Climate Services in support of decision-making in the health sector

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Functions of the Caribbean Institute for Meteorology and Hydrology (CIMH)

- **WMO Regional Training Centre** - Train various categories of meteorological and hydrological personnel
- **Operate as a centre of research** in meteorology, hydrology and associated sciences
- **Regional Climate Data Centre** - Data collection, storage, & dissemination
- **WMO Regional Instrument Centre** – Develop, maintain, repair, and calibrate meteorological & hydrological instruments
- **Regional Centre of Excellence for Training in Satellite Meteorology**
- **WMO Regional Climate Centre** – designated May 2017
- **Caribbean Centre for Climate and Environmental Simulations**
- **WMO Pan-American Centre for Sand and Dust Storm Warning Advisory and Assessment System**
- **Advisor to regional governments** on matters related to meteorology, climatology & hydrology
- **Provide specialized services to industry**

An affiliate of the UWI since 1972
Country Priorities for Climate and Health Action

- Caribbean countries rated the following topics as “Extremely Important” or “Important” for a climate change and health agenda.
- Many of these are topics where CIMH is actively doing atmospheric monitoring and forecasting...and increasingly interdisciplinary work.

Source: PAHO Country Survey on Health and Climate Change 2017
Vision

"To enable better management of the risks of climate variability and change and adaptation to climate change, through the development and incorporation of science-based climate information and prediction into planning, policy and practice on the global, regional and national scale."

Caribbean Roll Out begun in May 2013 in Trinidad and Tobago
REGIONAL WORKSHOP ON CLIMATE SERVICES AT THE NATIONAL LEVEL FOR THE CARIBBEAN
Since then national road map exercises in Belize, Trinidad and Tobago, Suriname, Guyana. Endorsed at the 53rd Special Meeting of COTED (Environment and Sustainable Development).
Climate Monitoring product suite

Drought and rainfall, temperature
Supports our regional Climate Watch

Produced through two in-house-built tools

Caribbean Climate Monitor
CariCOFOutlook
Generator

Reference Climatologies
Climate Forecasts product suite

Climate Products
Partnering with the NMHSs

Seasonal forecasts up to 3-6 month ahead

Rainfall totals
Mean, maximum and minimum temperatures

More meaningful
Drought – alerting system

Wet days
(Extreme) wet spells

Coral bleaching

0-3 ml Tercile-based precip. and temp. outlooks + verification

MJJ 2018
Frequency of wet days

MJJ 2018 frequency of extreme 3-day wet spells

Thematic / hazard-specific outlooks

Coral bleaching thermal stress for Aug. to Nov. 2017

Coral bleaching alert levels (0-4 ml)
Experimental climate products

Seasonal heatwave frequency outlooks (up to 6 months)

Probability of at least 14 heatwave days between Jun. & Sep.

Probability of at least 60 heatwave days between Jun. & Nov.

Seasonal rainfall exceedance outlooks for crop water demand (3 months)

Probability of meeting water demand for sweet potato

Seasonal dry spells frequency outlooks (3 months)

MAX. number of 7-day dry spells 7d max MJJ2018

Probability of at least ONE 15-day dry spell between May & Jul.

Drought monitoring products (SPEI, SPI change)
Sand and Dust Storm-Warning and Alerting System

- CIMH is the Pan-American node of the network
- Significant amounts of desert dust travel to the Caribbean annually from the Sahara region
  - Concentrations in the Caribbean often exceed WHO and United States Environmental Protection Agency (EPA) standards for PM2.5 and PM10
  - Serious implications for human health in the region
- CIMH has embarked on providing dust and air quality forecasts for the Caribbean
  - Weather Research and Forecasting model coupled with Chemistry (WRF-Chem)
    - Coupled weather prediction/dispersion model- simulates the release and transport of constituents; Saharan dust transport and concentration
    - Coupled weather/dispersion/air quality model with full interaction of chemical species- prediction of PM2.5, PM10 and ozone ($O_3$)

Find the latest 7 day forecast for dust, ozone, PM 2.5 and PM 10 here: http://dafc.cimh.edu.bb/
Consortium of Sectoral EWISACTs Partners

The Consortium is a key regional mechanism to champion the design, development and delivery of tailored climate products and services in the agriculture and food security, disaster risk management, energy, health, tourism and water sectors.

