

STRONG EL NIÑO AFFECTING THE CARIBBEAN

El Niño events involve unusual warming of the eastern equatorial Pacific Ocean, which happens every 2-7 years and last 6-18 months.

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

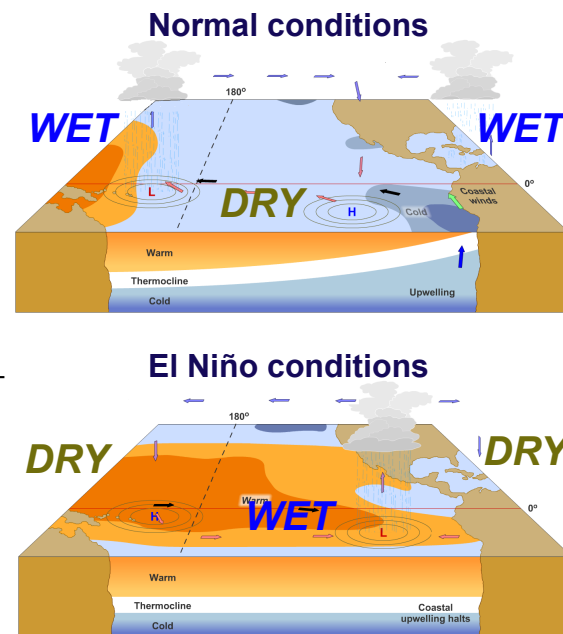
During an El Niño, air pressure is lower than usual in the eastern Pacific and more evaporation of the warm water takes place, leading to wetter conditions.

Higher up in the atmosphere, stronger 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.

One of the strongest El Niños on record is in place, with impacts across the Caribbean and is set to last until the end of the 2015-6 dry season.

The El Niño contributes to ongoing drought in the region, the 2015 global coral reef bleaching event, as well as record heat in many places, with both occurring in the Caribbean.

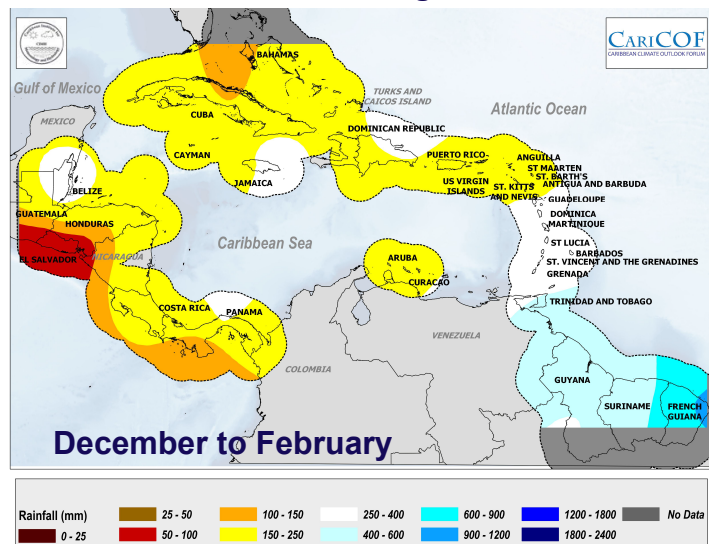


adapted from: MiraCosta College

What are the other 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 and showers can more easily form. Predictable? Several months in advance.
- 2) 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.
- 3) Saharan dust:** Dust blowing in from the Sahara tends to dry out the air, stabilise the atmosphere and cool the North Atlantic Ocean, all contributing to dryness. Predictable? Two weeks in advance.

Historical average rainfall



Our typical rainfall patterns between December and 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 without 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 spells and sunny days until February, drier after.

Guianas:

Dec to Feb - Short wet season. Frequent heavy showers.

Mar to May - Short dry season. Heavy showers at times.

Dry to very dry in most of the Islands;
very wet in Guyana;
uncomfortably hot

+ impacts

Raised public awareness on drought

- impacts

Water shortages;
reduced crop production and livestock; reduced stream flow; increased fire incidence

Observations

- ♦ **Rainfall:** *October:* very dry in Aruba and Dominica. *September:* very dry in Anguilla, Dominica, St. Croix, St. Maarten, Trinidad. *August:* very wet in eastern Cuba, Dominica, N Guyana; very dry in Aruba, Barbados, Belize, Grand Cayman, Grenada, Jamaica and St. Lucia.
- ♦ **Temperatures:** *October:* above-normal across the Caribbean and record high in some places.

