

The Caribbean dry season: cool at first, often very dry and few disruption from weather

What are the drivers of the Caribbean dry season?

1) Temperature of the Caribbean Sea and Tropical North Atlantic: when they are warmer, more evaporation takes place. This adds moisture to the atmosphere, so clouds, showers and storms can easily form, while also making us feel hotter. Predictable? Several months in advance.

2) Temperature of the eastern equatorial Pacific: particularly warm (El Niño) or cool (La Niña) episodes influence the winds in the atmosphere so that storm activity as well as rainfall in the Caribbean is reduced or enhanced, respectively. **Predictable?** Several months in advance.

3) Air pressure: in the dry season, air pressure is relatively high, inhibiting heavy shower activity. In years higher pressure over the region, less rainfall is noted in the eastern Caribbean, but more in the Bahamas. **Predictable?** Two weeks in advance.

4) Saharan dust: dry air blowing in from the Sahara can carry dust. This dryness and dust stabilise the atmosphere and cool the North Atlantic Ocean, contributing to reduced rainfall and hurricane activity. **Predictable?** Two weeks in advance.

Weak La Niña affecting the Caribbean

La Niña events involve unusual cooling of the eastern equatorial Pacific Ocean, which happens every 2-7 years and last 6-24 months.

In response to the cooling water, the atmosphere in the tropics - and some extra-tropical regions - behaves differently than in other years.

During an La Niña, air pressure is higher than usual in the eastern Pacific and less evaporation of the cooler water takes place, leading to drier conditions.

Higher up in the atmosphere, weaker winds are blowing into the Caribbean from the west. These winds tear apart cloud tops, which reduces the chance and intensity of rain- and thunderstorms as well as tropical cyclones.

In the dry season, El Niño often weakens the development of rain- and thunderstorms in the eastern and southern Caribbean, but enhances it in the north.



The ongoing weak La Niña in the Pacific and warmer than average waters around the Caribbean decrease chances of a very intense dry season.



Our typical rainfall patterns from December to May

Belize & Caribbean Islands north of 16°N:

Dec to Jan - early dry season. Heavy showers increasingly rare, but usually without extreme rainfall.

Feb to Mar - middle of the dry season. Alternation of sunny and showery days, mostly witout heavy rainfall.

Apr to May - end of the dry season. Occasionally wet and increasing chances of extreme rainfall.

Caribbean Islands south of 16°N (except ABC Islands):

Dec to Jan - early dry season. Heavy showers increasingly rare, but usually without extreme rainfall.

Feb to Apr - middle of the dry season. Alternation of sunny and showery days, mostly without heavy rainfall.

May - late dry season. Occasionally wet, increasing chances of extreme rainfall.

ABC Islands: Alternation of wet and sunny spells until February, drier after. **Guianas:**

Dec to Feb - short wet season. Frequent heavy showers. **Mar to May** - short dry season. Heavy showers at times.

Very wet inland Guianas, northern Cuba, but very dry in Cayman, N Leewards, Tobago; August to October uncomfortably hot

+ impacts

Drought relief for many

impacts

Where drought returned: water shortages; heat stress has led to a perceived higer rate of non-communicable disease

Observations

- **RAINFALL**: *October:* NE Guyana, St. Maarten and Trinidad very dry; S Dom. Republic and S Guianas very wet. *September:* Cayman and W Dom. Rep. very dry; Barbados, E Guyana, St. Lucia, W Suriname very wet. *August:* Barbados, S Belize, Tobago very dry; E Dom. Republic, W Jamaica very wet.
- **TEMPERATURES**: *ASO:* 0.75-1.5 °C warmer than average in Belize, French Guiana and across most the islands. 0.25-0.75 °C warmer in ABC Isl., Cuba, Guyana, Hispaniola, St. Lucia and Suriname.

Notable climate records

- **WET** *ASO*: record high rainfall totals in 1 location in Dom. Rep.
- **HOT** *ASO*: 4, 6 & 3 territories registered record high min., mean and max. temperatures, resp.

Notable Impacts

 Prevailing short- and long-term drought in Cayman and Tobago, with a return of water restrictions there.



Worsening living conditions in Haïti after 3-year drought, with some communitiesnow additionally suffering from Hurricane Matthew



Credit: FAO, hougansidney.com

How well did we predict? ASO Rainfall Outlook



ASO Observed Rainfall



Apart from Belize, Cayman Islands and Cuba, we successfully forecast which islands would be dry and which islands would be wet.

In places where the forecast was highly uncertain, i.e. a climatology forecast, we observed a mix of wet, normal and dry, which is the exact meaning of a climatology forecast.

LA NIÑA EVOLVING

December 2016 to May 2017

Recent observations:

Borderline weak La Niña appeared in recent weeks, with sea-surface temperatures (SSTs) around 0.5°C below avg. in the equatorial E. Pacific (NINO3.4).

Global Model guidance:

All the models indicate a fading La Niña, with 55% chance of La Niña conditions by DJF, decreasing to 20% by March-April-May (MAM), and a 65-80% chance of return to neutral conditions by MAM.

Expected impacts on rainfall, drought and temperatures:

La Niña increases chances of wetter than usual conditions in much of the region during DJF. It increases flash flood, long-term flooding and landslide potential until the end of the year, but cools the dry season and dampens the intensity of its dryness.

