



**ANNOUNCEMENTS**

Drought concerns in the eastern Caribbean have been alleviated apart from in the extreme northern Leeward Islands. Drought concerns in April turned to flood and landslide concerns in some countries. Temperatures are likely to continue to be above normal across most of the Caribbean by up to 0.5 °C at least until May/June 2013.

**REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR APRIL 2013**

Most of the eastern Caribbean and Guyana, apart from the extreme northern leeward islands, experienced normal to above normal rainfall. Trinidad and St. Vincent were extremely wet; Tobago, Barbados and Dominica exceptionally wet; St. Lucia very wet; Antigua moderately wet; and Guyana normal to moderately wet from south to north. Apart from the north-western region that was abnormally wet, Jamaica was normal. Central regions of Belize were severely dry and the remainder moderate dry, apart from the extreme south that was abnormally dry.

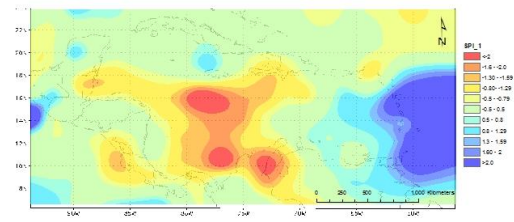


Figure 1. SPI for the Caribbean for April 2013. More information on the SPI can be viewed at <http://63.175.159.26/~cdpmn/spimonitor.html>.

Apart from the extreme northern Leeward Islands, the eastern Caribbean islands and Guyana were normal to above normal for the three month period. Trinidad, Tobago, St. Lucia and Antigua were moderately wet; Grenada normal; Barbados very wet;

Dominica exceptionally wet. Jamaica was normal, but conditions in Belize ranged from severely dry in the east to abnormally dry in the south. See Figure 2.

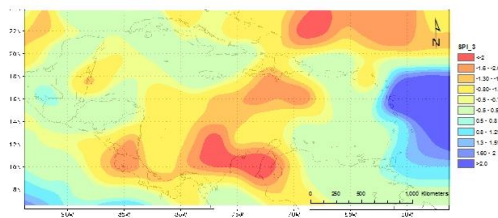


Figure 2. SPI for the Caribbean for February to April 2013. More information on the SPI can be viewed at <http://63.175.159.26/~cdpmn/spimonitor.html>

Concern about agricultural drought has dissipated in most of the Caribbean. However some concerns continue in the extreme northern Leeward Islands and Belize. Much of the region began dry, but was then influence by a series and troughs, with a jet stream particularly influencing the eastern Caribbean, causing, in some cases, record breaking rains

Temperatures for the month were generally cooler with the rains and around normal to above normal during the drier period.

**NATIONAL OVERVIEWS**

**Antigua**

The wet trend which started late March continued through April. The island average for the month was 132.1 mm; the second highest since 2003 and the

seventh wettest on record for April (1928 – 2013). For the month, at the airport, there were nine wet days ( $\geq 1$  mm), which was above normal. Meanwhile, the five heavy rainfall days were the highest since 1993 and tied with 1993 and 1981 April for the most such days for the month on record (1966 – 2013). The wettest day, April 30, had 38.1 mm – 32% of the total for the month. Surface to low level troughs along with moisture advection were responsible for a large majority of the rainfall. The mean temperature of 25.8°C was below normal. Meanwhile, the mean daily maximum and minimum temperatures were well below normal and above normal respectively.

The outlooks call for above normal rainfall and near normal temperature for April. Further, above normal rainfall and temperature are projected for the period May to July (MJJ). Based on the outlooks, conditions look relatively favourable for agricultural activities for the coming season. The continuing wet trend has farmers very upbeat; much field preparation and planting are now underway.

### Barbados

Although there was a six-day dry spell between 3rd April and 8th April, a number of persistent trough features which developed during the month, eventually allowed for significant rainfall accumulations. Thus, the below-normal rainfall which was observed in March was compensated for by the 150 % above-normal rainfall which was experienced in April.

The first trough system was stalled over the northern Lesser Antilles during the first half of the month with Barbados on the southern side of the instability triggering 29.1mm of rainfall at the Grantley Adams Airport between day nine and day fifteen. During the last dekad of the month, a more persistent trough system affected the southern Lesser Antilles; this feature produced 72mm of rainfall between days nineteen and twenty-three. Other significant rainfall events were recorded on day 26 (10.7mm) and day 29 (32.9mm).

