts of dry spells

Dr. Van Meerbeeck detailed that there is currently limited early warning capacity for flash flood and dry spells to improve preparedness and response action, characterised by limited human, technological and financial resources and limited knowledge of community vulnerabilities. He mentioned that the focus here is to use (sub-)seasonal climate forecast information to increase lead times to improve preparedness and mitigation.

The first illustration of our focus is the recent development and operationalisation of extreme wet spells frequency forecasts to augment seasonal precipitation outlooks by suggesting if the season ahead will see a

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concern for flash flood potential due to extreme wet spells. As such, these forecasts can help Disaster Risk Management (DRM) practitioners in better preparing for flash floods in a season.

The second topic introduced dry spells - a significant climate hazard on rain-fed agricultural crop productivity. He demonstrated the link of increased risk for farmers from dry spells and food security by showing that a severe heatwave and dry spell in Russia's grain producing region during the summer of 2010 led to a global hike in food prices. He then showed how the frequency of dry spells (of different durations, i.e. 7, 10 or 15 consecutive dry days) may reduce crop yields due to water stress during parts of the year and how this frequency varies across the Caribbean region. Given the location of the workshop, he demonstrated that for a hypothetical crop at risk when there are at least three 7-day dry spells or one 15-day dry spell within a three-month period, only few areas in Guyana could grow that crop during the months of September-October-November, which constitutes the country's main dry season.

The third part of the presentation illustrated a proposed format for the presentation of operational dry spells forecasts to henceforth be developed and delivered by CariCOF forecasters, and to be discussed during the stakeholder forum.

The second presentation, entitled "Predictability of sub-seasonal rainfall occurrence – what do we know?" facilitated by the International Research Institute for Climate and Society (IRI) and presented by Dr. Simon Mason, gave an overview of some of the best available science on predictability that backs the generation of climate information around sub-seasonal rainfall occurrence, including the occurrence of dry spells.

Dr. Mason first explained that, while most regional climate outlooks contain seasonal forecasts of rainfall totals over a certain number of months, forecasts of rainfall occurrence have a larger skill. This is because it is easier to predict whether or not a weather system producing rain may pass over a location than it is to predict just how intense the rainfall in that system will be. He then demonstrated that, in order for a forecast model to be skilful, there needs to be spatial coherency in the variable that is forecast, i.e. if neighbouring locations show similar signals for rainfall occurrence, then there will be useful (or good) skill in forecast models. Dr. Mason continued by highlighting that, though still in their infancy, there is growing promise in the delivery of sub-seasonal forecasts that span several weeks. This is because there is a growing wealth of knowledge – e.g. from the global Subseasonal to Seasonal Project (S2S) under the World Climate Research Program (WCRP) – that identifies possible drivers of sub-seasonal rainfall occurrence in different regions across the world. So he illustrated this with examples of datasets, sources of sub-seasonal scale predictability and examples of forecasts.

That growing body of knowledge is suggesting good potential for delivery of useful sub-seasonal forecasts for the Caribbean region, with predictability possibly originating from the Madden-Julian Oscillation. Based on this finding, a potential next generation of climate outlook products delivered by the CariCOF to be envisaged is sub-seasonal rainfall forecasts.

Ms. Wazita Scott (CIMH) demonstrated how time series of 7-day, 10-day and 15-day dry spells can be calculated from daily rainfall records. Such calculations are then utilised as predictands in statistical forecasts of dry spell frequencies within seasons.

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The second major item of the training workshop followed after lunch, namely the Climate Services Toolkit. This portion of the training was facilitated remotely by the US National Oceanic and Atmospheric Administration (NOAA) and by CIMH.

In a first presentation entitled “Introduction to Climate Services”, Dr. Marina Livezey (NOAA) touched on the topic of climate services and the steps necessary to augment climate information so as to become effective decision support. Such support enables evidence-based decision making within diverse sectors of the economy to reduce climate risk and improve resilience to it. She introduced the Global Framework for Climate Services pillar called Climate Services Information System (CSIS); what forms of capacity development are needed to bring a CSIS into operations; and how providers of climate information such as NOAA build their climate services programme to have a sustainable and operation CSIS in place. Then Dr. Van Meerbeeck (CIMH) highlighted CIMH’s CSIS implementation at the regional and, to a limited degree, the national level for the Caribbean.

