ARUBA

CLIMATOLOGICAL SUMMARY 2020

PRECIPITATION

The total amount of rainfall recorded at Reina Beatrix International Airport for the year 2020 was **466.2** mm. This is **1.17%** below normal (Figure 1).

During the first quarter of the year 2020 (January, February, March) a total of **53.2** mm of rainfall was recorded. This is **11.41%** of the total amount for 2020.

During the second quarter of the year 2020 (April, May, June) a total of **8.6** mm of rainfall was recorded. This is **1.84%** of the total amount for 2020.

During the third quarter of the year 2020 (July, August, September) a total of **100.8** mm of rainfall was recorded. This is **21.62%** of the total amount for 2020.

During the fourth quarter of the year 2020 (October, November, December) a total of **303.6** mm of rainfall was recorded. This is **65.13%** of the total amount for 2020.

The last quarter of the year 2020, which is part of the rainy season was the *wettest* quarter,and the total amount of rain for that quarter was above normal values.

The *wettest* month for 2020 was October with a total of **144.0** mm which was above normal values for that month. The *driest* months for 2020 were April and May with a total of **0.0** mm which is below normal for that month.

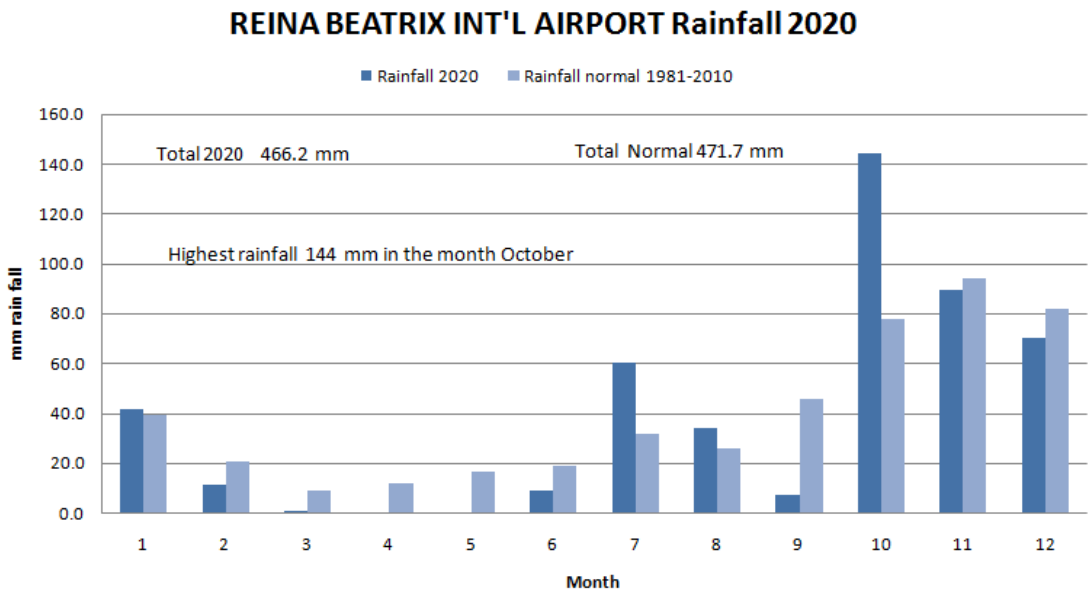

Figure 1. Rainfall 2020 versus 30 year normal (1981-2010) in mm.

TEMPERATURE

The year average air temperature recorded at the Reina Beatrix International Airport Aruba for 2020 was **28.5** ºC (normal value **28.1** ºC), which is a bit above normal.
(Figure 2a).

The *warmest* month of 2020 was September with an average of **29.8** ºC and the *coldest* months of 2020 were January and December with an average of **27.5** ºC.