The cumulative total (for the year thus far) rainfall of 273.3mm at April 30th is 30% above the long-term cumulative average for the same period. There were thirteen rain days (rain day= $\geq 1$ mm) which is five

more than the long-term average. Meanwhile, Golden Ridge in St. George recorded a total of 208.7mm for April over 18 rain days.

Wind-speeds during April averaged 27.8 km/hr with a 48.2 km/hr wind maximum being recorded on the 15th. Humidity during the day averaged 76% while during the night time it averaged 84%. Average temperature was 26.8°C while maximum temperatures averaged 30.3°C. The 30-year average (1981-2010) daily maximum temperature for April is 30.3°C. The observed daily maximum temperatures (April 2013) ranged between 31.0°C and 31.3°C during the first ten days of the month and between 29.4° and 30.8°C for the remainder of the month with the exception of the 19th and 20th which also saw maximums of 31°C. The lowest minimum of 22.7°C occurred on the 23rd April.

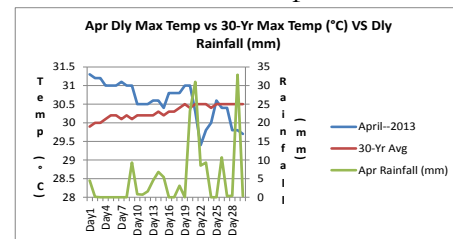


Figure 3. Temperature and rainfall at Grantley Adams for April 2013.

### May Forecast

May is considered the transition month from the 'dry' season to the 'wet' season which coincides with the official start to the Atlantic hurricane season. However, another dry spell is likely during the first half of May while wetter conditions are likely during the latter half of the month as the tropical waves start to move across the Atlantic.

### Belize

The month commenced with sunny and dry weather. The surface flow was a stable east to southeasterly and became windy on the 3<sup>rd</sup>. A cold front on the 5<sup>th</sup> produced cloudy and cool weather with light rain. A high pressure ridge behind the front kept a northwesterly surface wind blowing across the country through 6<sup>th</sup>, veering to southeasterly for the remainder of the weekend.

An Atlantic surface high continued to generate the gusty southeasterly flow across the country the following week. On 9<sup>th</sup> San Pedro, Ambergris Cay recorded gust to 46.3 km/hr, while Cay Caulker

measured top gusts to 50.0 km/hr. The dry southeasterly was to remain the major feature influencing our dry weather for the remainder of the week. Dry weather prevailed to the weekend for the remainder of the week. The weekend of 13<sup>th</sup> to 14<sup>th</sup> witnessed warm, hazy and dry weather.

On the 19<sup>th</sup> a cold front brought cloudy conditions over western and central Belize, but very little rainfall occurred across the country.

Warm and mostly dry weather prevailed at the start of the final full week in April. On the 26<sup>th</sup> significantly more showers, some over coastal waters and some over mainland portions of western and central Belize were experienced. More coastal showers occurred on 27<sup>th</sup>. From 28<sup>th</sup>, warm and mostly dry weather prevailed to the end of April.

Table 1 Rainfall and Temperature Summary for April 2013 for stations in Belize

Station	Liber tad	Zoo	PGIA	Belmopan	Central Farm	Savannah
Elevation (m)	12	30	5	90	90	13
<b>Rainfall (mm)</b>	<b>7.3</b>	<b>0.0</b>	<b>4.5</b>	<b>5.7</b>	<b>0.4</b>	5.0
Mean.	45.5	42.7	55.6	41.7	41.7	49.5
Max	7.3	1.5	3.3	5.7	0.4	2.7
Rain days	1	1	2	2	0	3
<b>Temp (°C)</b>						
Mean Min.	<b>22.1</b>	<b>22.7</b>	<b>24.8</b>	<b>22.4</b>	<b>21.3</b>	24.0
Mean	20.9	20.9	23.5	20.4	20.1	23.0
Lowest Min.	16.0	16.5	22.3	16.8	14.5	19.2
Mean Max.	<b>33.9</b>	<b>34.3</b>	<b>31.4</b>	<b>33.9</b>	<b>34.8</b>	34.1
Mean	33.0	33.8	30.9	32.9	33.4	32.2
Highest Max.	35.7	36.5	33.3	37.0	39.8	36.8

**Dominica**

Rainfall for April was beyond expectations as record breaking totals were recorded at both the Canefield and Melville Hall Airports relative to the past 30 years.