The second presentation entitled “Climate Services Toolkit” by Dr. Livezey, introduced the Climate Services Toolkit (CST) as a go-to, one-stop-shop for guidance, training materials, data and tools, as well as support functions for its users to develop and deliver climate services. As such, the toolkit forms an integral part of capacity development for CSIS, with all its resources being recommended by the World Meteorological Organization (WMO) through a team of Subject Matter Experts. Among the different types of climate services contained within the toolkit are, data management, analysing and monitoring, predicting and verifying predictions, and projecting future climate. The presentation illustrated the history, current state of the prototype and future plans for the CST. Dr. Livezey emphasized that, while the main intended audience of the CST is National Meteorological and Hydrological Services (NMHSs), as well as Regional Climate Centres (RCCs) as it allows them to develop climate products and services, sectoral stakeholders through the User Interface Platform pillar of the GFCS are the best persons to provide feedback on what kind and format of climate services are needed most.

Following this presentation, Ms. Wazita Scott demonstrated hands-on the major functionalities and architecture of the CST as found on <http://www.wmo.int/cst>. After this, a discussion ensued in which the workshop participants reflected on the usefulness and potential of the CST, as well as the need for a Caribbean version of the CST that forms a subset containing the resources most relevant to the NMHSs in the region.

NOAA and CIMH representatives noted that the plan of developing a Caribbean CST has already been set into motion. They further noted that CIMH has recently started contributing to the global CST with the CAROGEN tool and a template presentation for effective presentation of Regional or National Climate Outlook Forum type climate outlooks, both of which were developed in-house.

On a final note for the CST session, an online survey was developed for the purpose of feedback on the CST, with the participants of this workshop filling out the survey on day two of the training.

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Day 2 Dry spells forecasting, Sub-seasonal forecasting, CariCOF dry season climate outlooks review

The second day of the workshop started with a demonstration of a suggested dry spell frequency forecasting methodology in the Climate Predictability Tool (CPT) software, immediately followed by a hands-on exercise for participants. This was facilitated by Ms. Wazita Scott and Dr. Cedric Van Meerbeeck (CIMH). While the demonstration and exercise were running, Ms. Lisa Kirton-Reed prepared a manual on the methodology of producing the forecasts, which she distributed to all.

Afterwards, all workshop participants worked together to produce the December – January – February 2017-'18 CariCOF Wet days, Wet Spells and Dry Spells outlooks which were to be presented during the stakeholder engagement Forum the next day.

The afternoon session started with a presentation entitled "The Proposed WMO United States of America Regional Climate Centre (USRCC): Subseasonal forecasting capabilities and capacity building within CariCOF to deliver sub-seasonal forecasts" facilitated by NOAA and delivered by Ms. Sarah Diouf. Ms. Diouf commenced her presentation by highlighting the global status of WMO recognised Regional Climate Centres (RCCs). Among 8 designated RCCs is the WMO Caribbean RCC at CIMH, the first of such in WMO's Regional Association IV (RA IV) which includes North America, Central America and the Caribbean. She then mentioned the scope of an RCC for the entire RA IV, which could be housed at NOAA, who would then be the US RCC. The purpose of the US RCC in demonstration phase is to "Generate and deliver regionally-focused high-resolution data and products for the greater RA IV and the lower RA IV [*i.e. Central America and the Caribbean*]".

Ms. Diouf then shifted the focus to characteristics, challenges and proposed US RCC operations in sub-seasonal forecasting, illustrating this for the Central America and the Caribbean. She mentioned how the US RCC assists the Famine Early Warning Network (FEWSNET) by providing seasonal hazard forecasts, which are currently produced for Central America and for the island of Hispaniola (*i.e. Haiti and the Dominican Republic*). Her next slides dealt with a case study of the predictability of rainfall in Weeks 3 and 4 post delivery of the forecast. She then showed the US RCC operational monthly forecasts of sea surface temperature, precipitation and two-meter air temperature. She ended by suggesting some training activities for the Central America and the Caribbean w.r.t. operational sub-seasonal forecasting, with the aim of ensuring a proper use and interpretation of US RCC products in 2018.