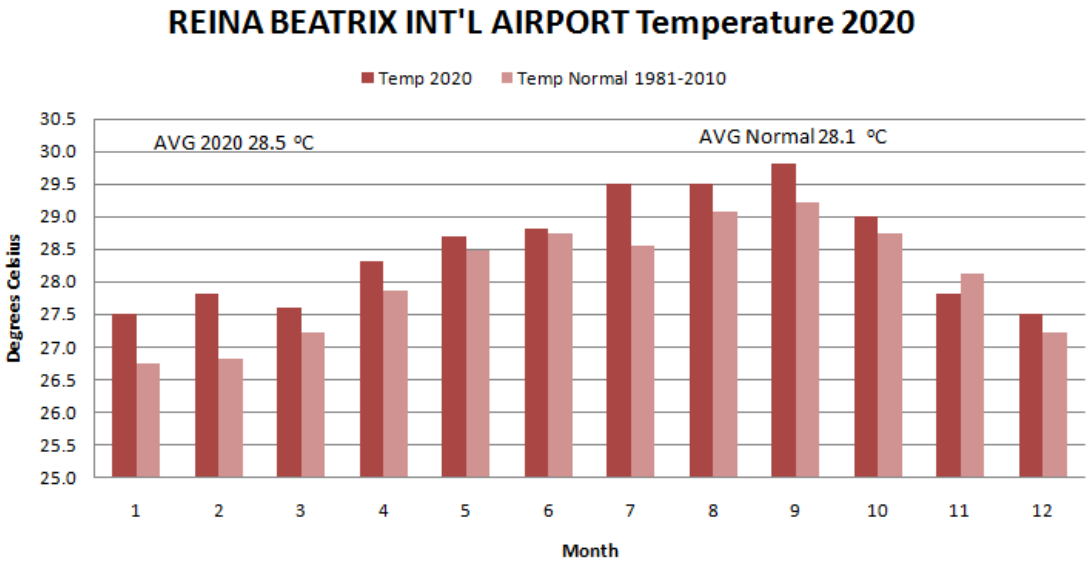

Figure 2a. Temperatures in degrees Celsius 2020.

MAX TEMPERATURE

The average maximum temperature for the year 2020 was **31.9** ºC compared with the normal average maximum temperature **31.5** ºC which is a bit above normal. (Figure 2b).

The *absolute* maximum temperature was in September 2020 with **33.2** ºC .

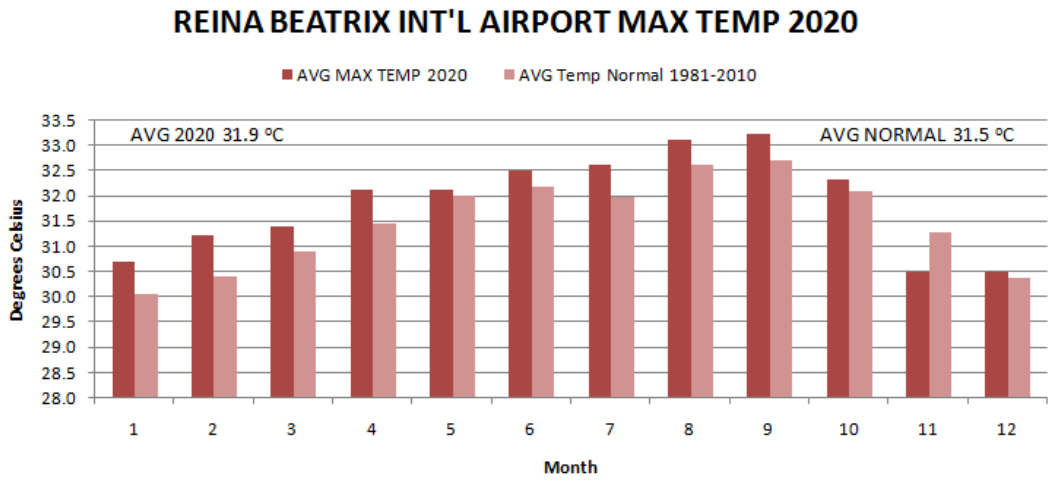

Figure 2b. Maximum temperatures in degrees Celsius 2020.

