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CLIMATOLOGICAL SUMMARY
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Introduction

After three years with above average rainfall, 2001 became a dry year again on the ABC Islands. Especially Aruba received very little rain with a total of 60% below the long-term average at the Reina Beatrix Airport. Bonaire became the least dry of these three islands with a year total of 28% below the average at Flamingo Airport.

On the SSS Islands, rainfall amounts were much higher and also close to the long-term averages. Juliana Airport's rainfall in 2001 was just a little below average while Roosevelt Airport in St. Eustatius got a little more than average. The main reasons for the rainfall anomaly in 2001 were:

1. The Sea Surface Temperatures (SST) of the Tropical North Atlantic and the Caribbean Sea were colder than normal for the months of January through June and normal for July, August and September. During the last months of 2001 the SST became slightly warmer than normal.
2. The El Niño/Southern Oscillation (ENSO) was in an intermediate phase during the 2001.
3. Furthermore, the atmospheric conditions were not favorable for the formation of rain producing clouds over the ABC Islands. Accordingly, the rainfall on the ABC Islands was below normal and on the SSS Islands about normal.

The ABC and the SSS Islands were spared of nearly all consequences of tropical cyclones in 2001. Only a strong tropical wave, which later in the day became tropical storm *Dean*, caused heavy rains, gusty winds and high seas over the SSS Islands on August 22. For the first time since 1998, no issuance of tropical cyclone watches or warnings were necessary for either island group.

Outlook for 2002

The condition of the Tropical Atlantic Ocean indicates that the sea surface temperatures will be slightly warmer in 2002. The ENSO is expected to be near normal to moderately warm (moderate El Niño). Consequently, the rainfall season for the ABC islands will be moderately dry to near normal. Since the sea surface temperature of the Tropical Atlantic will be slightly warmer, the SSS islands will have average rainfall amounts in 2002.

As far as tropical cyclones (TC) over the Atlantic are concerned, Colorado State University's Dr. William Gray and co-workers expect another season with above average activity. The climate factors, which enhance the TC activity will be in place during August-October 2002. They are a warm Tropical Atlantic, a westerly QBO (high level winds) and near neutral ENSO. According to their forecast, thirteen tropical storms (long-term average: 9.6) should develop in 2002. Eight (5.9) of these should become hurricanes and they expect four (2.3) of these to reach major hurricane strength (category three or higher on the Saffir-Simpson scale).

Summary of Tropical Cyclone Activity for the 2001 Hurricane Season

Introduction

The 2001 hurricane season was an active one. There were fifteen named storms of which nine became hurricanes. Four of these became major hurricanes, category three or higher on the *Saffir-Simpson* hurricane scale (or more than 185 km/hour). The long-term averages are ten tropical storms, six hurricanes and two major hurricanes.

The numbers for 2001 were higher than the ones predicted by Dr. William Gray of the Colorado State University in the U.S.A. (twelve named storms, eight hurricanes and two major ones).

Most of this activity took place during the last three months of the season during which eleven of the named storms, and all of the major hurricanes, developed. There were three hurricanes during November which was the first such occurrence on record. Two major hurricanes, *Iris* and *Michelle*, struck land areas around the (Western) Caribbean causing 48 deaths. *Michelle* also caused significant damage in the Bahamas. For the second consecutive year, there were no hurricane landfalls in the United States. Two of the three tropical storms that hit the U.S.A. were almost hurricanes, and the third, *Allison*, caused enormous flooding resulting in 41 deaths and billions of dollars in damage. There were also two tropical depressions (Two and Nine) that did not become tropical storms.

Individual Storm Summaries

Allison developed in the first days of the season from a disturbance that moved from the Eastern Pacific into the Southwestern Gulf of Mexico. On the morning of June the 5th the system quickly developed into a tropical storm. *Allison* strengthened to a peak intensity of 95 km/h on the afternoon of that same day before moving inland over Southeast Texas with 80 km/h winds a few hours later. After landfall, it caused very heavy rainfall during a number of days over several U.S. states with deadly consequences.

Barry formed from a tropical wave over the Eastern Gulf of Mexico on August 2. Initially moving West North westward, the storm slowed to an erratic drift on the 3rd that continued into the 4th. Unfavorable upper level winds caused *Barry* to weaken to a depression early on the 4th. With the cyclone regaining tropical storm strength later that day, *Barry* moved North and intensified on the 5th. It made landfall at just under hurricane strength in the Florida panhandle between Panama City and Destin early on the 6th.

The First Caribbean storm originated from a tropical wave and became a tropical depression on August 14 about 2250 km East of the Southeastern Caribbean islands. The depression moved westward so rapidly that it degenerated into a tropical wave on the 16th. When a circulation redeveloped on the 17th, the system became a tropical storm a couple of hundred kilometers Northeast of the ABC Islands. The system caused only overcast skies over our islands with no rain at all and light and variable winds. *Chantal* moved westward through the Caribbean, briefly reaching an intensity of 115 km/h (just under hurricane strength) on the 19th when it was South of Jamaica. *Chantal* weakened late on the 19th but began to strengthen again as it approached Belize and the Yucatán peninsula. The system made landfall near the

Belize-Mexico border late on the 20th with winds of 115 km/h. *Chantal* weakened to a depression and then dissipated over Southeastern Mexico on the 22nd.

Tropical storm *Dean* developed on August 22 after passing over the SSS islands as a strong wave. It soon encountered unfavorable atmospheric conditions and it weakened to a tropical wave just North of Puerto Rico the next day. *Dean's* remnants moved mostly northward for the next several days and interacted with a large non-tropical trough off the U.S. East coast. On the 26th, thunderstorm activity began to organize near the remnant low pressure system



A coaster ran ashore at Simpson Bay, St. Maarten due to the strong winds and high seas generated by what later became tropical storm Dean (Daily Herald).

indicating that it was again acquiring tropical cyclone characteristics. *Dean* regained tropical storm status late on the 26th while located about 400 miles North Northeast of Bermuda. After strengthening to just below hurricane force, *Dean* continued Northeastward and became extra tropical the following day.

Late First Hurricane

Erin formed on September 1 over the Eastern tropical Atlantic from a strong tropical wave that moved off the West coast of Africa on August

30. The system soon became a tropical storm about 660 miles West Southwest of the Cape Verde Islands. Over the next few days, *Erin* moved West North westward. It strengthened to 95 km/h on the 3rd but soon succumbed to strong upper Westerly winds (shear). The weakening cyclone moved to about 645 km East of the Northeastern Caribbean Islands on the 5th where it degenerated into an area of disturbed weather. However, a new center developed the following day about 765 kilometers North Northeast of the Northeastern Caribbean islands, within the same area of disturbed weather that was associated with *Erin*.

The reborn tropical cyclone strengthened back into a tropical storm about 635 kilometers North Northeast of the Northeastern Caribbean islands. While moving North Northwest, *Erin* became the first hurricane of the season on the 8th. The system passed about 160 miles East of Bermuda on the next day. Later that same day, it strengthened to its peak intensity of 195 km/h making *Erin* also the first major hurricane of the season.

Erin accelerated Northeastward and passed very close to Cape Race, Newfoundland in Canada on the 14th while weakening to just below hurricane strength. It became extra tropical shortly thereafter.

Four Consecutive Comeback Storms

Tropical depression Seven became tropical storm *Felix* on the 11th. During the next couple of days, *Felix* turned to the Northwest and then North. Late on the 12th, it intensified into the second hurricane of the season. While curving to the Northeast late on the 13th, *Felix* strengthened into the second major hurricane of the season far Southwest of the Azores. A peak intensity of 185 km/h was maintained until early on the 14th after which slow weakening occurred. *Felix* gradually turned eastward on the 15th and continued this motion until it

weakened back to a tropical storm on the 17th and to become a depression early on the 18th *Felix* was the last of four consecutive tropical cyclones in 2001 which weakened back to tropical waves. All these four systems, *Chantal*, *Dean*, *Erin* and *Felix* regained tropical cyclone status one or more days after they had weakened. That was the first time on record that such a re-intensification occurred. *Erin* and *Felix* eventually strengthened all the way to major hurricane strength.

Gabrielle formed over the Southeastern Gulf of Mexico on September 11. After looping slowly for a few days, it moved inland across central Florida on the 14th as a 115 km/h tropical storm. *Gabrielle* then moved northeastward over the Western North Atlantic Ocean and strengthened to an 130-km/h hurricane on the 17th while located about 400 kilometers North of Bermuda. It became an extra tropical storm on the 19th. One drowning death at the Alabama coastline is attributed to *Gabrielle*.

Humberto formed on September 19 about 490 miles South of Bermuda from a trough trailing from *Gabrielle*. It moved north westward for about a day strengthening into a tropical storm on the 22nd. On the 23rd *Humberto* gradually turned toward the North and strengthened into a hurricane. Later that day it passed about 225 kilometers West of Bermuda. Winds soon increased to near 160 km/h. *Humberto* turned toward the Northeast and weakened but still maintained hurricane strength for a couple of days. Then the cyclone re-intensified over the North Atlantic reaching a peak near 170 km/h on the 26th while centered about 360 kilometers South Southeast of Sable Island, Nova Scotia. The hurricane turned eastward and weakened to a tropical storm the following day. It lost tropical characteristics on the 27th.

Small but Strong *Iris*

Iris was a small but severe category four hurricane on the Saffir-Simpson hurricane scale that devastated Southern Belize. *Iris*, which formed from a tropical wave, became a tropical depression near the Southeastern Caribbean islands on October 4 and moved westward across the Caribbean Sea. It became a tropical storm on the 6th and reached hurricane status on the 7th just South of the Barahona peninsula of the Dominican Republic. *Iris* passed very close to the Southern coast of Jamaica and continued westward toward Central America. It then intensified reaching its peak intensity with maximum sustained winds of about 235 km/h and a pressure of 948 hPa just before making landfall in the vicinity of Monkey River Town in Southern Belize during the evening of the 8th. Because the core of *Iris* was small, the severe damage was concentrated within a 95 km wide area of Southern Belize.

Iris caused at least 31 deaths in the Caribbean and Central America, most of which occurred when the boat *M/V Wave Dancer* capsized near Belize.

Jerry developed from a tropical wave, becoming a depression on October 6 about 1000 km East Southeast of Barbados and reached tropical storm strength late that day. *Jerry* moved through the Southeastern Caribbean islands with maximum sustained winds of about 80 km/h on the 7th and 8th with the center passing close to St. Vincent. *Jerry* then became very disorganized in the Eastern Caribbean Sea and dissipated late on the 8th.

Karen originated from a cold frontal system that stalled a few hundred kilometers Southeast of Bermuda on October 10. Early on the 13th the system became tropical storm *Karen* which strengthened into a hurricane later that day. The hurricane moved northward for the next 2 days and reached a 130 km/h wind speed early on the 14th about 645 kilometers South of Halifax Nova Scotia. It made landfall along the Southern coast of Nova Scotia on the 15th as a much weaker tropical storm. *Karen* became extra tropical as it tracked northeastward toward Western Newfoundland.

