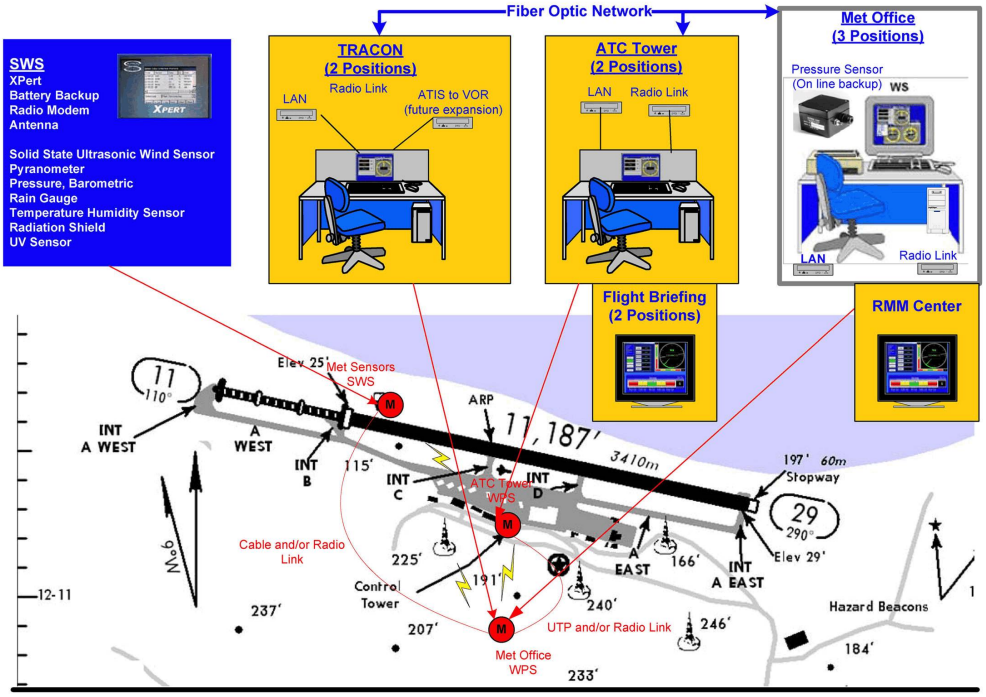
Meteorological Service of the Nederlands Antilles & Aruba



Climatological Summary 2005

Table of Contents

Climate Summary 2005 3
Rainfall Outlook 2006 6
Hurricane Season 2006 Outlook 6
Hurricane Season 2005 7

ABC-Islands 19
Curaçao 19
PRECIPITATION 19
TEMPERATURE 20
WIND 20
POTENTIAL WIND ENERGY 21
ATMOSPHERIC PRESSURE 21
SUNSHINE DURATION 22
CLOUD COVERAGE 23
EVAPORATION 23
Bonaire 24
PRECIPITATION 24
TEMPERATURE 24
WIND 25
ATMOSPHERIC PRESSURE 26
Aruba 27
PRECIPITATION 27
TEMPERATURE 27
WIND 28
ATMOSPHERIC PRESSURE 29
SSS-Islands 30
St. Maarten 30
PRECIPITATION 30
TEMPERATURE 30
WIND 31
ATMOSPHERIC PRESSURE 32
SUNSHINE 32
CLOUD COVER 33
EVAPORATION 33
St. Eustatius 34
PRECIPITATION 34
TEMPERATURE 34
WIND 35
ATMOSPHERIC PRESSURE 36
Saba 37
PRECIPITATION 37
Climatological Summary in Tabular Form 38
Track Map of 2005 Atlantic Tropical Cyclones 40

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Cover : New Automatic Weather Observation System (read more on page 6)

Climate Summary 2005

Globally

The global surface mean temperature in 2005 was estimated to be 0.48°C above the climatological normal of 1961-1990. This will place 2005 as the second warmest year on record and is likely to be among the warmest 4 years. 1998 remains with 0.54°C above normal the warmest year since the instrumental records started in 1861.
Nevertheless, the temperatures in June and October were the warmest on record exceeding those of 1998. Areas of significant warmth were parts of Africa, Australia, Brazil, China and the United States showing significantly above-average temperatures.
During the period October 2004 to June 2005, rainfall was less than half of the normal in some areas of the United Kingdom, France, Spain and Portugal. Spain and Portugal experienced the worst drought conditions since the late 1940s and the dry conditions provoked widespread wildfires.

Some areas of the tropical North Atlantic, the Caribbean Sea and tropical Indian Ocean were also significantly warm.

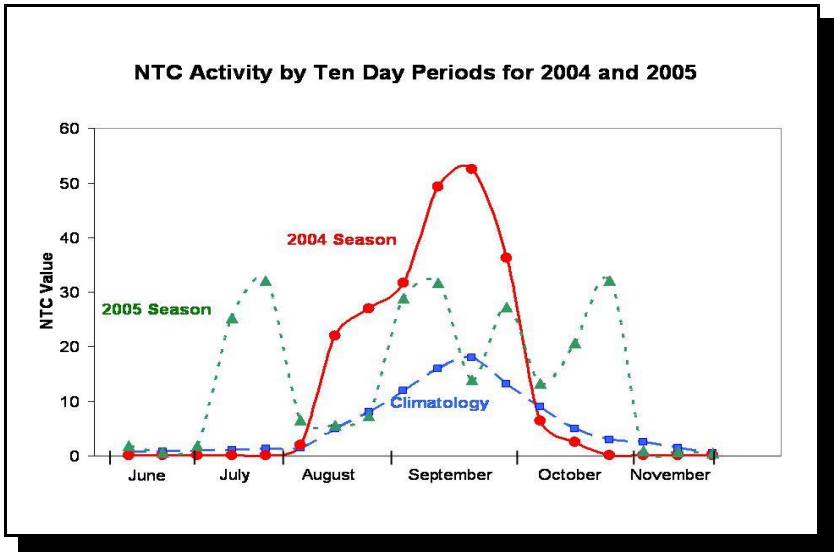
Heavy rains and massive flooding were brought by the south-west monsoon to parts of western and southern India during June-September, affecting more than 20 million people and resulting in more than 1800 deaths. On 27 July, Mumbai (Bombay) recorded 944 mm in 24 hours, which is an all-time 24-hour rainfall record for the city.

Caribbean Area

The year 2005 began with a normal Caribbean Sea and a warm North Tropical Atlantic Ocean (0.5-1.2°C above normal). The sea surface temperature in the Caribbean Sea gradually became warmer (1.0- 1.3°C above normal) late May. During the second half of 2005 the SST in the Caribbean Sea and the North Tropical Atlantic Ocean stayed warm about 0.5-1.0°C above normal.
The El Niño/Southern Oscillation (ENSO) began 2005 as weak El Niño, which had originally developed during the second half 2004. The El Niño conditions in the equatorial Pacific basin dissipated during March and April, which transformed to a neutral condition that persisted till the end of the year.
Heavy rainfall throughout much of January produced flooding that displaced thousands of people in Guyana. In Georgetown, it was estimated that two-thirds of the city had been flooded, affecting about 120,000 people.

Hurricane Season 2005

The 2005 Atlantic hurricane season was the most active on record. Twenty-eight named tropical (or subtropical) storms formed, breaking the old record of 21 of in 1995. Fifteen storms became hurricanes, breaking the old record of twelve of 1969. Seven of the hurricanes became major hurricanes (category three or higher on the Saffir-Simpson hurricane scale) including four, *Emily, Katrina*, *Rita* and *Wilma*, which reached a potentially catastrophic category five intensity. This is the first time since 1851 that four category five storms have been known to occur in a season. The season also included three tropical depressions that did not reach tropical storm strength. The Net Tropical Cyclone activity for 2005 was 263% above long term average. (See graph next page)
The average for the last 40 years in an average season, is eleven named storms, six hurricanes and two major hurricanes.



As far as our islands are concerned, only the ABC Islands were somewhat threatened by hurricane *Emily* during July as this system moved through the Southeastern Caribbean islands. This system stayed at a safe distance north of these islands and the Tropical Storm Warning could be discontinued without any tropical storm conditions being experienced.

No watches or warnings were necessary at any time for the SSS Islands (Saba, St. Eustatius and St. Maarten) during the 2005 hurricane season. The last time these islands were hit directly by a tropical cyclone was in 2000 when (weak) hurricane *Debby* came along on August 22 without causing much damage.

Prime Minister of the Netherlands Antilles, Mr. Etienne Ys (center) and Lt. Governor of Curaçao, Ms. Lizanne Richards-Dindial (second from left) on June 28, 2005 visited the National Hurricane Center in Miami. Hurricane specialist Mr. Richard Pasch (right) explains the procedures on hurricane tracking and forecasting at this center.

General conditions Aruba, Bonaire and Curaçao

The center of Hurricane ***Emily*** passed about 180 km north of the ABC islands on July 14 and 15. A tropical storm warning was therefore issued.
The rainfall season of the year 2005 again was wet to very wet for all three islands. Aruba (91%), Bonaire (48%) and Curaçao (52%) above normal rainfall from October through December. This is the result of above normal sea surface temperatures (SST) in the Caribbean Sea and the Tropical Atlantic and neutral SST conditions in the Pacific Ocean.

General conditions St. Maarten, St, Eustatius and Saba

No tropical cyclone affected the Leeward Islands during the hurricane season of 2005.
An isolated but extremely active cloud formation concentrated over the area of St. Peters in St. Maarten on Saturday afternoon, July 30, 2005. Heavy downpours caused flooding in the St. Peter basin with massive destruction, killing two people. An amateur rainfall station at Mary's Fancy measured over 210 mm in two hours. The estimated damage was US$ 700.000.

Deluge in St. Maarten

Automatic Weather Observation System (AWOS)

A series of new automated weather observation stations is being installed on the airports of the islands of the Netherlands Antilles and Aruba. Monitors displaying weather information will be available at the Air Traffic Control Tower, Flight Information Office, Area Air Traffic Control and the Meteorological Service. With the installation of this new system the Meteorological Service of the Netherlands Antilles & Aruba will be able to keep on providing quality information to users.

Rainfall Outlook 2006

The outlook for the global sea surface temperature indicates, warm condition (0.5-1.0°°C above normal) in the Caribbean Sea and the North Tropical Atlantic for 2006. On the other hand in the equatorial Pacific Ocean the sea surface temperature will continue its cooling trend, which will reflect a near neutral to a weak La Niña conditions for first six months of 2006.
As a result of a warm Caribbean Sea and the North Tropical Atlantic Ocean, the moisture in the atmosphere will be abundant in the Caribbean Area. The upper level westerly winds in the Caribbean that go along with a La Niña Event will be weak, hence enhancing the vertical development of deep convection. Therefore the rainfall for 2006 will be normal to above normal for the Netherlands Antilles and Aruba.

Hurricane Season 2006 Outlook

The Atlantic Ocean will remain anomalously warm and central and eastern tropical Pacific sea surface temperatures anomalies have continued to cool. Currently, weak La Niña conditions are observed. We expect either neutral or weak La Niña conditions to be present during the upcoming hurricane season.
Therefore the 2006 Atlantic hurricane season will be much more active than the average 1950-2000 season.
The forecast for the 2006 hurricane season is:

- **9** hurricanes (average is 5.9),
- **17** named storms (average is 9.6)
- **85** named storm days (average is 49.1)
- **45** hurricane days (average is 24.5),
- **5** intense (Category 3-4-5) hurricanes (average is 2.3)
- **13** intense hurricane days (average is 5.0).
- Atlantic basin Net Tropical Cyclone (NTC) activity **195** percent of the long-term average.

Please visit the **Colorado State University** web site for more information on this topic.

Return to Table of Contents

Hurricane Season 2005

Early Start for the hurricane season of 2005

Arlene formed on June 8 near the northeastern coast of Honduras and became a tropical storm on the next day about 275 kilometers west southwest of Grand Cayman island. The system moved slowly northward with steady intensification and crossed western Cuba near Cabo Corrientes with winds of 80 km/h. The storm continued northward over the eastern Gulf of Mexico where it reached its peak intensity of 110 km/h. Thereafter, *Arlene* weakened and made landfall near Pensacola, Florida with 95 km/h winds. The cyclone continued to weaken as it moved northward, farther inland and was absorbed by a frontal system on June 14 over southeastern Canada. One student died in a rip current triggered by *Arlene* at Miami Beach, Florida. The damage caused by Arlene was minimal.

Tropical storm ***Bret*** originated from a tropical wave and a weak area of surface low pressure that crossed Central America and the Yucatan peninsula of Mexico from 24-27 June. On the 28th, the associated area of disturbed weather became better organized over the Bay of Campeche. A tropical depression formed later that day about 95 kilometers northeast of Veracruz, Mexico. The cyclone quickly strengthened into a tropical storm. *Bret* moved west northwestward and made landfall on the coast of Mexico near Tuxpan early on June 29 with maximum winds of 65 km/h in a very small area near the center. The system dissipated over the mountains of Mexico later that same day. *Bret* produced flooding in the state of Veracruz where there was one confirmed death. However, several persons in two vehicles that were swept away by flood waters in Naranjos, Veracruz were reported missing.