This presentation was followed by a discussion on potential plans for the development of CariCOF sub-seasonal precipitation and climate extreme forecasts, such as wet spells, heatwaves and dry spells and how NOAA, the IRI and the CIMH could help facilitate this capacity development exercise. The discussion was moderated by Mr. Adrian Trotman (CIMH), who heads the WMO Caribbean RCC and who confirmed that CIMH would pursue and coordinate the roll out such activity during 2018.

The last session of the training workshop, as has become customary for pre-CariCOF Forum forecasters' training workshops, concerned the preparation and review of all CariCOF outlook products for the 2017-'18

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dry season such that a consensus is reached between all climate forecasters within the Caribbean NMHSs and CIMH. The outlooks were summarised in an outlook presentation that follows the template presentation for RCOF/NCOF (National Climate Outlook Forum) type climate outlooks developed by CIMH based on lessons learnt in the effective delivery of climate outlooks presentations at previous CariCOFs and at the Guyana NCOF.

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APPENDIX - AGENDA

Day 1: Monday November 27th, 2017 – Dry spells calculations and the Climate Services Toolkit

- 09:00 – 09:10 Welcome – Opening Remarks (CIMH, Guyana Hydromet Service)
- 09:10 – 09:50 Adding context to precipitation outlooks – wet spells and dry spells outlooks (Cédric Van Meerbeeck, CIMH)
- 09:50 – 10:15 Predictability of sub-seasonal rainfall occurrence – what do we know? (Simon Mason, IRI)
- 10:30 – 10:45 *Break*
- 10:45 – 12:15 Calculation of 7-day, 10-day and 15-day dry spells (Wazita Scott, CIMH)
- 12:15 – 13:30 *Lunch*
- 13:30 – 14:00 What is a service? Going from climate information to climate services (Marina Livezey, NOAA)
- 14:00 – 14:30 Capacity development and training needs in climate services delivery – discussion (Adrian Trotman & Cédric Van Meerbeeck, CIMH; Marina Livezey, NOAA)
- 14:30 – 14:45 The Climate Services Information System (CSIS) and the Climate Services Toolkit (CST) – an introduction (Marina Livezey, NOAA)
- 14:45 – 15:00 What resources are available from the CST? (Marina Livezey, NOAA)
- 15:00 – 15:15 *Break*
- 15:15 – 16:15 Introducing CST tools that address the identified needs (Cédric Van Meerbeeck, CIMH; Marina Livezey, NOAA)
- 16:15 – 16:45 Interactive session – a questionnaire to improve the CST and building a Caribbean CST (Marina Livezey, NOAA; Cédric Van Meerbeeck, CIMH)
- 16:45 – 17:00 CST – The way forward
- 17:00 Day's conclusion

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Day 2: Tuesday December 28th, 2017 – Dry spells forecasting, Sub-seasonal forecasting, CariCOF dry season climate outlooks review

09:00 – 09:45 Dry spell frequency forecasting – a demonstration in CPT (Wazita Scott and Cédric Van Meerbeeck, CIMH)

09:45 – 10:15 Dry spell frequency forecasting – hands-on exercise in CPT

10:15 - 10:30 *Break*

10:30 – 12:15 DJF Wet Days and Wet and Dry Spells outlook – preparing the outlooks (Cédric Van Meerbeeck & Wazita Scott, CIMH)

12:15 – 13:30 *Lunch (provided)*

13:30 – 14:00 Changing the timing of delivery of the CariCOF outlooks– a discussion (Cédric Van Meerbeeck & Adrian Trotman, CIMH)

14:00 – 14:30 The proposed WMO United States of America Regional Climate Centre: Subseasonal forecasting capabilities and capacity building within CariCOF to deliver subseasonal forecasts. (Sarah Diouf, NOAA)

14:30 – 15:15 Sub-seasonal forecasting within CariCOF – planning for a new range of products (Adrian Trotman & Cédric Van Meerbeeck, CIMH; Sarah Diouf, NOAA; Simon Mason, IRI)

15:15 – 15:30 *Break*

15:30 – 17:00 The CariCOF dry season 2017-'18 climate outlooks – a review discussion (Wazita Scott, CIMH)

17:00 Conclusion of the workshop

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