Lorenzo formed from a non-tropical area of low pressure in the Eastern Atlantic that gradually acquired tropical characteristics. The low became a tropical depression on October 27 about 1450 kilometers Southwest of the Azores Islands and moved slowly westward. Late on the 29th it reached tropical storm strength about 2010 kilometers West Southwest of the Azores and on the 31st, *Lorenzo* lost its tropical characteristics ahead of an approaching cold front

Late Season Hurricane over Cuba

Michelle started as a broad low pressure area in the Southwestern Caribbean Sea. It developed into a tropical depression (number Fifteen) on October 29 along the East coast of Nicaragua. The depression remained nearly stationary over Northeastern Nicaragua for two days producing extremely heavy rains with flooding over portions of Nicaragua and Honduras. Late on the 31st, the depression moved into the Northwestern Caribbean Sea just North of the Honduras-Nicaragua border and strengthened into tropical storm *Michelle*.

Michelle moved slowly north westward for the next two days as it strengthened into a hurricane and reached its maximum intensity on the 4th with maximum sustained winds of 225km/h as it crossed the coastal islands of Cuba as a category four hurricane and the coast of the main island of Cuba as a category three hurricane. A weakening *Michelle* continued northeastward through the Bahamas on the 5th and the storm became extra tropical over the Atlantic on the 6th.

Michelle left a trail of damage and death from Central America to the Bahamas. As far as is known, 17 deaths were associated with the hurricane.

Noel developed from a non-tropical low that became a subtropical storm on November 4 about 1435 kilometers South of Cape Race in Newfoundland. The northward moving cyclone acquired more tropical characteristics and strengthened into a hurricane on the 5th about 990 kilometers and on the 6th lost its tropical characteristics.

Season Extended

Olga formed from another non-tropical low that became a subtropical storm about 1450 kilometers East Southeast of Bermuda near the end of the season on November 24. The storm moved Northwest to westward for a day or so. On the 26th, the cyclone became a tropical storm and then a hurricane about 800 kilometers East of Bermuda. *Olga* slowed, meandered and executed a counterclockwise loop on the 27th after which it strengthened to a peak intensity near 145 km/h. *Olga* made another counterclockwise loop on the next day and then weakened back to a tropical storm while moving southwestward on the 29th and finally dissipated on the fourth of the month, while approaching the Northern coast of Cuba.

Trop. Depr. Nr.	Name	Period	Min. air pressure	Maximum wind
1	T.S. Allison	June 5 - 17	1000 hPa	95 km/hr
3	T.S. Barry	August 2 - 7	990 hPa	115 km/hr
4	T.S. Chantal	August 14 - 22	997 hPa	115 km/hr
5	T.S. Dean	August 22 - 28	994 hPa	115 km/hr
6	Hurricane Erin	September 1 - 15	968 hPa	195 km/hr
7	Hurricane Felix	September 6 - 18	962 hPa	185 km/hr
8	Hurricane Gabrielle	September 11 - 19	975 hPa	130 km/hr
10	Hurricane Humberto	September 21 - 27	970 hPa	170 km/hr
11	Hurricane Iris	October 4 - 9	948 hPa	235 km/hr
12	T.S. Jerry	October 6 - 8	1005 hPa	80 km/hr
13	Hurricane Karen	October 12 - 15	982 hPa	225 km/hr
14	T.S. Lorenzo	October 27 - 31	1007 hPa	65 km/hr
15	Hurricane Michelle	October 29 - November 5	933 hPa	225 km/hr
16	Hurricane Noel	November 4 - 6	986 hPa	120 km/hr
17	Hurricane Olga	November 24 - December 4	973 hPa	145 km/hr

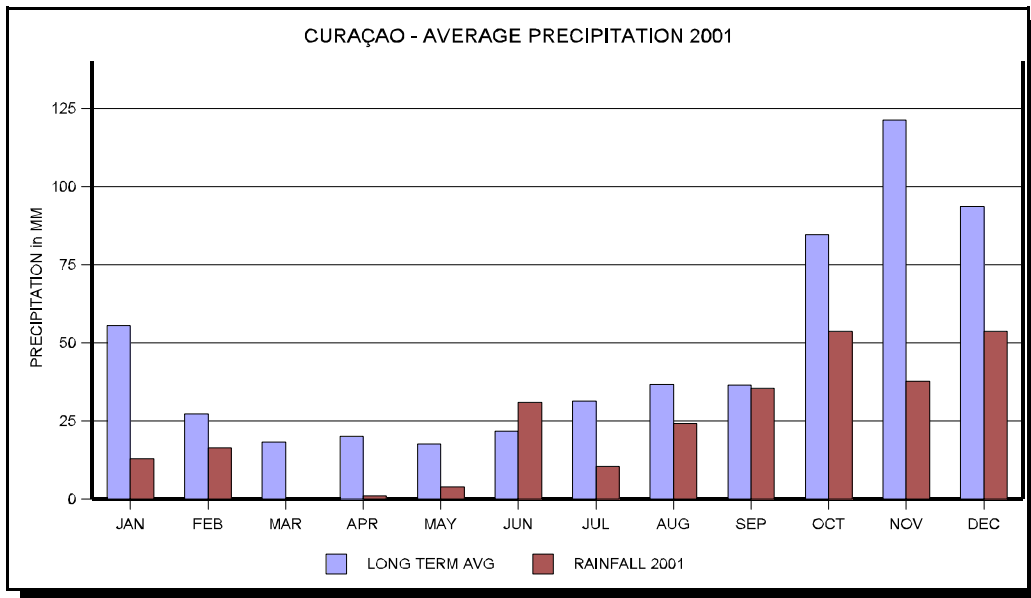
ABC-Islands

Curaçao

PRECIPITATION

The year 2001 was with an average of 280.6 mm a very dry year. This average is 49% below the long term average of 553.4 mm (1971-2000). The rainfall station at Mahuma had the highest year total of 372.1 mm.

The maximum 24-hour rainfall total for Curaçao was 134,5 mm and was measured at rainfall station *Aqualectra* at Mundu Nobo on October 18. Flooding was reported in several houses and buildings in Otrobanda as a result of this heavy rain event. Rainfall station Van Engelen had the largest amount of days with rainfall \$1.0 mm: 55 days.



Rainfall data from Hato rainfall station

The rainfall total for Hato in 2001 was 331.2 mm. The 24 hour maximum of 55.8 mm was recorded on October 25. The one hour maximum 22.6 mm was recorded on November 4 between 11:00 and 12:00 hours. The maximum intensity per minute for 2001 was 2.0 mm and occurred three times during last year.

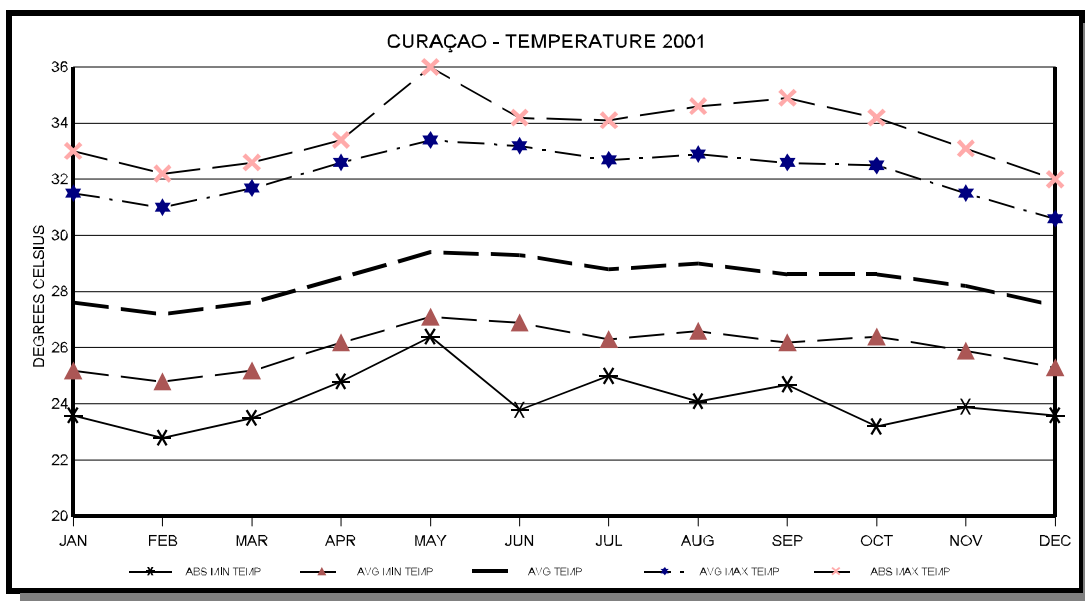
The hours with rainfall for the year 2001 recorded at Hato International Airport totaled 136 hours. The maximum rainfall duration (in minutes) was 95 minutes and was observed on December 3.

TEMPERATURE

The average air temperature as recorded at Hato International Airport over the year 2001 was 28.4/C (normal 27.8/- standard deviation 0.7). Three new records were established for the month of May (Climatological Summary 1971-2000). May was the warmest month of the past year with a highest daily average temperature of **29.4/C** (normal 28.2/C). This month also had the highest average maximum temperature of **33.4/C** (normal 31.6/C). The maximum temperature of the past year was **36.0/C** (normal 35.8/C established in 1987) and was recorded on May 6 at 12:19 hours.

The coolest month of last year was February with the lowest daily average temperature of 27.2/ C and the lowest average minimum temperature 24.8/C.

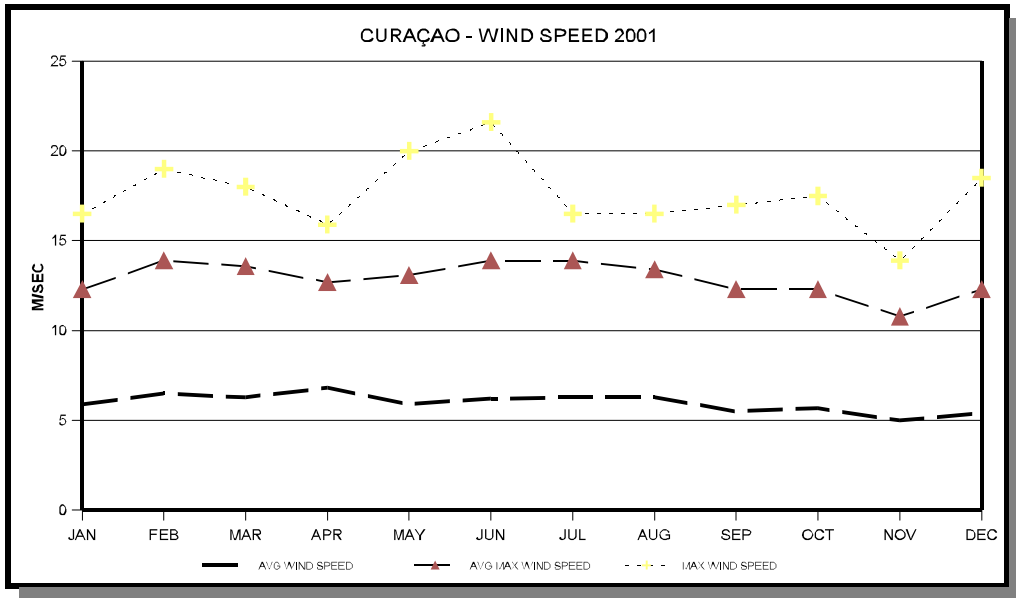
The absolute minimum temperature of 22.8/C was observed on February 28 at 06:25 hours.



