



ANNOUNCEMENTS

This issue presents a summary of Caribbean weather and climate for the year 2013. CAMI came to an end during the year 2013, but its work and philosophy continues through collaboration between the Caribbean Institute for Meteorology and Hydrology, and National Meteorological Services and Ministries/Departments of Agriculture of CAMI States.

A preliminary report from the National Climate Data Center suggests that 2013 was the fourth warmest on record since records began in 1880 (<http://www.ncdc.noaa.gov/sotc/global/>), with combined land and ocean temperature of 0.62 °C above the 20th Century average. The report went further to say that “Including 2013, 9 of the 10 warmest years in the 134-year period on record have occurred in the 21st century”. NCDC also reports that the rainfall in 2013 was near normal.

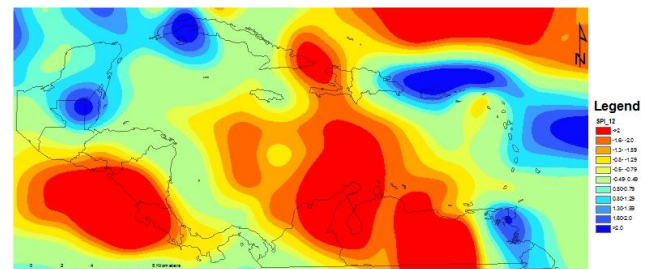


Figure 1. Standardised Precipitation Index (SPI) for the Caribbean for the 12 month period January to December, 2013 (1981-2010). More information on the SPI can be viewed at <http://63.175.159.26/~cdpmn/spimonitor.html>.

REGIONAL OVERVIEW ON RAINFALL FOR 2013

SPI for January to December, 2013

Apart from Grenada and St. Maarten that were abnormally dry, the eastern Caribbean and Guyana were normal to above normal for the calendar year 2013. Trinidad was very to extremely wet; Tobago, Antigua, St. Kitts and Anguilla; Barbados and St. Croix abnormally wet; St. Vincent normal to abnormally wet; Dominica and St. Lucia moderately wet; and Guyana moderately wet apart from the east that was abnormally wet. Jamaica was abnormally dry in the west and normal in the east, while the majority of Belize was exceptionally wet apart from the extreme north that was extremely wet and the extreme south that was very to extremely wet.

Quarterly SPI for 2013

For the period January to March 2013 (Figure 2. a), the eastern Caribbean and Guyana were predominantly normal to below normal. Trinidad, Tobago, Grenada, St. Vincent and Antigua were normal; Barbados severely dry; Dominica extremely dry; and Guyana normal in the west to moderately dry in the east. Jamaica was normal but conditions in Belize ranged from abnormally wet in the south to abnormally dry in the north.

During the second quarter of the year, the eastern Caribbean and Guyana were normal to above normal. Trinidad, Barbados and St. Lucia were predominantly very wet; Tobago, Grenada, St. Vincent and Anguilla moderately wet; Dominica and Antigua were extremely wet; and Guyana ranging from moderately wet in the northwest to normal in the east. Jamaica was normal, while Belize was normal in the south and abnormally wet in the north.

Normal to below normal rainfall was experienced in the islands of the eastern Caribbean for the period July to September 2013. Trinidad, Tobago and

Antigua were moderately dry; Grenada was extremely dry; St. Vincent extremely to exceptionally dry; and Barbados, St. Lucia and Dominica normal. Conditions in Guyana ranged from normal in the west to extremely wet in the east. Jamaica was normal in the west and abnormally wet in the east, while Belize ranged from abnormally dry in the south to extremely wet in the north.

For the last quarter of 2013, the eastern Caribbean and Guyana were predominantly normal to above normal. Trinidad was very to extremely wet; Tobago, Grenada, St. Lucia abnormally wet; Barbados, Dominica and Antigua normal; St Vincent moderately wet; and Guyana very wet in the west and moderately wet in the east. Jamaica was moderately dry in the west and abnormally dry in the east, but conditions in Belize ranged from exceptionally wet in the west to very wet in the south and moderately wet in the north.

**NATIONAL OVERVIEWS OF
WEATHER AND CLIMATE FOR
2013**

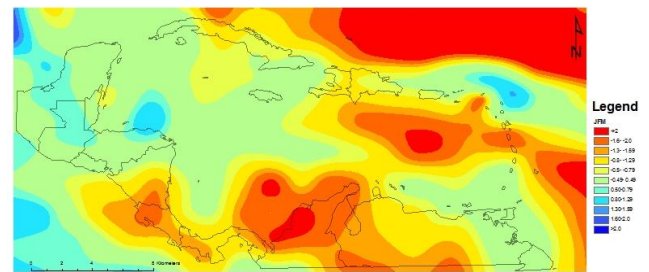
Antigua and Barbuda

The year 2013 was characterized by above normal rainfall amounts during the “dry” season (January-June), with below normal rainfall during the “wet” season (July-December). The wet season started quite dry with below normal rainfall in July; eventually triggering a serious meteorological drought which started in September. However, by the end of the year, the drought eased to slight levels. The rainfall amount for the year, 1173.48 mm, was near normal. The wettest month of the year was May with 172.2 mm, while the driest month was February with 10.67 mm of rainfall. Fifty percent (50%), 590.04 mm occurred during what is recognized as the dry season. The annual average rainfall amount is 1187.5 mm (1981-2010).