Active July

Hurricane ***Cindy*** formed on July 3 in the extreme western Caribbean Sea, just east of the Yucatan-Belize border. The cyclone moved northwestward across the Yucatan peninsula before emerging over the south-central Gulf of Mexico on July 4. Once over the warm Gulf waters, the depression strengthened into a tropical storm early on July 5 as the cyclone turned northward. Despite the very warm water ahead of *Cindy*, only slow intensification occurred due to moderate wind shear until just before landfall when more significant strengthening occurred. *Cindy* made landfall at minimal hurricane intensity early on July 6 over southeastern Louisiana, just to the southwest of Grand Isle. It turned northeastward and passed over the New Orleans area and merged with a frontal system over northern Georgia later that day. Extratropical *Cindy* moved northeastward along the Appalachian mountains and across New England and southeastern Canada before dissipating over the Gulf of St. Lawrence on July 11. The main effect from *Cindy* was heavy rainfall that caused flooding across southeastern Louisiana, southern Mississippi, much of Alabama, the Florida panhandle and Georgia. As an extratropical low, *Cindy* also produced locally heavy rainfall across much of the eastern United States. along and east of the Appalachian mountains. *Cindy* caused one death in Georgia due to flooding. Damages caused by this system were minimal.

Two Major Hurricanes in the Caribbean Area

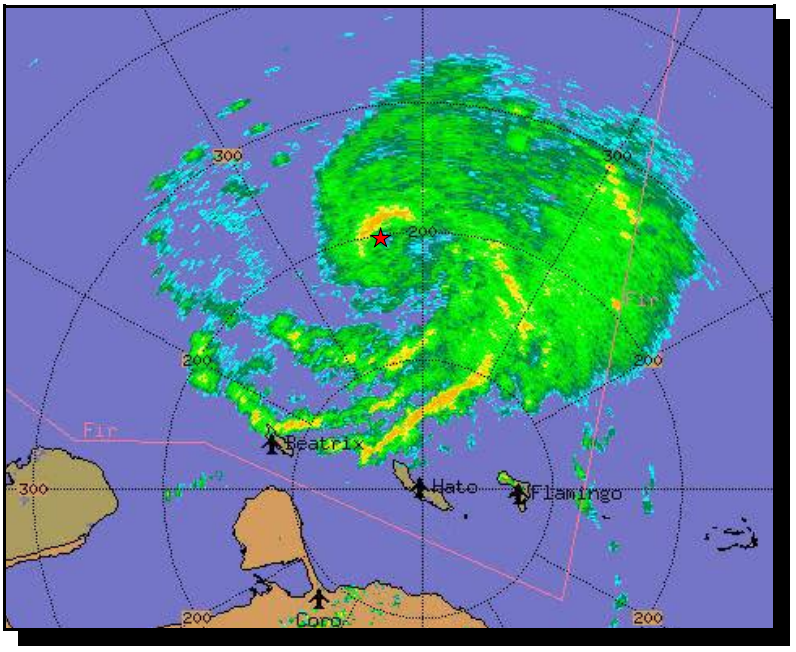
July was the first month of this active season in which records were broken. Five named storms developed this month breaking the old record of four. The two major hurricanes that developed tied a record set in 1916 and to top it all, the second one briefly reached category five intensity.

Hurricane ***Dennis*** developed on July 4 from a tropical wave near the Southern Lesser Antilles. The depression moved west northwestward across the eastern and central Caribbean Sea, became a tropical storm on the next day and strengthened into a hurricane early on July 6 about 395 kilometers east southeast of Jamaica. *Dennis* intensified over the next two days and became a major hurricane on the July 7 and a strong category four hurricane with winds of 240 km/h on July 8, just south of central Cuba. *Dennis* passed over Cabo Cruz, Cuba early that day with winds of 215 km/h and then made landfall along the South-central coast of that island/country that afternoon near Cienfuegos with winds of 235 km/h. Considerable damage occurred across central and eastern Cuba, including

widespread utility and communications outages. After making landfall, *Dennis* passed very near Havana and weakened to a category one hurricane before emerging over the southeastern Gulf of Mexico early on July 9. Although *Dennis* re-intensified into a category four hurricane early on July 10 over the eastern Gulf of Mexico, it weakened to category three strength before making landfall over the western Florida panhandle near Navarre Beach late on July 10. *Dennis* weakened to a low pressure area over the Tennessee and Ohio valleys and eventually dissipated over southeastern Canada on July 18.

Forty-one deaths were reported in association with *Dennis*, 22 in Haiti, 16 in Cuba and three in the United States. Considerable storm surge related damage occurred near St. Marks, Florida, well east of the landfall location. Heavy rainfall and flooding occurred across much of Florida and extended well inland over portions of the southeastern United States. The damage associated with Dennis is estimated at $1.84 billion.

Emily formed from a tropical wave on July 11 about 2100 kilometers east southeast of the Lesser Antilles. Moving westward, the depression became a tropical storm the following day. On July 14, just as *Emily* was passing through the southern Lesser Antilles, it abruptly strengthened and became a hurricane very close to Grenada and later that day became a major hurricane in the eastern Caribbean Sea. This hurricane had some similarities with hurricane *Ivan* in September 2004. Like in the case of *Ivan*, it appeared to become a threat to the ABC Islands and therefore, a tropical storm warning was issued on July 14. Its center stayed however at a safe distance north of these islands (approximately 180 kilometers/ 100 nautical miles) and no tropical storm winds were observed here when it made its closest approach during the early morning of July 15. The weather radar in Curaçao captured a good view of this system between the afternoon of July 14 and the late morning of the next day. In fact, it helped the hurricane specialists at the National Hurricane Center in Miami to follow the developments of this system through this period.



Emily, as "seen" by the weather radar in Curaçao on July 15, 2005 at about 5 A.M. The orange and red areas indicate the heaviest rain. The red star shows the approximate position of the center(200km) while the orange and yellow areas near northwestern Curaçao and Aruba indicate heavy rain in the so-called spiral bands.

Over the next few days, it moved west-northwestward across the Caribbean, reaching a peak intensity of 260 km/h which is just above the category five threshold, when it was located southwest of Jamaica. That made it the earliest known category five hurricane in the season and the only known hurricane of that strength during the month of July.
Emily passed to the south of Jamaica and the Cayman Islands and then struck Cozumel and the Yucatan peninsula of Mexico on July 18 with maximum winds near 215 km/h. *Emily* crossed the Yucatan and weakened but became a major hurricane again in the southwestern Gulf of Mexico. *Emily* made its final landfall on July 20 in northeastern Mexico about 120 kilometers south of the Texas border with maximum winds near 200 km/h. *Emily* then weakened and dissipated the

following day over northern Mexico.

Six deaths have been directly attributed to *Emily*; one in Grenada and five in Jamaica. Damage assessments we still ongoing at this writing and estimates were not yet available.

A Few Weaker Systems

After *Dennis* and *Emily*, a few weaker systems developed over the Atlantic Basin in July but none of these became major hurricanes.

Tropical storm ***Franklin*** formed from a tropical wave and became a tropical depression on July 21 near the central Bahamas. It became a tropical storm that evening but tropical storm-force winds remained east of the Bahamas. *Franklin* turned toward the north and then northeastward during the next two days while strengthening to its peak intensity of 115 km/h on July 23. During the period between July 23 and 26, *Franklin* moved erratically toward the east-northeast in the general direction of Bermuda and its winds weakened to 65 km/h by July 25 due to northwesterly wind shear. The closest approach to Bermuda by *Franklin* was about 300 kilometers to the west on July 26 and no tropical storm-force winds occurred on Bermuda. *Franklin* then moved slowly in a general northward direction on July 27 and 28 while its winds re-strengthened to near 95 km/h. On July 28, a frontal system moved off the east coast of the United States and accelerated *Franklin* toward the northeast. *Franklin* began to weaken after passing north of the Gulf Stream early on July 29 and became extratropical late that same day. It merged with a frontal zone while passing south of Newfoundland on July 30 and 31. No reports of damage or casualties due to *Franklin* have been received.

Tropical storm ***Gert*** formed in the Bay of Campeche on July 23 and moved slowly toward the west northwest. *Gert* made landfall near Cabo Rojo on the eastern coast of Mexico late on the next day with 75 km/h winds. *Gert* brought locally heavy rainfall to those areas that had been affected by hurricane *Emily* less than a week earlier. *Gert* dissipated well inland over central Mexico on July 26. No reports of casualties or damage have been received.

Harvey formed from a tropical wave that exited the coast of Africa on July 23. This wave showed signs of organization as it moved westward across the tropical Atlantic for several days before emerging over the northeastern Caribbean Sea on July 29. An associated area of disturbed weather crossed Hispaniola on July 30 and moved northward for a couple of days. The system organized into a tropical depression on August 2 about 370 miles Southwest of Bermuda. Moving north-northeastward, the cyclone strengthened into tropical storm Harvey on August 3. On August 4, *Harvey* turned toward the northeast and east northeast, passed about 75 kilometers south southeast of Bermuda and strengthened to its peak intensity of 105 km/h. Bermuda reported sustained winds of 60 km/h with a gust to 85 km/h when *Harvey* passed by. The storm turned northeastward on August 6 and stayed on that general heading for a couple of days. It lost tropical characteristics late on August 8 about 860 kilometers southeast of Cape Race, Newfoundland. The large and powerful extratropical cyclone lingered over the North Atlantic for several days before finally losing its identity on August 14. No reports of damage or casualties due to *Harvey* have been received.

Hurricane ***Irene*** was a long-lived Cape Verde tropical cyclone that remained over the open Atlantic throughout its lifetime and became a strong category two hurricane well to the north of Bermuda. *Irene* formed from a tropical wave that moved off the coast of Africa on August 1. It developed into a depression on August 4 about 1110 kilometers southwest of the Cape Verde Islands but turned north westward over cooler waters. Further development was halted until August 7 when it strengthened to a tropical storm about 2010 kilometers east of the northeastern Caribbean islands. *Irene* moved over the open waters of the central tropical Atlantic for the next few days, weakening to a tropical depression before re-strengthening to a tropical storm on August 10. *Irene* turned north

westward and moved between Bermuda and Cape Hatteras on August 14. *Irene* turned north-northeastward and strengthened into a hurricane, reaching its peak intensity of 170 km/h on the 15th. The hurricane turned to the east and weakened.
Irene then moved east-northeastward over much cooler waters and became extratropical about 475 kilometers east-southeast of Cape Race Newfoundland on August 18. No reports of damage or casualties due to Irene have been received.

Tropical depression ***Ten*** developed from a tropical wave on August 13 about 1690 kilometers east of Barbados. Strong vertical wind shear caused the westward moving cyclone to dissipate the next day. The remnants of this system moved west north westward until August 20 and the remnant mid-level part of the system likely contributed to the initial development of hurricane *Katrina*. No reports of damage or casualties due to tropical depression ten have been received.

José was a short-lived tropical storm that formed from a tropical wave on August 22 over the Bay of Campeche about 13 kilometers east-northeast of Veracruz. It became a tropical storm later that day and made landfall late that evening about 55 kilometers north of Veracruz with maximum winds of near 80 km/h. *José* soon dissipated over the mountains of eastern Mexico. *José* was responsible for six deaths in Mexico.

The Most Devastating Storm of the Year

This horrific tropical cyclone formed from a tropical wave, becoming a depression about 280 kilometers Southeast of Nassau in the Bahamas on August 23. It became a tropical storm the following day. *Katrina* moved north westward through the Bahamas and then turned westward toward South Florida and gradually strengthened. *Katrina* became a category one hurricane and made landfall near the Miami-Dade/Broward county line during the evening of August 25. *Katrina* moved southwestward across South Florida, dumping over 300 mm of rain, toppling trees and power lines and damaging homes and businesses in Miami-Dade and Broward counties. *Katrina* also brought heavy rains and sustained tropical storm-force winds to portions of the Florida Keys. Over the warm waters of the Gulf of Mexico, *Katrina* strengthened significantly reaching category five intensity on August 28 about 400 kilometers south southeast of the mouth of the Mississippi River. Later that day, *Katrina's* winds reached a peak intensity of 280 km/h and the pressure fell to 902 millibars which was at the time the fourth lowest pressure on record. *Katrina* turned to the northwest and then north, making landfall in Plaquemines Parish, Louisiana just south of Buras with an estimated 225 km/h winds, category four, during the early morning on August 29. Continuing northward, *Katrina* made a second landfall near the Louisiana/Mississippi border at 10:00 A.M. local time. Maximum winds operationally estimated at 200 km/h, category three. *Katrina* weakened as it moved inland to the north-northeast but was still a hurricane 160 kilometers inland near Laurel, Mississippi. *Katrina* continued to weaken and became a tropical

Hurricane Katrina, as it was located at category five intensity over the Gulf of Mexico on August 28.

depression near Clarksville, Tennessee on August 30. ***Katrina*** will likely be recorded as one of the most devastating hurricanes in the history of the United States producing catastrophic damage and hundreds of casualties in the New Orleans area and along the Mississippi Gulf Coast and additional casualties in South Florida. *Katrina* was directly responsible for an estimated 1200 deaths in the United States, making it the deadliest U.S. hurricane since the Palm Beach-Lake Okeechobee hurricane of September 1928. *Katrina* also caused an estimated $80 billion dollars in damage, making it the costliest U.S. hurricane on record.