WIND

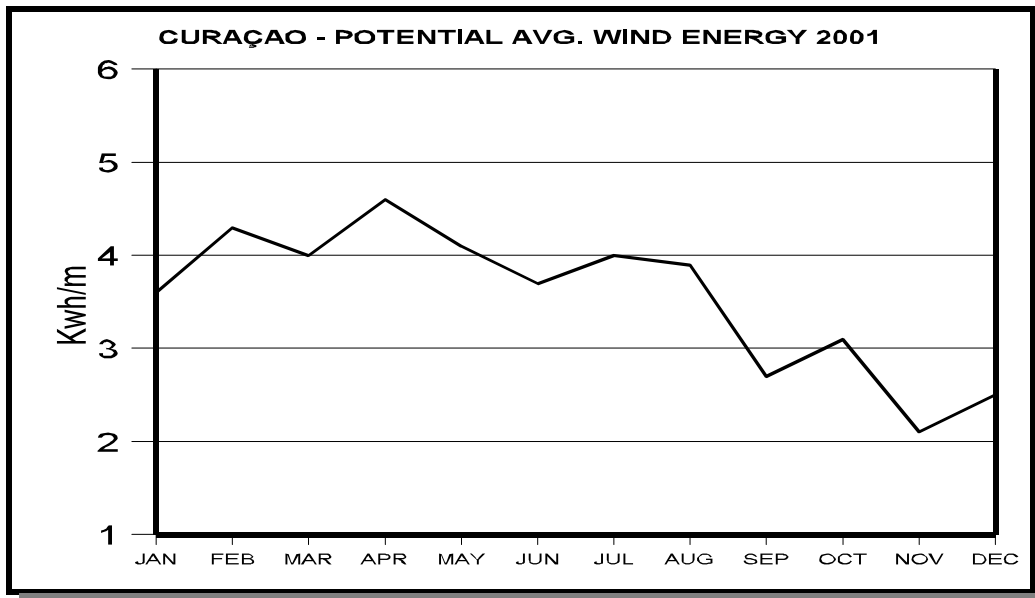
The average wind speed for the past year was 6.0 m/sec (21.6 km/hr) at a height of 10m and the average wind direction was 94/.

May was the month with the highest average wind speed of 6.8 m/sec (24.5 km/hr) and November had the lowest average wind speed 5.0 m/sec (18 km/hr). The highest daily average wind speed of 8.8 m/sec (31.8 km/hr) was recorded on July 17 and the lowest daily average wind speed of 2.5 m/sec (8.8 km/hr) was on November 3. The highest wind gust 21.6 m/sec (77.8 km/hr) was observed on June 27 at 07:41 hours during a heavy shower.



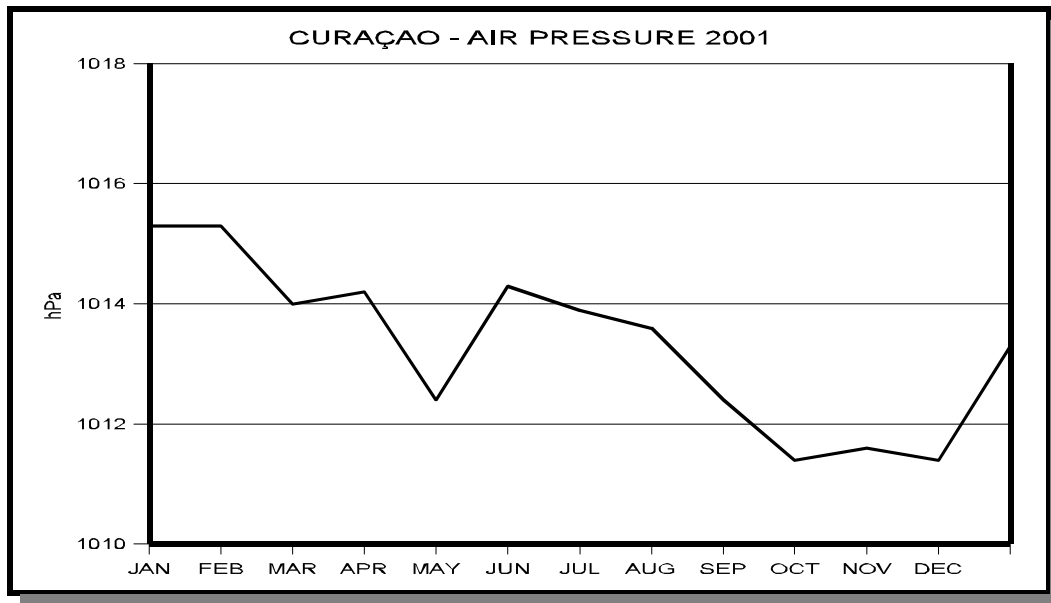
POTENTIAL WIND ENERGY

The total potential wind energy (at 10m height and wind speeds ≥ 4 m/sec) for the year 2001 was 1267.7 kWh/m². The daily average was 3.5 kWh/m²/day.



AIR PRESSURE

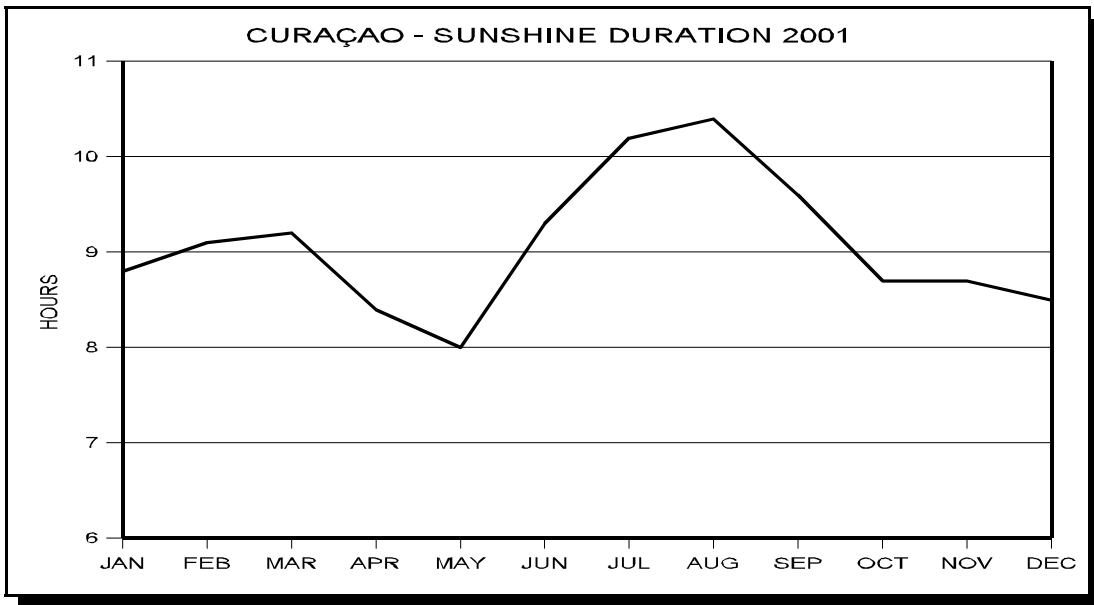
The average air pressure recorded at Hato Airport over the past year was 1013.3 hPa. The maximum air pressure of 1019.4 hPa was recorded on January 20 while the minimum air pressure of 1007.0 hPa was observed on October 17 and November 5.



SUNSHINE DURATION

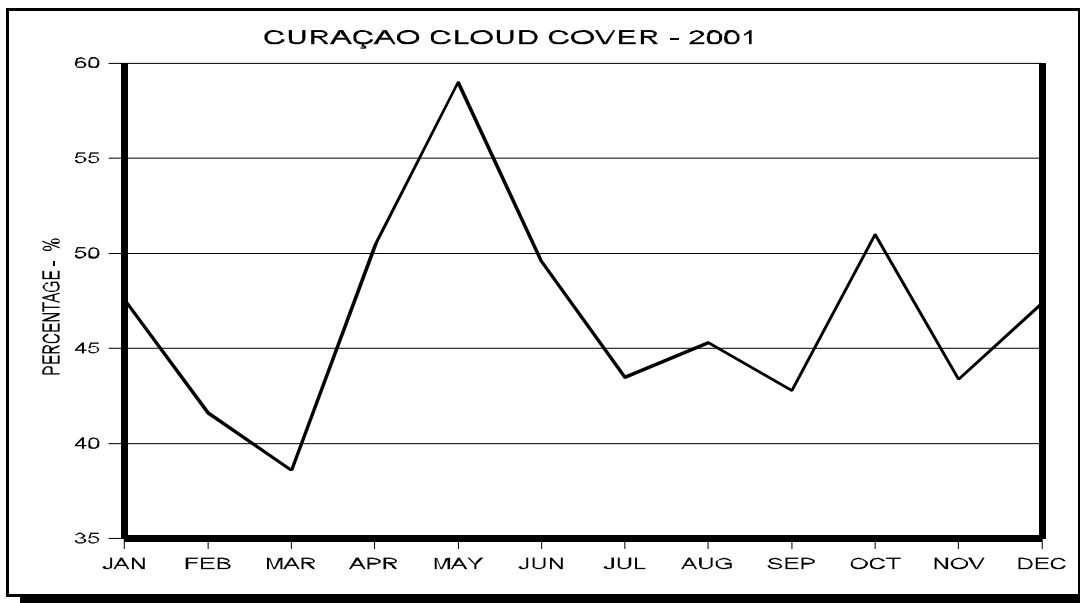
The total sunshine duration for the past year was 3096.1 hours. This was 74.8% of the maximum possible duration (4428 hrs). The average daily sunshine duration was 9 hours and 6 minutes.

The sunniest month, August, had a daily average sunshine duration of 10.4 hours while the month with least sunshine, May, had a daily average of 8.0 hours of sunshine duration. The days with the maximum sunshine duration, 11 hours and 42 minutes, were May 11, July 26 and August 22.



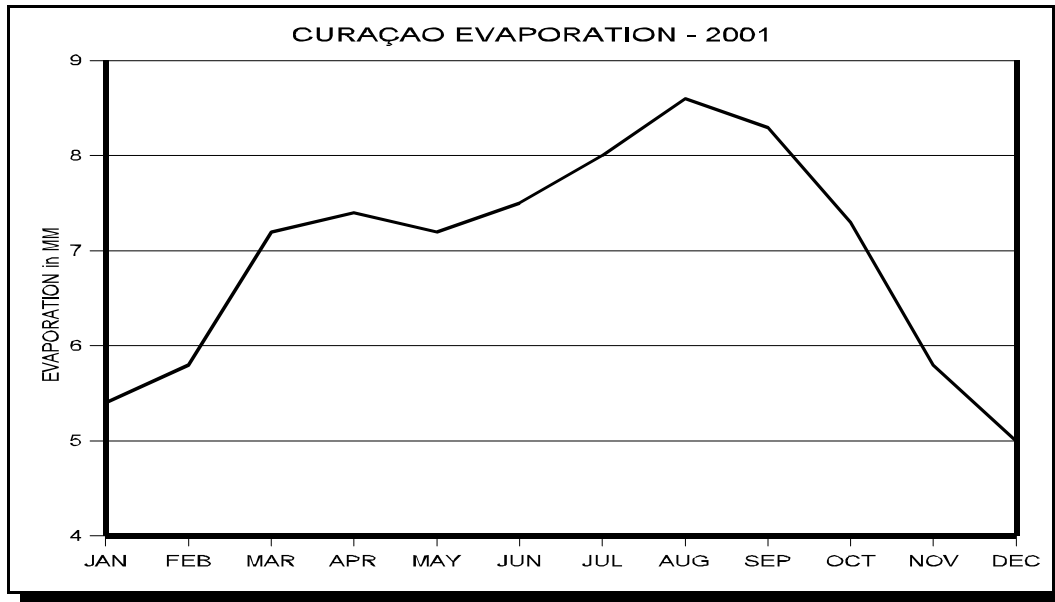
CLOUD COVER

The average cloud cover for the past year was 46.7%. The highest total cloud coverage per month was 59.0% and was observed in May. The lowest was 38.6% and was recorded in March.