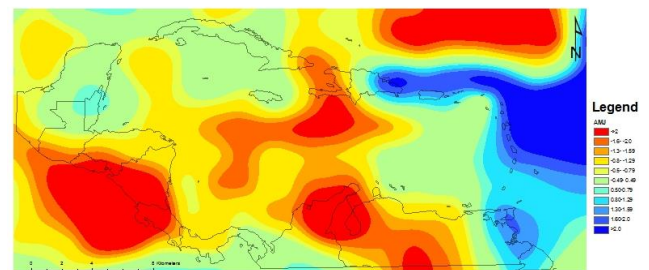
The mean average daily temperature for the year was 26.7°C. The normal daily temperature is 26.9°C (1981-2010). The coolest month was February with 25.2°C and August was the warmest with 28.2°C. The highest maximum temperature recorded for the

year was 32.6°C on the 20th of September while the lowest minimum was 18.8°C on the 4th of February.

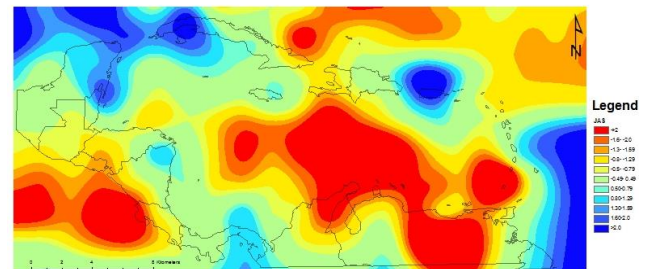
a)



b)



c)



d)

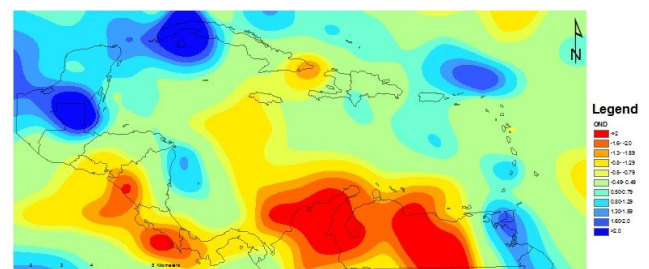


Figure 2. Quarterly Standardised Precipitation Index (SPI) for the Caribbean for 2013 (1981-2010). A) January to March, b) April to June, c) July to September, d) October to December. More information on the SPI can be viewed at <http://63.175.159.26/~cdpmn/spimonitor.html>.

This year none of the thirteen storms that formed during the North Atlantic hurricane season directly impacted Antigua and Barbuda. However, Tropical Storm Chantal during its passage across the Eastern

Caribbean generated a destructive waterspout which impacted Camp Blizzard, Antigua.

According to Agriculture Ministry Officials, this year was a generally good year for agriculture, with production being consistent throughout the year. The majority of the year’s rainfall occurred during the dry season leading farmers to alternate the types and time of crops being grown in order to accommodate for the anomalous weather conditions. However, as a consequence of this, certain commodities became scarce on the market such as sweet peppers while pumpkin on the other hand was glutting the market.

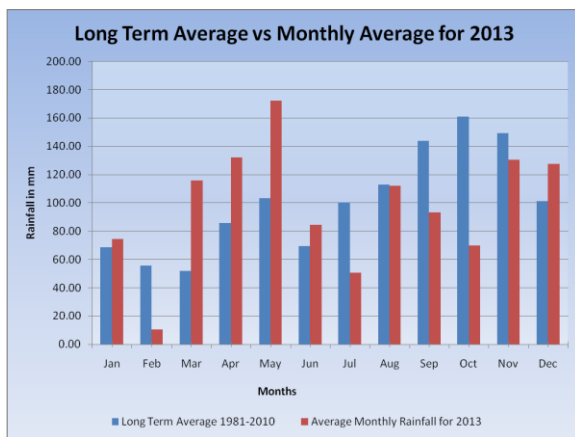


Figure 3 Island average for 2013 relative to 1981 to 2010 average

Table 1 Summary weather statistics for 2013 for Antigua and Barbuda.

Antigua & Barbuda Met Services Climatological Data For The Period 01/01/2013 AT 13:00 TO 01/01/2014 at 12:00 WEATHER SUMMARY	
WX:	Partly Cloudy
WINDS:	Easterly AT 17 km/hr
MAX 10-MIN WIND:	44 km/hr DATE: 07/12/2013 AT 07:00
SEA LEVEL PRESS:	1015.5 mb NORMAL
TOTAL RAINFALL:	1098.0 mm MAX 24-HOUR: 85.4 mm DATE 6/05/2013
MAX 6-HR RAINFALL:	65.1 MM DATE: 06/05/2013 AT 18:00
RAINFALL STATUS :	ABOVE NORMAL
AVG MAX TEMP:	29.4 °C MAX: 32.6 °C DATE: 20/09/2013 AT 18:00
AVG MIN TEMP:	24.2 °C MIN: 18.8 °C DATE: 04/02/2013 AT 12:00
AVG TEMP:	26.7 °C WARMEST DAY: 29.0 °C DATE : 30/09/2013 COOLEST DAY: 23.6 °C DATE : 03/02/2013
AVG REL HUM:	74.6 % MOST HUMID-DAY: 93.0 % DATE 02/12/2013 LEAST HUMID-DAY: 44.0 % DATE 15/03/2013

Barbados

Dry, windy and dusty conditions dominated the weather picture across Barbados during the first half of the year as a persistent Bermuda/Azores high pressure ridge pushed moderate to strong easterly breezes across the Lesser Antilles. Shallow cloud patches, embedded trade wind showers and significant amounts of African dust were transported into the region by winds varying between 20 and 45 km/hr with occasionally higher gusts.

