

PROVIDING HEATWAVE FORECASTS IN A REGION WITH LOW PREDICTABILITY

A Caribbean Approach

Dr. Cedric J. VAN MEERBEECK, Dr. Teddy ALLEN

Caribbean Institute for Meteorology and Hydrology

Dr. Simon MASON, Dr. Hannah NISSAN

International Research Institute for Climate and Society

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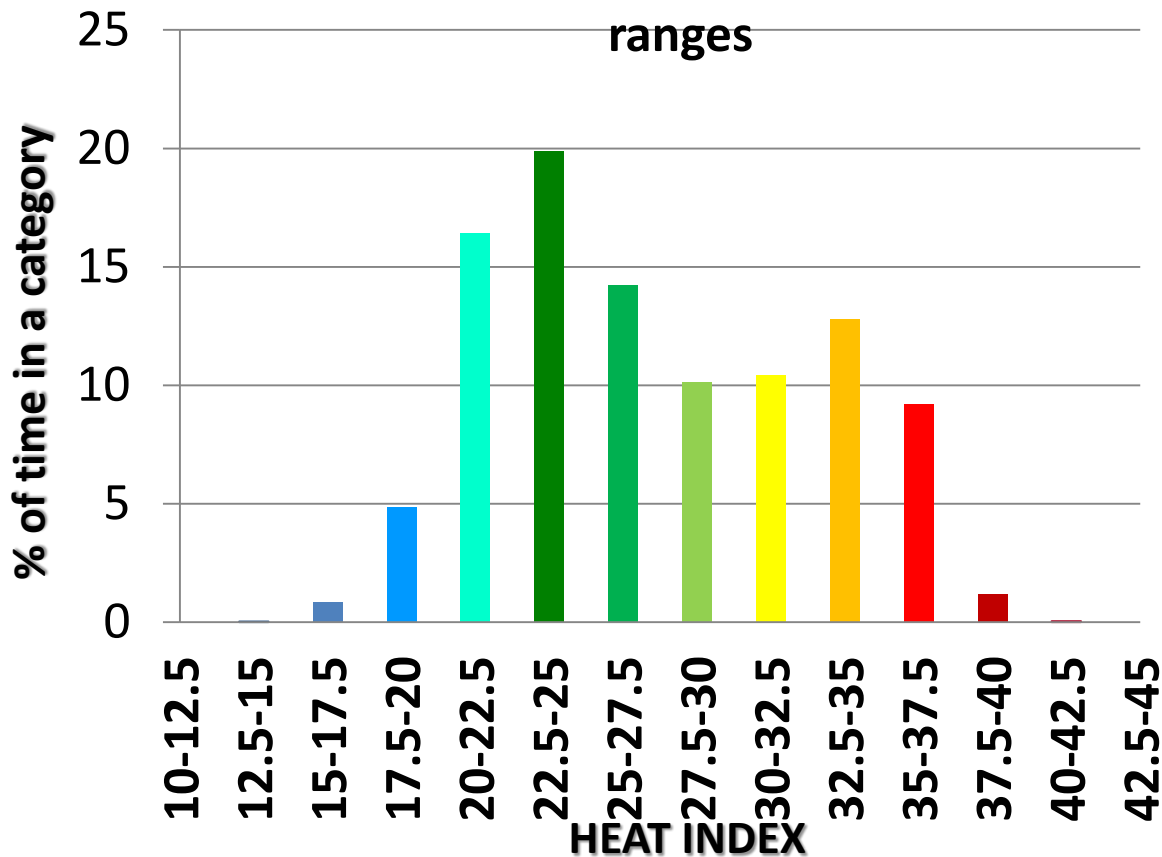
The challenge of “Measuring” heat stress

- Ambient temperature (**dry bulb temperature**) form a crude proxy for heat stress
 - + Ambient temperatures available in sufficiently long historical records
 - but heat stress also strongly dependent on humidity
- Apparent temperatures (**heat stress index**) would be ideal for indicating hazardous heat conditions in the Caribbean
 - + Includes combined effect of temperature and humidity
 - Requires long historical records of ambient temperature and relative humidity (RH) at hourly timescales are very sparse...
- **Proposed solution:**
Wet-bulb temperature (measured at most manned stations) or **dew point temperature** (measured at automatic weather stations) good substitutes for relative humidity and likely more easily available.

- **Heat stress** induced by excessive heat exposure
- Contributing factors: **temperature, humidity**, wind & sunshine
- **Heat Index** measure of feel-like temperature. Takes into account temp. & humidity.