EVAPORATION

The site of the evaporation pan is located at the Meteorological Service at Seru Mahuma. The daily average evaporation for the year 2001 was 7.0 mm. August had the highest daily average evaporation value of 8.6 mm while December had the lowest value of 5.0 mm.

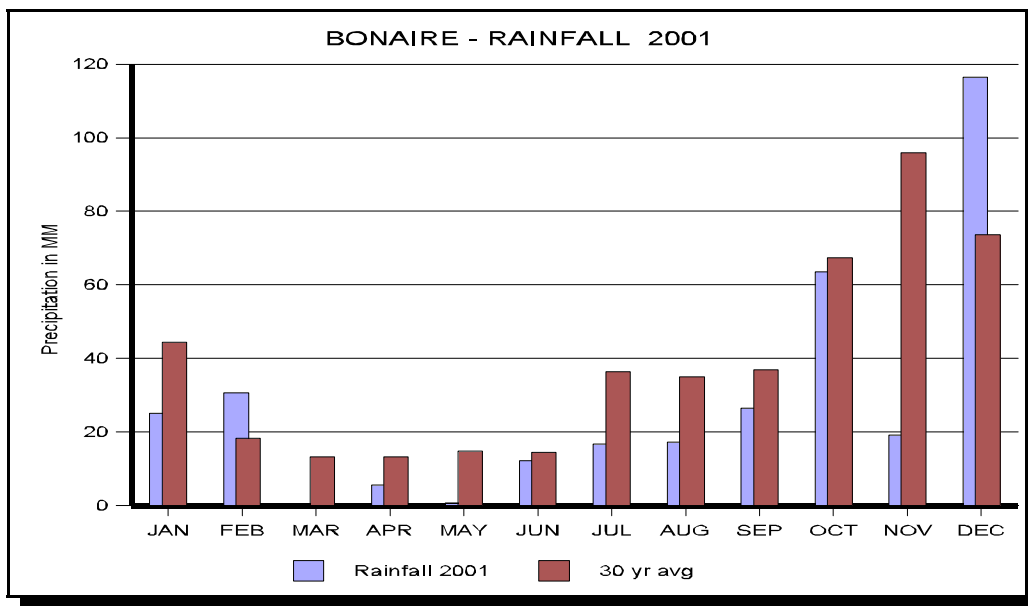


Bonaire

PRECIPITATION

The rainfall total, over the year 2001, as recorded at the Flamingo Airport of Bonaire was 333.8 mm. This amount is 28 % below the 30-year average (1971-2000) which is 463.4 mm. With the exception of February and December the island of Bonaire experienced dry to very dry conditions. The driest months being March, May and November resp. 98.5, 95.9 and 80.0 percent below of the normal(1970-2000). December was the wettest month with a total of 116.4 mm.

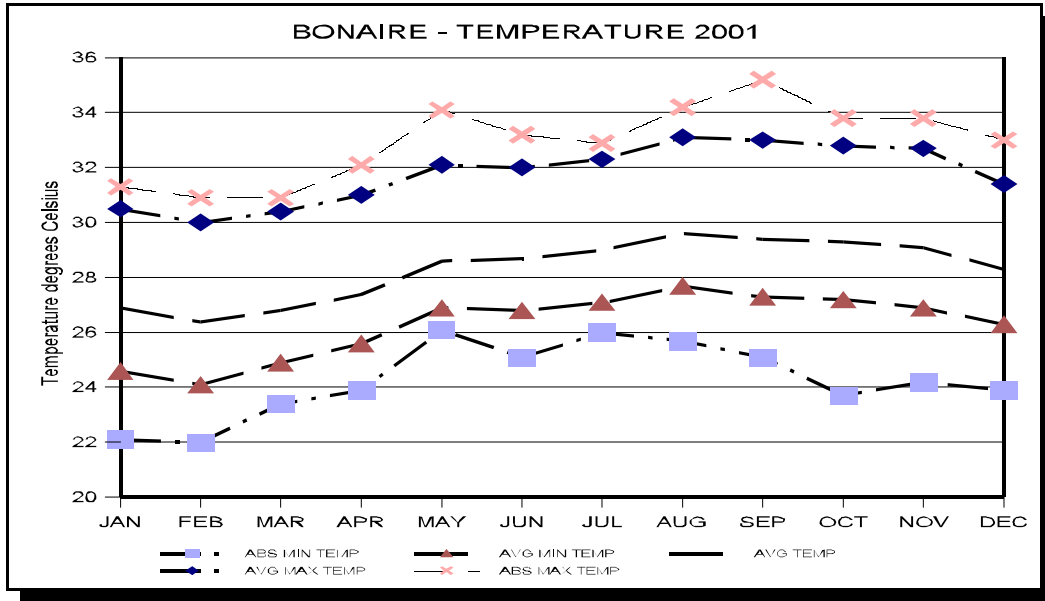
The 24-hour maximum was 79.6 mm and occurred on December 4. The number of days with precipitation ≥ 1.0 mm was 52.



TEMPERATURE

The average air temperature recorded at the Flamingo Airport of Bonaire over the year 2001 was 28.3/C (normal 28.0). The month of August was the warmest month of the past year with highest average temperature of 29.6/C. It was also the month with the highest average maximum temperature of 33.1/C. The coolest month of the past year was February with the lowest average temperature of 26.4/C and was also the month with the lowest average minimum temperature 24.1/C.

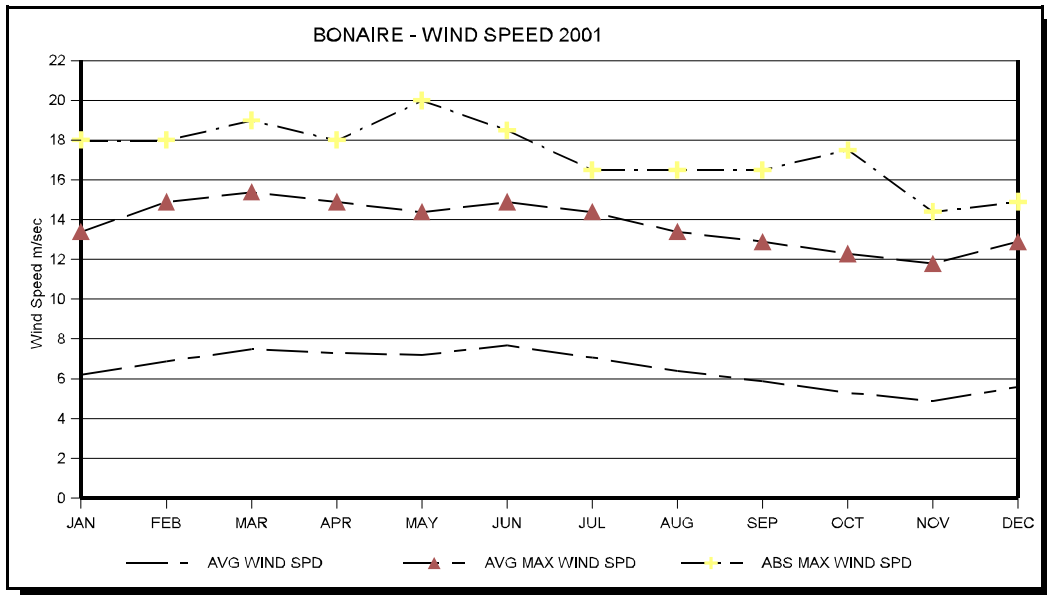
The absolute maximum temperature of the past year was 35.2/C. It was recorded on September 1 at 13:17 hours and the absolute minimum temperature of 22.0/C was observed on February 28 at 03:51 hours.



WIND

The average wind speed for the past year was 6.6 m/sec (23.8 km/hr) at 10m height. June was the month with the highest daily average wind speed 7.7 m/sec (27.7 km/hr) and November had the lowest daily average wind speed 4.9 m/sec (17.6 km/hr).

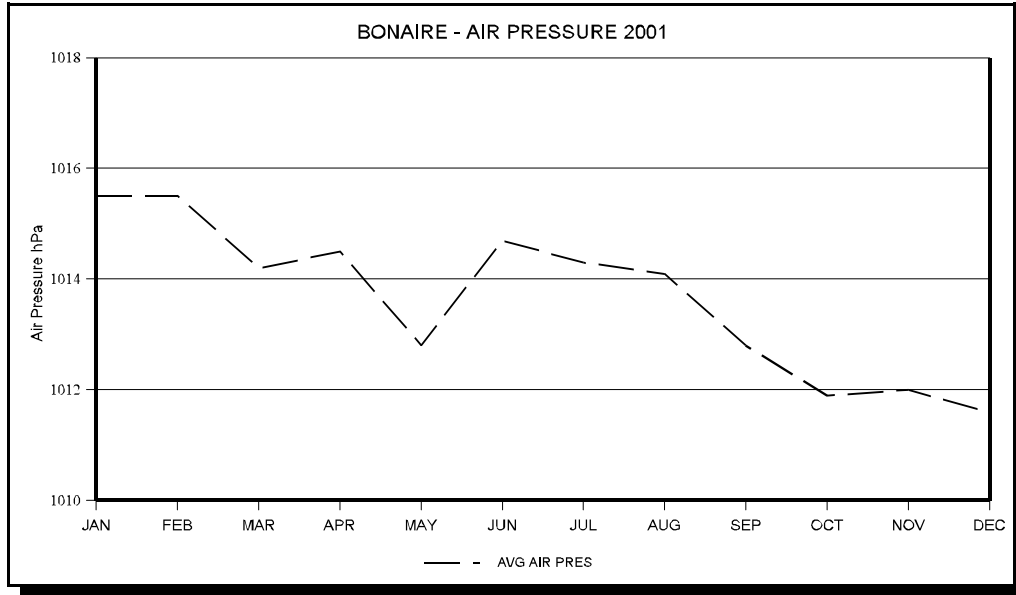
The day with the highest average wind speed 10.4 m/sec (37.6 km/hr) was recorded on May 19. The lowest average wind speed 0.7 m/sec (2.4km/hr) was on observed on November 3.



The highest wind gust 20.0 m/sec (72.0 km/hr) was recorded on May 19 at 08:39 hours.

AIR PRESSURE

The average air pressure recorded at Flamingo Airport over the past year was 1013.7 hPa. The maximum air pressure of 1019.9 hPa was observed on January 20 while the minimum air pressure of 1007.4 hPa was recorded on October 17.