At Canefield, 203.6mm or a little more than 3 and 1/2 times the normal rainfall was recorded. This is the highest total for April since recordkeeping began. Moisture and instability associated with a trough system lingered in the area from the 17th to 21st dumping 117.5mm of rainfall at the airport by the 20th. The maximum 24 hour total was 39.2mm on the 20th. This is closely followed by the 38.4mm

recorded on the 18th. There were a total of 12 rainy days which is above the mean. Following days of limited rainfall, the deficit created by a 6 day dry spell during the second week was quickly reversed during the third week. An average air temperature of 27.7°C was recorded for the month which is 0.2° below the monthly mean. The maximum temperature recorded was 33.1°C on the 15th while the minimum temperature was 21.7°C recorded on the 5th and 19th.

A total of 684.4mm of rainfall was recorded at Melville Hall during the month. This is almost 4 times the monthly average. This is the second highest monthly total for April on record; surpassed by 772.9mm recorded in 1981. The rains began in earnest on the 16th resulting in a total of 429.7mm by the 20th. The maximum 24 hour total of 129.4mm on the 17th was quickly followed by 129.2mm on the 18th. There were 24 rainfall days which is well above normal for April. The average air temperature was 26.9°C which is 0.3° below the monthly mean. The highest daily temperature was 30.4°C recorded on the 15th and 24th while the lowest was 21.4°C recorded on the 20th, 21st, 25th and 26th.

The abnormal rainfall amounts resulted in flooding and landslides in various communities around the island. Two persons lost their lives when their vehicle plunged into a 40ft gully created on one of the main roads in the centre of the island on the 19th.

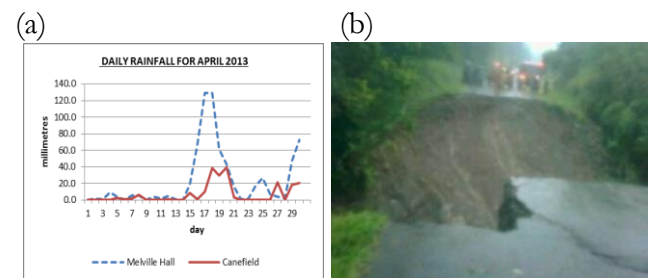


Figure 4. (a) Daily rainfall at Melville Hall and Canefield for April 2013 and (b) Gully created on Pond Casse road.

**Grenada**

April began like a regular dry season month. The conditions of March persisted, with the Bermuda/Azores High close to the islands of the Lesser Antilles producing fresh to strong trades. Dry air aloft and strong subsidence resulted in the first

twelve (12) days of April producing only a trace of rainfall.

The “dry season” conditions were interrupted by a fair amount of rainfall in the south to mid Windward Islands around the middle of the month. Conditions changed from almost cloudless to cloudy skies for the second half of the month. Rainfall associated with a jet stream on the 28th totalled 44.1mm of the month’s total rainfall, of 71.3mm, in less than six hours.

Temperature averaged 30.1°C with 31.2°C on the 3rd being the highest recorded. The minimum was held stable at 24.6°C with 22.5°C being the lowest on the 23rd.

Above normal surf affected eastern and northern coastlines from the 2nd to the 5th of the month as a strong frontal system made its way across the Atlantic. The meteorological office at the Maurice Bishop International Airport was forced to issue marine advisories during those days as the seas became inhospitable to small craft operators and sea bathers.

The fishing industry made a comeback during April because of more favourable seas when compared with previous months. Fishermen were able to spend longer time at sea and also, there were increases in the presence of the smaller fishes that are normally used as bait.

Water melons, ground provisions and tomatoes continue to have good production numbers this month. Red plums are now in abundance. Mangoes are now in full load generally and some varieties are now being harvested.

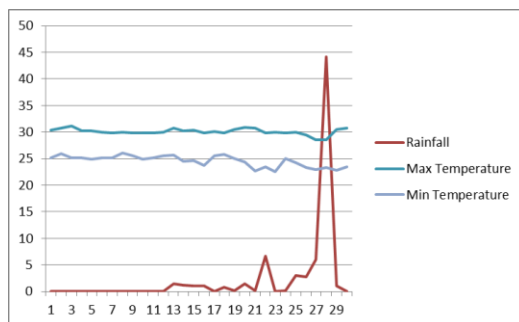


Figure 5 Daily maximum and minimum temperature, and rainfall for March at Maurice Bishop Airport, Grenada.