March is climatologically the driest month of the year but was drier than normal, with just three rain days (rainfall >=1mm) and 14.1mm of rainfall or 30% of the long term average being recorded during the month at the Grantley Adams International Airport. Golden Ridge in St. George also recorded a similar amount of 19.5mm over six rain days. Nevertheless, individual monthly rainfall amounts generally reached near normal levels during the remainder of the ‘dry’ season which is typically between January and May. The exception was April which was abnormally wet as a number of trough features moved over the region producing a total of 153.4mm (13 rain days) and 208.7mm (18 rain days) of rainfall measured at the Grantley Adams Airport and Golden Ridge respectively. This represented 252% above the long term average (60.8mm) for April at the Airport. It took the cumulative total for January to April to 273.3mm or 13% above the 1981-2010 cumulative average for the same period.

There was a quiet transition to the hurricane season with the development of two tropical storms (Andrea and Barry) in the far western Atlantic in June. These systems did not have any impact on Barbados’ rainfall which reached a total of 77.7mm in June. In contrast, the passage of the center of Tropical Storm ‘Chantal’ which passed about 45 miles to the north of Barbados during the early hours of the 9th July resulted in 47.6mm at the Airport. In spite of this contribution, the July total reached just 61.8mm or 46% below the long-term normal.

None of the other eleven tropical cyclones which developed over the remainder of the 2013 Atlantic Hurricane Season had any direct impact on Barbados’ rainfall. However, for the second consecutive year, the highest monthly rainfall total

was reached in August as a number of tropical waves interacted with a series of trough features and the I.T.C.Z to produce 267.2mm. This was 88% above the 1981-2010 normal.

The remaining months of the year saw below normal rainfall production with the cumulative total at the end of December reaching 1184.4mm; which was 85.8mm less than the long term (1981-2010) cumulative total. The total number of rain days (rainfall >=1mm) of 146 was six more than the long-term normal of 140. Golden Ridge recorded a total of 1278.2mm of rainfall and 168 rain days for 2013.

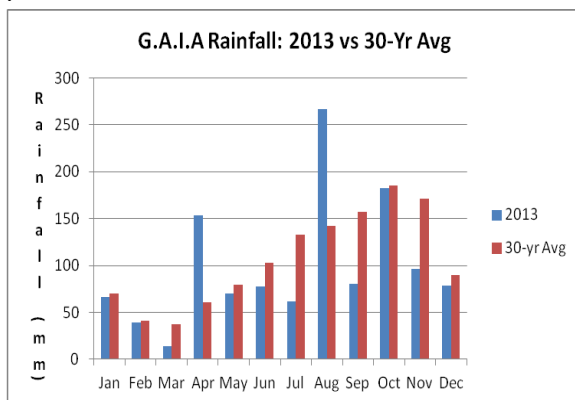


Figure 4 Rainfall for 2013 relative to average (1981 to 2010) rainfall at Grantley Adams Airport, Barbados.

The 2013 average monthly maximum temperatures were equal to or less than the 30-year average monthly maximum temperatures. The exception occurred in March and is shown below (Figure 5).

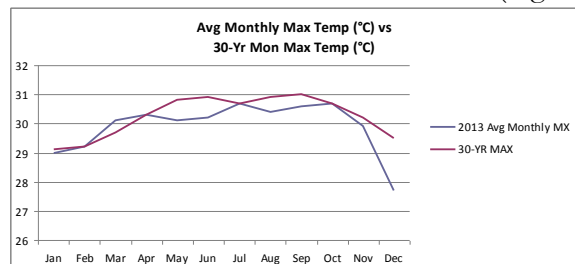


Figure 5 Average monthly maximum temperature relative to 1981 to 2010 averages at Grantley Adams Barbados.

The highest maximum temperature for 2013 was 32.4°C and this was recorded on 23rd July. In contrast, the 2013 average monthly minimum temperatures were higher than the 30-year average monthly minimum temperatures. The lowest minimum 21.2°C occurred on 18th January, 2013.

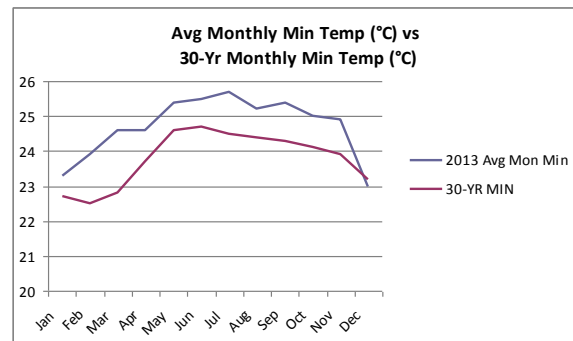


Figure 6 Average monthly minimum temperature relative to 1981 to 2010 averages at Grantley Adams Barbados.

