



**ANNOUNCEMENTS**

Drought concerns in the eastern Caribbean have been virtually eliminated. Concerns now shift to the other extreme – rains with flood potential, as above normal rainy and hurricane seasons are forecasted.

Temperatures are likely to be above normal across most of the Caribbean by up to 0.5 °C at least until August 2013, but this can be dampened by above normal rainfall.

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

Normal to above normal rainfall was experienced in the eastern Caribbean and Guyana. Trinidad was abnormal to moderately wet; Tobago, St. Lucia and Dominica normal; Grenada, Barbados and St. Vincent moderately wet; Antigua very wet; and Guyana moderately wet in the west and abnormally wet in the east. Conditions in Jamaica ranged from normal in the west to moderately wet in the east. Belize was abnormally wet in central areas and normal in southern and northern extremes.

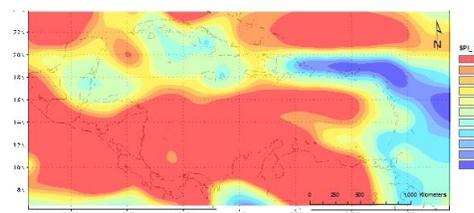


Figure 1. SPI for the Caribbean for May 2013. More information on the SPI can be viewed at <http://63.175.159.26/~cdpmn/spimonitor.html>.

The eastern Caribbean and Guyana were normal to above normal for the three month period. Trinidad was very wet; Tobago, Grenada, St. Vincent and Anguilla moderately wet; Barbados and Antigua extremely wet; St. Lucia abnormally wet; Dominica exceptionally wet; and Guyana ranging

from moderately wet in the northwest to normal in the east. Jamaica was normal in the west and abnormally wet in the east. Belize was normal. See Figure 2.

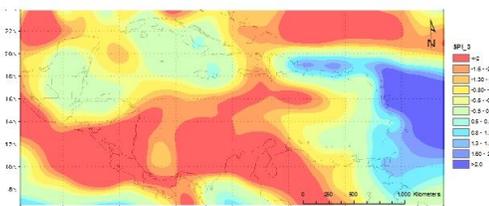


Figure 2. SPI for the Caribbean for March to May 2013. More information on the SPI can be viewed at <http://63.175.159.26/~cdpmn/spimonitor.html>

Concern about agricultural drought has dissipated. However these concerns have shifted to the potential for flood producing rains as an above normal rainy season is being forecasted. This is in conjunction, and not surprisingly so, with above normal hurricane activity forecast.

Temperatures in most of the region were below normal (particularly near greater rainfall) to normal.

**NATIONAL OVERVIEWS**

**Antigua**

Wet weather continues to prevail across the area; this is the third month running with above normal rainfall. The island average for May was 172.2 mm; the 14<sup>th</sup> highest on record, for the given month (1928 – 2013). For the month, at the airport, there were 15

wet days ( $\geq 1$  mm), which was above normal and the eight highest on record, for the month (1968 – 2013); meanwhile, the eight heavy rainfall days were the third highest on record. The wettest day, 6<sup>th</sup>, had 85.4 mm – 37% of the total for the month. Surface to low level troughs and moisture advection were responsible for a large majority of the rainfall. The mean temperature of 26.5°C was well below normal. Meanwhile, the mean daily maximum and minimum temperatures were well below normal and near normal respectively.

The outlooks call for above normal rainfall and temperature for June. Further, above normal rainfall and temperature are projected for the period June to August. Based on the outlooks, conditions look relatively favourable for agricultural activities for the coming season; however, measures should be put in place to mitigate the impacts of potential flooding. Based on the period 1995 – 2012, the probability of at least one named storm passing within 193km (120 miles) of Antigua is 28% as compared to 23% for the period 1981 – 2012.

### Barbados

Winds were generally out of the east-southeast while wind-speeds varied between ten and 18.5 km/hr during the first half of May. These speeds increased to between 27.8 km/hr and 37.0 km/hr during the latter half of the month with a wind maximum of 44.5 km/hr occurring on the 27<sup>th</sup>.