## Guyana

Guyana had an average of 170.7mm of rainfall with an average of 13 rainfall days, based on the rainfall data collected from the ten (10) administrative Regions. The average for April is 149.1mm with 12 rainfall days. This implies that Guyana was above its average. St Denny Mission in Region 2 recorded the highest monthly rainfall with 503.9mm. The highest one day rainfall total was also recorded at Better Hope Essequibo also in Region 2 with a total of 239.5mm on 24th. Region 2 recorded the highest average monthly total of 294.9mm with 16 raindays. A total of twenty nine rainfall stations across Guyana recorded rainfall values above their average.

April was warmer than normal, average Maximum temperature for the Month was 31.2°C when compared to the climatological maximum expected of 30.3°C. Lethem (Region 9) recorded the highest average monthly Maximum temperature of 33.5°C; Lethem on the 19th reported the highest one day maximum temperature with 35.0°C.

## Jamaica

Throughout the month of April the island was impacted mainly by high pressure ridges as well as a few intense surface troughs. There was an increase in the levels of rainfall activity across most western parishes, especially towards the latter part of the month. Sangster International airport (Sangster) in the northwest recorded above 50% of its monthly average while Norman Manley International airport (Norman Manley) in the southeast received below its 30 year mean rainfall. During the month, Sangster recorded 98.4 mm of rainfall, while Norman Manley recorded 11.8 mm. There were six rainfall days reported for Sangster, while Norman Manley had three rainfall days during the month. Sangster recorded approximately 88% above the 1971-2000 mean while Norman Manley recorded 44% of the 1971-2000 mean.

The highest maximum temperature recorded for Sangster Airport was 33.2°C (14th April), which exceeded the 20year mean for the station, while 32.7°C (18th April) was reported for Norman Manley Airport.

Table 2 Climatological Statistics for Manley and Sangster Airports for April 2013

Monthly Averages	Norman Manley	Sangster
Extreme Maximum Temperature	32.7 °C <b>(33.2 °C)</b>	33.2 °C <b>(32.8 °C)</b>
Lowest Minimum Temperature	23.5 °C <b>(21.7 °C)</b>	22.5 °C <b>(21.1 °C)</b>
Rainfall Total	11.8 mm <b>(27)</b>	98.4 mm <b>(52)</b>
Rainfall days (≥1mm)	3 days <b>(4.2)</b>	6 days <b>(9.6)</b>

Values in red indicate the 1992-2010(19-year) averages.

### St Lucia

What started as a relatively dry April, turned out to be one of the wettest Aprils in Saint Lucia. Both Hewanorra and George FL Charles Meteorological Stations recorded rainfall values well above the long term means. George FL Charles' total was the highest on record since 1967. The rainfall was poorly distributed throughout the month. At George Charles for example, the last day of the month produced 124.2 mm which is more than one third of the monthly rainfall. There were 18 rainy days and 9 of those days produced 10 mm of rainfall or more at both Hewanorra and George FL Charles.

May is considered to be the transition month from the dry to the wet season and the abnormally high rainfall amounts towards the end of April have ended the drought event that existed in the north of the island and presently there exist a surplus of soil moisture in most parts of the island.

The seasonal precipitation outlook for the May to and July period indicate the likelihood for rainfall to be in the above normal category or to range from 413 mm to 670 mm in Vieux-Fort and from 561 mm to 816 mm in Castries. Farmers should ensure adequate drainage and proper field sanitation practices to avoid outbreaks of pests and diseases associated with excess soil moisture.

Table 3 April 2013 monthly averages at Hewanorra Airport

AVERAGE MONTHLY DATA FOR HEWANORRA					
Cloud Cover (oktas)	Wind Dir (o from N)	Wind Speed (kt)	Air Temp. (°C)	RH (%)	Rainfall (mm)
5	90	15	27.2	77	247.7
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
30.2	24.3	8.3	8.3	28.7	

Table 4 April 2013 monthly averages at George Charles Airport

AVERAGE MONTHLY DATA FOR HEWANORRA					
Cloud Cover (oktas)	Wind Dir (o from N)	Wind Speed (kt)	Air Temp. (°C)	RH (%)	Rainfall (mm)
5	100	08	27.0	77	342.0
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
30.0	23.6				

### St Vincent and the Grenadines

Unstable conditions manifested in thunderstorm clouds (cumulonimbus) with rumblings of thunder on (19th, 20th, 23<sup>rd</sup>) off the east coast of St. Vincent and a funnel cloud (19<sup>th</sup>) in the Cedars area. Rainfall totals and rain-days were above average; the highest 24 hour rainfall (66.4 mm) was recorded on the 19<sup>th</sup> in the Belle Isle area.