Three Harmless Systems over Atlantic

Tropical storm ***Lee*** developed from a tropical wave over the central tropical Atlantic, first becoming a depression on August 28 about 1490 kilometers east of the Lesser Antilles. The depression dissipated the following day but its remnants redeveloped into a depression and then a storm on August 31. The system then quickly weakened and dissipated the next day several hundred kilometers northeast of Bermuda. No reports of damage or casualties due to *Lee* have been received.

Maria developed from a vigorous tropical wave that crossed the west Coast of Africa on August 27. The system became a tropical depression on September 1 while centered about 1770 kilometers east of the Northeastern Caribbean islands. Moving west north westward to north westward, the cyclone strengthened into a tropical storm on September 2. *Maria* turned north-north westward and became a hurricane on September 4. Peak intensity, 185 km/h, was reached early on September 6 when the cyclone was centered about 755 kilometers east of Bermuda. *Maria* recurved northeastward and weakened to a tropical storm before regaining hurricane intensity on September 7. Over the next few days the intensity slowly decreased and *Maria* weakened to a tropical storm early on September 9. *Maria* became a powerful extratropical storm over the North Atlantic about 1175 kilometers east southeast of Cape Race, Newfoundland on September 10. The storm moved into Scandinavia on September 14 where it caused a landslide and one death in Norway.

Hurricane ***Nate*** formed from a tropical wave which moved off the coast of Africa on August 30. The northern portion of the wave broke away and moved north westward as it interacted with a weak upper-level trough near Bermuda. A tropical depression formed late on September 5 about 480 kilometers southwest of Bermuda and the system quickly strengthened into a tropical storm just six hours later. *Nate* drifted northeastward for the next two days and rapidly intensified into a hurricane by September 7. Early on the next day, *Nate* quickly accelerated east northeastward and briefly threatened Bermuda. However, the hurricane passed well to the southeast of the island and gradually weakened back to a tropical storm on September 9. Slow weakening continued as upper-level shear increased ahead of an approaching frontal system and *Nate* transformed into a strong extratropical low pressure system on September 10 about midway between Bermuda and the Azores Islands. Extratropical low *Nate* continued to move quickly to the east northeast and merged with a frontal system later that day about 1450 kilometers west southwest of the Azores. No reports of damage or casualties due to *Nate* have been received.

Erratic *Ophelia*

Hurricane ***Ophelia*** formed from an area of disturbed weather along the western end of an old frontal system. The cyclone began to organize on September 4 over the central and northwestern Bahamas and a tropical depression formed on September 6 near Grand Bahama island. The depression moved erratically north northwestward and became tropical storm *Ophelia* on September 7 about 185 kilometers east southeast of Cape Canaveral, Florida.

Ophelia meandered off the central Florida coast for the next two days, briefly becoming a hurricane on September 8. *Ophelia* began a northeastward motion late on September 9 which continued until it again stalled two days later about 380 kilometers south of Cape Hatteras, North Carolina. During that time, it twice reached hurricane strength before weakening back to a tropical storm.

Ophelia made a slow loop on September 12 and 13, moving southwestward and north westward before beginning a northward motion toward the North Carolina coast. The cyclone became a hurricane yet again late on September 13 and maximum sustained winds reached 135 km/h by the time the northern eyewall reached the North Carolina coast near Cape Fear on September 14.

Ophelia turned slowly east northeastward with the center passing south of Cape Lookout and Cape Hatteras on September 15. It then weakened to a tropical storm early on September 16 about 75 kilometers south southeast of Cape Hatteras. *Ophelia* accelerated to the northeast later on September 16 and passed east of Cape Cod the next day. The storm transformed into an extratropical low near Nova Scotia early on September 18, passed over Newfoundland on September 19 and reached the eastern Atlantic on September 21. Extratropical *Ophelia* dissipated all the way over the North Sea on September 23.

One death was attributed to *Ophelia*, a drowning along the southeastern coast of Florida. The storm caused an estimated $1.6 billion in the United States with significant beach erosion noted from the North Carolina coast southward to the central Florida coast.

Philippe formed from a tropical wave, becoming a depression on September 17 about 490 kilometers east of Barbados. The depression became a tropical storm later that day. Although this system did not pose a direct threat to the SSS Islands, information advisories were issued by the Meteorological Service of the Netherlands Antilles and Aruba just to assure the authorities and the people of these islands that they would be safe. *Philippe* moved north-northeastward to the east of the Lesser Antilles and strengthened, becoming a hurricane on September 19 about 630 kilometers east of the SSS Islands. Philippe reached its peak intensity of 125 km/h early the following day. Continuing to the north northwest over open waters, *Philippe* weakened to a tropical storm late on September 20. The cyclone turned northward and its circulation became embedded within a larger non-tropical area of low pressure on September 22. Rotating counter-clockwise within the larger low, *Philippe* turned to the west and South and weakened to a tropical depression the next day. The circulation of this system was absorbed by the non-tropical low early on September 24. No reports of damage or casualties due to *Philippe* have been received.

A Third Category Five Hurricane

Rita was an intense, destructive and deadly hurricane that significantly impacted the Florida Keys and devastated portions of southeastern Texas and southern Louisiana. *Rita* became a depression just east of the Turks and Caicos Islands late on September 17. It moved westward and became a tropical storm the following afternoon.

Continuing on through the central Bahamas on September 19, *Rita* approached hurricane strength with 110 km/h winds. While Rita did not strengthen during the following night, it rapidly intensified on September 20 while moving through the Florida Straits. It reached category two intensity as the center passed about 80 kilometers south of Key West. Even though the center did not make landfall in the Florida Keys, it downed trees and produced storm tides of up to five feet (1.5 meters) in portions of the island chain, flooding sections of U.S. Highway 1 and many other streets as well as

several homes and businesses.
After entering the Gulf of Mexico, *Rita* intensified at a rapid rate, from category two to category five in about 24 hours with winds reaching 265 km/h on the afternoon of September 21. The hurricane strengthened further and reached a peak intensity of 280 km/h early on the next day about 915 kilometers east southeast of Galveston, Texas. The central pressure fell to 897 millibars which at the time was the third lowest on record in the Atlantic Basin. *Rita* began to weaken later that day but as it passed through the Gulf of Mexico, it produced storm surge flooding in portions of the New Orleans area that had previously been inundated by *Katrina*.
Rita turned north westward and weakened to category three on September 23. It then made landfall around 2:30 A.M. local time on September 24, just east of the Texas/Louisiana border between Sabine Pass and Johnson's Bayou, still at category three intensity with 195 km/h winds. *Rita* caused devastating storm surge flooding and wind damage in southwestern Louisiana and extreme southeastern Texas. It weakened after moving inland but remained a tropical storm until reaching northwestern Louisiana late on September 24. It then turned northeastward and merged with a frontal system two days later. *Rita* caused six deaths and damage estimated at $9.4 billion in the United States.

Tropical depression *Nineteen* formed on September 30 about 1070 kilometers west southwest of the Cape Verde Islands. The system moved slowly north westward and dissipated on October 2 about 1255 kilometers west of the Cape Verde Islands. No reports of damage or casualties due to this system have been received.

Severe Floods in Central America

Stan developed from a tropical wave that generated a persistent area of disturbed weather over the western Caribbean Sea in late September. A tropical depression eventually formed on October 1 about 175 kilometers southeast of Cozumel, Mexico. The cyclone moved west north westward, reaching tropical storm status just before crossing the east coast of the Yucatan peninsula about 65 kilometers south of Tulum, Mexico on October. *Stan* traversed Yucatan and weakened to a depression but it soon regained tropical storm strength after it moved into the Bay of Campeche on October. The storm turned from a westward to a southwestward heading and continued to strengthen. *Stan* became a hurricane as it neared the coast of Mexico on October 4 and made landfall later that day about 145 kilometers east southeast of Veracruz with maximum winds estimated at 130 km/h. The cyclone weakened rapidly after moving inland and dissipated over the mountains of southern Mexico on October 5.

Around the time of *Stan's* existence, torrential rains caused severe flash floods and mud slides over portions of Mexico and Central America, including Guatemala, El Salvador, Nicaragua, Honduras and Costa Rica. The estimated death toll associated with this weather system ranges from 1000-2000. As best as can be determined *Stan* itself was responsible for 80 of these deaths.

Post season analysis indicated that a short-lived subtropical storm developed on October 4 near the Azores from an upper level disturbance. It moved then toward the Northeast and its strongest sustained winds reached an estimated 85 km/h later that same day. On the next day, this unnamed system merged with an approaching cold front and was later absorbed by a non-tropical low pressure area. That latter system would become tropical storm *Vince* a few days later.

Tammy was a short-lived tropical storm that developed just east of the central Florida coast as a result of complex interaction between an upper-level low and a tropical wave. Early on October 5, *Tammy* quickly developed into a tropical storm about 30 kilometers east of Cape Canaveral, Florida. The cyclone moved steadily north northwestward, parallel to the Florida east coast, most of the day before it turned north westward and made landfall along the northeastern Florida coast near Mayport very late that day with maximum sustained winds of 80 km/h. *Tammy* moved westward over

southern Georgia and southeastern Alabama on October 6 before becoming absorbed by a larger extratropical low pressure system over the Florida panhandle. No significant damage occurred to structures but locally heavy rainfall of 75 to 125 mm did produce some minor flooding across northeastern Florida and southern Georgia.

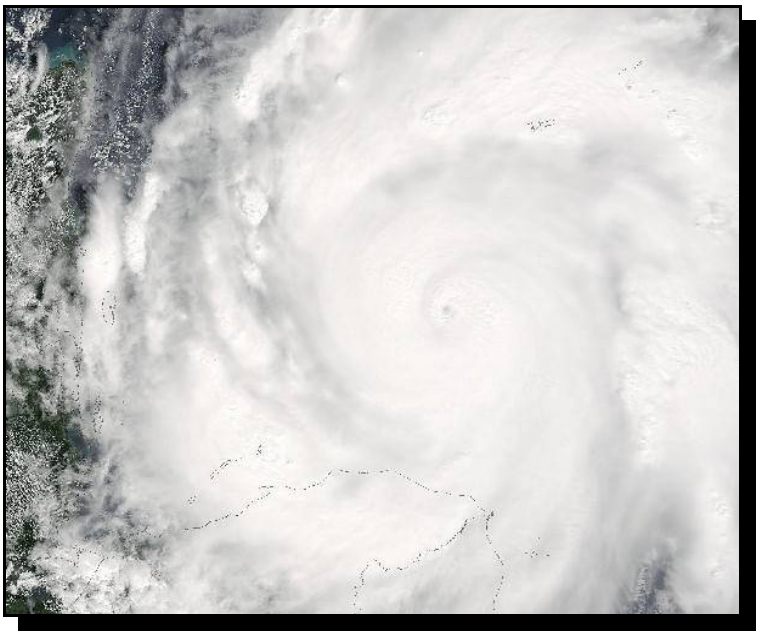
Short-lived subtropical depression ***Twenty-two*** formed on October 8 about 725 kilometers southeast of Bermuda from a non-tropical low pressure system. The cyclone moved north westward to westward and degenerated into a low pressure area about 280 kilometers west southwest of Bermuda on October 10. The remnants of the depression merged with a cold front on October 11 and became an extratropical gale center off the U.S. Mid-Atlantic states on October 12. This low was absorbed by a larger non-tropical low on October 14. No reports of damage or casualties due to this system have been received.

All the Way to Spain

Vince**,** the first known tropical cyclone to make landfall in Spain, developed from a non-tropical area of low pressure in the Eastern Atlantic. The low gradually acquired tropical characteristics and became a tropical storm on October 9 about 830 kilometers east southeast of the Azores Islands. It strengthened and became a hurricane later that day as it moved slowly northeastward to the northwest of the Madeira Islands. It weakened to a tropical storm the next day as it accelerated east northeastward. On October 11, *Vince* weakened to a tropical depression shortly before making landfall near Huelva, Spain. *Vince* lost tropical characteristics shortly after making landfall. No reports of damage or casualties due to Vince have been received.

Fourth Category Five Hurricane

Wilma formed from a large area of disturbed weather that stretched across much of the Caribbean Sea during the second week of October. A surface low pressure system gradually became defined near Jamaica and a tropical depression developed about 345 kilometers southeast of Grand Cayman Island on October 15. The tropical cyclone moved erratically westward and southward for two days while slowly strengthening into a tropical storm. *Wilma* became a hurricane and began a west north westward motion on October 18. Later that day, the hurricane began to intensify explosively. On October 19, it became a category five hurricane and its minimum central pressure dropped to an estimated 882 millibars while its very small eye was centered about 590 kilometers southeast of Cozumel. This is the lowest pressure on record for a hurricane in the Atlantic Basin. *Wilma's* maximum intensity is estimated to have been 280 km/h. On October 20, the system weakened slightly and turned north westward toward the northeastern Yucatan peninsula. On October 21, the hurricane made landfall over Cozumel and early the next day it made landfall over the northeastern Yucatan**.**



Hurricane Wilma had a very small eye when it reached its greatest intensity on October 19 while located between Cuba and Honduras (bottom of picture).

