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Enhancing Farming through Weather and Climate Information

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ANNOUNCEMENTS

Rainfall varied across the Caribbean in October, with some countries having some relief from an extensive dry period, but normal to above normal rainfall should exist in most of the Caribbean until January 2014. Hurricane activity continued to be suppressed during October. Temperatures are likely to be normal to above normal across most of the Caribbean through November.

REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR OCTOBER 2013

Diverse conditions existed across the eastern Caribbean and Guyana, particularly separating the normal to below normal north from the normal to above normal south. Trinidad and St. Vincent were moderately wet; Tobago very wet; Grenada, St. Lucia and Dominica normal; Antigua moderately dry; and Guyana normal. Jamaica was severely dry in the west and moderately dry in the east, while Belize was predominantly moderately wet.

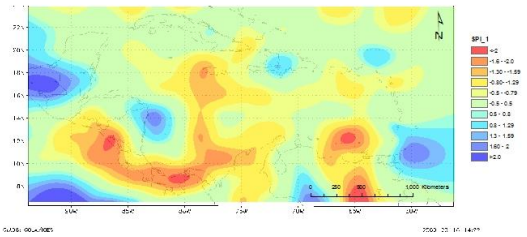

Figure 1. SPI for the Caribbean for October 2013. More information on the SPI can be viewed at http://63.175.159.26/~cdpmn/spimonitor.html.

Diverse conditions were experienced across the eastern Caribbean and Guyana for the three month period. Trinidad, St. Vincent, St. Lucia and Dominica were normal; Tobago and Barbados moderately wet; Grenada extremely dry; Antigua moderately dry; and Guyana from normal in the west to moderately wet in the east. Conditions in Jamaica ranged from moderately dry in the west to normal in the east. Conditions in Belize ranged from abnormal to moderately wet.

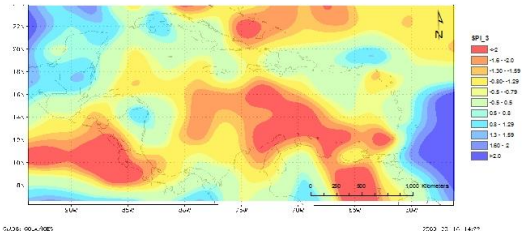

Figure 2. SPI for the Caribbean for August to October 2013. More information on the SPI can be viewed at http://63.175.159.26/~cdpmn/spimonitor.html

The year's hurricane season activities continued in October with Tropical Storm Jerry weakening to a tropical depression on the 2nd and dissipated on the 3rd. Tropical Strom Karen was formed in the Gulf of Mexico on the 3rd and was downgraded to a tropical depression on the 5th and dissipated to a low on the 6th. Tropical depression No. 13 was formed on the 21st then upgraded to Tropical Storm Lorenzo latter that day at 5:00pm. Lorenzo was downgraded to tropical depression status on the 23rd. None of these systems threatened any land-mass.

NATIONAL OVERVIEWS

Antigua

The month of October resulted in mostly dry conditions across the islands of Antigua and

Barbuda. Convective activity was restricted by the low moisture levels in the lower atmosphere. The rainfall amount recorded at V.C Bird Int'l Airport was 58.5 mm, which was significantly lower than the 2012 October value of 272.9 mm as well as below the month's average of 132.33 millimeters. This October was one of the driest, 11th on record from 1928-2013, and is also the fourth month running with below normal rainfall figures. In total there were Twelve (12) days with ≥1.0mm of rainfall with the highest 24hr rainfall recorded on the 28th at 13.1mm. Despite the fact that the month was fairly dry, there were three major rainfall events, including this 24 hour high. On the 7th, 10.8mm resulted from the passage of a weak tropical wave. The third event from the 19th-21st was associated with a series of surface to upper level troughs coupled with light winds. This was aided by daytime heating and available moisture, and resulted in 20.1mm of rainfall.