Belize

The year 2013 was a wet year for the country of Belize. All stations across the country received rainfall above their normal as noted in the examples in Figure 7 and Table 2. Punta Gorda was the district that received the highest yearly total 4767.2mm or 187.7inches, but Belize City (St John’s College) received the highest percentage above the normal 45%.

The excessive rainfall resulted in flooding across much of the country. The above normal rainfall and flooding caused extensive damages to roads, streets, crops, livestock, and one human death. These damages resulted in millions of dollars lost to the country.

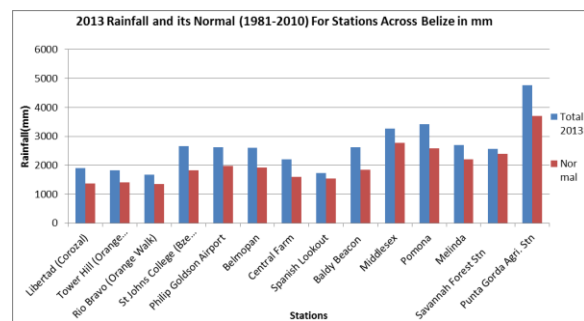


Figure 7 Rainfall for 2013 relative to average rainfall (1981 to 2010) at select stations in Belize.

During the dry season months of February to April (FMA), the rainfall totals were all below normal for all stations except Belmopan, which was slightly above normal as indicated in Figure 8. These low rainfall totals in the FMA period resulted in much of the country experiencing moderate to severe meteorological drought.

Table 2 Rainfall for 2013 relative to average rainfall at select stations in Belize (1981 to 2010)

Station	2013 (mm)	Normal (mm)	% above Normal
Libertad (Corozal)	1909.1	1370.1	33
Tower Hill (Orange Walk)	1833.8	1405.7	37
Rio Bravo (Orange Walk)	1678.7	1353.9	24
St John's College (Bze City)	2655.7	1830	45
Philip Goldson Airport	2628.4	1984.3	32
Belmopan (Cayo)	2608	1920.2	36
Central Farm (Cayo)	2197.2	1599.2	37
Spanish Lookout (Cayo)	1732.9	1548.6	12
Baldy Beacon (Cayo)	2620	1836.7	43
Middlesex (Stann Creek)	3268.3	2781.4	18
Pomona (Stann Creek)	3420.4	2586	32
Melinda (Stann Creek)	2707.9	2201.6	23
Savannah (Stann Creek)	2567.2	2386.5	8
Punta Gorda Agri. Stn	4767.2	3713	23

Note: Stations in Red indicate that the total used to calculate the normal is less than 30 years

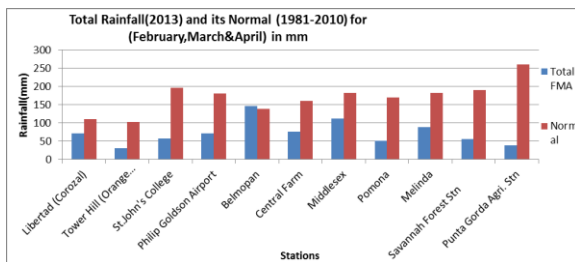


Figure 8 Rainfall for February to April 2013 relative to average rainfall (1981 to 2010) at select stations in Belize.

The rainy season for the country was right on time. Normally the rains start around the second week in the month of May in the south of the country and works its way to the north to signal the rainy and the hurricane seasons. At the end of the May to July period much of the country was already experiencing above average rainfall, relieving the country from the drought it was experiencing in the FMA period.

One tropical cyclone crossed the country; this was Tropical Depression #2 (TD2), which occurred on June 18, 2013. TD2, along with several tropical waves and upper level troughs triggered a wet May-June-July season which resulted in much of the country receiving rainfall above average. The entire country from the month of June through to December received above normal rainfall. For the capital Belmopan, August to October (ASO) 2013 period was the wettest on record. The ASO total for 2013 was 1126.3mm. The second highest ASO in historical records for Belmopan was the year 2001

with a total of 1069.2mm. The average for ASO for Belmopan is 675.9mm.

Libertad (Corozal), for the period October to December (OND), was the wettest on record from 1981-2013, with a total of 667.6mm. The second highest in the historical records was the year 1998 with a total of 656.4mm.

The rainfall received in December for Belize City (St. John's College) was 507.4 mm - the highest total on record for December (1965 to 2013) for Belize City. The second highest monthly total for December was in 1976 which was 434.3mm. The average for December for Belize City is 194.3mm.

Belize did not record any significant changes to its temperatures. Maximum, minimum and mean daily temperatures were within normal range.