Wilma moved slowly and weakened over northeastern Yucatan and emerged over the Gulf of Mexico early on October 23 as a category two hurricane. Later that day, it turned northeastward and accelerated toward the southern Florida peninsula. The hurricane strengthened as it approached the southwestern Florida coast and it made landfall near Cape Romano on October 24 with category three intensity.
The system continued to accelerate northeastward, crossing Florida in less than five hours. *Wilma* moved into the Atlantic just to the north of Palm Beach as a category two hurricane. It regained category three status just off the east-central coast of Florida and gradually weakened thereafter. The hurricane moved rapidly northeastward over the western Atlantic and lost tropical characteristics about 330 miles south southeast of Halifax, Nova Scotia on October 25.
Until the end of 2005, 22 deaths have been directly attributed to *Wilma*. It caused extensive damage in northeastern Yucatan, including Cancun and Cozumel and southern Florida. The hurricane also produced major flooding over Western Cuba. Damage in the United States is estimated at $14.4 billion.

Greek Alphabet Names for the First Time

Due to the extremely active 2005 hurricane season, the National Hurricane Center for the first time had to resort to using the Greek alphabet when tropical storm ***Alpha*** formed from a vigorous tropical wave near the southern Lesser Antilles on October 21. Shower activity became concentrated south of Puerto Rico and radar data from the island helped determine that a tropical depression formed early on October 22. The depression became tropical storm *Alpha* later that day. It moved north westward and data from Hispaniola indicate that the cyclone made landfall near Barahona in the Dominican Republic with 80 km/h winds. *Alpha* weakened to a tropical depression over the high terrain of Hispaniola and it continued north westward and northward over the southeastern Bahamas and the Atlantic on October 23. The cyclone weakened to a trough as it approached the much larger circulation of hurricane *Wilma* on October 24. *Alpha* caused twenty deaths in Hispaniola, primarily from flooding caused by heavy rains.

Beta developed over the extreme southwestern Caribbean Sea from a tropical wave. A surface low pressure system formed along the wave axis near the coast of Colombia on October 25. The system became a tropical depression the next day about 275 kilometers east of the Costa Rica-Nicaragua border. The depression moved slowly northward for a couple of days, becoming a tropical storm on October 27. Beta strengthened into a hurricane on October 29 near Providencia Island. It then turned westward and west-southwestward and strengthened into a category three hurricane on October 30. Beta weakened slightly later that day and made landfall as a category two hurricane on the central east coast of Nicaragua near La Barra. The cyclone moved westward over land and dissipated over western Nicaragua early on October 31.
Beta caused widespread damage on Providencia island. Extensive damage to structures was reported along the central Nicaraguan coast. Significant flooding also occurred in Honduras.

The vigorous tropical wave that spawned ***Gamma*** passed through the Southeastern Caribbean islands on November 13 and produced wind gusts to near tropical storm force along with heavy rainfall. Early on the next day, tropical depression Twenty-seven formed over the Southeastern Caribbean Sea about 160 kilometers west of St. Vincent. The depression continued on a westward track and may have briefly reached tropical storm strength on November 15 before strong westerly upper level wind shear displaced the thunderstorm activity to the east and caused the cyclone to degenerate back into a tropical wave. This wave caused very heavy rainfall on the ABC islands on October 17. The remnants of Tropical Depression 27 accelerated westward across the central Caribbean Sea on November 17 before slowing down and reaching the western Caribbean Sea and eastern Honduras on November 18. A large low pressure system developed over Panama and moved north westward and merged with the remnants of TD 27 over central Honduras and it is estimated that tropical storm *Gamma* formed near the northern coast of Honduras later that day. While the other low pressure

system likely aided the generation of tropical storm *Gamma*, shower activity associated with the low to mid level circulation center of TD 27 maintained continuity throughout its lifetime and it is estimated that the low level circulation of the other area of low pressure merged with the remnant low level circulation of TD 27 over the mountains of central Honduras. *Gamma* drifted northward over the northwestern Caribbean Sea and strengthened to 90 km/h east of the island of Roatan on November 19 and turned slowly southeastward on November 21 and 21. Strong upper level northwesterly winds (shear) weakened the cyclone and it degenerated into a remnant area of low pressure late on November 21 and dissipated on November 22 just east of the Nicaragua-Honduras border.
Heavy rainfall caused flash floods and mud slides in Honduras and Belize. The flooding associated with *Gamma* is known to have resulted in a total of 37 deaths, 34 in Honduras and three in Belize. At least 13 people in Honduras were also missing. Ten bridges were destroyed and seven more were damaged in Honduras.

Inclement Weather in the Canary Islands

Delta originated from an extratropical area of low pressure over the central Atlantic. On November 19, this system was located about 1690 kilometers east southeast of Bermuda. The low moved eastward and then northeastward, reaching a position about 800 miles southwest of the Azores on November 22. The low turned southward later that day and developed into a subtropical storm. *Delta* continued southward on November 23, as it became a tropical storm and winds reached an estimated 110 km/h the next day while the storm moved southeastward.
Delta moved erratically southward through November 26 while weakening then it turned northeastward and and strengthened on November 27 with winds again reaching 110 km/h. The tropical storm turned eastward and became a vigorous extratropical low on November 28 about 350 miles west-northwest of the Canary Islands. The extratropical low brought wind gusts of hurricane force to the Canary Islands on November 28 before weakening and moving into Morocco on the following day. Seven deaths on or near the Canary Islands were attributed to the extratropical stage of *Delta*.

Trop. Depr. Nr.	Name	Period	Lowest Air Pressure	Maximum sustained winds
1	TS Arlene	June 8 - 13	989 hPa	110 km/h
2	TS Bret	June 28 - 29	1002 hPa	65 km/h
3	Hur. Cindy	July 3 - 7	991 hPa	120 km/h
4	Hur. Dennis	July 4 - 13	930 hPa	240 km/h
5	Hur. Emily	July 11 - 21	929 hPa	260 km/h
6	TS Franklin	July 21 - 29	997 hPa	115 km/h
7	TS Gert	July 23 - 25	1005 hPa	75 km/h
8	TS Harvey	August 2 - 8	994 hPa	105 km/h
9	Hur. Irene	August 4 - 18	975 hPa	180 km/h
11	TS José	August 22 - 23	998 hPa	95 km/h
12	Hur. Katrina	August 23 - 30	902 hPa	280 km/h
13	TS Lee	August 28 - September 1	1006 hPa	65 km/h

Trop. Depr. Nr.	Name	Period	Lowest Air Pressure	Maximum sustained winds
14	Hur. Maria	September 1 - 10	970 hPa	185 km/h
15	Hur. Nate	September 5 - 10	979 hPa	150 km/h
16	Hur. Ophelia	September 6 - 17	976 hPa	140 km/h
17	Hur. Philippe	September 17 -24	985 hPa	130 km/h
18	Hur. Rita	September 18 - 26	897 hPa	280 km/h
20	Hur. Stan	October 1 - 5	979 hPa	130 km/h
---	STS Unnamed	October 4 - 5	997 hPa	85 km/h
21	TS Tammy	October 5 - 6	1001 hPa	80 km/h
23	Hur. Vince	October 9 - 11	987 hPa	120 km/h
24	Hur. Wilma	October 15 - 25	882 hPa	295 km/h
25	TS Alpha	October 22 - 24	998 hPa	85 km/h
26	Hur. Beta	October 26 - 31	960 hPa	185 km/h
27	TS Gamma	November 13 - 20	1002 hPa	85 km/h
28	TS Delta	November 22 - 28	980 hPa	115 km/h
29	Hur. Epsilon	November 29 - December 8	981 hPa	140 km/h
30	TS Zeta	December 30 - January 6	994 hPa	100 km/h

Hurricane ***Epsilon***, like its predecessor, developed from an extratropical low over the central Atlantic about midway between the Azores and Bermuda on November 29. *Epsilon* moved west southwestward and slowly strengthened and at month's end was located several hundred miles east of Bermuda and moving east northeastward over the open waters of the central Atlantic.
It strengthened to a hurricane on December 2 and the system continued to move eastward until December 6. After that, it turned toward the Southwest and on December 7, it finally weakened back to a tropical storm because of strong upper level winds. It weakened to a tropical depression on December 8 and to a remnant area of low pressure on the next day. Since it stayed over the open waters of the central North Atlantic, it caused no damage nor any casualties.

Season Still Active Around and After New Year's Day

With the year 2005 almost history, an area of low pressure over the central North Atlantic rapidly became better organized during the morning of December 30. It was classified during that same early afternoon as a tropical storm and was named ***Zeta***. It moved initially toward the northwest but turned to the west southwest during the days thereafter. The year 2005 ended and we welcomed 2006 with *Zeta* still around at that time. It continued to strengthen during the first two days of 2006 and peaked in intensity on January 3 with maximum sustained winds of about 105 km/h. After that, increasing upper level winds started to affect the system and on January 6, 2006, the memorable 2005 Atlantic Basin hurricane season finally ended, more than a month after its official conclusion.

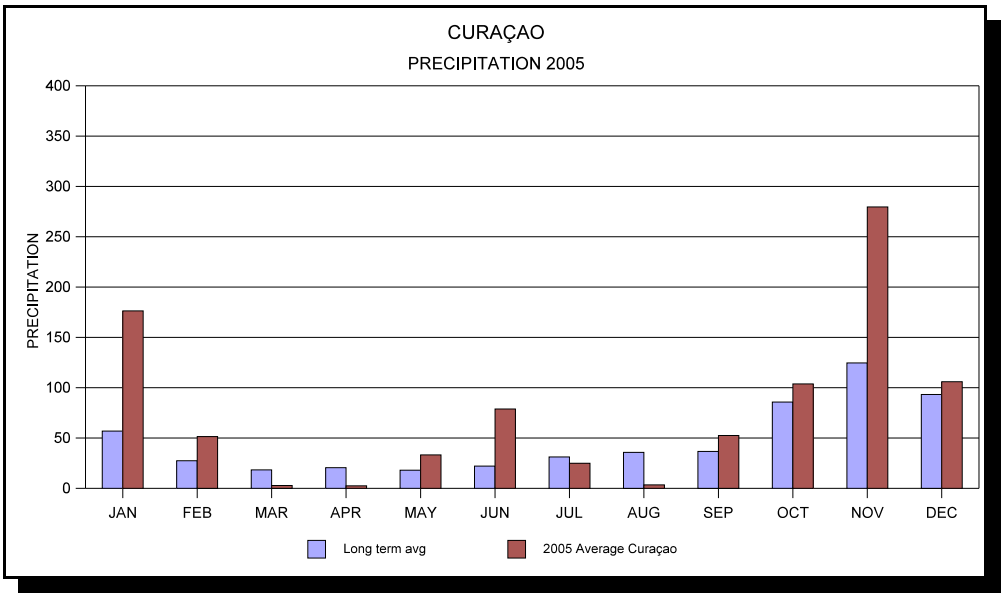
Return to Table of Contents

ABC-Islands

Curaçao

PRECIPITATION

The year 2005 was a very wet year. The island average rainfall for 2005 was 915.6 mm. This is 60.4% above the long-term average of 570.4 mm. When analyzing the individual data from the rain gauge network, the rainfall station at *San Juan* measured the highest annual total of 1003.6 mm during 2005. The maximum 24-hour rainfall total for Curaçao was 190 mm and was measured at rainfall station *Ostrich Farm* (*Groot St. Joris*) on 17 November 2005. The highest monthly total for 2005 was 335.3mm, measured in November at rainfall station *Klein Kwartier*. The rainfall station at *Seru Mahuma* had the highest total of rain days with 89 (days with rainfall greater than or equal to 1.0 mm).



Rainfall data from Hato rainfall station

The annual rainfall total for Hato in 2005 was 842.8 mm. (The 30-year average of 1971-2000 is 553.4mm). The 2005 rainfall season (October through December) of 2005 was a wet one. The total rainfall for this period was 459.6 mm. This is 64% above the 30-year (1971-2000) average (280.2 mm).

The 24-hour maximum of 59.6 mm was recorded on November 17. The one-hour maximum of 41.2 mm was recorded on October 9 between 05:00 and 06:00 hours.