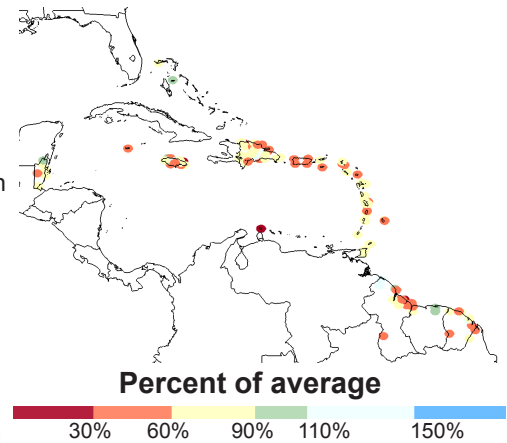
Notable climate records:

- ♦ **Dry** - ASO: 10 territories had locations that experienced record low rainfall (with mostly 30-50% of avg.). October: parts of French Guiana, Guyana, Martinique and Dom. Rep. and Jamaica.
- ♦ **Hot** - ASO: 7, 6 & 6 territories had locations that experienced record high min., mean and max. temperatures, respectively.

Notable Impacts

- ♦ Prevailing drought across the Caribbean in Anguilla, Antigua, Barbados, Belize, Cayman, Cuba, Dom. Rep., Jamaica, US C'bean Terr., St. Kitts & Nevis, St. Maarten and St. Lucia, with widespread agricultural losses and/or very low water production and rationed distribution.
- ♦ Possible easing of the drought in parts of Belize, Jamaica and St. Lucia, following wet spells in October.

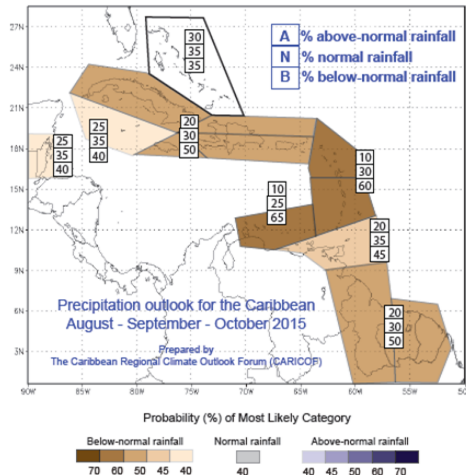
ASO Observed rainfall



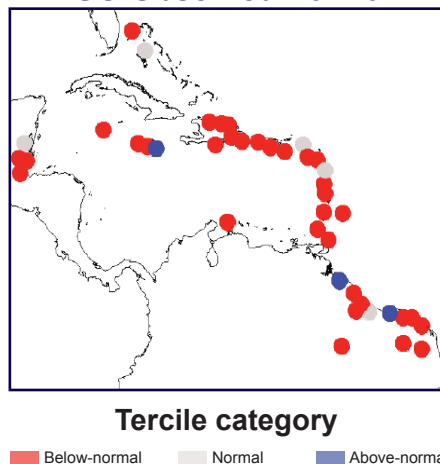
Drought in St. Martin 2015

How well did we predict?

ASO Rainfall Outlook



ASO Observed Rainfall



We successfully forecasted widespread dry conditions for ASO.

Our outlook successfully identified the most likely category for 73% of locations.

This was the highest score since 2012.

Performance

- ♦ In the last three rainfall outlooks (June to August, July to September and August to October), we scored over 70%.
- ♦ Comments:
 - 1) This was one of our best precipitation outlooks, which is consistent with the unusually high probabilities in the outlook...
 - 2) Investments following the outlook could have resulted in a 39% profit if paid out with fair odds.

THE ONGOING EL NINO:

December to May 2015-6

Recent observations:

Strong El Niño; sea-surface temperatures (SSTs) 3°C above avg. in the equatorial E. Pacific (NINO3.4).

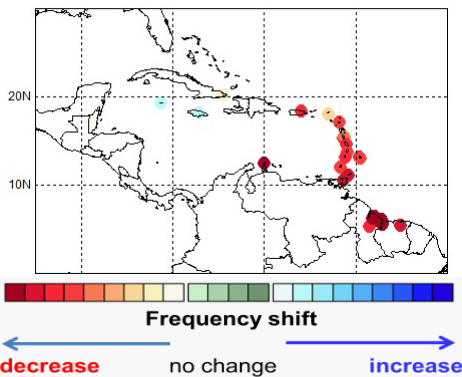
Global Model guidance:

All the models indicate continued El Niño conditions for DJF & 95% of them for MAM. Some models suggest further warming.

Expected impacts on rainfall, drought and temperatures:

- 1) There are high chances of drier than usual conditions for the east and south, exacerbating the ongoing drought.
- 2) Wetter conditions are expected for the NW C'bean.
- 3) In addition, we are very confident that there will be higher temperatures for much of the region.

DJF 2015-6 Wet Days Frequency Shift



What usually happens from December to February?

- The number of wet days decreases from December to February, except the Guianas where it increases.
- Few wet spells after December, except in the Guianas.

Wet days and wet spells up to February

What are wet days and wet spells?