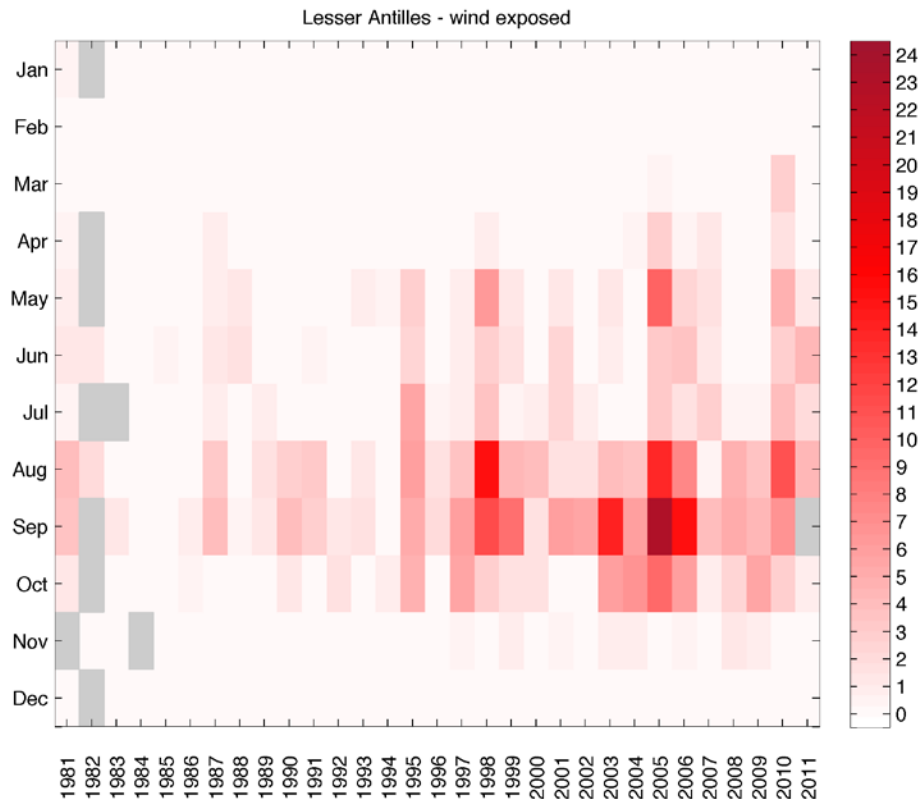
Heat Index in Zanderij, Suriname

Percentage of time within certain heat index



A new reality?

Local imprint of recent Global Warming



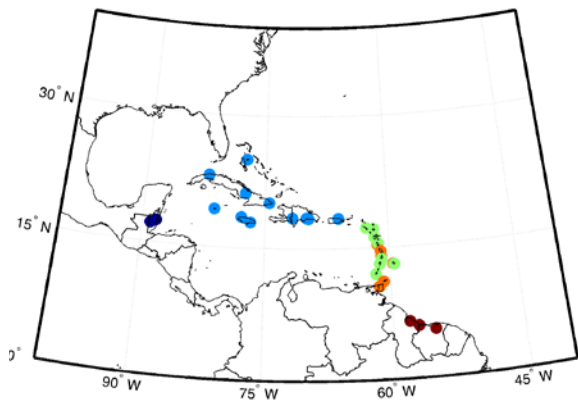
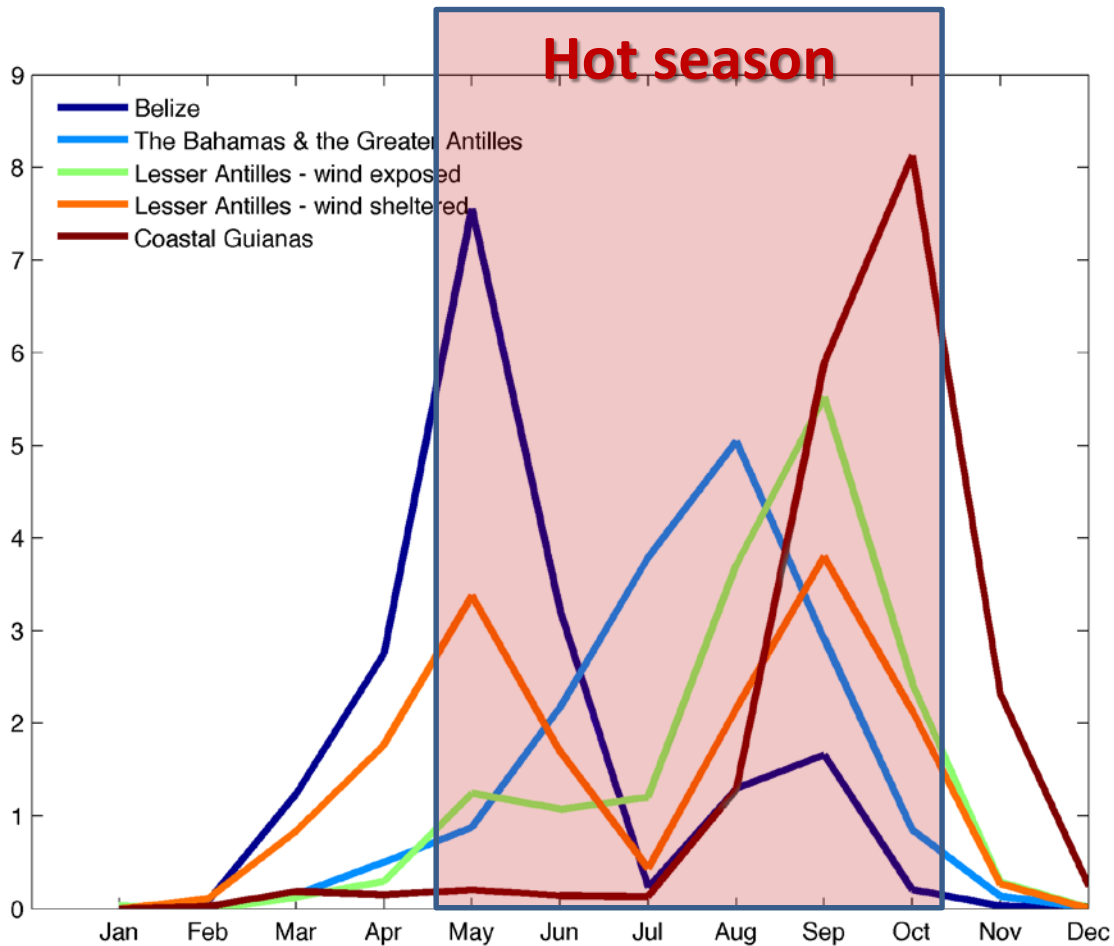
>15% **increase** in frequency of **warm** days and nights; >7% **decrease** in frequency of **cool** days and nights; 1°C **warming** of **hottest** & **coolest** days and nights (Stephenson et al. 2014).