Winds gusted to near 52km/hr on the 1<sup>st</sup>, 2<sup>nd</sup>, 14<sup>th</sup> and 15<sup>th</sup> at the E.T. Joshua Airport. Hazy conditions were experienced during the third week. Sea-swells were most times moderate in open waters, with above normal swells triggered by high winds, and a low pressure area in the north Atlantic

Table 5 April 2013 rainfall and temperatures across St. Vincent

Rainfall in mm	Max. Temp. °C	Min. Temp. °C	Station
203.1	31.2	22.6	Arnos Vale - Airport
201.5	n/a	n/a	Rivulet
357.0	n/a	n/a	Langley Park
199.9	30.0	20.7	Belle Isle
325.3	n/a	n/a	Richmond
232.6	n/a	n/a	Owia

(excerpts from SVG Monthly Weather Bulletin, Volume 3, Issue 4)

### Trinidad and Tobago

The month of April 2013 in Trinidad and Tobago could be described as a month of two halves which produced contrasting rainfall behaviours. Overall however, April evolved into an extremely wet month with recorded rainfall in excess of 200% of the average in some locations. During the first twenty days of the month, sunny conditions prevailed, as rainfall was most often brisk, light, and infrequent; producing on average, near 1.0 mm per day and up to 19.0 mm in total at some locations.

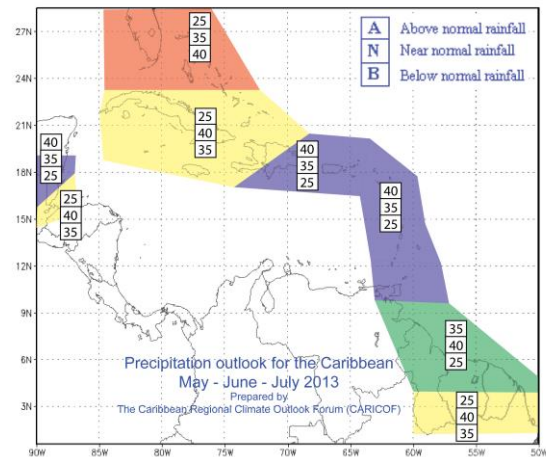
Corresponding with the sunny conditions were maximum temperatures which frequently exceeded 33 °C in the shade in Trinidad and 32°C in Tobago; while minimum temperatures during the night hardly ever fell below 23°C. Across both island average day time relative humidity ranged between 47 and 62 %, while wind speeds were moderate in strength, reaching on average 24 - 37 Kmh-1 (7 - 10 ms-1) during the day.

In contrast, the last ten days of the month produced mostly unsettled weather as a trough accounted for frequent rainfall that was often heavy, prolonged and widespread, especially between the 23rd and 28th. A maximum 24 hour rainfall of 55 mm was recorded at Piarco Trinidad on the 27<sup>th</sup>; while at the ANR Robinson Airport in Tobago, the maximum 24hour rainfall exceeded 25 mm on three consecutive days to give a total of 107 mm between the 26<sup>th</sup> and 28<sup>th</sup>. During the period, maximum temperatures hardly rose above 29°C, while relative humidity remained mostly above 75% in the presence of overall light winds. As a result of the prolonged and excessive rainfall, several areas including farm lands became flooded and crops swamped; hampering farming and other agricultural activities. Newspaper reports indicated that hundreds of acres of various crops such as tomatoes, water melons, melogenes, ochros, pumpkins, cucumbers, corn, and sweet peppers were destroyed, some of which were matured or within days of harvesting. Estimated losses to farmers are projected to be in the millions of dollars (TT). The outlook for May is for a high chance of above normal rainfall across Trinidad and Tobago as well as warmer than normal temperatures.

### REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECAST

Rainfall in the Caribbean during May to July shows a tendency to normal or above normal from Hispaniola east- and southward down to Trinidad and Tobago. This inference can be made with relatively high confidence, given a convergence of all models to showing such trend. Other areas where normal to above normal rainfall is the predominant trend, though with less confidence, are northern and inland portions of Belize as well as the northern half of the Guianas. Above normal Sea Surface

Temperatures (SST) in the north Atlantic and portions of the Caribbean with the neutral ENSO conditions in the Pacific, are expected to drive these conditions. By contrast, other areas show signs of below normal to normal rainfall totals, especially over the Bahamas.



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Figure 6 The May to July 2013 Rainfall Forecast

Currently, the tropical North Atlantic shows SSTs that are mostly average or slightly above (overall about 0.5°C above average). Such conditions are expected to last through May to July, with an area of above normal SSTs centred over and east of the Lesser Antilles. Consequently, slightly more evaporation than usual may be expected, promoting rainfall across the Lesser Antilles. Moreover, a notion of below average trade wind strength in coming months has surfaced amongst the climate forecasting community.

Largely in response to the positive SST anomalies around the Caribbean, air temperatures are likely to be above normal over the entire Caribbean. This is especially so over the Lesser Antilles and the Guianas, while towards the northwest, chances of above normal air temperatures decrease, though remaining higher than the probability of below normal air temperatures.

### ENSO Conditions

Most models tend to maintain fairly small anomalies (i.e. close to 0°C) in the coming months. Note that, as ENSO shows little signal and because of the so-called ENSO spring barrier (i.e. little predictability and high variability in the evolution of ENSO during

spring between different years), the predictability of rainfall and temperatures in the Caribbean – as driven by ENSO – is typically reduced at this time. That a quick reversal and a possible evolution to either El Niño or La Niña conditions may still evolve, is leaving us with considerable uncertainty beyond this period. In conclusion, if the current neutral-cold ENSO conditions prevail, as forecasted by most models, we do not expect a large effect on Caribbean rainfall in this season, if any.

### **NAO conditions**

Background: The North Atlantic Oscillation (NAO) is basically a flip flop in the relative strength of the Bermuda/Azores High and the Icelandic Low pressure system over the North Atlantic and acts on time scales of typically a couple of years to a decade. NAO is in its positive phase when the Bermuda/Azores high is stronger and larger than usual, while negative if the High is smaller and weaker than usual. A positive NAO typically tends to decrease rainfall in the eastern Caribbean. By contrast, the northwestern-most areas of the Caribbean (such as the Bahamas), would typically experience more rainfall as stronger than usual ocean currents would bring in more warm waters from the south, enhancing evaporation and precipitation there. A typical negative NAO phase would result in the opposite pattern.

Current situation: the NAO has been the dominating driver for much of the dry season, and especially in March and early April. In Mid-April, however, the NAO signal reversed, which led to a more northward location of the subtropical high pressure over the North Atlantic, thus moving its drying influence away from southern portions of the Antilles. That hemispheric scale shift in atmospheric patterns in combination with a strong and persistent trough over the Windward Islands has led to very welcome drought busting April rains in places.

May-July: The shift in atmospheric conditions – including the NAO signal – in April means the drying Subtropical High has moved northward and quite abruptly loosened its firm grip on weather in the Caribbean. Not much is known, though, on the NAO signal to be expected in the coming three months. In any case, the northward retreat of the subtropical High is expected to continue as we move into wet season. This retreat will make way for the rain systems to penetrate the region, as they normally do in the wet/hurricane season.

### **Six month outlook**

As in any six month forecast, there is considerable uncertainty as to the development of rainfall activity in the region. With anticipated neutral ENSO conditions in the Pacific, no clear sense of NAO evolution, but above average SSTs being forecasted in the Caribbean, below normal rainfall is rather unlikely over the islands of the eastern Caribbean, indicating a normal to above normal period from May to October (i.e. a normal to above normal wet season). By contrast, some models reveal a period of below normal to normal rainfall over the Guianas.

Note that, over the western Caribbean the “mid-summer drought” makes an appearance around July-August. Importantly, though, the mid-summer drought may not occur this year if the Sub-tropical High exerts below average influence over northern parts of the Antilles. This could occur if NAO reverted once more to its negative mode, as it has done repeatedly in winter. If so, then six-monthly rainfall totals until October is likely to turn out to be above normal over the Greater Antilles as well.

In conclusion, air temperatures are very likely to become or remain above normal during this period.

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