EXPECTED WET SPELLS AND TEMPERATURES December - January - February (DJF) 2016-'17



What usually happens from December to February?

- Roughly 25 to 45 days are wet at most places.
 Roughly 1 to 3 wet spells occur, of which up to 1
- is very wet (ABC Islands & Guianas: twice as many).
- Also, there tends to be up to 1 extreme wet spell.



DJF Max. Temperature Outlook

Wet days and wet spells outlook up to February

What are wet days and wet spells?

- Wet days: days with at least 1mm rainfall.
- Wet spells: the number of 7-day spells (within a 3 month period) during which rainfall ranks among the wettest twenty percent of the entire historical record.
- Extreme wet spells: the number of 3-day spells (within a 3 month period) during which rainfall ranks among the wettest 1% of the entire record.

How often will it rain and will it often rain heavily?

For December 2016 to February 2017 we forecast no change from the usual amount of wet days or wet spells (*low confidence*), or very wet spells (*low to medium confidence*). Apart from the coastal Guianas, we forecast low chances for extreme wet spells beyond December (*high confid*.).

Implications?

- Fewer disruptions of outdoor activities by rainfall towards February.
- Surface dryness increase slower than usual, except in far northwest.
- Depletion of large reservoirs likely slower than usual for dry season.
- Flash flood potential mostly disappearing by end of year, except in Guianas.

Below-normal

45 40

>70 60 50

DJF Mininum (Min.) Temperature

Min. temperatures above- to normal across the region, except Guyana.

In detail: Trinidad and Tobago: confidence 85%. ABC, Cayman, Jamaica, Leewards, U.S. Carib' Terr., Windwards: confid. 75%. Bahamas: confid. 75%. Guyana: below- to normal confid. 75%. Belize and Cuba: confid. 70%.

IMPLICATIONS:

- Night time temperatures more comfortable than earlier this year than we are used to.
- Some increased cooling needs for tourism purposes.

DJF Min. Temperature Outlook



Normal

>40

Above-normal

50 60 >70

40 45

DJF Maximum (Max.) Temperature

Max. temperatures above- to normal across the region, except Belize and Leewards, as we are moving into the coolest season.

In detail: ABC, Windwards, e Guianas: confidence 85%. Bahamas, Jamaica: confidence 80%. Cayman, Cuba: confid. 75%. Belize: below- to normal confid. 75%. Elsewhere: confid. 70%.

IMPLICATIONS: More comfortable temperatures than in recent months. Heat waves very unlikely throughout the period.

Climate outlooks - background

The Caribbean Climate Outlooks are prepared by the Caribbean Regional Climate Outlook Forum (CariCOF). The Caribbean Institute for Meteorology and Hydrology, in its role as WMO Regional Climate Centre in demonstration phase, coordinates the CariCOF process. Contributors to the Outlooks are the Meteorological Services from the region. For more information on how the outlooks are produced, please visit rcc,cimh.edu.bb

The Precipitation and Temperature Outlooks are issued in the form of a map, which shows regions where the forecast rainfall or temperatures

have the same probabilities to be: Above-normal (A) - wit

e-normal	(A) - within the wettest/hottest third of the historical	record
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- Near-normal (N) within the middle third of the historical record
- Below-normal (B) within the driest/coldest third of the historical record

DISCLAIMER

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EXPECTED RAINFALL AND DROUGHT

Consensus Rainfall Outlook

DJF rainfall in the Caribbean is likely to be above- to normal in the Antilles (except Cayman and Cuba), as well as in the Guianas. By contrast, the Bahamas, Belize and Cuba are likely to see below- to normal rainfall. Rainfall predictability in Cayman is low for the Dec. 2016 to Feb. 2017 period.

In detail: Guianas: above- to normal, confidence 85%. ABC Islands, Barbados, Leewards, Hispaniola, U.S. C'bean Terr., Windwards: above- to normal, confid. 80%. Jamaica: above- to normal, confid. 80%. Bahamas: below- to normal, confid. 80%. Belize, Cuba: below- to normal; confid. 75%. Cayman: equal chance of below-, above- or normal.

MAM Rainfall Outlook



Dry Season 2016-'17

DJF Rainfall Outlook



Consensus Rainfall Outlook

MAM

MAM rainfall in the Caribbean is likely to be above- to normal in Belize, Bahamas, Cayman, Cuba and eastern Guianas; below- to normal in ABC Islands, eastern Guianas, Jamaica and Trinidad & Tobago. Rainfall currently has low predictability elsewhere.

In detail: ABC Is., Cuba, Cayman Is.: above - to normal, confidence 80%.
Belize, Hispaniola, Jamaica, Leewards, U.S Terr. above- to normal, confid.
80%. East Guianas: below-or normal; confid. 80%. Bahamas, Turks & Caicos: above- to normal; confid. 75%. Trinidad & Tobago: below- or normal, confid. 75%.
Barbados, west Guianas, Winwards: below- or normal, confid. 75%.

THE CLIMATE OUTLOOK IN SHORT

A wetter than usual early dry season for much of the islands and the Guianas, but possibly drier in Bahamas and Belize, with the usual amount of wet days and wet spells. Much uncertainty beyond February.

+ **impacts :** slower decrease in surface and soil moisture; slower depletion of water reservoirs.

flash flood potential mostly disappearing by end of year; limited heat stress.



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