During the first three days of May 15.8mm of rainfall was recorded at the Grantley Adams Airport as a trough feature lingered over the northern Lesser Antilles. This was followed by a six-day dry spell as a deep-layered high pressure ridge dominated over the central and southern portion of the island chain. Between days ten and thirteen, the above-mentioned trough dipped southwards across the chain and this contributed another 24.9 mm of rainfall. Spotty showers were observed up to 18<sup>th</sup> before the first tropical wave for the year moved over the island on 19<sup>th</sup>. Only 4.1mm of rainfall was measured at the Airport as this system passed over the area. A second wave traversed the southern portion of the island chain between 24<sup>th</sup> and 25<sup>th</sup> but no significant rainfall resulted at the Airport. The total of eight rain days for May (days with rainfall  $\geq 1$ mm) equaled the long-term average while the rainfall total reached

69.6mm or just 9.4mm shy of the long-term average (1981-2010). Nevertheless, the cumulative rainfall total (January to May) was 342.9mm which was above the long-term cumulative total for the same period of 288.9mm. Meanwhile, Golden Ridge in St. George recorded a total of 163.9mm over 19 rain days.

The average maximum temperature reached just 30.1°C. This was below the long-term average (1981-2010) maximum temperature of 30.8°C. The highest maximum temperature of 30.9°C was recorded on 29<sup>th</sup>. The lowest minimum of 23.5°C was observed on the 23<sup>rd</sup>.

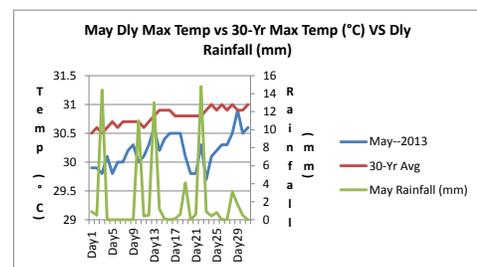


Figure 3. Temperature and rainfall at Grantley Adams, Barbados for May 2013.

### June Outlook

According to the Precipitation Outlook (CIMH), during the first three months of the official “wet” season rainfall accumulations over the eastern Caribbean are to be average to above average. For the Grantley Adams Airport, this means that for June, July and August the cumulative rainfall is likely to fall between 346 and 427mm. The June average alone is 103.0mm

Above-average sea-surface temperatures in the eastern Atlantic will also help to enhance precipitation over the eastern Caribbean.

### Belize

On the 2<sup>nd</sup> a surface trough resulted in an afternoon hailstorm in northern Belize (Corozal district) during the afternoon. Strong winds accompanied the hailstorm. Later, several thunderstorm cells developed on the periphery of Belize (southern Mexico, northern Guatemala and Honduras). The cell from southern Mexico crossed Belize and produced much rain and high winds over northern, central and coastal Belize. The International Airport recorded wind gusts to 120.4 km/hr with sustained

winds in the range of 74 to 93 km/hr. Total rainfall measured at the Airport was 43mm see <http://www.7newsbelize.com/sstory.php?nid=25394&frmsrch=1>. This was all over by the next day, which was sunny.

A southeasterly surface flow developed and persisted to the weekend of 11<sup>th</sup>. Winds were particularly gusty over the weekend but with very little rainfall. Apart from coastal showers on 14<sup>th</sup>, the week following was mostly dry as the Atlantic surface high asserted dominance on the weather. This type of weather persisted to the start of the following week.

By 23<sup>rd</sup>, weather conditions showed some change as sunny weather alternated with cloudy skies. A modest increase in low level moisture aided the development of showers over inland Belize and along the southern and southwest slopes of the Maya Mountains. Extensive coastal showers occurred late that night and early 24<sup>th</sup> morning over southern and coastal Belize. During the afternoon showers occurred primarily over inland Belize. The cloudy and rainy weather persisted to the weekend for much of the country.

The cloudy and rainy weather continued to the start of the final week. Cloudiness and showers over Belize decreased for the final two days in May as a southeasterly surface flow persisted.

Table 1 Rainfall and Temperature Summary for May 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>87.1</b>	<b>157.7</b>	<b>146.4</b>	<b>202.3</b>	<b>110.8</b>	<b>70.4</b>
Mean.	109	139	123	103	86	114
Max	61.1	146.9	56.1	84.2	52.2	28
Rain days	7	1	5	5	5	7
<b>Temp (°C)</b>						
Mean	<b>22.1</b>	<b>22.8</b>	<b>25.5</b>	<b>23.4</b>	<b>22.3</b>	<b>24.4</b>
Min.						
Mean	22.9	22.5	24.6	22.1	21.8	24.1
Lowest	19.2	19.5	20.6	19.5	17.8	21.9
Min.						
Mean	<b>34.6</b>	<b>34.9</b>	<b>31.6</b>	<b>34.0</b>	<b>34.8</b>	<b>34.0</b>
Max.						
Mean	33.5	34.4	31.8	34.0	34.6	32.8
Highest	37.7	37.5	33.4	38.0	38.5	36.9
Max.						