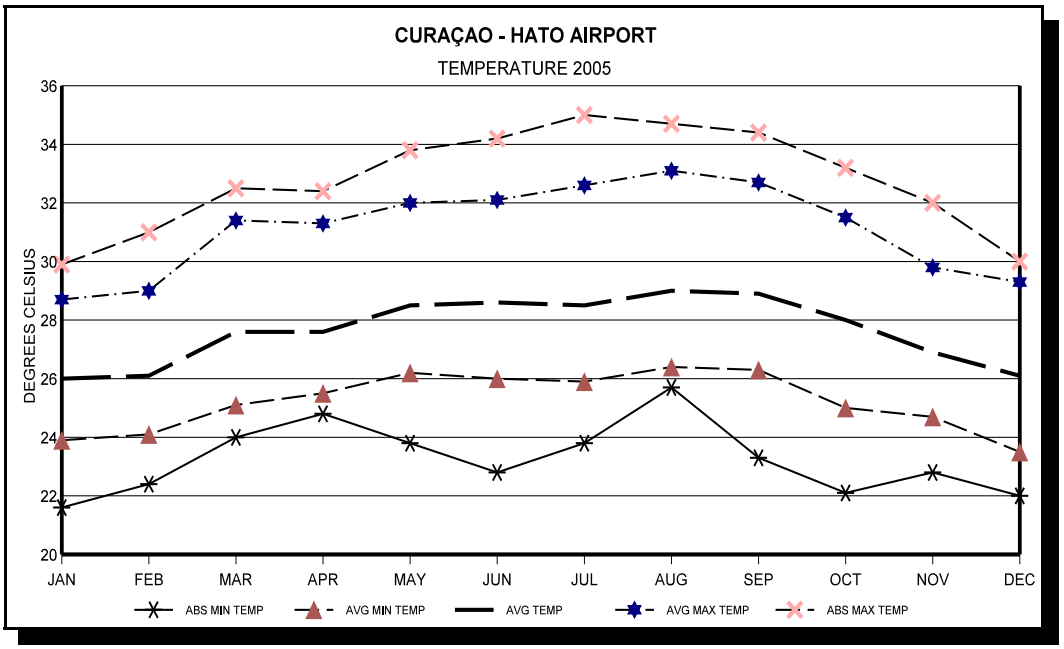
The maximum intensity per minute of 3.0 mm was recorded on June 7, five minutes after midnight.

The hours with rainfall for 2005 recorded at Hato International Airport totaled 155 hours. The maximum rainfall duration (in minutes) was 102 minutes and was recorded on October 30.

The number of days with thunder was 26 (normal is 23 days)

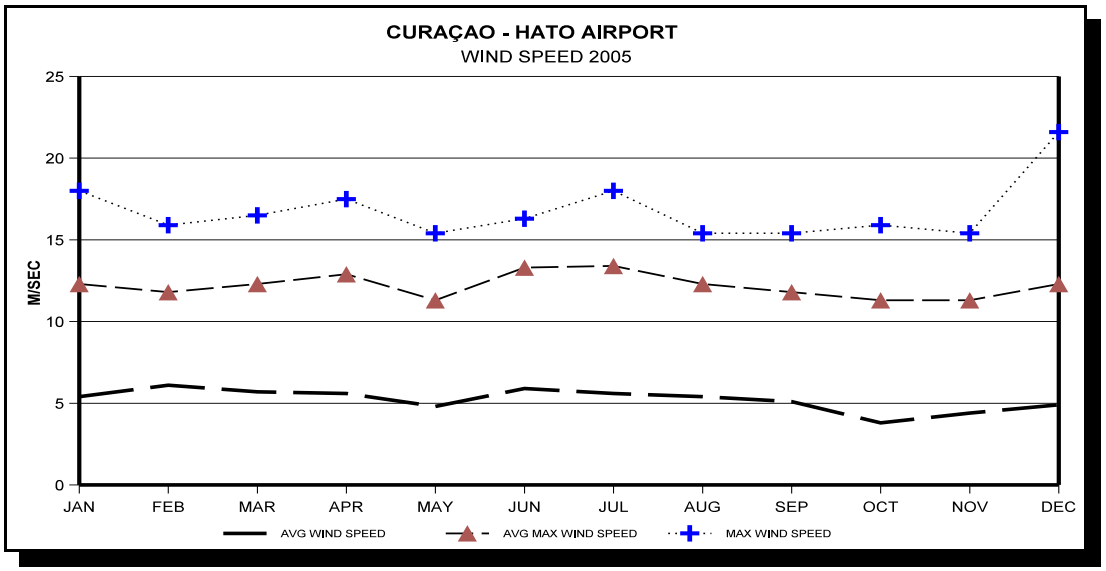
TEMPERATURE

The average air temperature, as recorded at Hato International Airport over the year 2005, was 27.7°C (normal 27.8°- standard deviation 0.8°). August was the warmest month with a daily average temperature of **29.0**°C (normal: 28.9°C). This month also had the highest average maximum temperature of **33.1**°C (normal: 31.9°C).
The absolute maximum temperature was **35.0**°C and was recorded on July 30, 2005 at 13:45 hours (Absolute maximum record of 38.3°C was established in September 1996).The hottest day of 2005 was September 20 with a 24 hour average temperature of 29.6°C.
January was the coolest month with a daily average temperature of **26.0**°C. December was the month with the lowest average minimum temperature of **23.5**°C .
The absolute minimum temperature of **21.6**°C was recorded on January 20, 2005 at 07:02 hours.
The coolest day of the year was November 17 with a 24 hour average temperature of **24.5**°C.



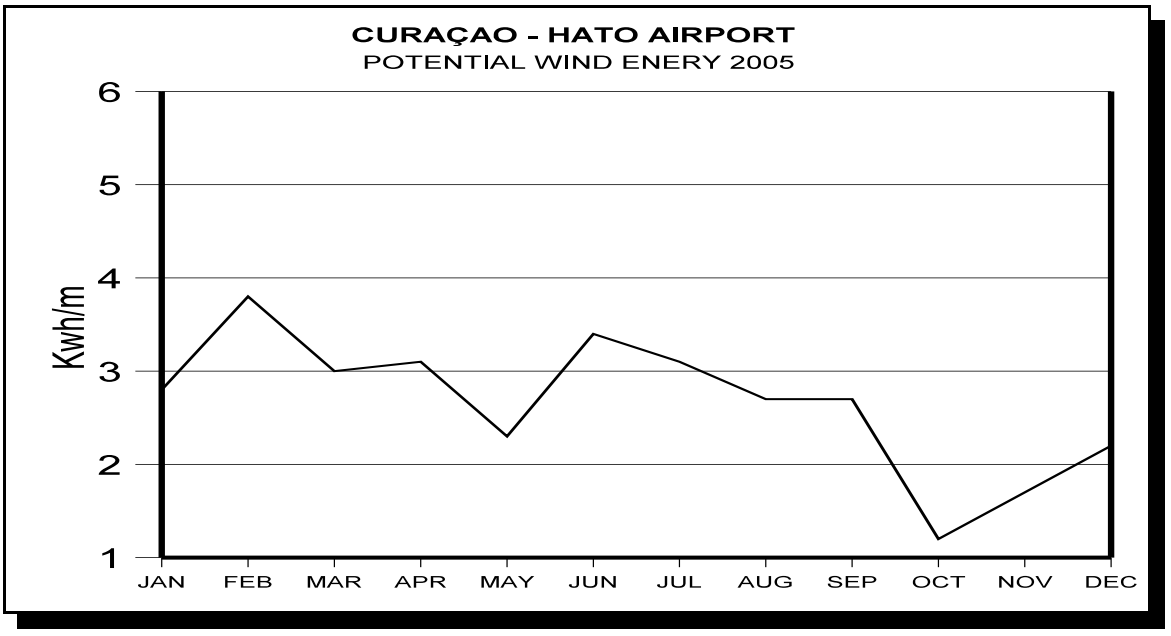
WIND

The average wind speed for the year 2005 was 5.2 m/sec (18.7 km/hr) (normal 6.6 m/sec - 23.8 km/hr) at a height of 10m and the average wind direction was 94°.
June was the month with the highest daily average wind speed of 6.1 m/sec (22 km/hr) and October was the month with the lowest average wind speed 3.8 m/sec (13.9 km/hr).
The highest wind gust 21.6 m/sec (77.8 km/hr) was recorded on December 8 at 01:57 hours.
The day with the highest 24 hour average wind speed of 8.2 m/sec (29.5 km/hr) was recorded on February 7, 2005.



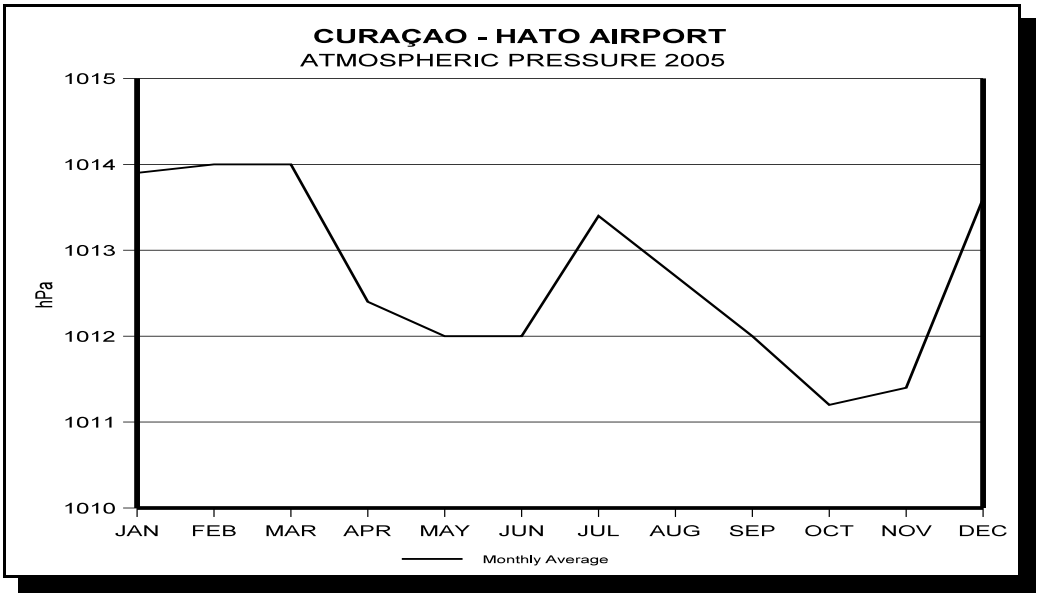
POTENTIAL WIND ENERGY

The total potential wind energy (at 10m height and wind speeds ≥4 m/sec) for the year 2005 was 998 kWh/m^2 The daily average for 2005 was 2.7 kWh/m^2/day.



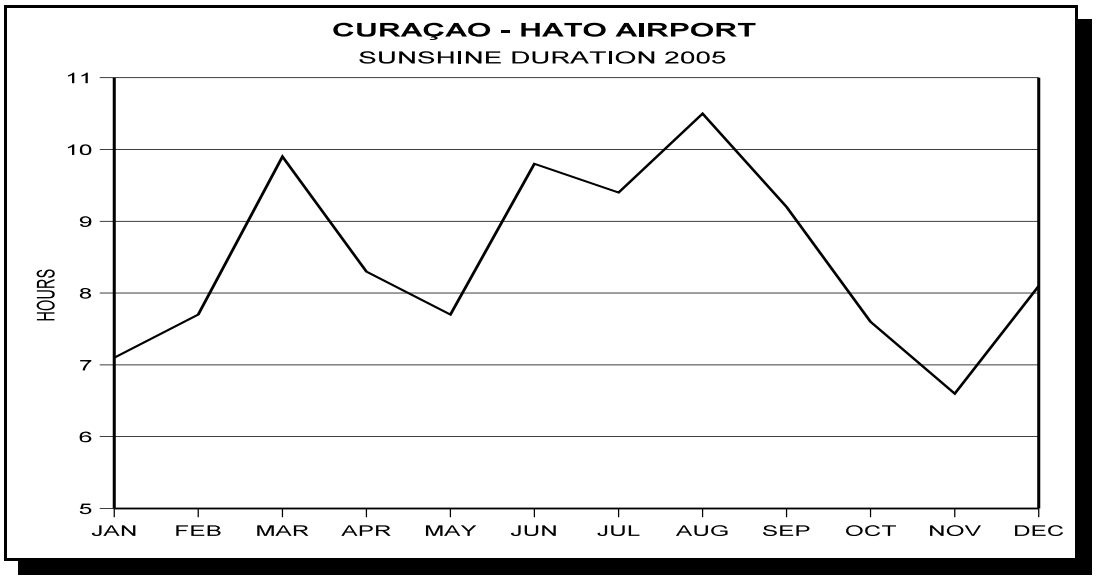
ATMOSPHERIC PRESSURE

The average atmospheric pressure recorded at Hato Airport over the year 2005 was 1012.7 hPa. The maximum atmospheric pressure of 1018.6 hPa was recorded on February 20, 2005 while the minimum 1007.0 hPa was recorded on October 22.