WINDSPEED

The year average wind-speed at 10 meters height for the year 2020 at the Reina Beatrix International Airport was **7.2 m**/sec (25.9 km/h) compared with the normal value of **7.3** m/sec (26.3 km/h) is just below normal.(Figure 3a).

The *highest* average wind-speed of **9.5** m/sec (34.2 km/h) was recorded during the month of May 2020. The *lowest* average wind-speed during the month of November 2020 with a **5.2** m/sec (18.7 km/h).

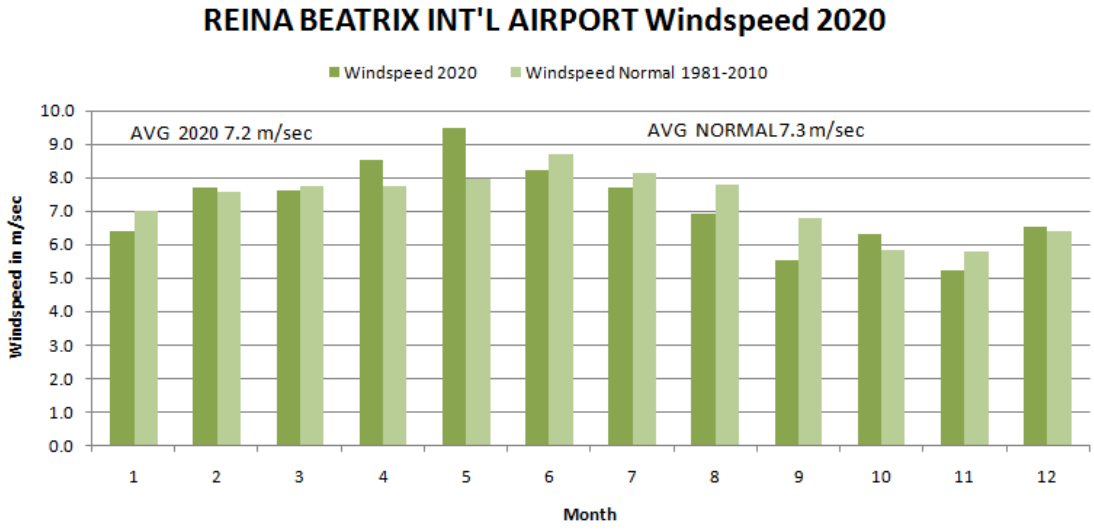

Figure 3a. Wind-speed 2020 in m/sec.

MAX WINDSPEED

The average maximum wind-speed for the year 2020 was **14.1** m/sec (50.8 km/h) compared to the normal value of **14.5** m/sec (52.2 km/h), which is below normal. (Figure 3b).

The *absolute* maximum wind-speed of **17.2** m/sec (61.9 km/h) was recorded during the month of May 2020.