The month's average air temperature recorded at the V.C Bird Int'l Airport was 28.0°C, which was higher than 2012 October with an average value at 27.1°C which shows a slight increase of 0.9°C. The highest maximum of 32.0°C was recorded both on the 6th and 14th, respectively; while the lowest minimum temperature of 22.3°C was recorded on the 21st. On average, the winds were mainly southeasterly at 12.2 km/hr.

According to the Ministry of Agriculture, farmers capitalized on the dry conditions by preparing their lands for planting. Some however, tried to make the best of the situation by planting watermelons, which traditionally are planted in the dry season around February – March. These were reported to have done quite well under the prevailing dry conditions. On the other hand, rainfed farmers reported low production levels and other difficulties. Crop Loss was also experienced due to high humidity levels which caused bacterial growth on crops such as sweet peppers.

Barbados

Barbados experienced a significant wind-surge event during the period 24th to 25th. Brisk surface winds averaging 37.0 km/hr started to affect Barbados and the southern Windwards on 24th. These speeds increased to between 37.0 to 55.6 km/hr on 25th and persisted throughout the day with wind-gusts reaching as high as 96.3 km/hr at the Airport.

These strong winds coincided with arrival of a mid to upper-level trough. As a result, the combination of the two features produced a prolonged period of gusty winds, torrential rains and thunderstorms with reports of some flash-flooding across the island on 25th. Some 61.5mm of rainfall was recorded at G.A.I.A for the twelve-hour period ending at 6:00 p.m.

Three other significant rainfall events contributed to the final October total of 182.9mm at Grantley Adams International Airport over a period of 20 rain days (rainfall>=1.0mm). This was just shy of the 30-year average of 185.7mm.

In spite of near normal rainfall experienced during the month, it was a relatively warm October. There were nineteen days on which the maximum temperature was >=31.0°C with the highest maximum temperature of 31.9°C occurring on 1st; the 30-year average normal for October being 30.7°C. The lowest minimum of 22.8°C occurred on 6th.

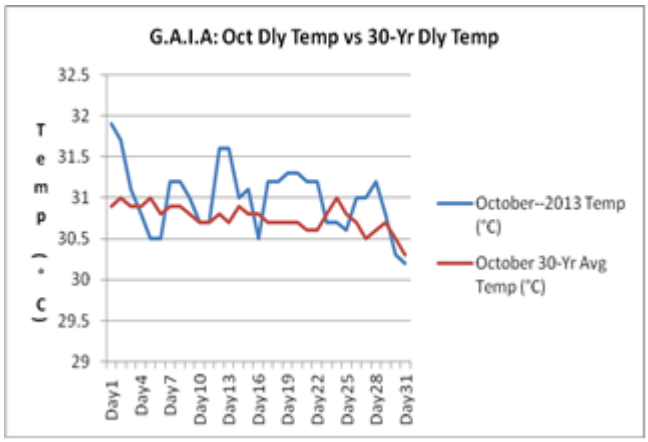

Figure 3 October daily maximum temperature as compared with the average in Barbados.

Normal to above normal rainfall is expected during November to January, 2014. For November, model data suggest that most of the significant shower activity across Barbados is likely to occur during the latter half of the month.

Belize

At the beginning of the month, a low pressure system produced cloudy skies, some showers and

thunderstorms particularly over northern districts and coastal areas. On 3rd, moderate to deep convection continued offshore Belize, as a result from the circulation created by tropical storm Karen. As Karen headed further into the central Gulf of Mexico, weather improved. An increase in showers and thunderstorms, especially over central and northern Belize on 6th morning was experienced. Weather conditions, however, improved during the afternoon.

The 7th continued cloudy with several showers and thunderstorms which spread from the south to the north of the country. Several weather stations recorded rainfall totals between 25 to 50mm. The western station of Barton Creek (BTC) measured 78mm followed by the Belize Zoo with 53.1mm. Rains continued in 9th, but decreased on 10th, but skies remained cloudy. The weekend's (12-13th) weather turned out to be quite sunny as a light east to northeasterly flow prevailed.

During the morning of the 14th numerous showers and isolated thunderstorms occurred along coastal areas and portions of the Cayo and Toledo districts. Otherwise, the weather continued sunny for most places. As the weekend approached, showers occurred mainly in the south and some coastal areas during the morning then inland during the afternoon.