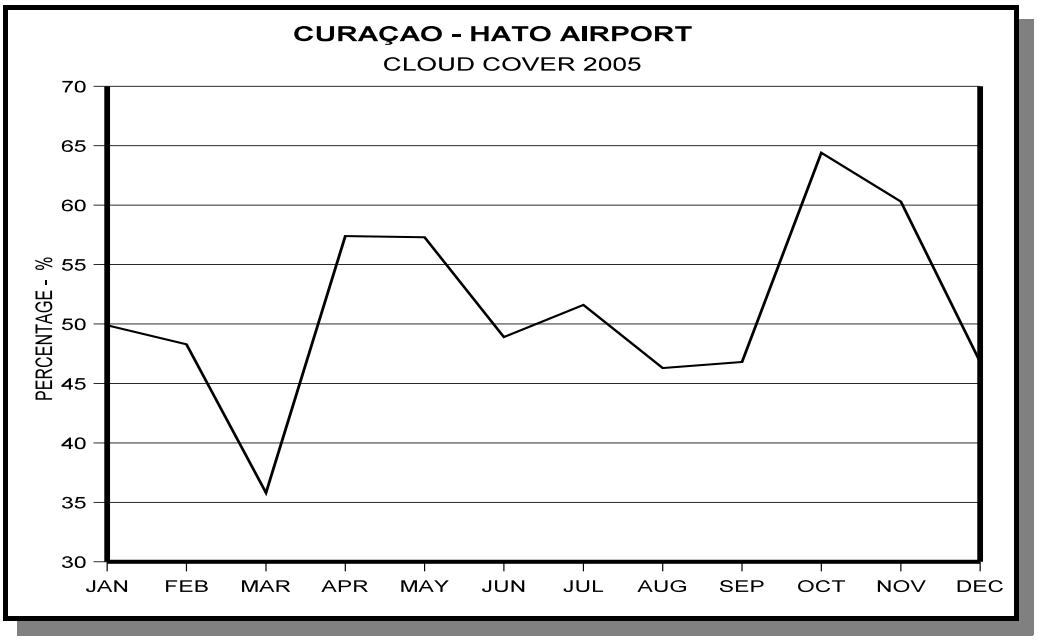
SUNSHINE DURATION

The total sunshine duration for the year 2005 was 3102.1 hours, 0.4% below normal and 70.1 % of the maximum possible duration (4428 hours). The average daily sunshine duration was 8 hours and 30 minutes. The sunniest month, August, had a daily average sunshine duration of 10 hours and 30 minutes while the month with the least sunshine was November, with a daily average of 6 hours and 36 minutes. The day with the maximum sunshine duration, 12 hours, was June 17, 2005.



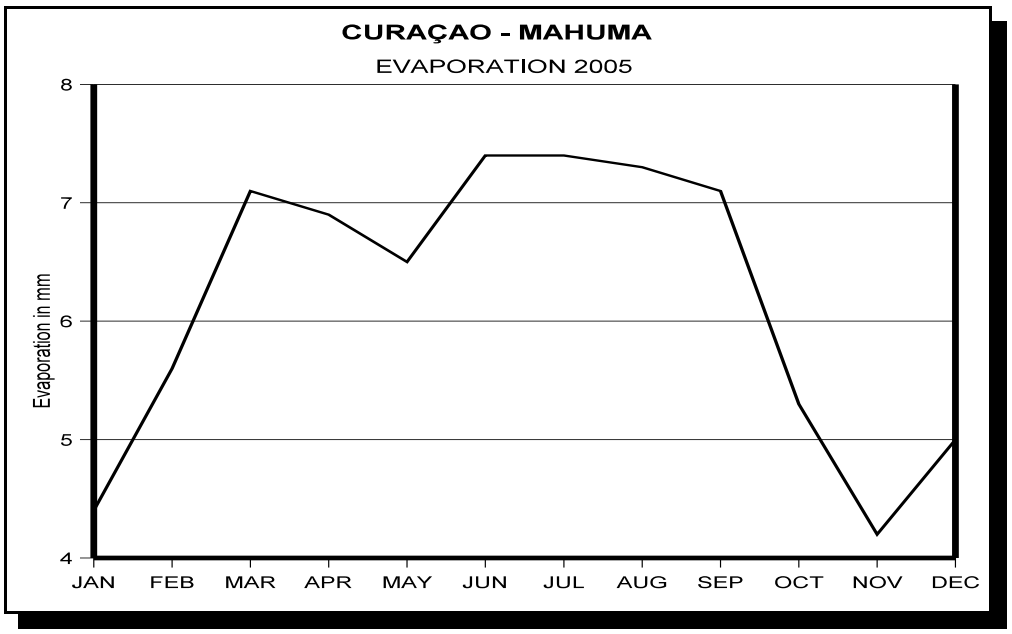
CLOUD COVERAGE

The average cloud cover for the year 2005 was 51.2%. The highest total cloud coverage per month, 64.4% was observed in October .The lowest, 35.8% , was observed 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 2005 was 6.2 mm per day. June and July had the highest daily average evaporation of 7.4 mm while November had the lowest daily average evaporation value of 2005 with 4.2 mm.

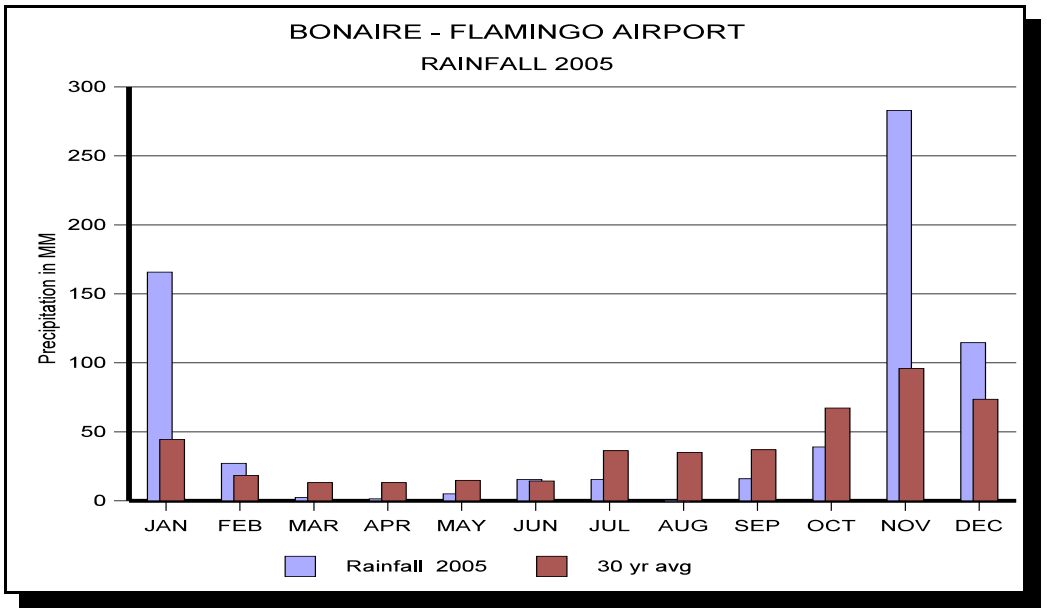


Return to Table of Contents

Bonaire

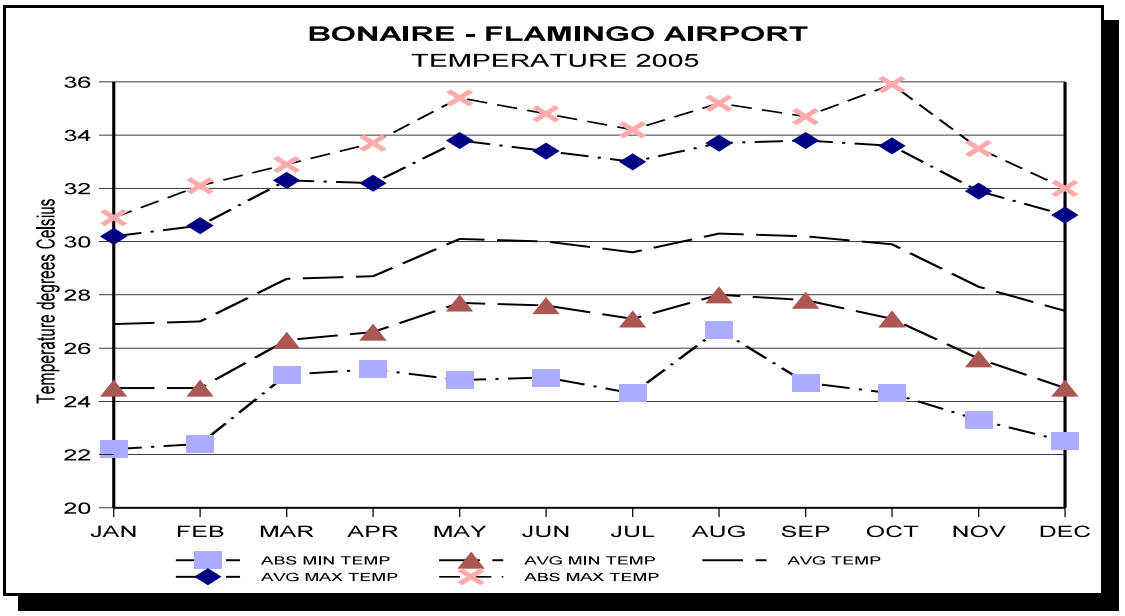
PRECIPITATION

The rainfall total, over the year 2005, as recorded at the Flamingo Airport of Bonaire was 685.2 mm, 48% above normal (normal 1971-2000 is 463.3 mm).
This total was also the highest amongst the rainfall stations at Bonaire during 2005.
November was the wettest month of the year with a total of 283.0 mm.
The 24-hour maximum was 122.2 mm recorded on November 17, 2005. The number of days with precipitation greater than or equal to 1.0 mm totaled 64.
With 66 days, the rainfall station at BOPEC had the highest total of days with greater than or equal to 1.0 mm of rainfall



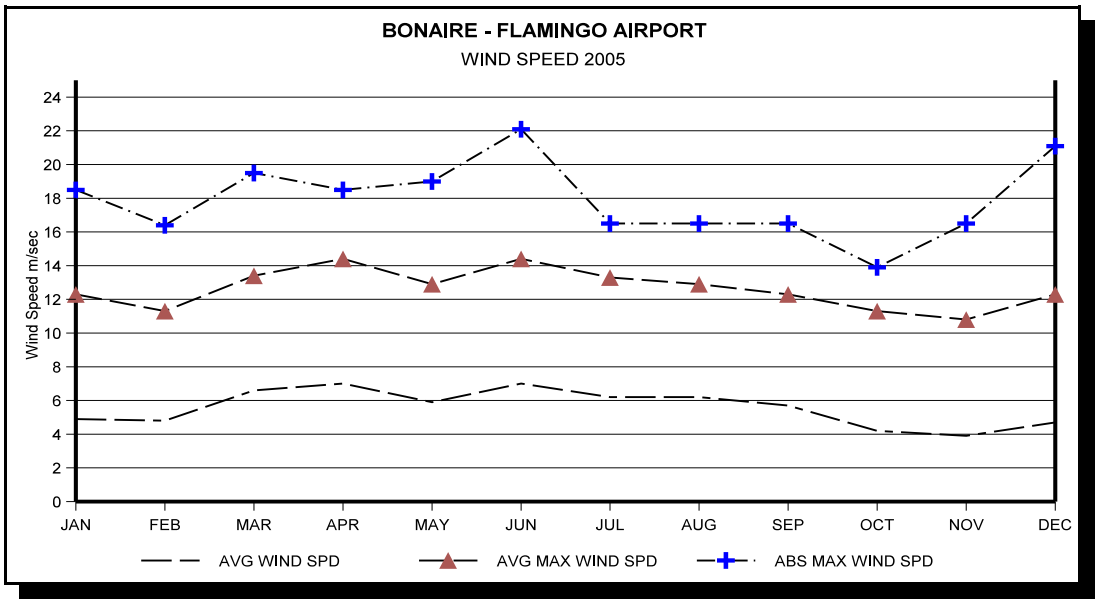
TEMPERATURE

The average air temperature recorded at the Flamingo Airport of Bonaire over the year 2005 was **28.9**°C (normal 28.0). The month of August was the warmest month with an average temperature of **30.3**°C. May and September had the highest value for the average maximum temperature of **33.8**°C. The absolute maximum temperature of the past year was **35.9**°C and was recorded on October 8 at 14:24 local time. The warmest day of 2005 was October 8 with a 24-hour average temperature of **31.5**°C.
With an average temperature of **26.9**°C January had the lowest monthly average temperature for 2005. The lowest average minimum temperature **24.5**°C was recorded during January, February and December. The absolute minimum temperature of **22.2**°C was recorded on January 20, 2005 at 05:40 hours.
January 8, February 1, November 16 were the days with the lowest 24-hour average temperature of 25.5°C for 2005.