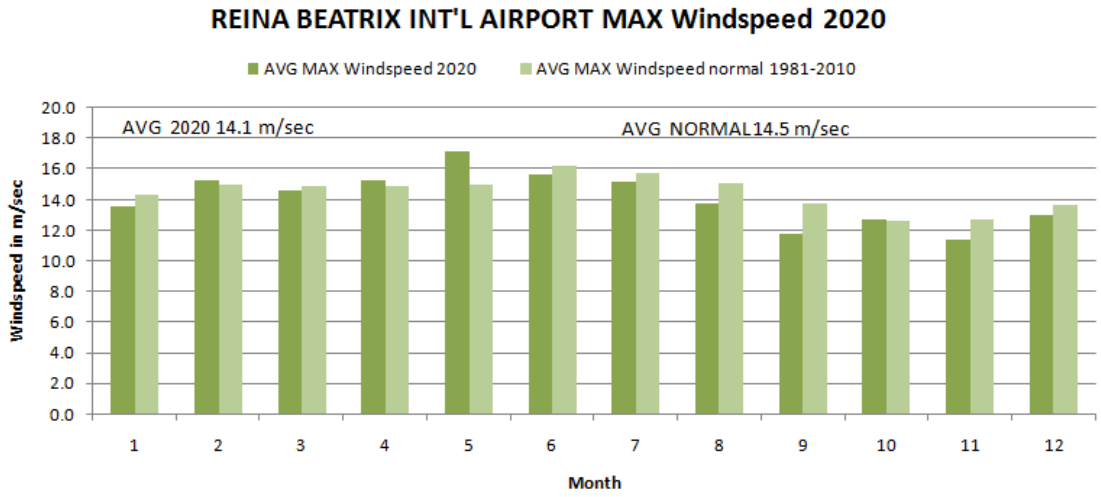

Figure 3b. Maximum wind-speed 2020 in m/sec.

WINDROSE

The wind-rose figure indicates that for **75.1%** of the time the wind was between 11-17 knots. The wind was **8.5%** of the time between 17-21 knots and **16.4%** of the time between 7-11 knots. (Figure 3c).

The wind was **91.5**% of the time from the East and **8.5**% from the East-South East.

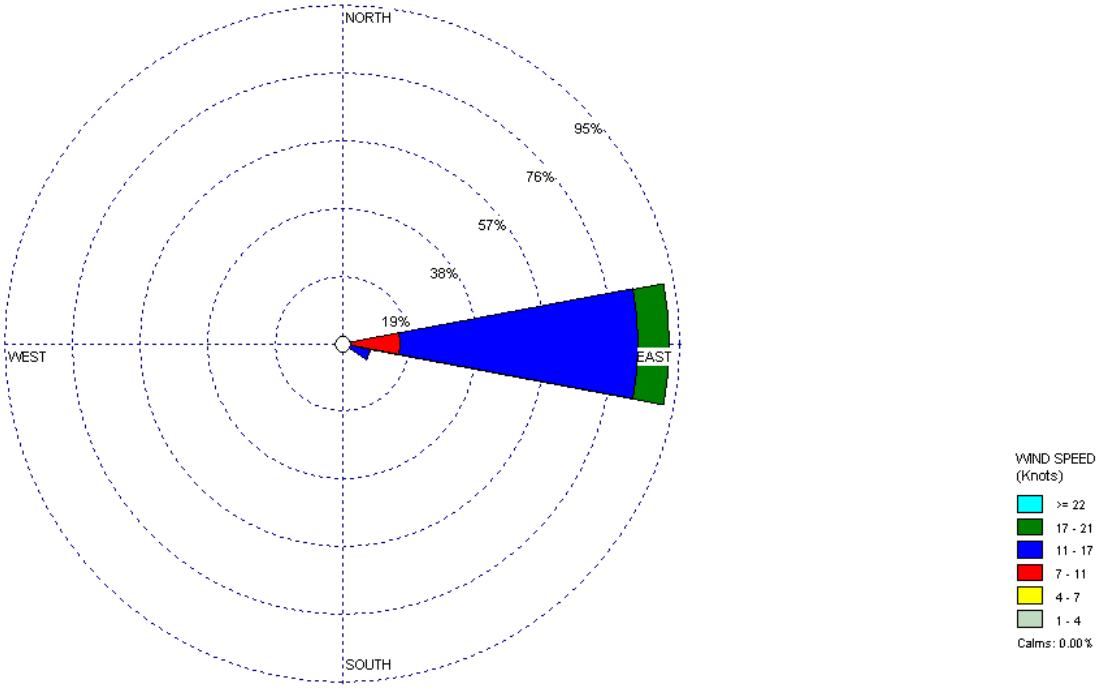

Figure 3c. Wind-rose data 2020 in knots.

ATMOSPHERIC PRESSURE

The average atmospheric pressure for 2020 recorded at the Reina Beatrix International Airport was **1012.1** hPa compared with the normal value of **1011.8** hPa which is above normal (Figure 4).