## Dominica

Moisture and instability associated with trough systems generated much of the shower activities across the island.

Yet another wet month was observed at the Canefield Airport with a rainfall total of 247.2mm. This represents about 63% above the monthly mean. The highest daily total of 46.6mm was recorded on the 27<sup>th</sup>. 16 rainfall days were recorded, which is above normal for May. Intervals of short dry spells were observed during the first half of the month. Air temperatures were cooler than average with 28.2°C recorded for the month, which is about 0.5°C below the monthly mean. The maximum temperature recorded was 33.1°C on the 7<sup>th</sup>, while the minimum of 22.7°C was recorded on the 8<sup>th</sup>, 20<sup>th</sup>, and 25<sup>th</sup>. The average wind direction was east south easterly (120°) with an average speed of 7km/hr. The highest wind gust recorded was 43km/hr recorded on the 19<sup>th</sup>.

At Melville Hall, rainfall was rather near normal with a total of 263.4mm recorded. This total is 7% above the monthly mean. The highest daily total was 60.8mm which was recorded on the 14<sup>th</sup>. There were 22 wet days which is above the normal. There was no significant dry spell. The average air temperature was 27.8°C which is 0.2°C below the mean. The maximum temperature recorded was 31.9°C on the 4<sup>th</sup> and the minimum of 22.1°C was recorded on the 3<sup>rd</sup>. The winds dominated an east south easterly (110°) direction at an average speed of 13km/h. The highest wind gust for the month was 57km/hr recorded on the 21<sup>st</sup>.

With the high level of rainfall received during the month, there was an increase in pest and diseases within the farming communities. They saw a slight increase in the spread of the Black Sigatoka Disease, an increase in the powdery mildew on cucumbers, a slight increase in the numbers of the giant African snails, higher infestation of worms among grazing livestock and also an increase in ticks. The eradication exercise for citrus greening continued mainly along the north of the island. A decline of the symptoms of the mosaic virus in dasheen was seen. The growth rate of weeds was more prevalent this month. Farmers who established vegetables suffered loss as seedlings were washed away by heavy rainfall. There was an increase in root crop establishment.

Some farmers in the most central part of the island suffered crop loss due to landslides. Flowers displayed at the annual flower show were of excellent quality.

**Grenada**

May started off with very little rainfall. The first 12 days yielded only a trace of rainfall, but the middle of the month approached, the pattern changed due to the presence of a mid to upper trough. As the latter part of the month came near, the effects of two tropical waves, which produced some moderate showers and thunderstorms were felt, signalling the commencement of the wet season. The rainfall recorded at the Maurice Bishop International Airport totalled 85.1mm which was lower than last year’s total of 171.2 mm. highest 24 hour rainfall was recorded on the 14<sup>th</sup>, which was 23.1mm, followed by the 26<sup>th</sup> with 18.1mm, then the 27<sup>th</sup> with 14.8mm.

The mean maximum temperature recorded was 30.3°C, with the highest temperature reading of 31.8°C on the 18<sup>th</sup>. The mean minimum temperature and lowest monthly temperature were 25.0°C and 22.5°C respectively. The lowest temperature was recorded on the 23<sup>rd</sup>.

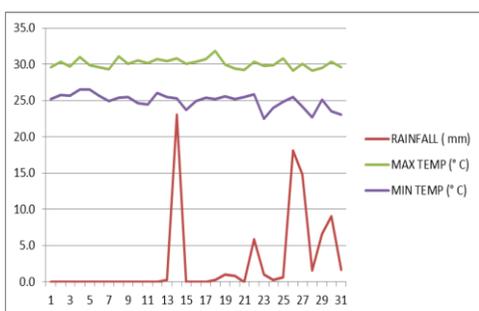


Figure 4 Daily maximum and minimum temperature, and rainfall for May at Maurice Bishop Airport, Grenada.