- Wet days: days with at least 1mm rainfall.
- Extremely wet spells: the number of 3-day spells (within a 3 month period) during which rainfall ranks among the wettest percent of the entire historical record.
- Wet spells: the number of 7-day spells (within a 3 month period) during which rainfall ranks among the wettest 10% of the record.

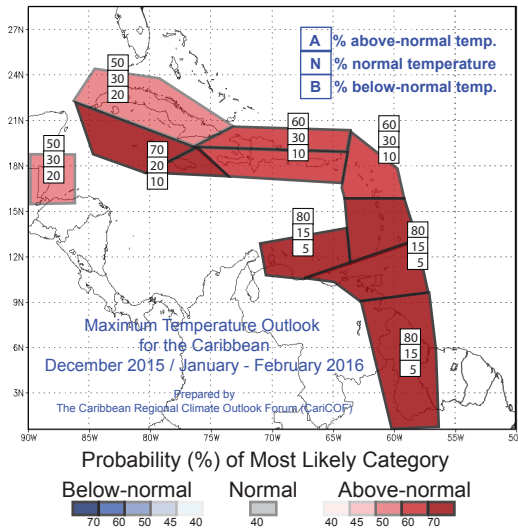
What is the rainfall forecast?

- December to February rainfall expected to be below- to normal in eastern and southern Caribbean with fewer wet days (*high confidence*), wet spells (*medium confidence*) and extreme wet spells (*medium confidence*), but above- to normal in Bahamas, Belize, Cuba.

Implications?

- Fewer wet days: fewer disruptions of outdoor activities and increasing surface dryness.
- Fewer wet spells: reduced recharge of water reservoirs.
- Few extremely wet spells: limited flash flood potential.

DJF Max. Temperature Outlook



March to May Min. Temperature

MAM minimum temperatures above-normal across the region.

In detail: ABC Islands: confidence 90%.

Barbados, Trinidad & Tobago,

Windwards: confid. 80%. Cayman:

confid. 70%. Belize, Hispaniola, US

C'bean Terr.: confid. 60%. Guyana,

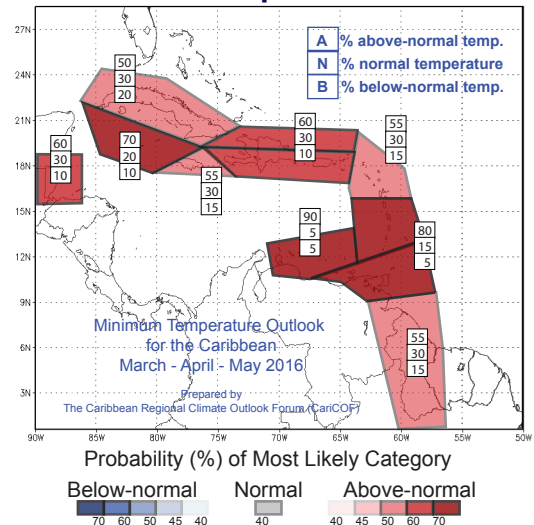
Jamaica, Leewards: confid. 55%.

Cuba: confid. 50%.

IMPLICATIONS:

Night time temperatures become uncomfortable early on in the year. Favourable conditions for mosquito breeding.

MAM Min. Temperature Outlook



December to February Max. Temperature

DJF maximum temperatures above-normal across the region.

In detail: ABC Islands, Barbados, Guyana, Trinidad & Tobago: confidence 80%. Cayman, Jamaica: confid. 70%. Hispaniola, Leewards, US C'bean Terr.: confid. 60%. Belize, Cuba: confid. 50%.

IMPLICATIONS: *Increased cooling needs during the tourism high season.*

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.

This consensus outlook is produced by combining global, regional and national forecasts and expert interpretation. National and region-wide forecasts produced using the Climate Prediction Tool (CPT) are considered together with global dynamical climate models. Probabilities for rainfall and temperatures are estimated for sub-regions based on the model outputs, the level of agreement between the different models and expert knowledge of the regional setting. 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) - within the wettest/hottest third of the historical record
- Near-normal (N) - within the middle third of the historical record
- Below-normal (B) - within the driest/colest third of the historical record

DISCLAIMER

The information contained herein is provided with the understanding that The Caribbean Climate Outlook Forum makes no warranties, either expressed or implied, concerning the accuracy, completeness, reliability, or suitability of the Outlook. The information may be used freely by the public with appropriate acknowledgement of its source, but shall not be modified in content and then presented as original material.

