



# The Caribbean Institute for Meteorology and Hydrology

## Wet/Hurricane Caribbean Climate Outlook Forum – Seasonal Forecast Training Workshop

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Husbands, St. James  
Barbados  
May 29<sup>th</sup> to May 30<sup>th</sup> 2017

## REPORT

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The 2017 Wet/Hurricane Season pre-CariCOF forecasters' training was held on May 29<sup>th</sup> and 30<sup>th</sup> in Villa, St. Vincent & the Grenadines, ahead of the Forum held on May 31<sup>st</sup>.

### Day 1 Seasonal heat wave forecasts

The first presentation, entitled "Heat warning systems around the world" was facilitated by the International Research Institute for Climate and Society (IRI) and presented by Dr. Simon Mason. The presentation touched on four topics:

- How dangerous is heat?
- How do you measure heat stress?
- When to issue a warning?
- How do other countries manage heatwaves?

Dr. Mason detailed that heat impacts on different sectors in the Caribbean, including health, economy, energy, infrastructure and agriculture among others. That being the case, we ask the question which are the most important sectors to focus on? In terms of human health, a wealth of evidence is available from around the world that heat may be the most dangerous meteorological hazard. However, most people are unaware of how serious the problem can be. Illustrative examples are the European summer of 2003 heatwave, claiming tens of thousands of lives, or the more recent 2010 heatwave in Ahmedabad, India.

With the danger of excessive heat exposure becoming identifiable in health records, Dr. Mason continued by highlighting how to measure heat stress. In terms of human health, excessive heat exposure imposes stress on the body once more heat is coming in than out for a prolonged beyond a certain rate. Hence, prolonged exposure to excess high temperatures, elevated humidity, strong insolation or even heavy calorie intake or too much clothing can cause heat stress if not enough cooling can be achieved. With temperatures and atmospheric moisture levels being elevated much of the time in the Caribbean, the sensation of heat, or feels-like temperature often is relatively high. For instance, in hot and humid weather, 30C can easily feel like 35C or higher, with heat stress becoming more probable, whereas in hot and windy weather, 30C can feel like 27C, which to many could be very comfortable. As such, heat stress can be estimated through feels-like (or apparent) temperatures. There are a plethora of heat models, from very simple ones incorporating just temperature and humidity (e.g. the Heat Index) to very complex human body heat budget models.

In answering the third question, i.e. when to issue heat alerts, Dr. Mason suggested warning thresholds should be employed which essentially identify the point beyond which a sectoral outcome becomes too adverse to not act upon. The health risk of excessive heat exposure is a factor of feels-like temperature

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as well as geographical and temporal adaptation (i.e. regional and short-term acclimatisation, respectively) to heat and, of course, vulnerabilities and heat exposure. A widely utilised threshold is a feels-like temperature beyond which excess mortality rises exponentially. However, with a growing, though arguably embryonic, notion within the health sector in the Caribbean that excess morbidity may be observed at present-day, and with Caribbean temperatures rising in the context of climate change, a similar threshold relating to a breakpoint in excess morbidity may be a welcome alternative for the Caribbean.

Dr. Mason then finished the presentation by showing different kinds of heat early warning systems from around the world. He showed a classification of systems based on a few parameters such as: thresholds being based on historical mortality, excess mortality actually forecast, duration and/or seasonality of the heat event, regionally variable thresholds (such as the French system), and human expertise.

Following this presentation, the workshop shifted gear to practical work. In the first afternoon session, Dr. Cédric Van Meerbeeck (of the Caribbean Institute for Meteorology and Hydrology, CIMH) and Dr. Mason made a demonstration on how ongoing collaborative research<sup>2</sup> between the IRI and CIMH suggested seasonal heatwave forecasts could be made by CariCOF, followed by a hands-on exercise. The final session of the workshop day was dedicated to making the first experimental CariCOF heatwave forecast that would estimate the chances of having at least 14, 30 and 60 heatwave days<sup>3</sup> taking place between June and November 2017.

## Day 2 Exceedance forecasting and finalising the CariCOF climate outlooks

To respond effectively to a growing demand from seasonal climate forecast user stakeholders, especially in agriculture, means to build the region's NMHSs' capacities in the provision of so-called exceedance forecasts. For instance, instead of being provided the user with a standard, tercile based rainfall forecast which leaves the farmer to guess what it could mean for them in terms of deciding whether to grow a crop or not (i.e. a risk-based decision), a much more handy format for the farmer enabling them to

<sup>2</sup> This research commenced in early 2016 and had initially entailed collecting, quality controlling and processing long records from weather station observations of temperature and humidity on hourly and daily time scales to calculate time series of feels-like temperatures such as the daily maximum heat index across the Caribbean. With data availability, especially at the more optimal hourly time scale, proving quite challenging, a second part of the research explored what usable historical climatological information on heatwave seasonality could be extracted from the data utilising a (combination of) method(s) that is consistent throughout the region. The outcome was an information set that was highlighted at the Stakeholder Forum following the training workshop and published on the Caribbean Regional Climate Centre (RCC) website given its relevance to the RCC's stakeholders. The last portion of the research then focused on building an experimental, seasonal heatwave forecasting system that is tailored to the data availability and heatwave characteristics in the Caribbean.