**Guyana**

Based on the rainfall data collected from the ten (10) administrative Regions, Guyana had an average of 361.7mm of rainfall with an average of 19 rainfall days. Rainfall values recorded for May implied that Guyana was well above its average. St Denny Mission in Region 2 recorded the highest monthly rainfall with 693.0mm. The highest one day rainfall total was recorded at Lethem in Region 9 with a total of 178.8mm on the 8<sup>th</sup>. Region 7 recorded the highest average monthly total of 506.5mm with 16 raindays. With the exception of two rainfall stations

that were below average, a total of forty one rainfall stations across Guyana recorded rainfall values above their averages.

Lethem (Region 9) recorded the highest average monthly Maximum temperature of 32.2°C; and also reported the highest one day maximum temperature on the 25<sup>th</sup> with 34.2°C. The lowest minimum temperature was recorded at Timehri on the 23<sup>rd</sup> with 20.0°C.

**Jamaica**

The month of May generally signifies the start of the secondary rainy season. Throughout the month the island was impacted mainly by surface troughs migrating from the north-western Atlantic. This resulted in an increase in the levels of rainfall activity across the island. Sangster International airport (Sangster) in the northwest recorded about 70% of its monthly average while Norman Manley International airport (Norman Manley) in the southeast received 90 % above its 30 year mean rainfall.

During the month, Sangster recorded 74.1 mm of rainfall, while Norman Manley recorded 129.0 mm. There were nine rainfall days reported for Sangster, while Norman Manley had six rainfall days during the month.

The highest maximum temperature recorded for Sangster Airport was 34.3°C (31<sup>st</sup>), while 33.4°C (23<sup>rd</sup>) was reported for Norman Manley Airport.

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

Monthly Averages	Norman Manley	Sangster
Extreme Maximum Temperature	33.4 °C <b>(33.7 °C)</b>	34.3 °C <b>(33.5 °C)</b>
Lowest Minimum Temperature	22.8 °C <b>(23.1 °C)</b>	22.0 °C <b>(21.8 °C)</b>
Rainfall Total	129.0 mm <b>(67.0)</b>	74.1 mm <b>(106.0)</b>
Rainfall days (≥1mm)	6 days <b>(8.5)</b>	9 days <b>(14.2)</b>

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

**St Lucia**

Saint Lucia experienced below average rainfall for May. Both Hewanorra and George Charles recorded

rainfall figures below the long term means. George Charles recorded 10 rainy days while Hewanorra recorded 14.

The month of June is considered to be the beginning of the wet season and also the Atlantic hurricane season. Therefore there is a greater likelihood of heavy rainfall events and related disasters. The seasonal precipitation outlook for the June to August period indicate the likelihood for rainfall to be in the above normal category or to range from 499 mm to 719 mm in Vieux-Fort and from 685 mm to 892 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. They should also liaise with their Meteorological Services to decide on the best times to apply fertilizer.

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	100	15	28.0	79	57.5
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
30.5	25.5	8.7	7.6	29.1	

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)
6	110	09	28.1	77	118.1
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
30.5	24.8				

**St Vincent and the Grenadines**

Unseasonally dry conditions were evident across St. Vincent and the Grenadines (SVG) as May began with a nine day dry spell (1<sup>st</sup> to 9<sup>th</sup>). This was eased by weak unstable conditions from the second week of the month. These conditions were manifested in thunderstorm clouds (cumulonimbus) with rumblings of thunder (13<sup>th</sup>, 22<sup>nd</sup>, 25<sup>th</sup>, 29<sup>th</sup>) off the east and west-coast of St. Vincent.

Winds gusted to near 59km/hr on the 22<sup>nd</sup> were recorded at the E.T. Joshua Airport station. Hazy conditions were experienced for a few days during the third and fourth weeks of May. Sea-swells were most times moderate in open waters, with above normal swells being agitated by strong winds, and a low pressure area in the North Atlantic Ocean.

Total rainfall for at E.T. Joshua Airport-Arnos Vale was 176.6 mm; 62.2 mm more than the average (using 1981-2010). Rain-days (13) were below average; with the highest daily rainfall (57.3 mm) being recorded on the 22<sup>nd</sup>. There were two days with rainfall totals more than 25.44 mm. The longest period with rainfall < 1mm was nine consecutive days (1<sup>st</sup> to 9<sup>th</sup>), while 6 days had rainfall less than 1mm.

Rainfall distribution showed the first dekad (ten-day period) had ~9%, the second dekad had 26%, and the third dekad had 65% of the total.