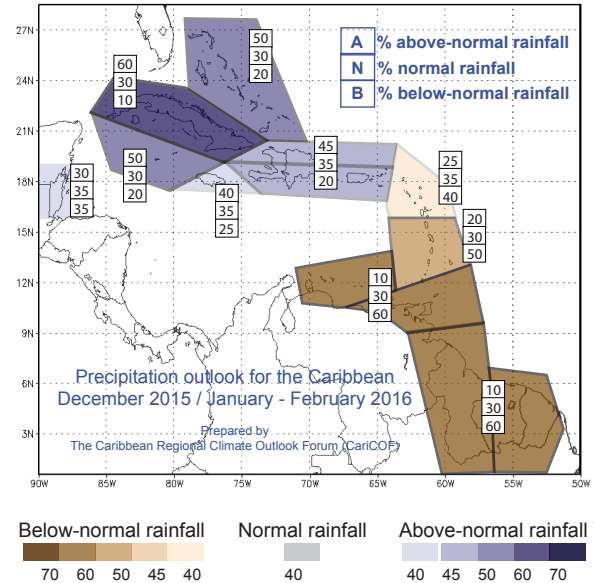
Consensus Rainfall Outlook

December to February

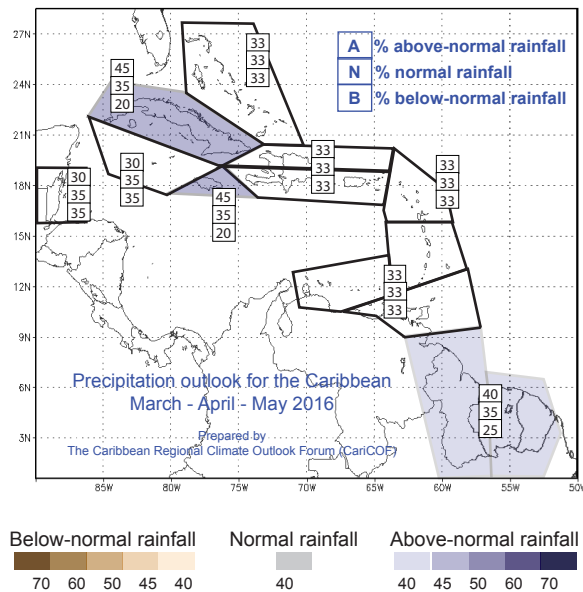
DJF rainfall in the Caribbean is likely to be below- to normal from the Leeward Islands southward, *with fewer wet days and wet spells than usual*; and above- to normal from Puerto Rico westward including Belize.

In detail: ABC Islands, Guianas, Trinidad & Tobago: below- to normal, confidence 90%. **Cuba:** above- to normal, confid. 90%. **Barbados, Windwards:** below- to normal, confid. 80%. **Bahamas, Cayman, Turks & Caicos** above- to normal; confid. 80%. **Hispaniola, US territories:** above - to normal; confid. 80%. **Windwards:** below -to normal; confid. 75%. **Belize, Jamaica:** above- to normal; confid. 75%.

Dec. to Feb. Rainfall Outlook



Mar. to May Rainfall Outlook



Consensus Rainfall Outlook

March to May

MAM rainfall in the Caribbean is likely to be above- to normal in Cuba, the Guianas and Jamaica. Rainfall currently has low predictability present in other areas.

In detail: Cuba, Jamaica: above - to normal, confidence 80%. **Guianas,** above- to normal, confidence 80%. **Belize, Cayman:** below- or normal; confidence 70%. **Elsewhere:** equal chances of below-, above- or normal.

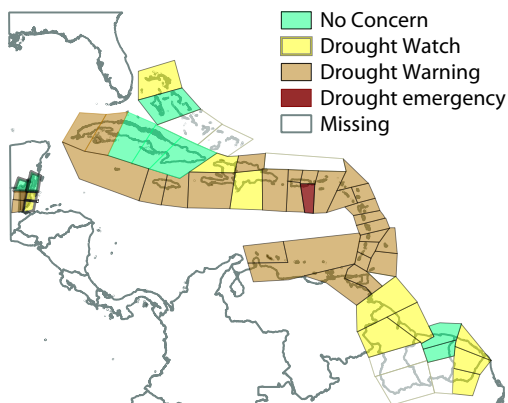
THE CLIMATE OUTLOOK IN SHORT

Drier than usual end of wet season from the Leewards southward; wetter in the extreme north-west; a drier wet season in the Guianas; mild.

+ impacts limited water-related pests, epidemics, disruptions of outdoor activities and flood potential

- impacts long-term drought remaining in many Islands

Drought alert levels by May



RAISE AWARENESS & CONSERVE WATER !!

Drought conditions up to May

Drought situation:
(as of November 1)

Drought alert levels:

Long-term concern:

Most islands are in long-term drought and many in short-term drought after near-record dry August to October. These places have suffered water shortages. **Drought warning or worse:** Antilles (except Cuba), parts of Belize. Water shortages may persist throughout the rest of 2015 and will worsen in the first half of 2016.