At the start of the following week (21st), mainly similar weather continued, with more sunny weather. However, 23rd witnessed an explosive outburst of showers and thunderstorms (some intense) along the entire coast from Dangriga in the south to Corozal in the north. On 24th the weather was cloudy with showers and thunderstorms occurring mainly inland, and continued into 25th morning. Several showers, thunderstorms and periods of rain occurred along coastal Belize. Rainfall was particularly intense in the south and west of the country. On 25th, Farm 11 in the Toledo district recorded 97.8mm; Central Farm in the Cayo district measured 98.4mm; and Hummingbird Hershey recorded the most rainfall with 189.6mm. The excessive rainfall prompted the National Emergency Management Organization (NEMO) to issue its first of several public advisories for the Cayo, Stann Creek and Toledo districts. The advisories would later include portions of the Belize district the following week. The flood waters claimed the life of one man in the Cayo district. Surrounding areas of Belmopan and portions of the George Price Highway experienced flooding. The weekend's (26th and 27th) weather was cloudy to overcast with incessant rainfall occurring across the entire country. The maximum for rainfall for 26th was 110mm and 95.6mm on 27th at Hummingbird Hershey (SHY). On 28th the maxima of rainfall shifted south to Farm 11(F11) where 151mm of rain fell. On the following day (29th) the maximum rainfall occurred once again at HSY with 96.9mm of rainfall. Much less rainfall occurred on the final day in October as dry air from the Gulf of Mexico invaded south across Belize and the region.

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

Station	Liber tad	Zoo	PGIA	Belmopan	Central Farm	Savannah
Elevation (m)	12	30	5	90	90	13
Rainfall (mm)	289	93	416	396	327	438
Mean.	174	291	275	227	198	299.1
Max	66.0	53.1	46.4	84.6	98.4	53.5
Rain days	15	7	24	17	15	23
Temp (°C)						
Mean Min.	23.5	23.1	24.7	23.4	23.8	24.0
Mean	21.4	21.9	23.1	21.5	21.7	23.3
Lowest Min.	20.3	22.0	23.2	20.6	21.3	17.9
Mean Max.	32.1	32.2	30.3	31.0	31.4	31.1
Mean	31.6	31.2	30.4	30.9	31.2	31.0
Highest Max.	35.2	33.8	32.6	33.5	34.0	33.5

Dominica

Unstable conditions and tropical waves affected the island throughout the month producing most of the month's rainfall amounts.

The month of October was recorded as the wettest month of 2013 so far and also the wettest October for the past 12 years at the Canefield Airport. A total of 321.4mm was recorded and that is 71% above average. The highest daily total recorded was 42.0mm on the 20th. There were 24 rainfall days and that is 8 days above the average. Dry spell lengths were insignificant. The average air temperature recorded was 28.0°C and this is 0.5°C below average. The highest daily temperature recorded was 34.1°C on the 3rd, with the lowest being 22.0°C recorded on the 9th. The average wind direction was south

easterly at an average speed of 7km/hr. The highest wind gust of 44km/hr recorded on the 13th was associated with unstable conditions.

Despite the rainfall total being 8% below normal, the Melville Hall Airport also experienced wet conditions throughout. A total of 293.8mm was recorded. The highest daily total of 44.2mm was associated with unstable conditions on the 31st. Twenty-three (23) rainfall days were recorded and that is normal for October with a mid-month dry spell of 5 days in length. The average air temperature recorded was 28.4°C and that is 0.2°C above average. The highest temperature recorded was 32.3°C on the 1st and the lowest recorded was 23.2°C on the 2nd. Melville Hall also experienced winds from the south east at 11km/hr. The highest wind gust recorded on the 10th and 25th was 59km/hr.