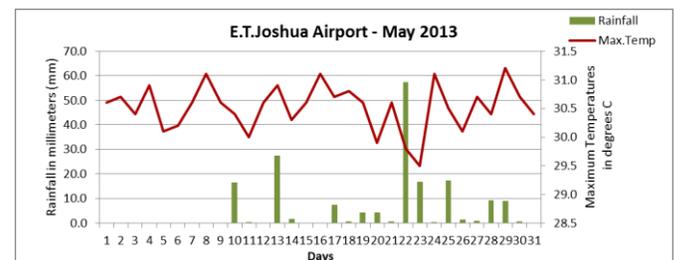


Figure 5 Maximum temperature and rainfall for E. T. Joshua, St. Vincent and the Grenadines.

The average maximum temperature was 30.5°C, and the average minimum temperature was 25.1°C. The extreme maximum temperature recorded was 0.4 lower than the average (31.6 °C), while the extreme minimum temperature was the same as the average of 23.2°C. The mean relative humidity was 1.5% higher than the average of 75.1%.

**Trinidad and Tobago**

Transition into a wet state in Trinidad and Tobago continued during the month of May even though during the first 15 days sunny conditions prevailed, with rainfall occurrence being most often light, and infrequent. The second half of the month had extensive cloudy periods, quite a few cool and wet days with an extremely wet day (59.7 mm) occurring on the 27<sup>th</sup> at Piarco with the 27<sup>th</sup> being the wettest day in Tobago as well albeit with 19.3 mm. During

the month of May, 87.5 mm or near average rainfall (average 88.8mm 1981-2010) was recorded at ANR Robinson airport in Crown Point Tobago, which was 82.7 mm less than that of May 2012 with 95% of this occurring after the 15th of the month. At Piarco in Trinidad the month of May produced above average rainfall (131.3 mm or 111% of average:-1981-2010) with 90% of this occurring during the second half of the month; however, this amount was 80.5 mm lower than May 2012. The latter period of heavy rainfall resulted in several instances of localized flooding which may have disrupted agricultural activities. Notwithstanding the wet conditions during the second half, Piarco mean temperature was 27.9°C, 0.5 °C above the 1981-2010 average and 1 °C above May 2012 that had an overall mean maximum temperature of 32.7°C and an extreme of 34.4 °C. In contrast to this, mean temperature recorded at ANR Robinson was 26.9 °C which was below normal while the mean Maximum was on par average at 31.3°C. During the night, minimum temperatures on average hovered near 23.2 °C which was above average (18.8°C). With 107% of normal total sunshine hours, the month was still considered bright due to the abundance of sunshine. Overall however, these conditions were deemed favourable to agricultural activities across the country.

**REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECAST**

Rainfall in the Caribbean during June to August shows a strong tendency to above normal across all of the Antilles. 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 with in decreasing order of above normal probabilities are the western half of the Guianas, the eastern half and Belize. By comparison, models are confidently showing that little can be inferred on expected rainfall in the Bahamas.

As the Antilles enter the wet season which coincides with the hurricane season, rainfall is mostly convective in origin, i.e. falling from storm clouds, whether or not imbedded in tropical cyclones. Two factors contribute to an above normal rainfall outlook for the Antilles.

1. Well above average North Atlantic tropical sea surface temperatures (SSTs), providing more heat and moisture - the primary fuel source for heavy rainfall events and cyclones.
2. Trade winds over the Atlantic Ocean are expected to be weaker than average. This allows storms to grow taller and more potent due to reduced vertical wind shear.