Co-design Co-develop Co-deliver Products & Services

Regional Consortium

Agriculture Water DRM Climate

Health Energy Tourism

4 Consortium Meetings hosted by CIMH:

May 2015, October 2015, July 2016, May 2018

Recognised Observers – 5Cs, UWI CSGM, CCCCC, OECS

New partnerships being brokered – CCREEE

CTO and CHTA sign the LoA, September 16th, 2016

CWWA signs the LoA, October 26th, 2016

CARDI and CDEMA sign the LoA, December 6th, 2016

CARPHA and CIMH sign the LoA, April 26th, 2017
Caribbean Health-Climatic Bulletin

6 issues since May 2017

- Insights on typical climate conditions for upcoming season;
- An outlook (how wet, how dry, how hot etc.) for the upcoming season
- Key climate messages for that period; and
- Advises on health implications arising from seasonal climate information.

Find the latest HCB here: http://rcc.cimh.edu.bb/caribbean-health-climatic-bulletin/

Special Saharan Dust Advisories

2 advisories issued in 2018

Current event
Models run and managed by the Caribbean Institute for Meteorology and Hydrology (CIMH) in its role as the Pan-American Centre for the World Meteorological Organization (WMO) Sand and Dust Storm Warning Advisory and Assessment System (SD-WAS) are showing a dust episode in which dust concentration amounts are dramatically high. Cameroonian desert has already seen elevated levels of PM10 over 300 µg/m^3 dust concentration. This is above the maximum air quality guidelines of 50 µg/m^3 24-hour mean for particulate matter established by the World Health Organization (WHO).

Dust Forecast
In the coming 1-3 days, we expect that dust and PM2.5 concentration events will increase.

Key messages:
- Increased dust and PM2.5 accumulation
- Increased respiratory health risks

Health messages:
- Extreme caution needed in elderly, children, and patients with pre-existing respiratory conditions

Stay informed
Access the 7-day dust forecast in your area. This product is available at http://おかげ.cimh.edu.bb/dust-forecast/

Health Stakeholders are encouraged to consult the 7-day dust forecast for their area.

CONTACT US
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- Dr. Andrew Hau, Meteorologist: awau@rcc.cimh.edu.bb

Saharan Dust Update for April 30 - May 09, 2018

IMPLICATIONS FOR RESPIRATORY ILLNESS
Persons with asthma and those prone to allergic rhinitis may become increasingly symptomatic due to the significantly elevated dust and PM2.5 concentrations. Medical facilities may experience increased numbers of patients with respiratory illnesses. This situation may be exacerbated in territories where the ground surface is dry.
Climate services for *Aedes aegypti* borne diseases

Annual dengue costs to Caribbean: **approx. $321.4 million USD** excluding costs of vector control and other prevention programmes (Shepard et al, 2011)

### Climate driven spatio-temporal model to support dengue early warning

- Statistical model to test whether dengue outbreaks in Barbados could be predicted using weather station data for temperature and a precipitation index.
- Risk of dengue outbreaks increased with increasing minimum temperature ($T_{\text{min}}$; up to 25°C).
- Disease outbreaks more likely to occur 4 to 5 months after periods of drought and 1 month after periods of excess rainfall.
- Results suggest that a drought period followed by intense rainfall 4 to 5 months later could provide optimum conditions for an imminent dengue outbreak.
- Probabilistic dengue outlooks could be included in the Caribbean Health-Climatic Bulletin.

Model able to successfully predict months with dengue outbreaks versus non-outbreaks in most years...overall proportion of correct predictions (hits and correct rejections) of 86% (81%:91%) compared with 64% (58%:71%) for the baseline model.

Climate services for heat related non-communicable diseases

Excessive heat exposure, especially during heat waves, engenders NDCs from heat stress.

Heat waves deadliest meteorological hazard in USA (Smith and Katz, 2013).

Excess mortality in the thousands during major heat waves (e.g. 2003 Europe, 2010 Russia, 2015 & 2016 South Asia).

Early warning information relying on historical occurrences and climate predictions can help improve preparedness to heat waves.

1-month to 6-month heat wave forecasts experimentally delivered by the Caribbean RCC since 2017.

Climate change

Increased frequency & intensity of heat waves already observed in the Caribbean (Stephenson et al., 2014) and projected to worsen in future.
Thank you

rcc.cimh.edu.bb