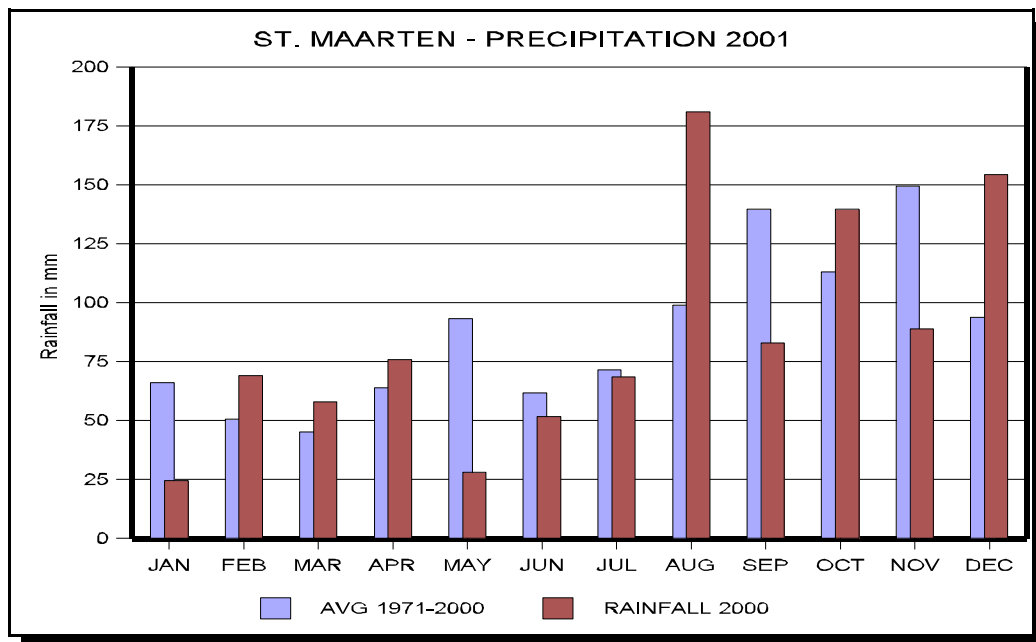


SSS ISLANDS

St. Maarten

PRECIPITATION

The rainfall total, recorded at the Princess Juliana Airport, for the year 2001 was 1023 mm. This amount is 3% below the 30-year average (1971-2000) which is 1047.1 mm. January and May were very dry months with respectively 24.4 mm and 28.1 mm. August was the wettest month with 181.0 mm which was 83% above the 30-year average. The 24-hour maximum was 85.0 mm and occurred on August 23. The number of days with precipitation ≥ 1.0 mm was 139.

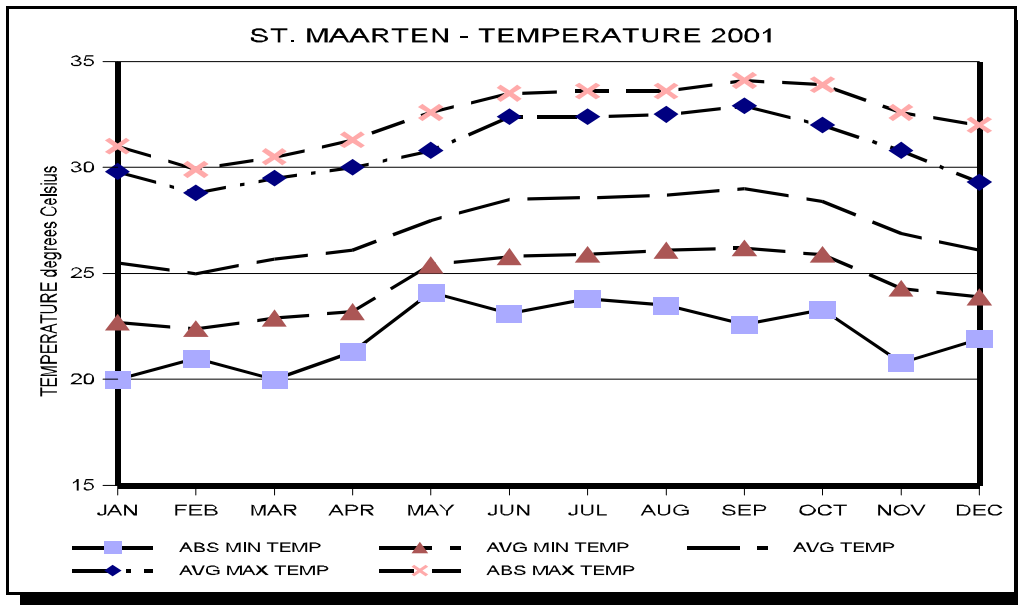


TEMPERATURE

The average air temperature as recorded at Princess Juliana Airport over the year 2001 was 27.2/ C (normal 27.2/). September was the warmest month of the past year with a monthly average temperature 29.0/C and September had also the highest monthly average maximum temperature of 32.9/C .

The absolute maximum temperature of the past year was 34.1/C and was recorded on September 21 at 13:30 hours local time. The lowest monthly average temperature was 25.0/C and was observed in February and February had also the lowest average minimum temperature of 22.4/C.

The absolute minimum temperature was 20.0/C and was recorded twice in the past year on January 11 at 06:15 and March 1 at 06:16 hours local time.

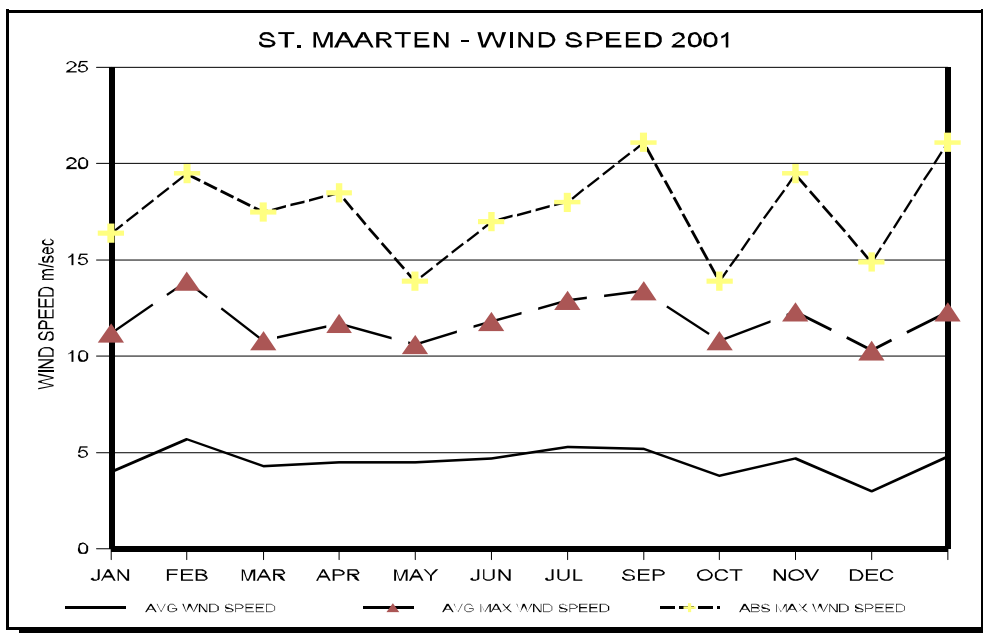


WIND

The average wind speed for the past year was 4.5 m/sec (16.2 km/hr) at 10m height. February was the month with the highest average wind speed 5.7 m/sec (20.5 km/hr) and November had the lowest average wind speed 3.0 m/sec(10.8 km/hr).

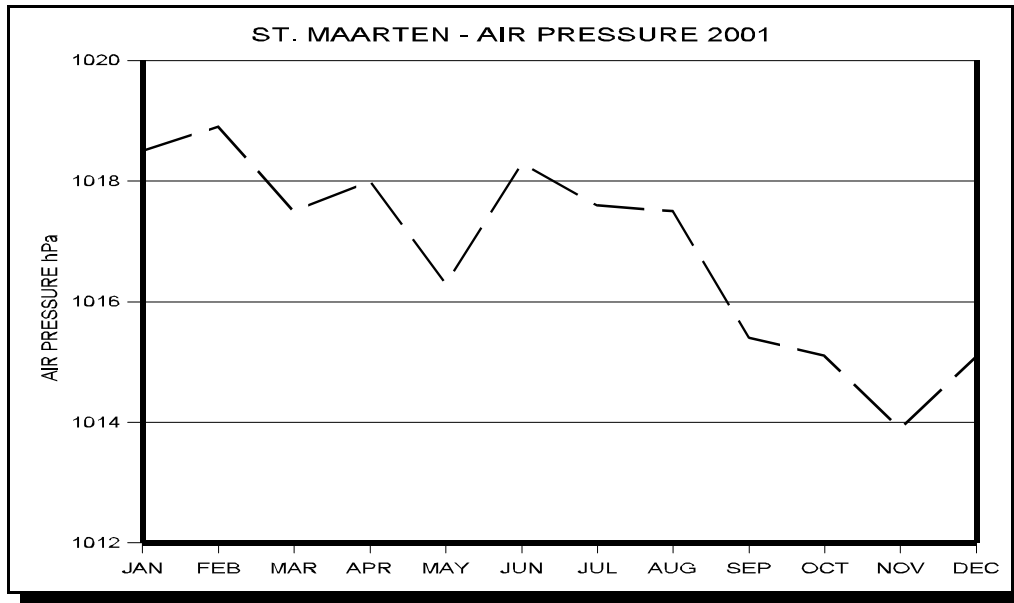
The highest daily average wind speed of 8.8 m/sec (31.6 km/hr) was recorded on February 12 and the lowest daily average wind speed of 0.7 m/sec (2.6 km/hr) was on November 17.

The highest wind gust 21.1 m/sec (76.0 km/hr) was observed on August 22 at 04:31 a.m. and December 13 at 18:13 hours local time.



AIR PRESSURE

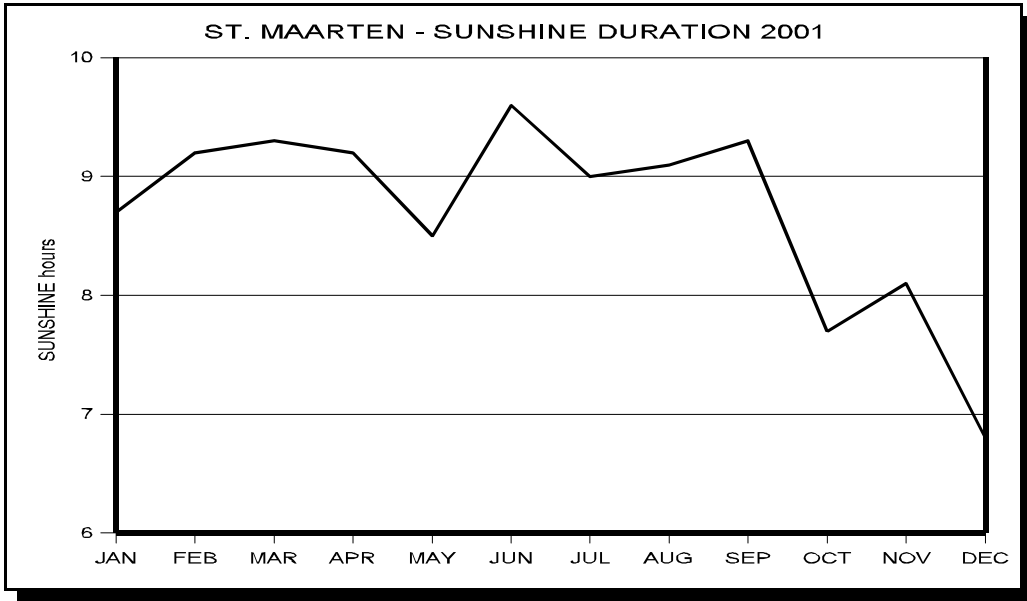
The average air pressure, recorded at Princess Juliana Airport, over the past year was 1016.8 hPa. The maximum air pressure of 1023.4 hPa was observed on the 13th of February while the minimum air pressure of 1011.5 hPa was recorded on November 12.