EXCESS RAINALL IN 2013 (% ABOVE/BELOW AVERAGE)

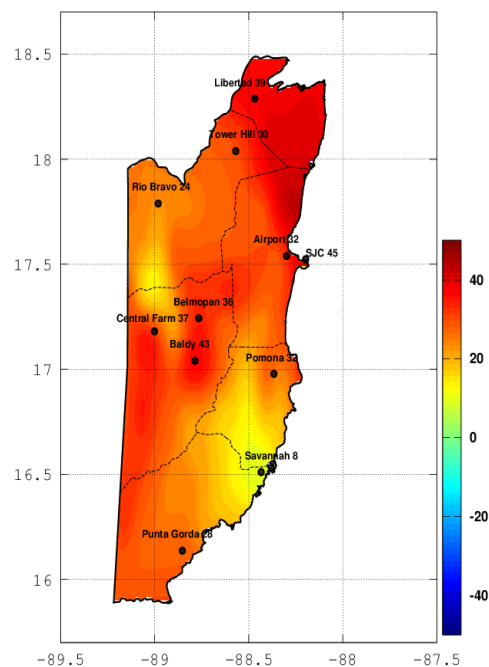


Figure 9 Rainfall anomalies across Belize for 2013 (% above or below average).

Dominica

A total of 2867.1mm of rainfall was recorded at the Melville Hall airport in 2013. This total is approximately 8% above average. A trough system in the month of April generated rainfall beyond expectation, making it the wettest month for 2013 at Melville Hall. A monthly total of 684.4mm of rainfall

was recorded, which is almost 4 times the monthly average and the second highest monthly total for April on record. The rains began in earnest on the 16th April, resulting in a total of 429.7mm by the 20th. The driest month was February. Rainfall total was 37.8mm which is about 39% of the monthly mean, and with the year's highest number of dry days totaling 19 days.

2013 ranks as the second wettest year on record at the Canefield Airport. A total of 2219.1mm of rainfall was recorded. This represents about 26% above the annual average. October produced the year's highest rainfall total of 321.4mm, which is about 70% above the monthly mean. Tropical disturbances such as tropical waves and troughs contributed to much of the rainfall. June follows closely with a total of 314.7mm. March was the driest month with a total of 18.9mm, which is approximately 39% of the monthly mean. Record breaking rainfall fell in December (294.2mm) as a trough traversed the region. This resulted in extensive flooding and landslides in the south of Dominica on the 24th December, resulting in huge losses of property.

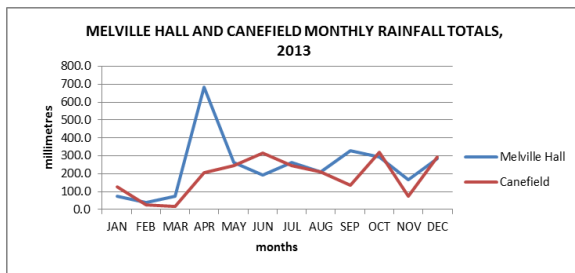


Figure 10 Monthly rainfall total for 2013 at Melville hall and Canefield, Dominica.

About average air temperature of 27.5°C was recorded for 2013 at the Melville Hall Airport. The warmest month was August with an average temperature of 28.8°C and the coolest month was January with temperature averaging 26.1°C. Melville Hall's highest temperature was 32.3°C on October 1st with the lowest being 17.6°C on the 14th March. At the Canefield Airport the average temperature was 27.8°C. This is a -0.1° difference from the annual mean. The warmest month was September with an average temperature of 29.0°C while January was the coolest with an average of 26.2°C. The maximum temperature recorded was 35.0°C on August 17th and the minimum temperature recorded

was 19.0°C on January 15th and February 4th. A new mean maximum temperature record was set in November of 33.8°C.

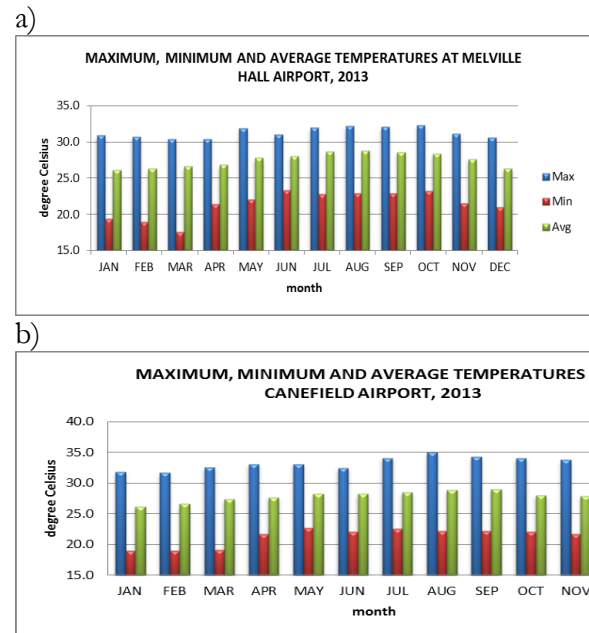


Figure 11 Mean monthly maximum, minimum and average temperatures at a) Melville Hall and b) Canefield for 2013.

The dry conditions which continued from December 2012, particularly in the north east of the island, restricted the establishment of new crops during the earlier part of 2013. Strictly rain-fed farms suffered greatly from the rainfall deficits. As the dry season progressed, young crops were lost as they burnt and wilted while others showed signs of stunted growth. Many farmers chose not to plant and to wait for the rains.