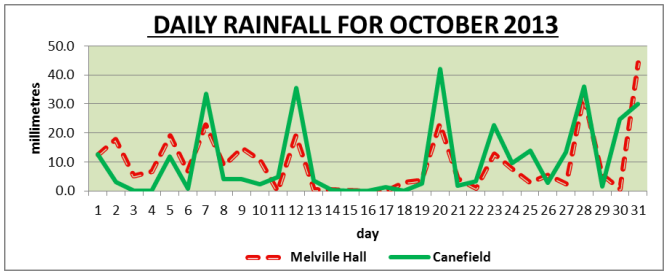

Figure 4 October 2013 rainfall for stations in Dominica.

Grenada

For the tri-island state of Grenada, Carriacou and Petit Martinique October was an eventful month. Firstly, it was the wettest month of the year thus far with 136.3mm, but still below the long term October average by 2.9mm. Rainfall measurements this month were doubled that of the previous three months. The highest rainfall was recorded on 21st when the I.T.C.Z. dumped 27.6mm. Similarly, on 31st a surface trough left 21.8mm on the island. That same trough produced 12.3mm on the 30th. There were two other significant rain events- on the 13th, when a trough system delivered 13.9mm, and a tropical wave was responsible for 10.2mm on the 19th in only 6 hours. In contrast to previous months there were only eight (8) days of zero or no significant rainfall in the month.

The second hottest day on record occurred on the 1st - 33.5°C. The mean maximum for the month was 30.8°C. Whereas the hottest day was on the 1st, the coolest was on the 31st. The lowest minimum was 22.6°C, and the month's average minimum is 24.9°C. The month's highest minimum of 26.8°C occurred four times on the 1st, 4th, 7th & 16th.

October, like September, had generally flat seas, varying between slight to moderate. A surface trough caused the Meteorological Office to issue a marine advisory on the 25th and 26th as above normal surf affected the northern coastline. Despite this disturbance the month was good for the fishing industry. This was evident by the constant availability of numerous varieties of fish on the market.

The farming community was relieved to finally have a 'wet' month. The short cash crops such as cabbage, lettuce and okras bloomed. They are expected to have good numbers for the festive season. There are still noticeable low numbers of citrus but pumpkin are doing well.

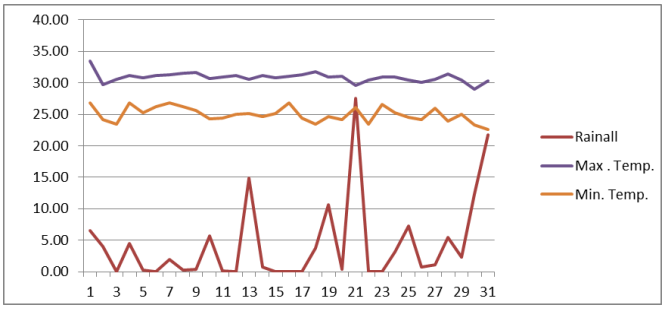

Figure 5 Maximum and minimum temperature and rainfall for October 2013 at Maurice Bishop International Airport

Guyana

For month of October Guyana had an average of 9 rain days. The weather conditions throughout the month varied from fair and sunny to occasional showers which were scattered across Guyana. Region 1 recorded the highest average rainfall total of 230mm within an average of 17 rain days. The highest one day rainfall total was recorded at Wakenaam Region 2 with 118.7mm on 28th. Mabaruma recorded the highest monthly rainfall total with 307mm

The highest mean maximum temperature for the month was recorded at Lethem Region 9 with 35.0°C. Lethem also recorded the highest one day temperature of 36.0°C on 24th. The lowest mean minimum temperature was recorded at Timehri with

21.9°C and the lowest minimum temperature for the month was recorded at Kaieteur with 19.3°C.

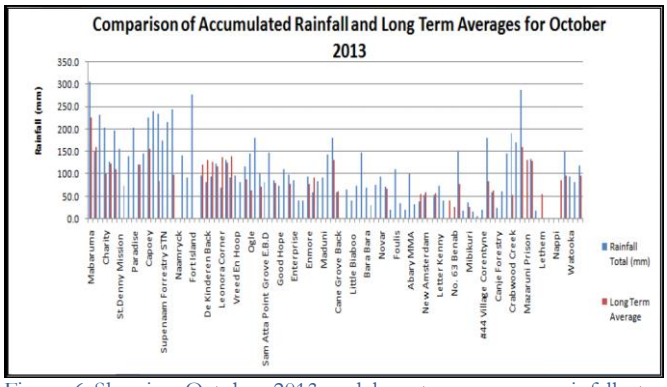

Figure 6 Showing October 2013 and long-term average rainfall at a number of stations in Guyana.