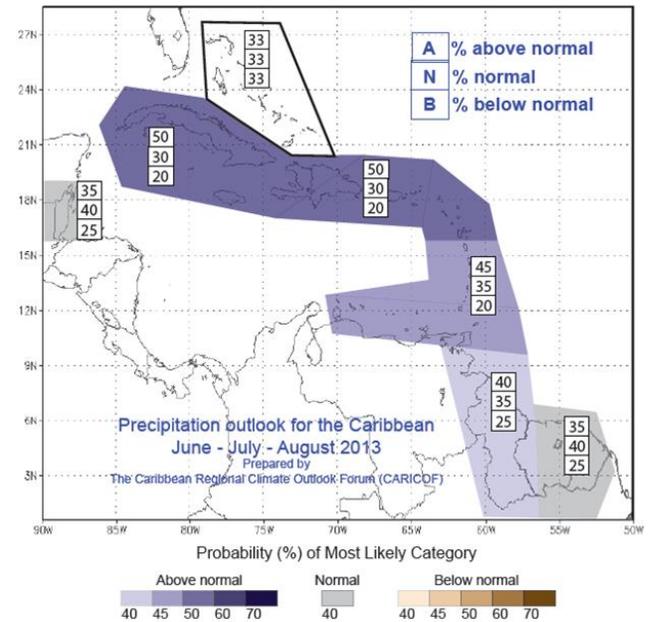


Figure 6 The June to August 2013 Rainfall Forecast

Currently, the tropical North Atlantic shows SSTs that are about 0.5-1°C above average. Such conditions are expected to last into August. Consequently, more evaporation than usual may be expected, promoting rainfall across the Lesser Antilles. The expected above normal rainfall across the Antilles should keep air temperatures at relatively mild below normal to normal levels, as had been the case during the last month.

**ENSO Conditions**

Eastern Pacific equatorial SST anomalies have recently hovered just below average (i.e. deviation of 0°C to -0.5°C, which is ENSO-neutral). Most models tend to maintain ENSO-neutral conditions in the coming months. Therefore little impact is expected on Caribbean temperatures and rainfall

**NAO and Atlantic Subtropical High conditions**

A particular negative phase of the North Atlantic Oscillation (NAO - a measure of the strength and size of the Subtropical High pressure cell over the Atlantic Ocean) has been reducing dry season rainfall

to below normal. A subsequent northward shift of the High was noted in mid-April. This, in combination with a strong and persistent trough over the Windward Islands, has led to drought busting rains and some floods in the eastern Caribbean. A weaker and/or more northerly High should reduce trade wind speed. This will help sustain above average Atlantic SSTs and reduce vertical shearing of storms, thus enhancing the probability of strong disturbances and tropical cyclones, as well as rain.

**Six month outlook**

As in any long-lead forecast, there is considerable uncertainty as to the development of rainfall activity in the region. Albeit with lesser confidence for the period September to November, it is expected that normal to above normal rainfall conditions will dominate much of the region for the next six month. For the period September to November, there is slightly higher chance that the Leeward Islands across to Hispaniola, and Guyana would be above normal. The Windward Islands and Suriname have a slightly higher chance of being normal. Little can be inferred on expected rainfall in the Bahamas.

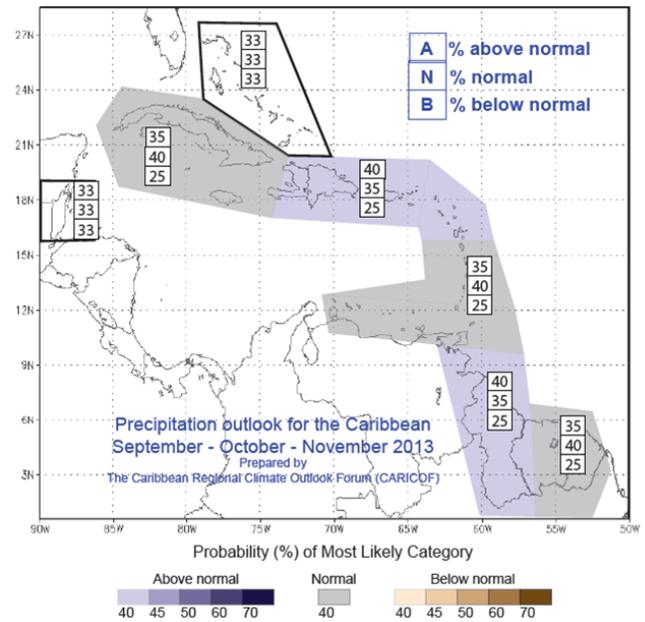


Figure 7 The September to November 2013 Rainfall Forecast

In conclusion, air temperatures are very likely to become or remain above normal for most of the Caribbean during this six month period. Above normal temperatures may well be dampened by above normal rainfall.

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 Antigua and Barbuda, Barbados, Belize, Dominica, Grenada, Guyana,  
 Jamaica, St Lucia, St Vincent and the Grenadines and Trinidad and Tobago  
*CAMI is funded by the European Union in partnership with the institutions that have prepared this bulletin, along*  
*with the Caribbean Agricultural Research and Development Institute and the World Meteorological Organization*