With the onset of the rains in April, farmers were able to establish root crops; however, above normal rainfall resulted in flooding of farms and infrastructural damage to roads in the eastern regions. There were local outbreaks of the Dasheen Complex diseases and widespread outbreak of a fungus in pumpkins and whiteflies. The incidence of pest and diseases in both plants and animals including Black Sigatoka, Citrus greening, Giant African snails, powdery mildew and ticks increased. Tomatoes in particular succumbed to the deadly Bacterial Blight which prompted research and training by the Division on how well to address the problem. In July, the passage of tropical storm Chantal affected up to 50% of banana production in some areas.

Throughout the year, the Division continued to give attention to the Black Sigatoka disease by hosting farm demonstrations and completing spray cycles. There has been a positive impact especially in plantain production and harvesting. Since the cut back of the Citrus Greening eradication activity in the northeast region, there has been limited reports of new infestations.

Jamaica

January 2013 began on a very dry note, with reduced levels of rainfall being recorded across the island. This was particularly important because December through March represents the dry season so drier than normal conditions can have significant impact especially in the agricultural sector. Conditions improved in some areas by the beginning of the early rainfall season in May due to the movement of surface troughs across the island. In August the island was impacted by several surface troughs which resulted in increased rainfall at the beginning of the late rainfall season.

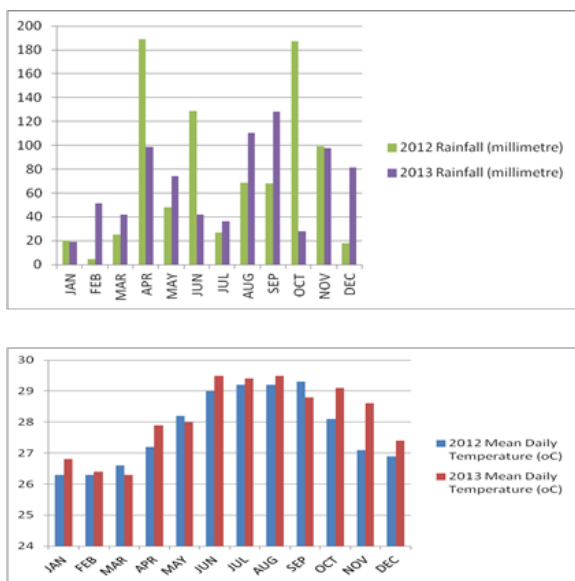


Figure 12 a) Rainfall and b) temperature comparison (2012 vs.2013) for Sangster International Airport, Jamaica.

On average normal rainfall was experienced for most months of the year with only a few occasions of above normal rainfall. St. Mary in the northeast reported abnormally dry conditions throughout the year especially in the farming communities.

Sangster Int'l recorded higher than average rainfall amounts for 2013 in July and August and also had

higher mean daily temperatures. Norman Manley April and October recorded significantly less rainfall when compared with 2012 and also recorded higher temperatures for 2013.

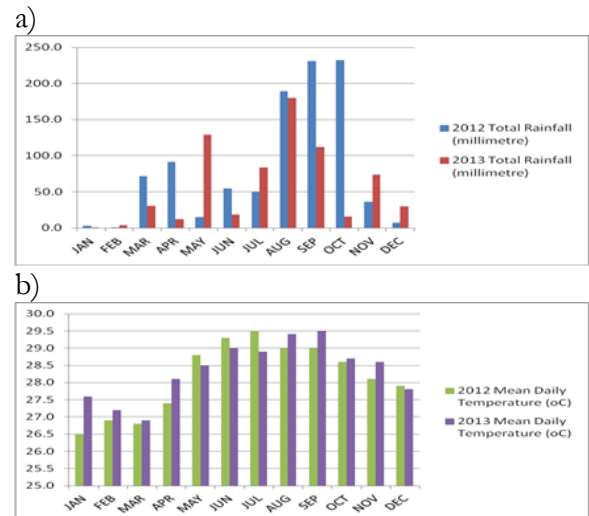


Figure 13 a) Rainfall and b) temperature comparison (2012 vs.2013) for Norman Manley International Airport, Jamaica.

St Lucia

The total rainfall in Saint Lucia for the year 2013 was generally above average. Both Hewanorra and George Charles Met. offices recorded totals above the 1981 to 2010 climatological normal. For Hewanorra, the months of April, June, August and December were wetter than average, whereas for George Charles, the month of May was also wetter than the average. See Figures 14 a) and b).

Table 3 2013 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)
4	80	12	27.6	78	151.4
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
30.4	25.0	8.8	7.4	28.5	

Table 4 2013 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	90	17	27.6	76	2035.4
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
30.2	24.1				

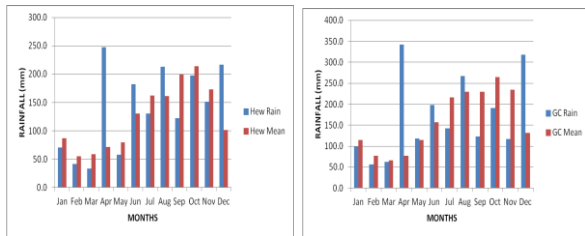


Figure 14 Rainfall for 2013 relative to average rainfall (1981 to 2010) at a) Hewannorra and b) George Charles Airports.

The wettest month for both stations was surprisingly April which is traditionally a dry month. There was a prolonged drought event at George Charles Airport, which started in September 2012 and ended in April 2013.