Currently Guyana is transitioning into its secondary rainy season of 2013. Thus, all farmers are asked to take note since the seasonal forecast models are indicating high probabilities of normal to above normal rainfall across most parts of Guyana for the period November 2013 – January 2014. During this period moderate to heavy rains are likely, which may cause flooding in low lying areas.

Jamaica

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

Monthly Averages	Norman Manley	Sangster
Extreme Maximum Temperature	34.4 °C (34.1 °C)	34.0 °C (33.8 °C)
Lowest Minimum Temperature	23.9 °C (23.1 °C)	22.4 °C (23.4 °C)
Rainfall Total	15.6 mm (116.0)	28.1 mm (161.0)
Rainfall days (≥1mm)	3 days (9.5)	9 days (18.0)

Values in red indicate the 1992-2010(19–year) averages. 30-year (values in green) mean (1971-2000) is used for Rainfall.

Surface to low level troughs were the dominate weather features that affected the island throughout the month. Preliminary figures indicate that the rainfall amount for the month of October remained near normal over the interior areas of the island, however Sangster International airport (Sangster) in the northwest recorded 17% of its 30 year monthly mean while Norman Manley International airport (Norman Manley) in the southeast received 13% of its 30 year mean rainfall. During the month, Sangster recorded 28.1 mm of rainfall, while Norman Manley recorded 15.6 mm. There were nine rainfall days reported for Sangster, while Norman Manley had three rainfall days during the month.

Sangster Airport recorded 34.0°C (2nd October), while 34.4°C (24th October) was reported for Norman Manley Airport. It should be noted here that both International airports exceeded the maximum 20-year mean temperature.

Saint Lucia

Table 3 October 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	12	28.3	80	197.1
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
31.2	25.5	7.7	7.0	29.2	

Table 4 October 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	100	07	28.3	79	191.2
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
31.0	24.7				

November is the last month of the Atlantic hurricane season and in Saint Lucia, although in most instances rainfall totals for November are lower than for October, significantly high rainfall events have occurred in November. The seasonal precipitation outlook for the November, December and January period indicate likelihood for rainfall to be in the above normal category or to range from 400 mm to 709 mm in Vieux-Fort and from 538 mm to 831 mm in Castries.

St Vincent and the Grenadines

October was a wet month with a few landslides reported, and two occasions of flooding in the Arnos Vale area. The highest rainfall of 650mm was recorded in the Hermitage area, while the highest temperature of 32.9 was recorded in the Langley Park area.

Sea-swells were generally slight to moderate in open waters. Sahara dust haze reduced visibility on a few

occasions. Gusty winds during the third week were quiet noticeable. Maximum winds recorded were 31knots (57.4 km/h) in the Arnos vale area.

Table 5 Weather parameters for October at E. T. Joshua, and the averages

E. T. Joshua Airport Station	Rain-days	Rainfall mm	Mean RH %	Max/Min Temp.° C
October	28	435.3	79	31.9/23.1
30 year average	19	280.1	78.0	32.1/23.0

Trinidad and Tobago

The month of October 2013 was particularly wet for Trinidad and Tobago with rainfall being frequent, widespread and often moderate to heavy resulting in above normal rainfall in both islands; however Tobago was relatively wetter than Trinidad. At ANR Robinson airport in Tobago, rainfall totalled 310.5 mm or 182.8 % of the long term average (1981-2010) while at Piarco in Trinidad the rainfall measured 266.4 mm or 128.8% of the long term average (1981-2010). During the first ten days of the month there were only two days that was considered as dry days. The highest daily rainfall total recorded was 38.5 mm at ANR Robinson airport in Tobago and 24.6 mm at Piarco in Trinidad; however, it is possible that higher daily totals could have occurred in isolated pockets in both islands. Overall, average recorded daily rainfall during the ten days was just about 9.5 mm per day in Tobago and near 5.0 mm per day in Trinidad. Maximum temperatures only rose above 33 ^{0} C on four days in Trinidad while it never topped 31.9 ^{0} C in Tobago. Daytime Relative Humidity ranged in the high 60's to 70's, while average wind speeds ranged between 10 and 25km/hr.