SUNSHINE

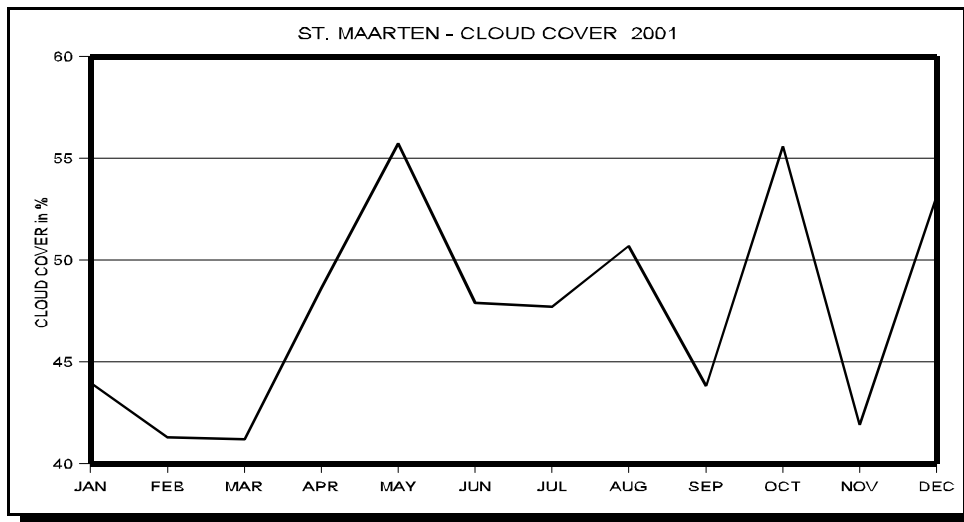
The total sunshine duration for the past year was 3167.8 hrs. This is 71.5% of the maximum possible duration (4431.3 hrs). The average daily sunshine duration was 8 hours and 42 minutes.

The sunniest month was April with a daily average sunshine duration of 9 hours and 36 minutes. The month with least sunshine in 2001 was December with a daily average of 6 hours and 48 minutes. The longest daily sunshine duration for the past year was 11 hours and 36 minutes and it was recorded on April 15.



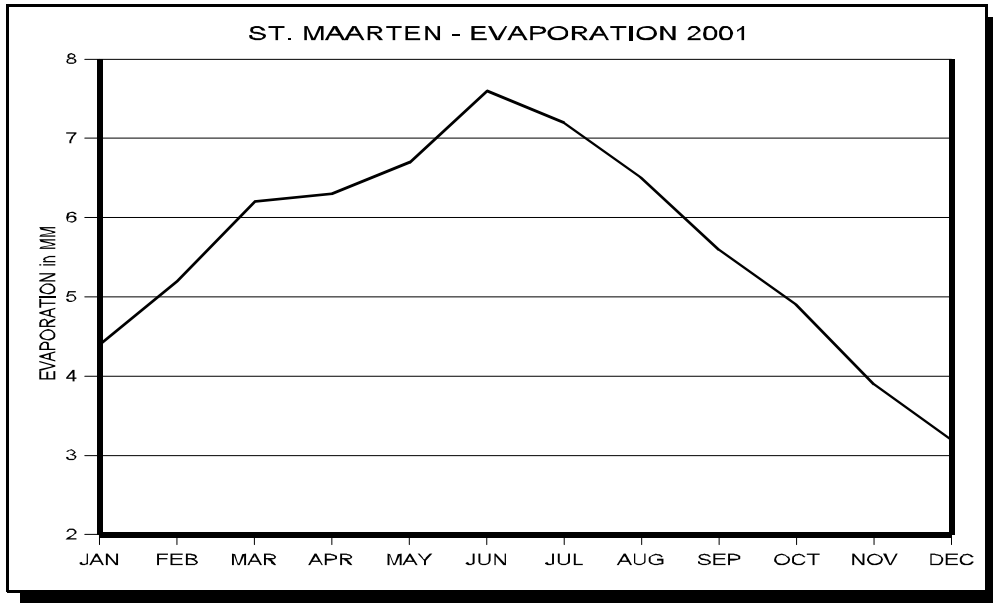
CLOUD COVER

The daily average clouds cover for St. Maarten over the past year as recorded at Princess Juliana Airport was 47.6%. The highest daily average cloud cover/month of 55.7% was recorded in May. December had the lowest value of 41.2%.



EVAPORATION

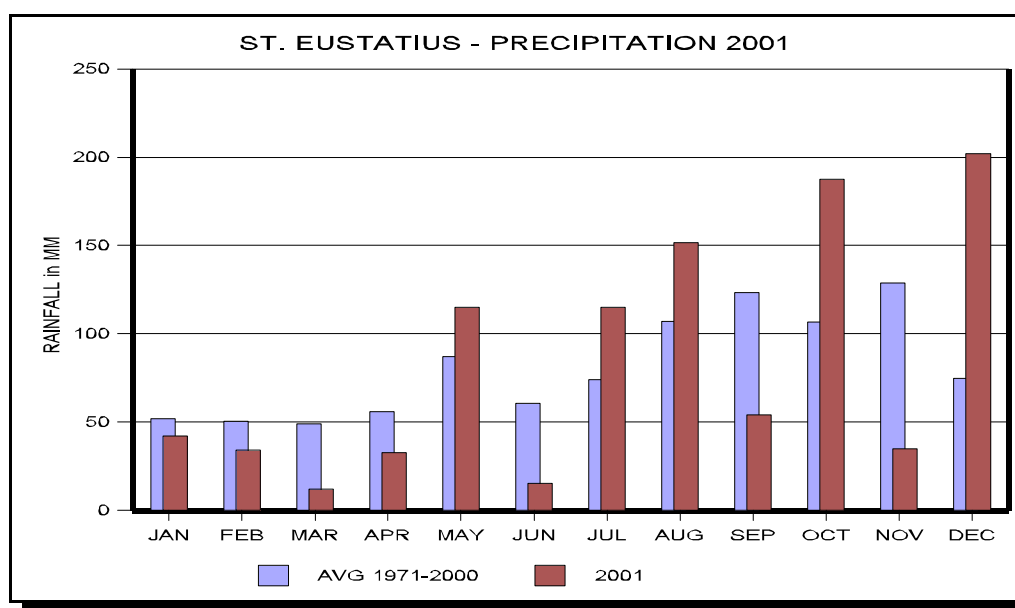
The average daily evaporation, measured at the Princess Juliana Airport, for the year 2001 was 5.6 mm. June had the highest average evaporation value of 7.6 mm while December had the lowest value of 3.2 mm.



St. Eustatius

PRECIPITATION

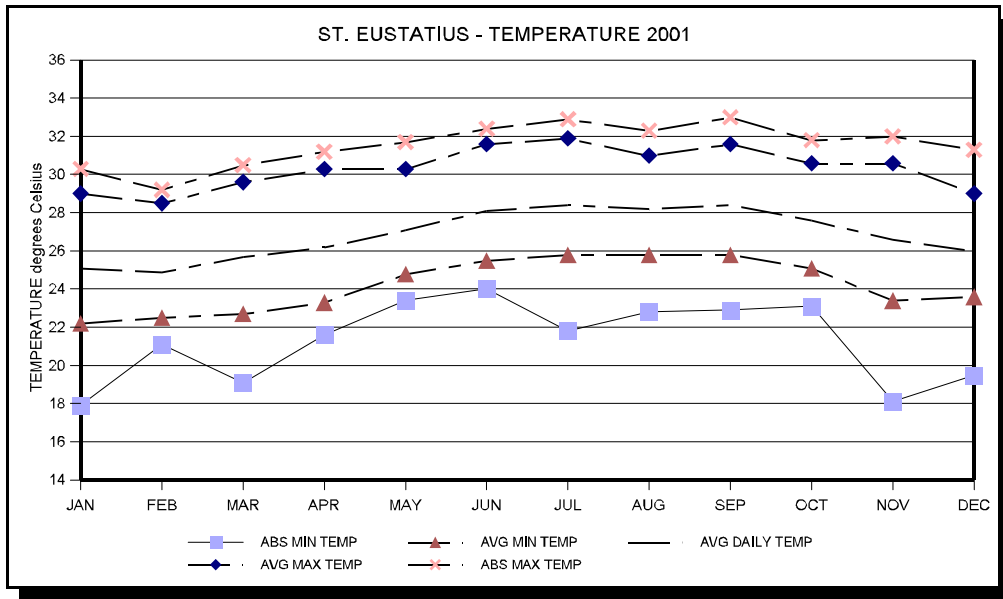
The rainfall total, recorded at the Roosevelt Airport, for the year 2001 was 995.8 mm. This amount is just above the 30-year average (1971-2000) which is 985.8 mm. The 24-hour maximum was 77.0 mm and occurred on July 30. The number of days with precipitation ≥ 1.0 mm was 117. December was the wettest month of 2001 with a monthly total of 202 mm and the driest month was March with 11.8 mm.



TEMPERATURE

The average air temperature as recorded at Roosevelt Airport over the year 2001 was 26.9°C (normal 26.9°C). July and August were the warmest months of the past year with highest monthly average temperature 28.4°C. July had the highest average monthly maximum temperature of 31.9°C. The absolute maximum temperature of the past year was 33.0°C and was recorded on the 16th of September at 13:23 local time.

February was the coolest month with a monthly average temperature of 24.9°C while the month with the lowest average minimum temperature was January at 22.2°C. The absolute minimum temperature was 17.9°C and was recorded on the 15th of January at 03:39 local time.