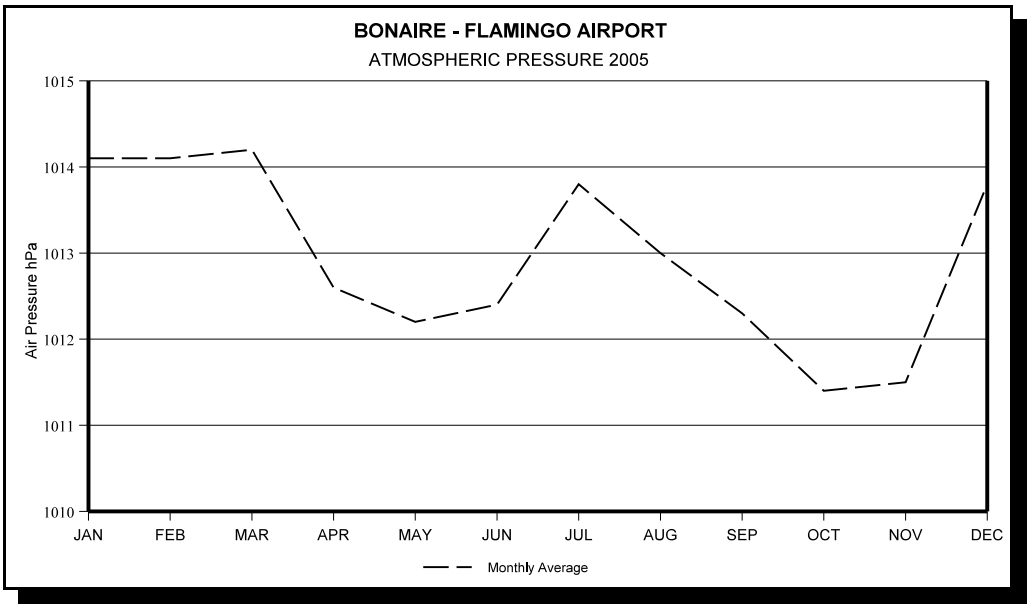
WIND

The average wind speed of 2005 recorded at the Flamingo Airport was 5.6 m/sec (20.1 km/hr) at 10 meter height.
June and April were the months with the highest average wind speed 7.0 m/sec (25.2 km/hr). November had the lowest monthly average of 3.9 m/sec (14.0 km/hr).
The day with the highest 24-hour average wind speed was March 23 with an average of 11.3m/sec (40.7 km/hr). The lowest 24-hour average wind speed of 1.2 m/sec (4.4 km/hr) was recorded on November 24. The highest wind gust 22.1 m/sec (79.6 km/hr) was recorded on June 20 at 11:07 hours local time.



ATMOSPHERIC PRESSURE

The average atmospheric pressure recorded at Flamingo Airport over the year 2005 was 1013.0 hPa. The maximum atmospheric pressure of 1018.5 hPa was observed on February 20 while the minimum atmospheric pressure of 1007.3 hPa was recorded on October 22.

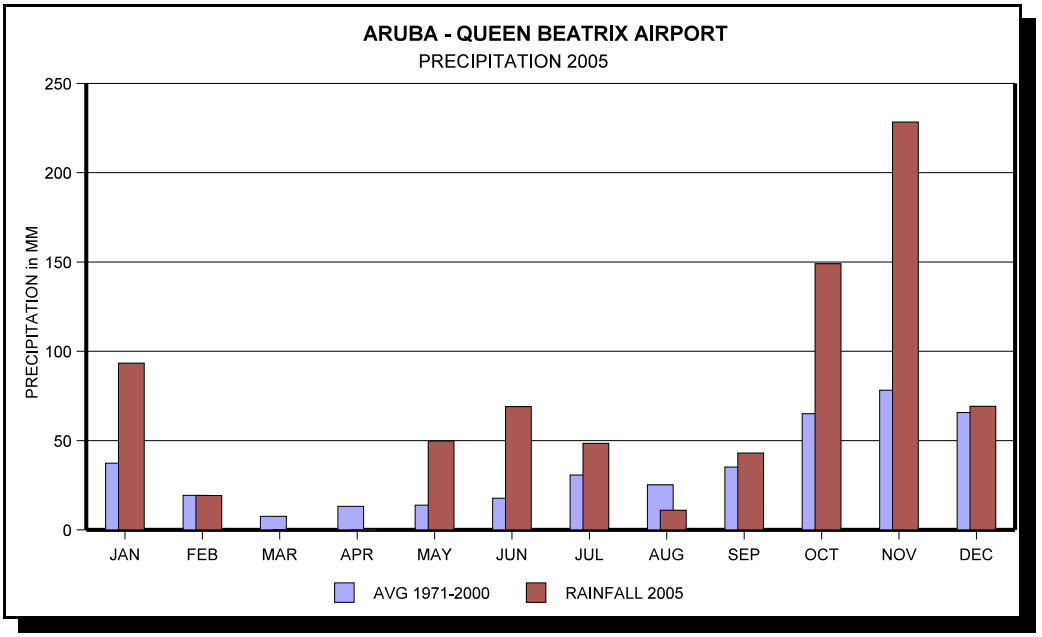


Return to Table of Contents

ARUBA

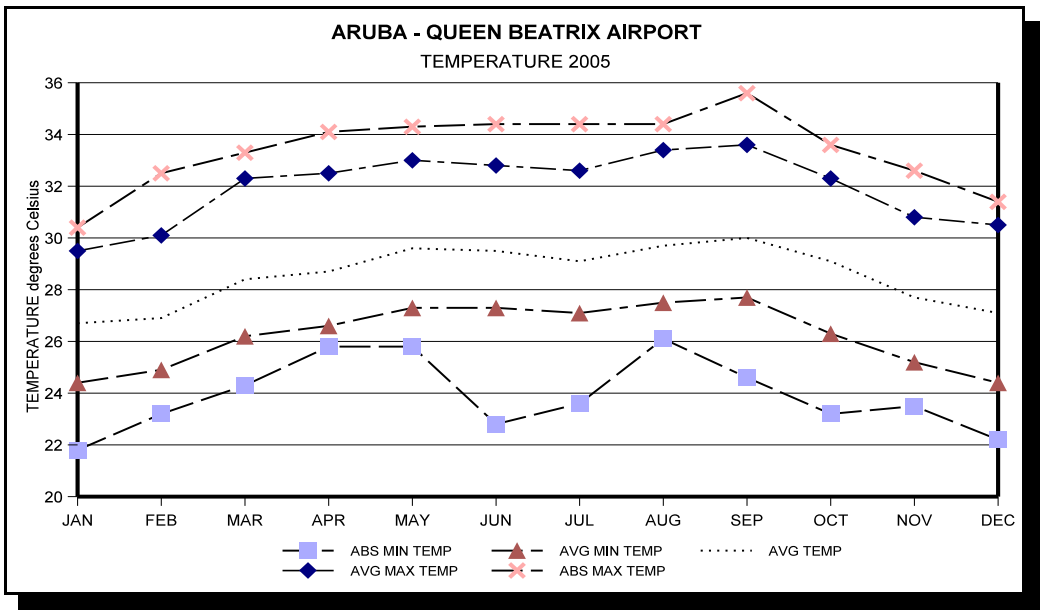
PRECIPITATION

Aruba also had a very wet 2005. The rainfall total recorded at the Queen Beatrix Airport for the year 2005 was, with 780.6 mm, 90.9% above normal (409 mm). The wettest month was November with a total rainfall of 228.4 mm. The 24-hour maximum rainfall of 51 mm was recorded on November 18. The number of days with precipitation greater than or equal to 1.0 mm was 72.



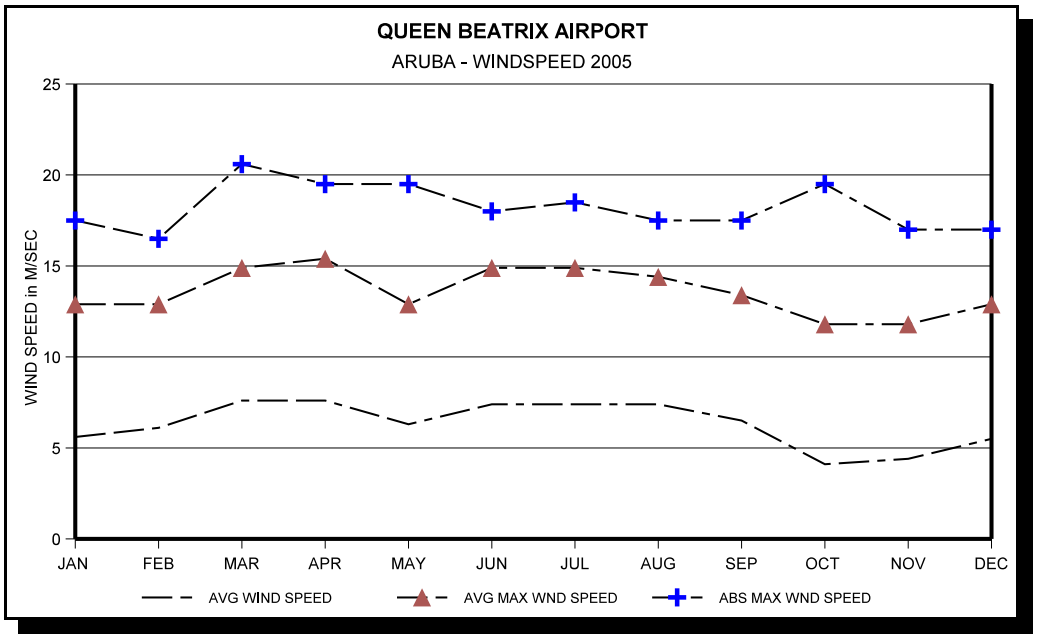
TEMPERATURE

The average air temperature, as recorded at Queen Beatrix Airport over the year 2005, was **28.5**°C (normal 27.8°). September was the hottest month with a monthly average temperature of **30.0**°C and it also was the month with the highest average maximum temperature of **33.6**°C. The absolute maximum temperature of **35.6**°C was recorded on September 17, 2005 at 12:49 hours local time. January was the coolest month with an average temperature of **26.7**°C and was also the month with the lowest average minimum temperature of **24.4**°C. The absolute minimum temperature was **21.8**°C and was recorded on January 19 at 06:59 hours local time.



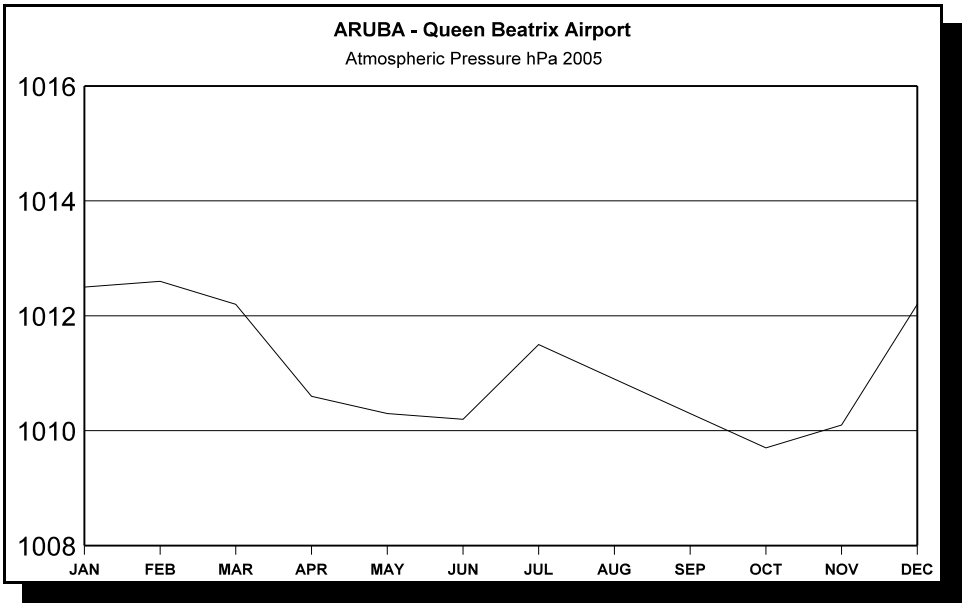
WIND

The average wind speed, at 10 m height, for the year 2005, as recorded at Queen Beatrix Airport, was 6.3 m/sec (22.8 km/hr).
March and April were the months with the highest average wind speed of 7.6 m/sec (27.4 km/hr) and October had the lowest average wind speed 4.1 m/sec (14.8 km/hr). The highest 24 hour average wind speed of 11.1 m/sec (40.0 km/hr) was recorded on March 23 and the day with the lowest 24-hour average of 1.6 m/sec (5.7km/hr) was recorded on October 13, 2005.
The highest wind gust of 20.6 m/sec (74.2 km/hr) was recorded on March 23 at 12:37 hours local time.



ATMOSPHERIC PRESSURE

The average atmospheric pressure recorded at Queen Beatrix Airport over the year 2005 was 1011.1 hPa. The maximum atmospheric pressure of 1016.3 hPa was observed on February 22 while the minimum atmospheric pressure of 1005.2 hPa was recorded on September 18.