The *highest* monthly average atmospheric pressure of **1013.9** hPa was recorded during August 2020 with the *lowest* during September 2020 of **1010.2** hPa.

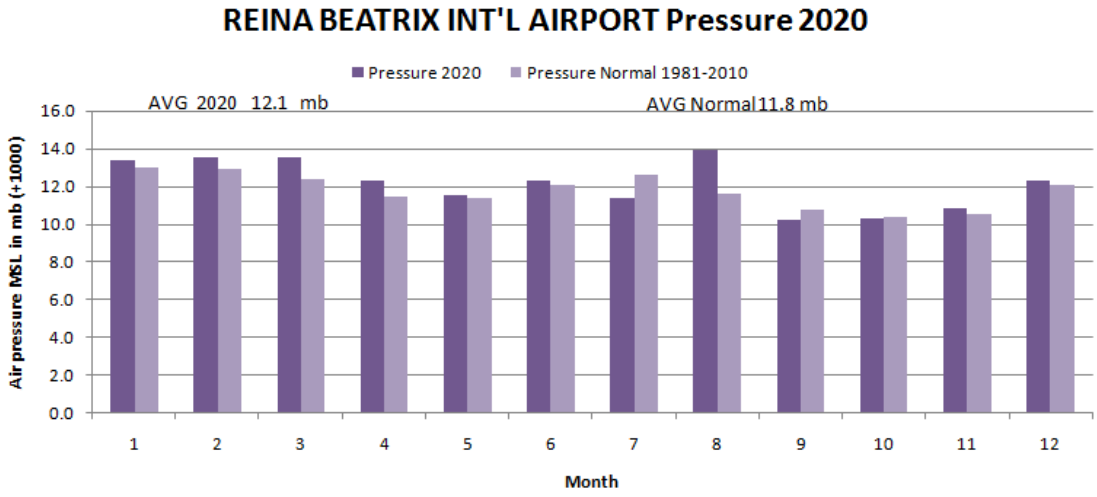

Figure 4. Atmospheric Pressure at MSL, (Mean Sea-Level) in hPa (+1000) 2020.

CLOUD COVERAGE

The average cloud coverage in 2020 was **63.0**% compared with the normal value of **47.3**% which is above normal. (Figure 5).

Highest average cloud coverage in 2020 was observed during November (**76.0**%) with the *lowest* during the month of February (**44.9** %).

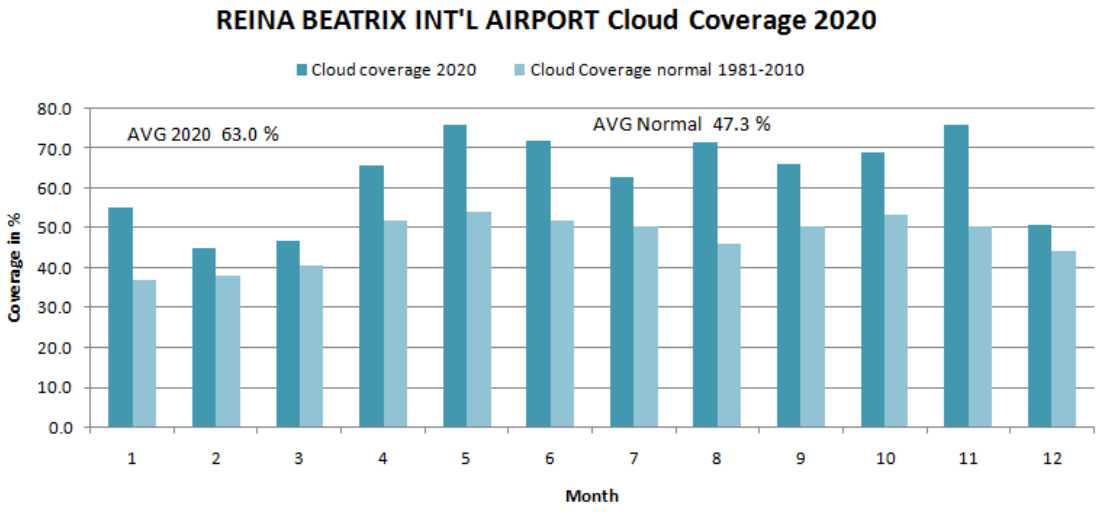

Figure 5. Total cloud coverage in percentage 2020.