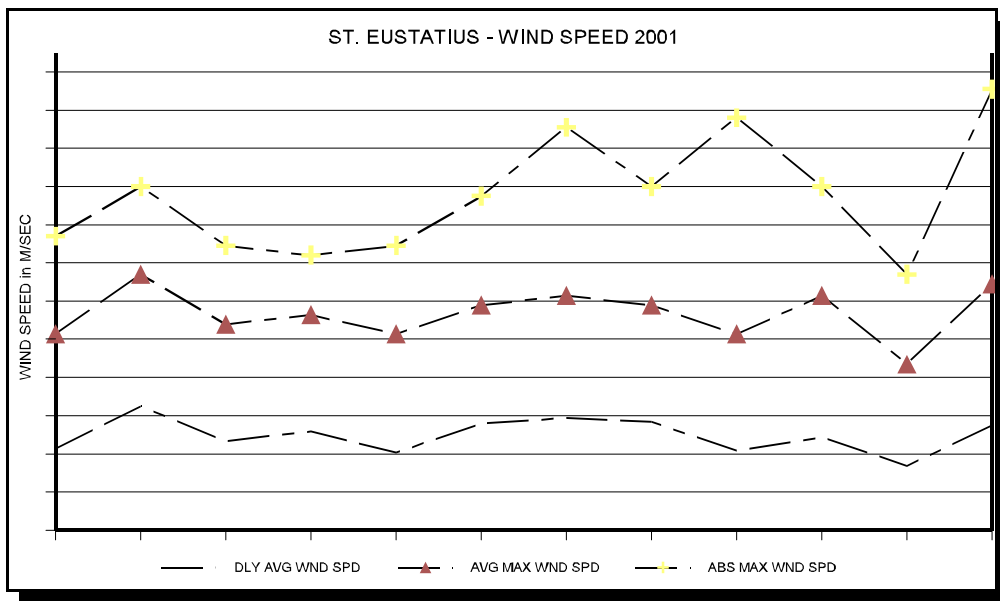


WIND

The average wind speed for the past year was 5.0 m/sec (18.0 km/hr) at 10m height. January was the month with the highest average wind speed 6.5 m/sec (23.4 km/hr) and September had the lowest average wind speed 3.4 m/sec (12.2 km/hr).

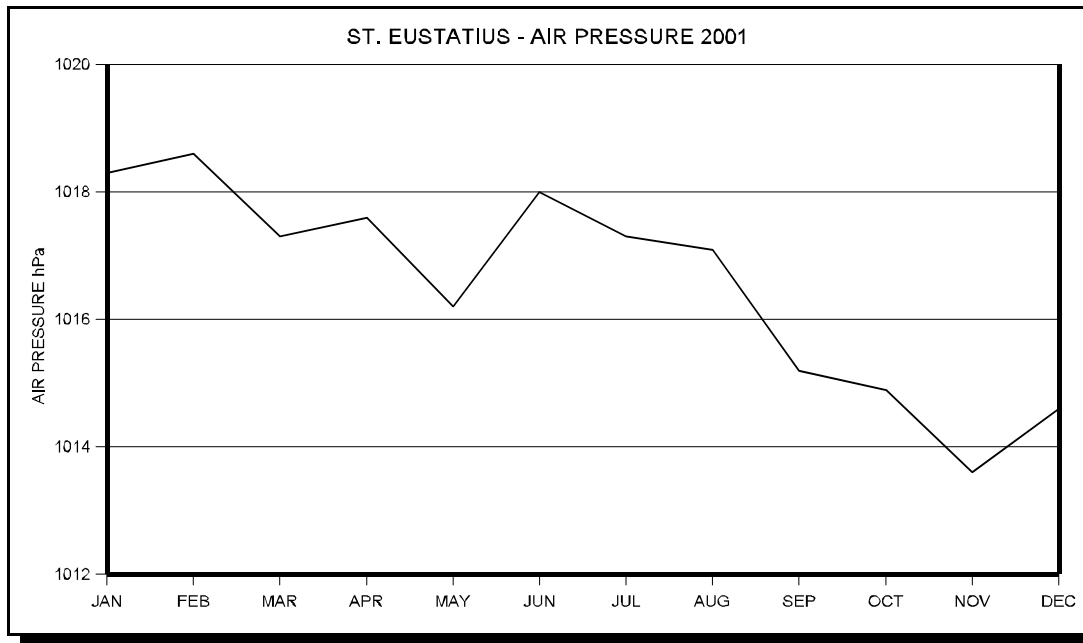
The highest daily average wind speed of 8.3 m/sec (30 km/hr) was recorded on July 16 and the lowest daily average wind speed of 0.7 m/sec (2.5 km/hr) was on November 3.

The highest wind gust 23.1 m/sec (83.2 km/hr) was observed on December 13 at 18:30 local time.



AIR PRESSURE

The average air pressure recorded at Roosevelt Airport over the past year was 1016.6 hPa. The maximum air pressure of 1023.6 hPa was observed on the 20th of January while the minimum air pressure of 1008.8 hPa was recorded on November 26.

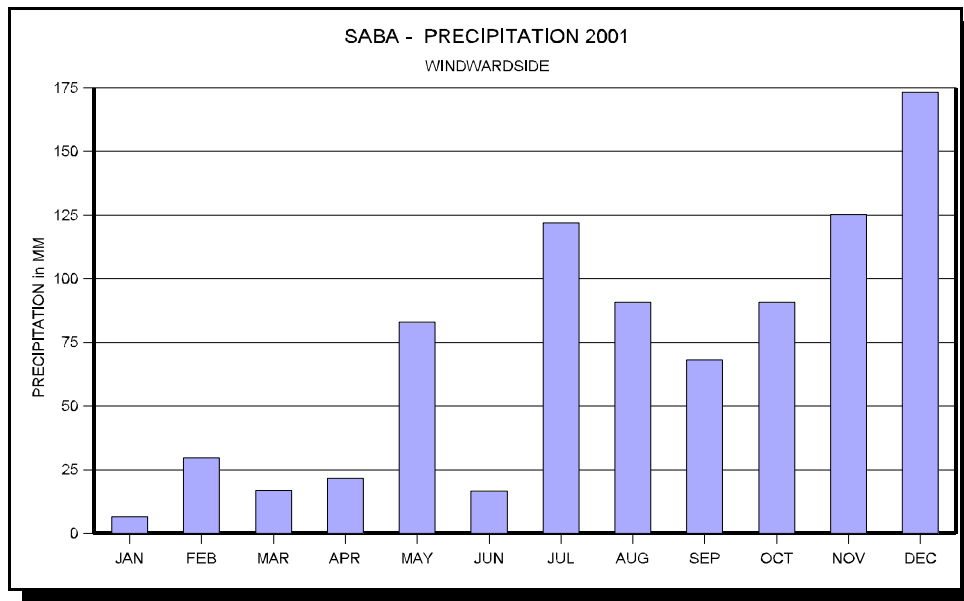


Saba

PRECIPITATION

The rainfall total, recorded at Windwardside, Saba, for the year 2001 was 844.5 mm. The 24-hour maximum was 102 mm and occurred on July 30.

Due to technical problems, no data is available from the Juancho Yrausquin Airport at Saba. The rainfall data is from the rainfall station at Windwardside.

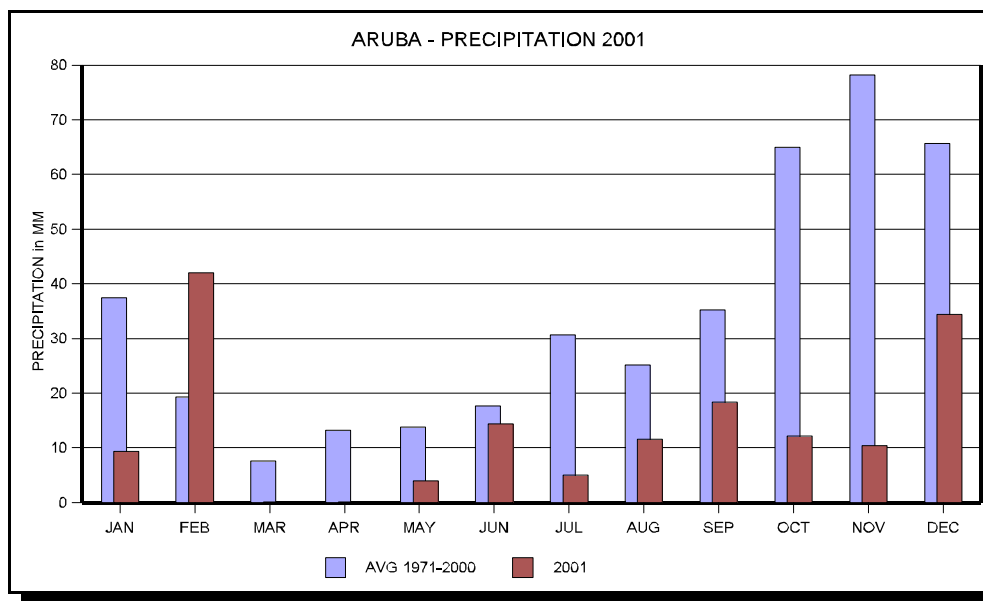


ARUBA

PRECIPITATION

The rainfall total, recorded at the Queen Beatrix Airport, for the year 2001 was 161.8 mm. This amount is 60% below the 30-year average (1971-2000) which is 409.0 mm. Only the month February was above the long term monthly average. The rest of the year Aruba experienced dry to very dry conditions.

The 24-hour maximum was 23.6 mm and occurred on February 21. The number of days with precipitation ≥ 1.0 mm was 48.

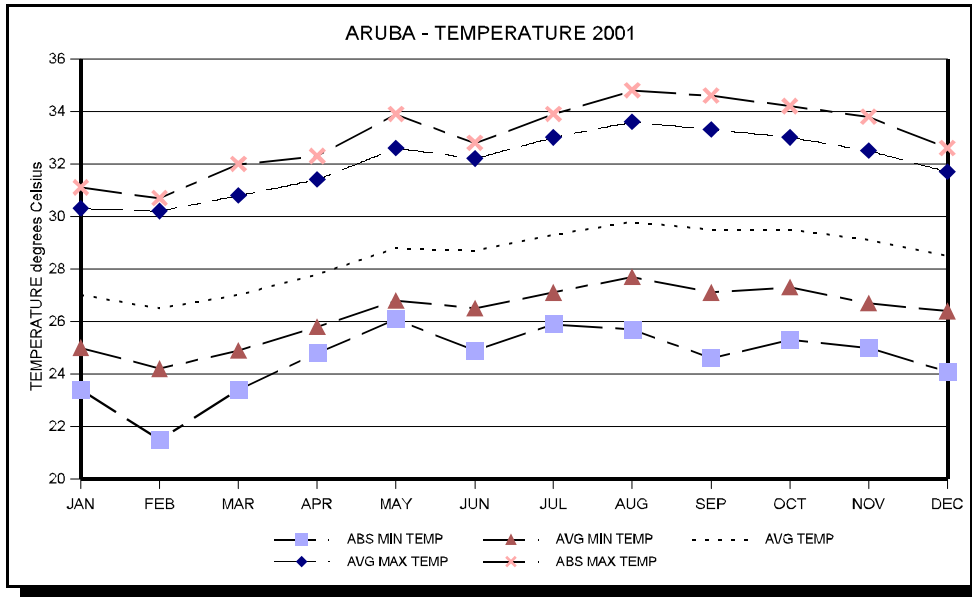


TEMPERATURE

The average air temperature as recorded at Queen Beatrix Airport over the year 2001 was 28.5/C (normal 27.8/). August was the warmest month of the past year with highest monthly average temperature 29.8/C. August had the highest monthly average maximum temperature of 33.6/C . The absolute maximum temperature of the past year was 34.8/C and was recorded on August 20 at 14:20 local time.

February was the coolest month with a monthly average temperature was 26.5/C' and also the lowest monthly average minimum temperature of 24.2/C was recorded in February.

The absolute minimum temperature was 21.5/C and was recorded on February 22 at 07:33 local time.