The first part of December was relatively dry with low daily rainfall amounts and even a 4 day dry spell, but on December 24, a trough system dumped unprecedented heavy rains which caused flooding and landslides that severely damaged infrastructure and crippled Saint Lucia’s agricultural sector. Many homes were flooded and six fatalities were recorded. Major damage was reported on several banana farms along the river banks. Extensive damage was also reported in the livestock and fishing sectors.

Table 1 below compares the 2013 averages with the 1981 to 2010 climatological means.

Table 4 Comparison of the 2013 statistics with the averages of 1981 to 2010.

Element	1981-2010 Mean	2013
Hew Rainfall (mm)	1492.9	1661.2
G Charles Rainfall (mm)	1911.2	2035.4
Hew Air Temp (°C)	27.4	27.6
Hew Max Temp (°C)	30.2	30.4
Hew Min Temp (°C)	24.7	24.9
Hew Abs Max Temp (°C)	33.3	32.6
Hew Abs Min Temp (°C)	17.4	21.0
Hew RH (%)	77.2	77.1
Wind Speed (Km/hr)	23.4	25.7

Mean, maximum and minimum temperatures, evaporation and sunshine hours were all greater than average. Figures 15 a) and b) show the comparison between the 2013 mean monthly maximum and minimum temperatures and the 1981 to 2010 averages.

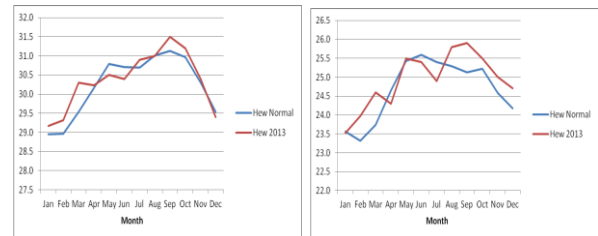


Figure 15 Monthly a) mean maximum and b) mean minimum temperatures for 2013 relative relative to averages (1981 to 2010) at Hewannorra.

St. Vincent and the Grenadines

A rainfall total of 2,270.8 mm was recorded at the E.T. Joshua airport for 2013.

The month of January had light to moderate showers for the first half and strong gusty winds throughout the month. These strong winds caused rough seas for most of the month. February was a dry and windy month with the passage of only a few trough systems. A funnel cloud was observed at the end of the month.

Dry and windy conditions persisted across the country through March and into the early part of April. Funnel clouds were spotted on the 8th and 23rd March. The dry spell at the beginning of April was broken by the passage of a trough system in the middle of the month and the second half of April was rather wet. On the 19th, 20th and 23rd thunderstorms and gusty winds were experienced, with Sahara dust creating hazy conditions for days at a time. May began with a dry spell but by the middle of the month there was some easing of this spell with thunderstorm activity as the tropical waves began to traverse the Atlantic and affect the island chain.

June saw the continued passage of tropical waves and on the 25th heavy thunderstorm activity caused damage to radio transmitters of three radio stations. St Vincent and the Grenadines were placed on Tropical Storm Watch due to the advancing Tropical Storm Chantal at 12:00 am on the 7th July. The centre of the tropical storm passed to the north of the island during the morning of the 9th of July. The country experienced light to moderate showers from the passage of this system and the northern part received some gusty winds. Only 93.8 mm of rainfall was recorded for July, far below the 30 year average for the country. Very dry air and the presence of

Sahara dust in the atmosphere limited the development of any tropical storm activity during August. September began with a dry hot spell. Night time temperatures of 28-30 °C made the nights very uncomfortable especially during the first half of the month.

In October the passage of tropical waves and trough systems caused localized flooding. October was the wettest month of the year with 430.3 mm of rainfall and 28 rain days. The high rainfall amount seems to have had a cooling effect on the temperatures. November had its share of troughs and weak tropical waves. In the latter part of the month the passage of trough systems produced some heavy rainfall which caused some landslides and flooding in already saturated soils.

December saw the passage of a few troughs and some shear lines affecting the island but for the most part they were devoid of major activity. On the 24th into the 25th a trough system affected the island. This system dumped anomalous amounts of rainfall on the island and this resulted in major flooding, landslides, dislocation and nine (9) deaths. There was also major infrastructure damage with many bridges and roads either destroyed or severely damaged. Hail was even reported by some residents. One station on the north eastern side of the island recorded 278 mm in a two hour period.

Trinidad and Tobago

As can be expected during a neutral El Nino-Southern Oscillation (ENSO) year, Trinidad and Tobago experienced fluctuating fortunes in annual rainfall totals during 2013 with annual totals varying temporally, spatially and in magnitude. During the year, two extremely dry periods stood out; these were the months of February to mid-March and July to August. For the most part, the country’s annual rainfall exceeded the 1981-2010 average with percent of annual totals relative to the long term means being higher in Tobago than in Trinidad. In particular annual rainfall totals at the ANR Robinson Airport and Hillsborough Reservoir in Tobago stood at 1506.2 mm and 2546.4 mm or 122.3% and 113% of the long-term means respectively; while at Piarco Airport, Hollis Reservoir, Caroni Arena Dam and Navet Reservoir in Trinidad, annual totals amounted to 1897.8 mm (95.6%), 3148.5 mm (106.1%), 2385.2

mm (112%), and 1699.1 mm (73.8%) respectively (of 30 year mean).