RELATIVE HUMIDITY

The average relative humidity of 2020 was **75.9**% compared to the normal value of **77.4**%, which is a bit below normal. (Figure 6).

Highest monthly average relative humidity of **80.9**% was recorded during the month of November 2020 with a *lowest* monthly average of **69.6%** during the month of March 2020.

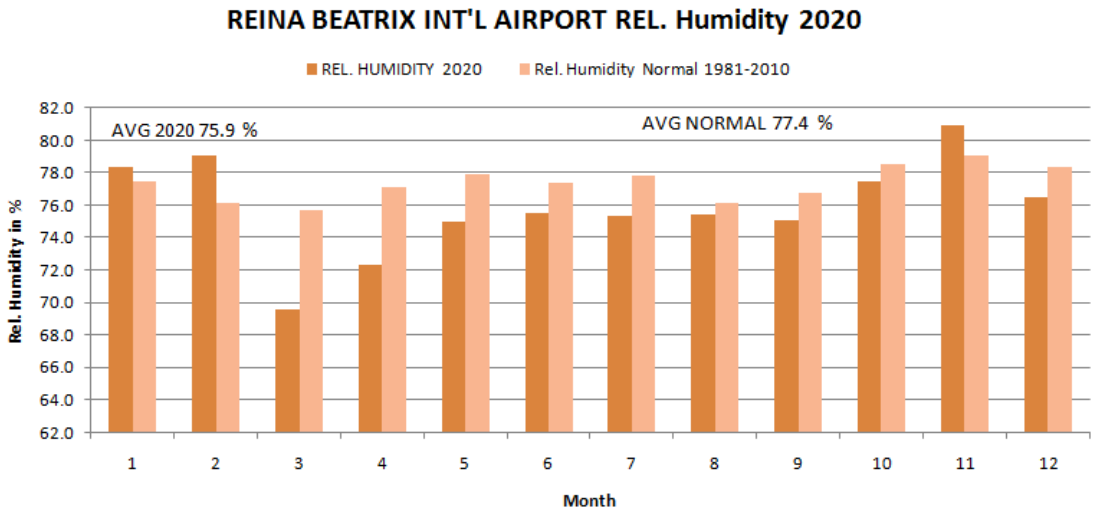

Figure 6. Relative humidity in percentage 2020.

SPECIAL OCCURRENCE (EVENTS) DURING THE YEAR 2020

SEISMIC ACTIVITIES:

There were 2 earthquake events near Aruba. The strongest was on June 26th at 6:33 AM local time with a magnitude of 4.5 on the Richter Scale and had a depth of 126.2 kilometers and was about 152 km southwest of Aruba.

EARTHQUAKES NEAR ARUBA YEAR 2020

Date	Local Time (AM/PM)	Latitude North (degrees)	Longitude West (degrees)	Magnitude	Depth (km)
June 26, 2020	6:33 AM	11.359	70.776	4.5	126.2
September 3, 2020	5:31 AM	11.92	69.67	3.1	17.7

Table 1. Earthquakes near Aruba year 2020

CLIMATE ANOMALY 2020

Climate change continued its relentless march in 2020, which is on track to be one of the three warmest years on record. 2011-2020 will be the warmest decade on record, with the warmest six years all being since 2015.

Ocean heat is at record levels and more than 80% of the global ocean experienced a marine heatwave at some time in 2020, with widespread repercussions for marine ecosystems already suffering from more acidic waters due to carbon dioxide (CO_2) absorption.