<sup>3</sup> a heatwave day is defined as a calendar day during which the maximum temperature exceeds the 90th percentile and which is either preceded and/or followed by at least 1 other calendar day crossing that same threshold. As such, two consecutive heatwave days constitute the minimum length to qualify as a heatwave.

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assess risk would be to tell them the probability of rainfall being below or above a critical threshold. Such information can be provided directly in the form of exceedance forecasts<sup>4</sup>.

In the first session of day 2 of the training workshop, Dr. Mason and Dr. Van Meerbeek demonstrated how such forecasts can be easily made using the Climate Predictability Tool, which all participating NMHSs had received prior extensive training in.

After that demonstration, the remainder of the morning was utilised to discuss and finalise the participants' national objective climate outlooks and the regional outlooks for the 2017 Wet/Hurricane Season Climate Outlook. A template for the inclusion of the different sets of outlooks for presentation that was designed by the CIMH team ahead of the 2016 Wet/Hurricane Season CariCOF General Assembly (aka Stakeholder Forum) and tested in a nationally downscaled form during a training session in Guyana in October 2016 as well as utilised for the 2016 Dry Season CariCOF Stakeholder Forum, was again adopted for presentation the next day at the Stakeholder Forum. Furthermore, in addition to the usual dissemination channels utilised every month, in the following week, the outlooks were distributed in the form of expanded Caribbean Climate Outlook Newsletter to all participating NMHSs, which would then distribute them widely among their national stakeholders.

*Note: the proceedings of the afternoon's media training are made available in a separate report.*

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<sup>4</sup> Although the robustness of the forecast probabilities depend on the quantity and quality of historical data driving them, the answer coming out of such forecasts is very straightforward, which addresses one of the major challenges identified by CariCOF's user stakeholders.

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**CariCOF 2017 Wet/Hurricane Season - Seasonal Forecast Training Workshop  
Villa, St. Vincent & the Grenadines**

**29<sup>th</sup> – 30<sup>th</sup> May, 2017**

**Workshop Draft Agenda**

**Day 1: Monday May 29<sup>th</sup>, 2017 – Towards providing heat-health early-warning in the Caribbean**

09:00 – 09:10 Welcome – Opening Remarks (St. Vincent Met Office; Adrian Trotman, CIMH)

09:10 – 09:20 Workshop Objectives (Cedric Van Meerbeeck, CIMH)

09:20 – 10:15 Heat-health session 1 (Hannah Nissan/Simon Mason, IRI)

10:15 - 10:30 *Break*

10:30 - 12:15 Heat-health session 2 (Hannah Nissan/Simon Mason, IRI)

12:15 - 01:30 *Lunch (provided)*

01:30 - 01:45 Making seasonal heat wave forecasts – a demonstration  
(Simon Mason, IRI; Cédric Van Meerbeeck, CIMH)

01:45 – 3:15 Preparing seasonal heat wave forecasts – hands-on exercise  
(Simon Mason, IRI; Cédric Van Meerbeeck, CIMH)

03:15 - 03:30 *Break*

03:30 - 05:00 Preparing the June-July-August 2017 heat wave outlook  
(All)

05:00 Day's conclusion

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**Day 2: Tuesday May 30<sup>th</sup>, 2017 – Exceedance forecasts, 2017 wet/hurricane season climate outlooks, media training**

- 09:00 – 10:15 Making threshold exceedance forecasts using CPT (Simon Mason, IRI)
- 10:15 – 10:30 *Break*
- 10:30 – 12:15 Finalising the 2017 wet/hurricane season CariCOF climate outlooks - All
- 12:15 – 1:15 *Lunch (provided)*
- 1:15 – 1:45 Weather beyond traditional media – credibility and keeping the public informed (Irene Sans, ClimaData)
- 1:45 – 2:15 The new social season – how to make weather and climate bloom (Irene Sans, ClimaData)
- 2:15 – 2:45 Improving weather & climate communications– best practices (John Toohey-Morales, ClimaData)
- 2:45 – 3:00 *Break*
- 3:30 – 4:30 Role reversal workshop – walking in each others’ shoes (Irene Sans, assisted by John Toohey-Morales, ClimaData)
- 4:30 – 4:45 Media training evaluation, discussion, participant comments
- 4:45 – 5:00 Closing Remarks (Adrian Trotman, CIMH)

END OF WORKSHOP

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