Numbers of heatwave days* increasing rapidly and hotter season becoming longer.

Heatwave day = any day with max. temperature among the historical top 10% (aka hot day) for at least 2 consecutive days.

Seasonality of heatwaves in the Caribbean

Historical average
heatwave days per month



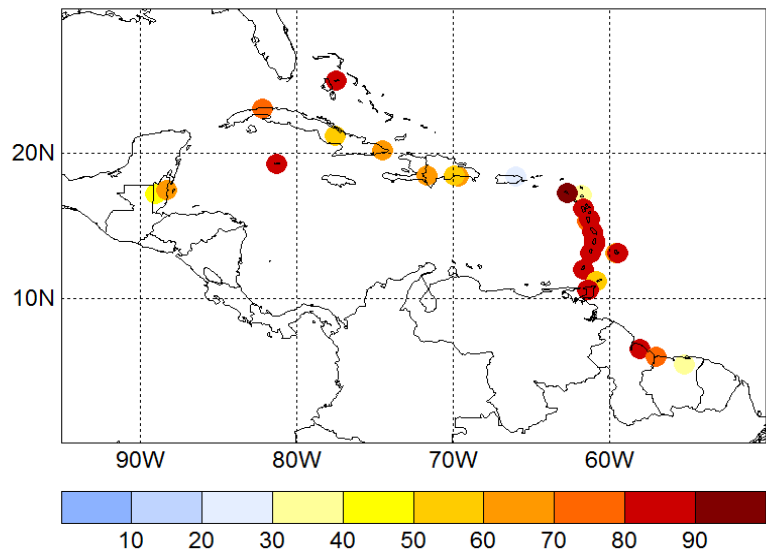
Taking on the challenge of forecasting Caribbean heatwaves

- Some **predictive skill** for 1-3 day heatwave forecasts, but nearly none beyond 1 week.
- However, **interannual variability** (e.g. ENSO) source of useful predictive skill for heatwave frequency forecasts at seasonal timescales.
- A **Caribbean approach**:
Phase 1: delivering (sub-)seasonal heatwave frequency forecast information to increase lead times to improve preparedness and mitigation. (rolled out under the USAID BRCCC Programme 2015-2017)

Experimental seasonal heat outlooks for the Caribbean comprise heatwave forecasts

(updated each month during the hotter season on rcc.cimh.edu.bb)

Prob. at least 14 heatwave days between Jun & Nov



How to produce?

such “exceedance forecasts” generated with the **Climate Predictability Tool** ([CPT iri.columbia.edu](http://iri.columbia.edu)) combine information contained within historical climatology & tailored probabilistic forecasts.

Why this way? allows for threshold-related questions to be answered!

e.g. chance of exceeding this threshold, min./max. expected number of heatwaves, etc.
NOTE: At times when there is no useful skill, the numbers will simply reflect climatology.

Thank you

rcc.cimh.edu.bb