High-impact events including extreme heat, wildfires and floods, as well as the record-breaking Atlantic hurricane season, affected millions of people, compounding threats to human health and security and economic stability posed by the COVID-19 pandemic.

Despite the COVID-19 lockdown, atmospheric concentrations of greenhouse gases continued to rise, committing the planet to further warming for many generations to come because of the long lifetime of CO_2 in the atmosphere.

The average global temperature in 2020 is set to be about 1.2 °C above the pre-industrial (1850-1900) level. There is at least a one in five chance of it temporarily exceeding 1.5 °C by 2024. Record warm years have usually coincided with a strong El Niño event, as was the case in 2016. We are now experiencing a La Niña, which has a cooling effect on global temperatures, but has not been sufficient to put a brake on this year's heat. Despite the current La Niña conditions, this year has already shown near record heat comparable to the previous record of 2016. We saw a record number of hurricanes in the Atlantic, including unprecedented back-to-back category 4 hurricanes in Central America in November.

Heat, drought and fires

In the Caribbean, major heatwaves occurred in April and September. Temperatures reached 39.7 °C at Veguitas on 12 April, a national record for Cuba, whilst Havana also had its hottest day with 38.5 °C.

Tropical Cyclones and storms

The number of tropical cyclones globally was above average in 2020, with 96 cyclones as of 17 November in the 2020 Northern Hemisphere and 2019-2020 Southern Hemisphere seasons.

The North Atlantic region had an exceptionally active season, with 30 tropical cyclones as of 17 November, more than double the long-term average (1981-2010) and breaking the record for a full season, set in 2005. At a time when the season is normally winding down, two Category 4 hurricanes made landfall in Central America in less than two weeks in November, resulting in devastating flooding and many casualties.

According to FAO (Food and Agriculture Organization) and WFP (World Food Program), over 50 million people have been hit twice: by climate-related disasters (floods, droughts and storms) and the COVID-19 pandemic in 2020. Countries in Central America are suffering from the triple-impact of hurricanes Eta and Iota, COVID-19 and pre-existing humanitarian crises. The Government of Honduras estimated that 53 000 hectares of cropland were washed away, mainly rice, beans, and sugarcane.

Negative environmental effects include impacts on land such as droughts, wildfires in forest and peatland areas, land degradation, sand and dust storms, desertification and air pollution, with far reaching implications for nature and wildlife. Impacts on marine systems include sea level rise, ocean acidification, reduced levels of ocean oxygen, mangrove decay and coral bleaching.

TROPICAL CYCLONE ACTIVITIES:

Overall, the 2020 Atlantic hurricane season was extremely active, with well above normal activity for the season. A record thirty named storms formed, with thirteen becoming hurricanes and six becoming major hurricanes - category 3 or higher on the Saffir-Simpson Hurricane Wind Scale. This compares to the long-term average of twelve named storms, six hurricanes, and three major hurricanes. There was also one tropical depression that did not reach tropical-storm strength. In terms of Accumulated Cyclone Energy (ACE), which measures the strength and duration of tropical storms and hurricanes, activity in the Atlantic basin in 2020 was 75
percent above the long-term mean.

Name		Dates	Max Wind (mph)
TS	Arthur	16-19 May	60
TS	Bertha	27-28 May	50
TS	Cristobal	1-9 Jun	60
TS	Dolly	22-24 Jun	45
TS	Edouard	4-6 Jul	45
TS	Fay	9-11 Jul	60
TS	Gonzalo	21-25 Jul	65
H	Hanna	23-27 Jul	90
H	Isaias	30 Jul-5 Aug	85
TD	Ten	31 Jul-1 Aug	35
TS	Josephine	11-16 Aug	45
TS	Kyle	14-16 Aug	50
MH	Laura	20-28 Aug	150
H	Marco	20-25 Aug	75
H	Nana	1-4 Sep	75
TS	Omar	31 Aug-5 Sep	40
H	Paulette	7-22 Sep	105
TS	Rene	7-14 Sep	50
H	Sally	11-17 Sep	105
MH	Teddy	12-22 Sep	140
TS	Vicky	14-17 Sep	50
TS	Wilfred	18-20 Sep	40
SS	Alpha	18 Sep	50
TS	Beta	17-22 Sep	60
TS	Gamma	2-5 Oct	70
MH	Delta	4-10 Oct	145
MH	Epsilon	19-26 Oct	115
H	Zeta	24-29 Oct	110
MH	Eta	31 Oct-13 Nov	150
TS	Theta	10-15 Nov	70
MH	Iota	13-18 Nov	160