For the second ten day period rainfall totals reached the 100.0 mm mark in Tobago, making it the wettest ten-day period since July. The wettest day during this period in Trinidad was 32.2 mm while in Tobago it produced 33.5 mm. Maximum temperatures soared to reach 35^0 C on two days during the period while nigh time temperature hardly fell below 24 ^{0} C.

The last ten days produced extremely wet conditions as ten day rainfall totals peaked at 117mm and 96mm at Piarco and ANR Robinson airports respectfully. Most locations experienced 4 days during which the rainfall was in excess of 10.0 mm. Across several districts there were at most, 3 days which were considered as dry days suitable for agriculture fieldwork. The wettest day (21st) in Trinidad produced 44.0 mm while in Tobago (29th) it produced 35.6 mm. The wet weather regime did little in suppressing daily maximum temperatures in Trinidad as temperatures surpassed 33^0 C on 5 days, whereas in Tobago the wet conditions dampened hot conditions as maximum temperatures reached 32^0 C only on 2 days while night time temperatures hardly fell below 24 ^{0} C across both islands.

The frequent rain episodes during the month would have slowed agricultural fieldworks but at the same time would have been beneficial to late season crops development while allowing newly planted and germinating crops to flourish. The rainfall would have also maintained excellent conditions in developing and maturing crops and should have helped with these crops producing outstanding yields at harvesting time; however, the rainfall may have slowed maturity in Christmas season crops.

With the recent frequent rainfall episodes, livestock conditions would have been mostly good as pastures remain green and in excellent conditions. The surplus water from the rainfall presented good opportunities for rainfall harvesting for the upcoming dry season and moisture for the short-season Christmas crops. The drier days would have benefited harvesting of mature crops, mowing, plough and fertilizing of agriculture plots and fields. However, the combined effects of abundant rainfall and high temperatures would have provided good opportunities for the development and rise of pests, fungus and diseases especially on days with reduced rainfall. This may have increased the need for disease control spraying in the coming month.

REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECAST

November 2013 to January 2014

Normal to above normal conditions are expected over the Guianas, Barbados, Windward Islands, and Belize. Normal to above normal conditions are also most likely from the Leeward Islands across to Jamaica, but there is less certainty of this. Except for Guyana, wet weather is expected to continue in these regions in November, but as the dry season sets in,

rains are expected to decrease, with the occasional showers in December to January, but not with heavy rains. In the Guianas, as the dry season comes to a close, increased showery activity should take place, with increasing heavy rains in December and January. These are unlike in the vicinity of Cuba and the Bahamas, where increasing dryness is expected, with normal to below normal conditions and with the dry season beginning.