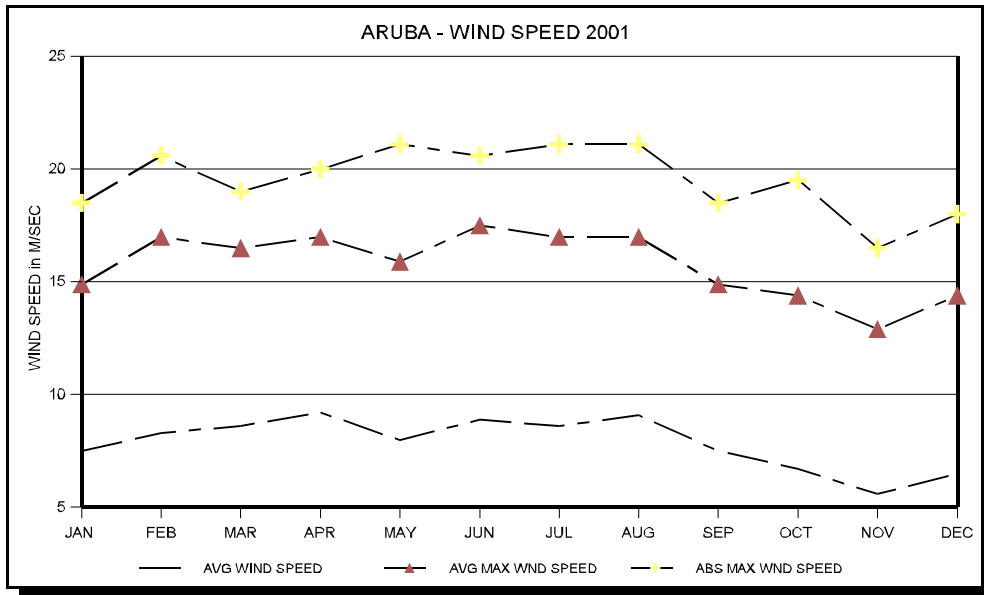


WIND

The average wind speed for the past year, recorded at Queen Beatrix Airport was 7.9 m/sec (28.4 km/hr) at 10m height.

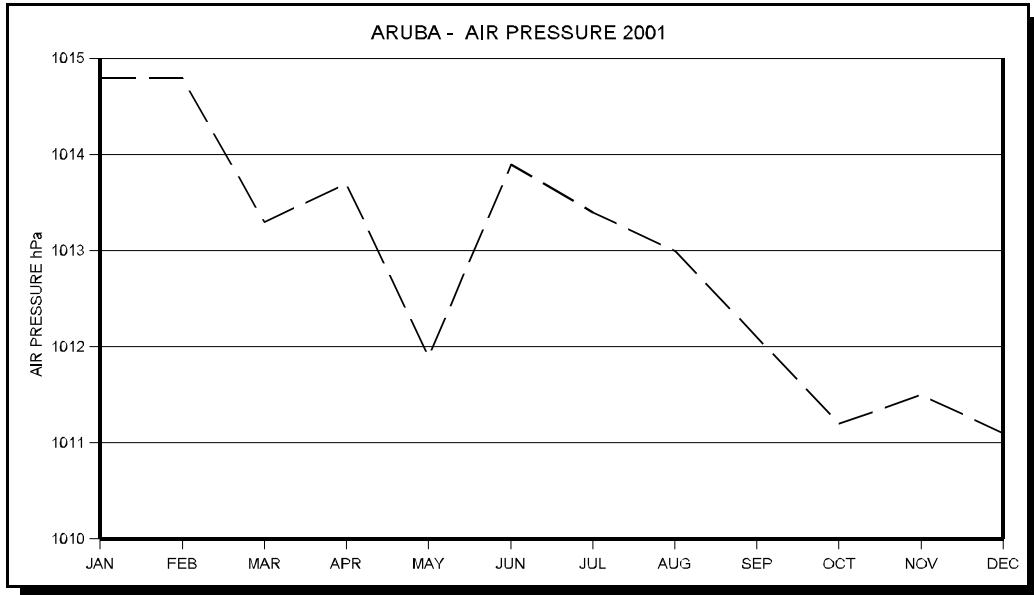
April was the month with the highest average wind speed 9.2 m/sec (33.1 km/hr) and November had the lowest average wind speed 5.6 m/sec (20.2 km/hr). The highest daily average wind speed of 11.5 m/sec (41.4 km/hr) was recorded on August 21 and the lowest daily average wind speed of 1.4 m/sec (5.4 km/hr) was on November 3.

The highest wind gust 21.1 m/sec (76.0 km/hr) was observed on various occasions, respectively May 20, July 17 and August 18.



AIR PRESSURE

The average air pressure recorded at Queen Beatrix Airport over the past year was 1012.9 hPa. The maximum air pressure of 1018.7 hPa was observed on January 28 while the minimum air pressure of 1006.7 hPa was recorded on November 5.



Rainfall outlook for 2002

Climate mechanisms, which drive the rainfall on our islands, are the extension of the North Atlantic high, the sea surface temperature (SST) in the Tropical Atlantic Ocean, the Caribbean Sea and the Equatorial Pacific region (El Niño regions). During the summer the sun heats up the surface of the Caribbean Sea and the North Atlantic Ocean. Consequently, the atmospheric moisture in this region will be abundant. Atmospheric conditions in the region are also important for the development of rain producing clouds. When sea surface temperatures and the atmospheric conditions are favourable, the rainfall will be abundant in rainfall seasons.

In the Atlantic Ocean there is a flow of oceanic surface water propagating from west of South Africa to Iceland, which is a component of the oceanic conveyor belt. There are periods of time that the tropical Atlantic Ocean and consequently the Caribbean Sea will be warmer than normal. As result of this the rainfall season in those years has a tendency be abundant and a hurricane season will have increased activity.

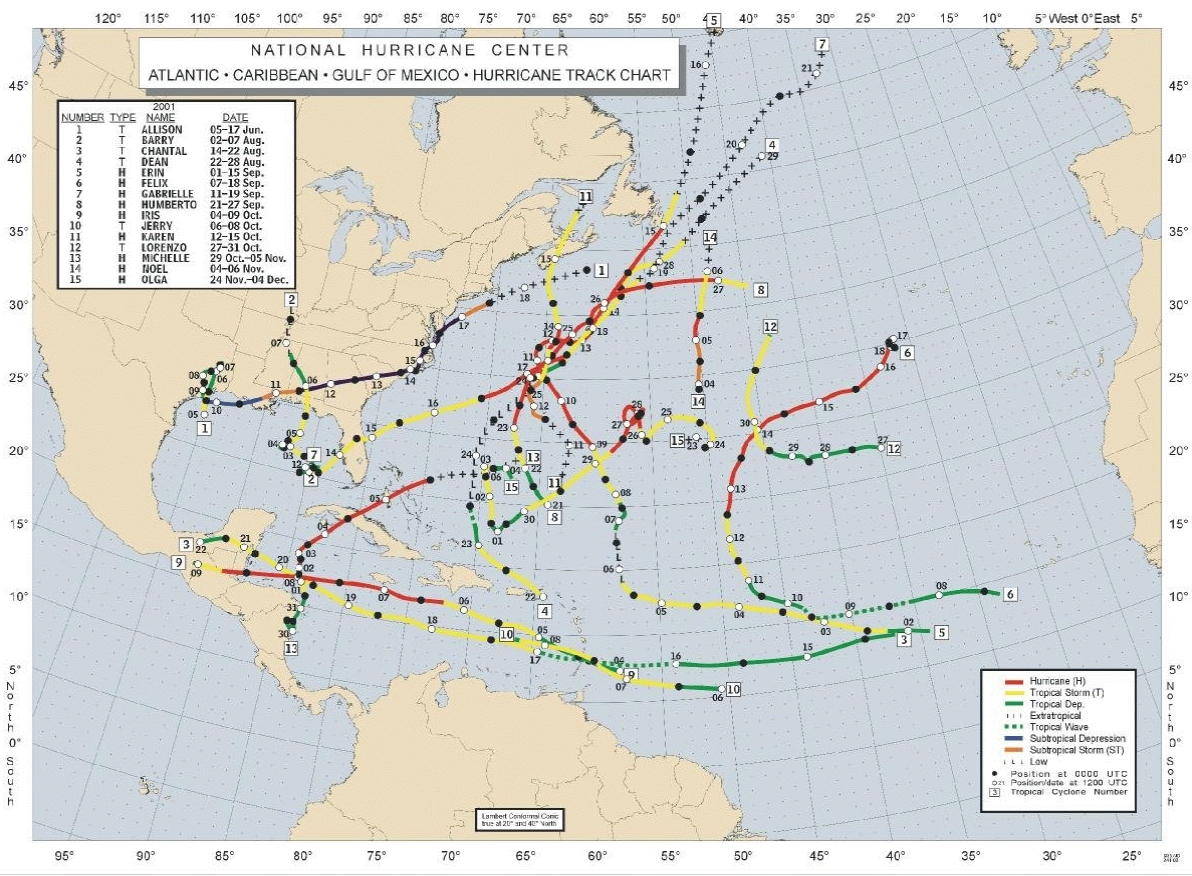
The El Niño Southern Oscillation (ENSO) is an unusual warming or cooling of the SST in the tropical Pacific Ocean. Each phase of ENSO induces changes in the global atmospheric circulation. In the Caribbean during a warm phase of ENSO (El Niño) the favourable conditions are in the northwest of the Caribbean and the unfavourable conditions are in the southern region. Hence, for our islands rainfall activity will be suppressed only on the ABC islands and not on the SSS islands. The hurricane activity is also reduced during this period. The cold phase of ENSO (La Niña) induces the reverse atmospheric conditions in the Caribbean. Since the warm/cold SST of the ENSO is not linked directly to the rainfall activity in the Caribbean or elsewhere, this is called a teleconnection. There are also some years that there is neither an El Niño nor a La Niña; this is called the intermediate phase. During this period the influence of the Tropical Atlantic Ocean, the Caribbean Sea and local features will be more prominent on the rainfall pattern in our Islands.

In 2001 the SST of the Tropical North Atlantic and the Caribbean Sea were colder than normal for the months of January through June, and normal for July, August and September. The last months of 2001 the SST became slightly warmer than normal. The ENSO was in an Intermediate phase during the 2001. Moreover, the atmospheric conditions were not favourable for the formation of rain producing clouds. Accordingly, the rainfall on the ABC Islands was below normal and the on the SSS Islands normal.

The condition of the Tropical Atlantic Ocean indicates that the sea surface temperature will be slightly warmer in 2002. The ENSO is expected to be near normal to moderate warm conditions (moderate El Niño). Consequently, the rainfall season for the ABC islands will moderately dry to near normal. On the other hand since the sea surface temperature of the Tropical Atlantic will slightly warmer, the SSS islands will have a normal rainfall for 2002.

As far as tropical cyclones over the Atlantic are concerned, Colorado State University's Dr. William Gray expects another season with above average activity. According to his forecast, thirteen tropical storms should develop in 2002. Eight of these should become hurricanes and he expects four of these to reach major hurricane strength (category three or higher on the Saffir-Simpson scale). The averages for the period 1950 - 2000 are 9.6 tropical storms, 5.9 hurricanes and 2.3 major hurricanes.

Cover: Collection of Meteorological Instruments used by this Service in the Past



Track of all 2001 Atlantic Tropical Cyclones