Table Hurricanes 2020.

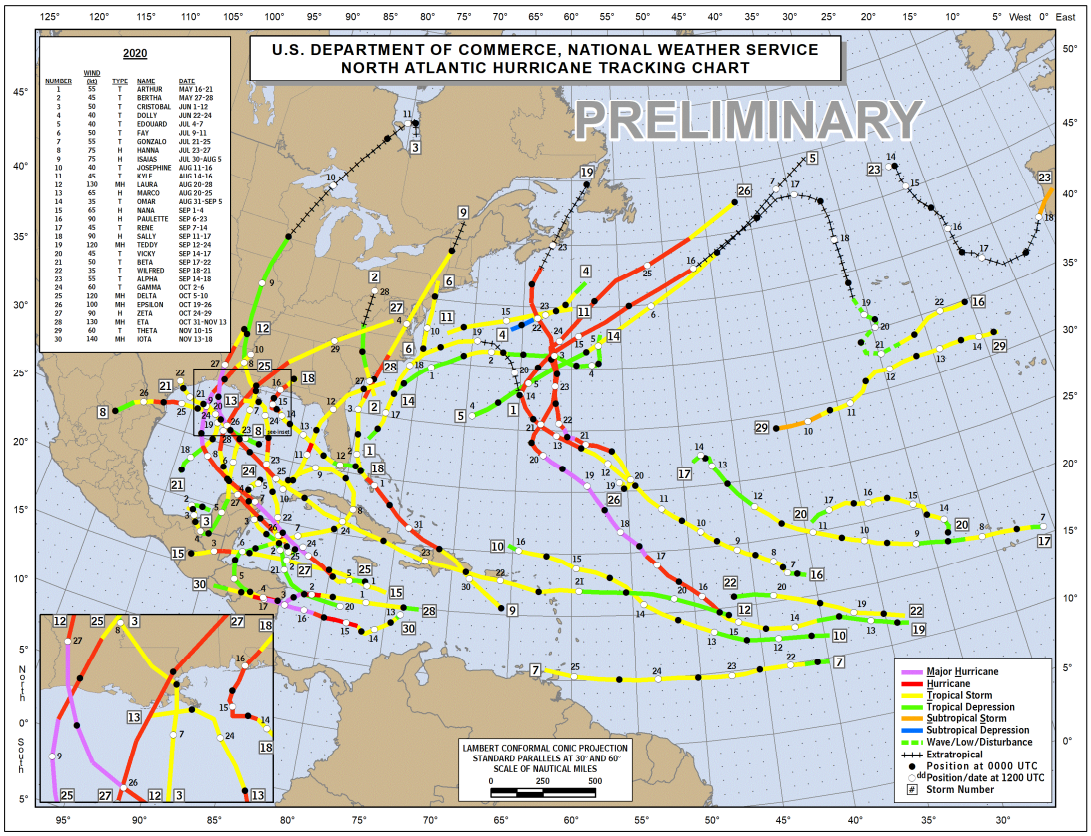

Figure 10. Storm tracks Atlantic Basin 2020.

In figure 10 we can see the storm tracks. There was no major threat to Aruba.

For the year 2021 a slight above normal hurricane season is forecasted.
Keep in mind that these are extreme long-term forecasts and therefore changes can occur.

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