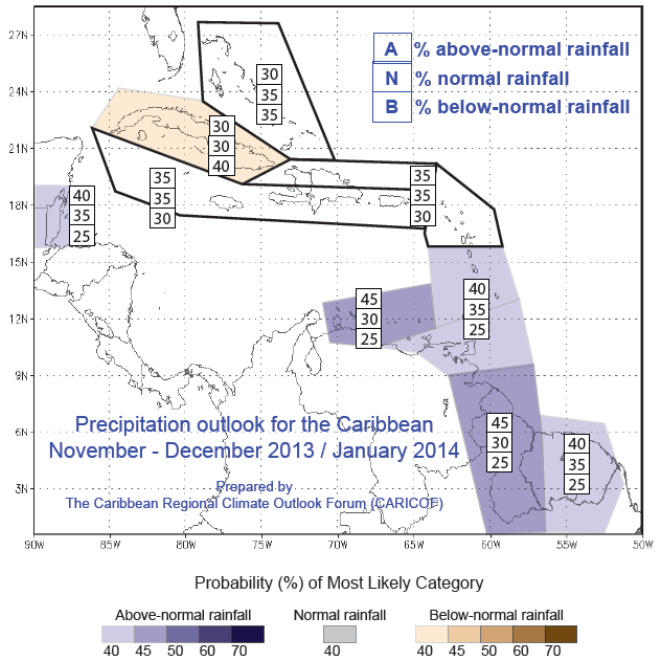

Figure 7 The November 2013 to January 2014 Rainfall Forecast

Apart from in the vicinity of Central and Western Cuba that should be normal to below normal, the Caribbean is expected to have normal to above normal temperatures.

ENSO Conditions

Eastern Pacific equatorial Sea Surface Temperature (SST) anomalies have recently hovered just below average (i.e. deviation of 0°C to -0.5°C). There is a high likelihood that these ENSO neutral conditions will last until January 2013, with the likelihood decreasing after this into April 2013

Little impact is expected on Caribbean rainfall from ENSO with slight increase in rainfall in the Eastern Caribbean, mild temperatures and slight decrease in rainfall in the NW Caribbean, if [the expected ENSO conditions are] accompanied by above-average Tropical North Atlantic and Caribbean SSTs.

Conditions in the Tropical North Atlantic and Caribbean

Recent conditions in this region were of SSTs about 0.5-1°C above average, with stronger than average trade winds and a drier than average atmosphere, which is a continuation from earlier in the season. The above average SSTs are forecasted to continue but decrease into April.

Apart from the northwest portions of the region that should continue to be relatively dry, the atmosphere is expected to be of high moisture in November, as was the case in October, inducing rainfall.

The combined effects of ENSO and Tropical North Atlantic and Caribbean conditions, should result in more rainfall and high humidity in the south-eastern half of the Caribbean, above average storminess across Belize and the Antilles through November, and mild temperatures and slight decrease in rainfall in Bahamas and Cuba

February to April 2014

As in any long-lead forecast, there is considerable uncertainty as to the development of rainfall activity beyond January 2014. Currently, for the period February to April 2014, the eastern Caribbean and the Guianas are expected to be normal to below normal with a slightly higher chance of below normal in the southern half of the eastern Caribbean and the Guianas. The northwest Caribbean should have a similar experience. Apart from the Cayman Islands that has a slightly greater than normal chance of being normal to above normal from February to April, there is no clear signal for the remainder of the Caribbean basin at this time.

Air temperatures are very likely to be normal to below normal in the northwest around Cuba. Elsewhere should be normal to above normal.

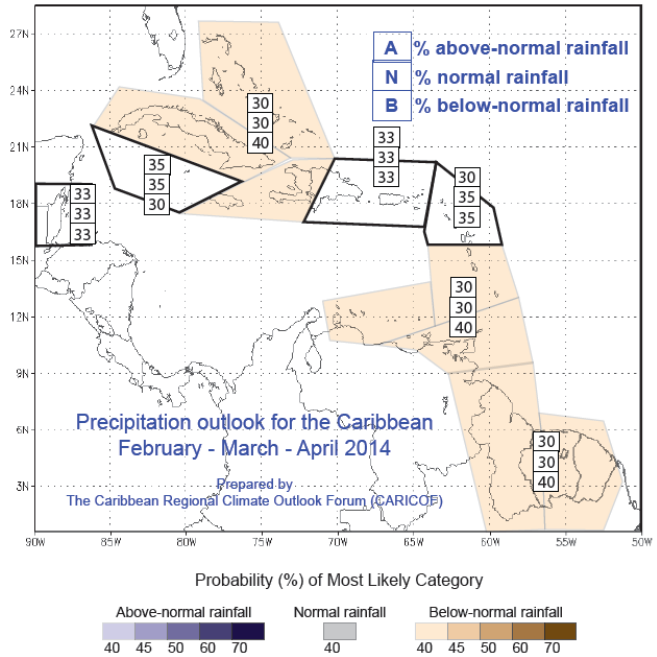

Figure 8 The February to April 2014 Rainfall Forecast