At the dry and wet seasonal scales, the rainfall distribution across Trinidad and Tobago was more definitive. During the dry season the rainfall recorded at five (5) of the 6 stations exceeded the long term means, ranging between 113% and 168% of the average (Figure 16). Overall, the season was considered to be wetter than normal, even though the months of February and March were considerably dry across both islands.

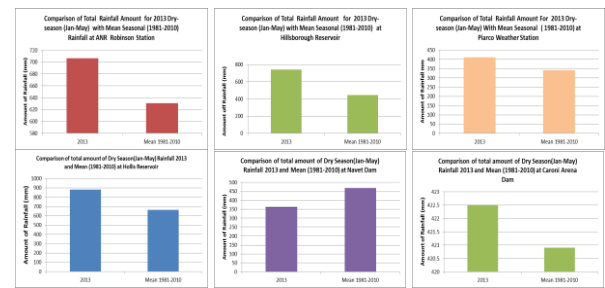


Figure 16 Total dry season rainfall relative to averages (1981 to 2010) at six Stations

Rainfall during the wet season either exceeded or marginally fell below the long-term average at the stations considered (Figure 17), but remained within the near-normal category overall (75% -125%). Sub-seasonal to the dry and wet seasons rainfall showed the greatest fluctuations and it was at this scale that agriculture was affected the most. The first quarter of the year (January to March) was particularly dry with total rainfall ranging between 63% of the average at Navet in South Trinidad to 89 % at Piarco in the North and 102% in Tobago. The second quarter (April to June) was particularly wet for Tobago and most stations in Trinidad. Rainfall amounts ranged between 141% and 152% of the average in Tobago and between 109% and 142% in north Trinidad to 82%, the lowest in south Trinidad.

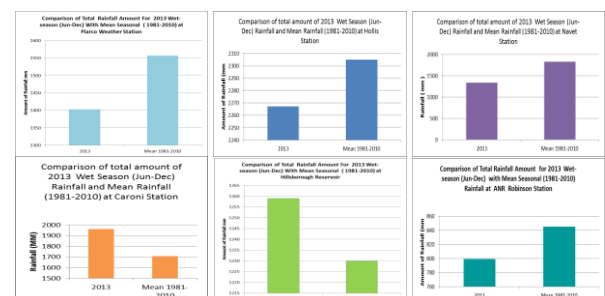


Figure 17 Total wet season rainfall relative to averages (1981 to 2010) at six stations

During the 3rd quarter (July to September), conditions returned to a dry state as rainfall was relatively scanty and in the below normal category (less than 75%) which impacted agriculture negatively. The month of July was the 3rd driest on record since 1946 in Trinidad while it was the driest on record in Tobago since 1969. Similarly, August was the 2nd driest on record since 1946 in Trinidad. The unseasonal and abnormally dry air during July to August were attributed to subsidence from the North Atlantic Sub-Tropical High displaced further south than usual for that time of the year and the presence of a persistent deep Saharan Air Layer (SAL) emanating from the North-Western Africa.

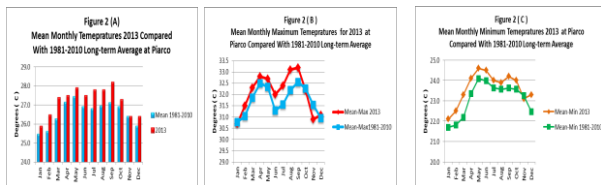


Figure 18 Mean a) monthly, b) monthly maximum and c) monthly minimum temperatures relative to averages (1981 to 2010) at Piarco.

In contrast to the 3rd quarter, the 4th quarter was extremely wet with total rainfall ranging between 104% of average at Navet in south Trinidad to 162% at Caroni in north Trinidad, while it hovered around 129% in Tobago.

Notwithstanding the fluctuation in rainfall there were several instances when torrential and widespread rainfall resulted in agriculture fields becoming flooded. For instance torrential rainfall associated with the Inter-Tropical Convergence Zone resulted in widespread flooding in the months of September and November in Central Trinidad and other areas; while late dry season rainfall in April caused significant losses in agriculture crops with damages amounting to millions of Trinidad and Tobago dollars, as farmers lost crops such as pumpkins, cucumbers, water-melons and corn in the Aranguez and Plum Mitán areas of north Trinidad.

The year was also extremely warm in Trinidad and Tobago. During the year mean monthly temperatures exceeded the 1981-2010 mean in all months with September having the highest mean temperature of 28.2° C which was 1.1° C above the baseline (Figure 18 a)). Accompanying the extremely dry conditions during the months of July and August were also high temperatures. The months of August to October in particular were extremely hot as extreme maximum temperatures soared above 35.4°C to maximize at 35.9°C in October, which was above the 1981-2010 mean of 35.5 °C. At Piarco, mean monthly maximum temperatures exceeded the 1981-2010 mean in all months except January, October and November, with temperatures being highest between April to October and ranging between 32.8°C in April to 33.2 ° C in October (Figure 18 b)). Monthly extreme minimum temperatures were also relatively high as they remained above 1981-2010 means for all months. Similarly, mean minimum temperatures exceeded baselines for all months except November; allowing nights to be warmer than normal (Figure 18c)).

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