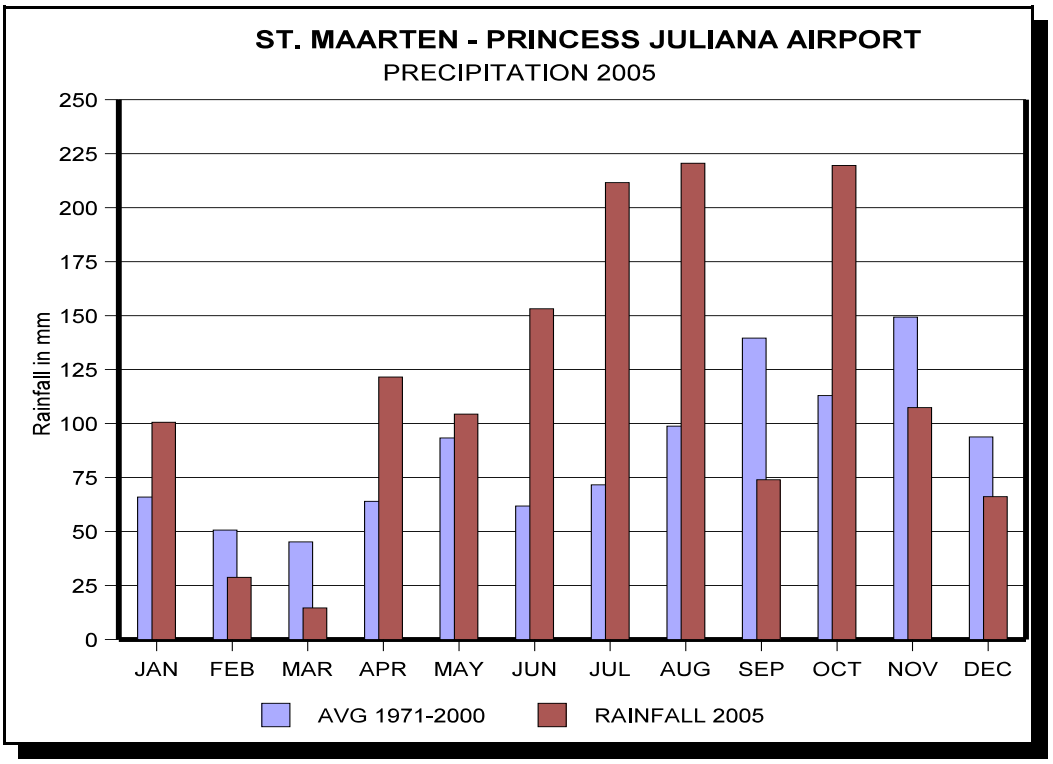
Return to Table of Contents

SSS ISLANDS

St. Maarten

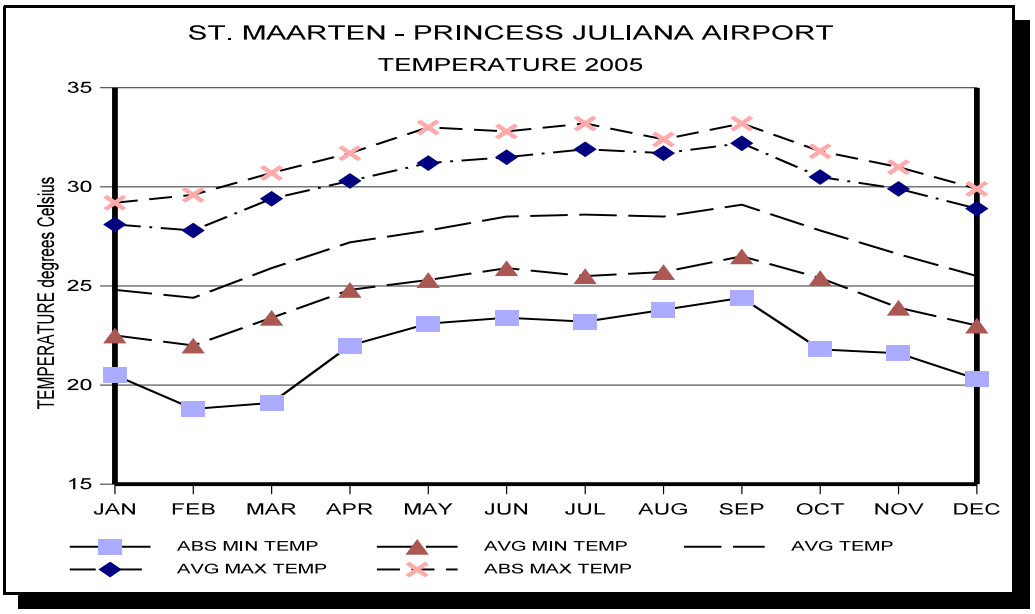
PRECIPITATION

The total rainfall for 2005, recorded at the Princess Juliana Airport was 1422.5 mm about 36% above normal (1971-2000 of 1047.1 mm). August was the month with the highest monthly total of 220.6 mm, making it the wettest month for the year 2005. A new monthly total rainfall record was established for the month of July with 211.6 mm. The old record was 163.3 mm during July 1996. The 24-hour maximum was 80.6 mm and occurred on August 24, 2005. The number of days with precipitation greater than or equal to 1.0 mm was 162.



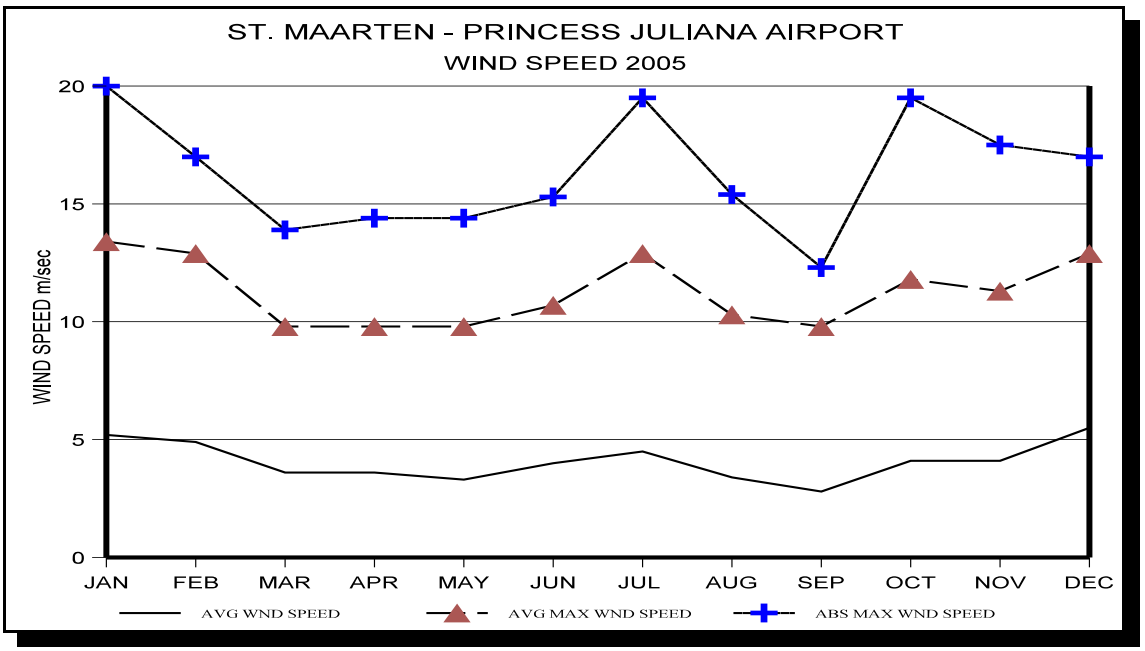
TEMPERATURE

The average air temperature as recorded at Princess Juliana Airport over the year 2005 was **27.1**°C (normal 27.2°). September was the warmest month with a monthly average temperature of **29.1**°C and was also the month with the highest monthly average maximum temperature of **32.2**°C of 2005. The absolute maximum temperature was **33.2**°C and was recorded on July 1at 14:54 hours and on September 10 at 13:12 hours local time. September 10 was the hottest day with a 24-hour average temperature of **29.8**°C.
February was the month with the lowest monthly average temperature of **24.4**°C and was also the month with the lowest average minimum temperature of **22.0**°C for 2005.
The absolute minimum temperature was **18.8**°C recorded on February 1 at 06:57 hours local time. The absolute minimum temperature for the month of October (**21.8**°C) is a new record for this month. The coolest day of 2004 was January 26 with an average temperature of 22.2°C



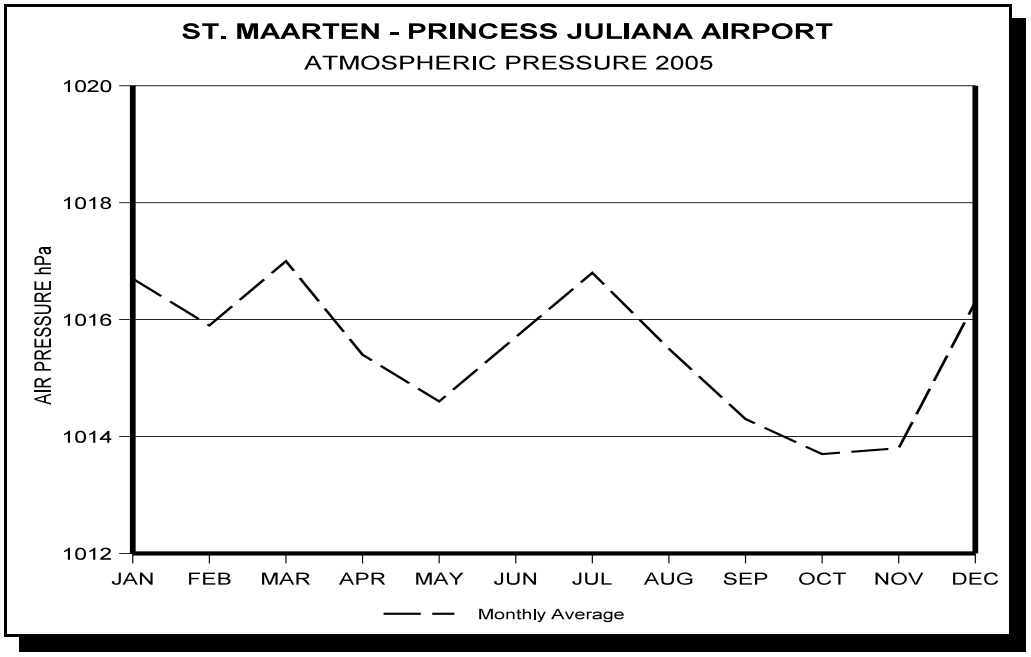
WIND

The average wind speed of 2005, as recorded at the Princess Juliana airport, was 4.1 m/sec (14.7 km/hr) at 10 m height. January had the highest average wind speed of 5.2 m/sec (18.7 km/hr) while September had the lowest average wind speed of 2.8 m/sec (10.1 km/hr). January 13 was the day with the highest 24-hour average wind speed of 8.2 m/sec (29.5 km/hr). The lowest daily average wind speed of 1.4 m/sec (5.0 km/hr) was on September 3, 2005.
The highest wind gust 20 m/sec (72 km/hr) was recorded on January 13 at 20:28 hours local time.



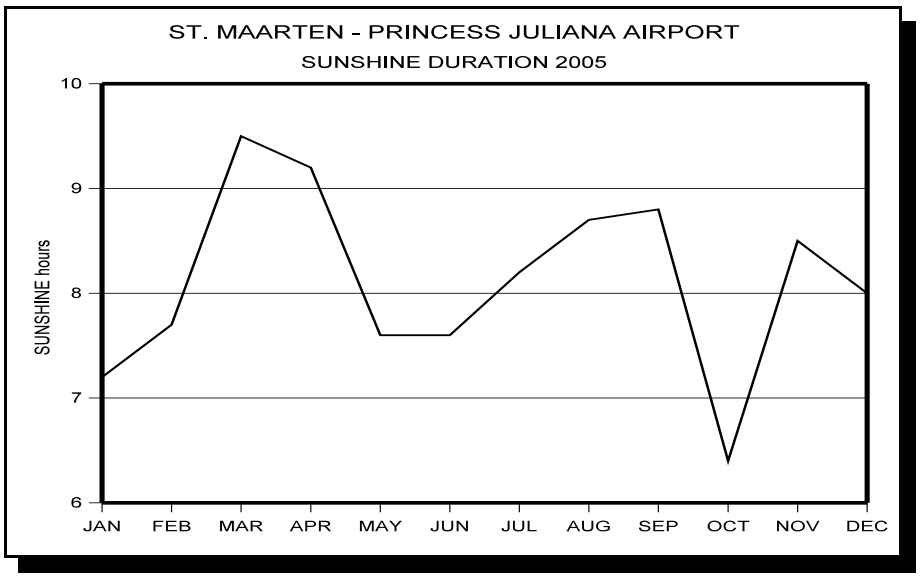
ATMOSPHERIC PRESSURE

The average atmospheric pressure, recorded at Princess Juliana Airport, during the year 2005 was 1015.5 hPa. The maximum atmospheric pressure of 1021.8 hPa was recorded on February 20, while the minimum atmospheric pressure of 1008.9 hPa was recorded on November 22.



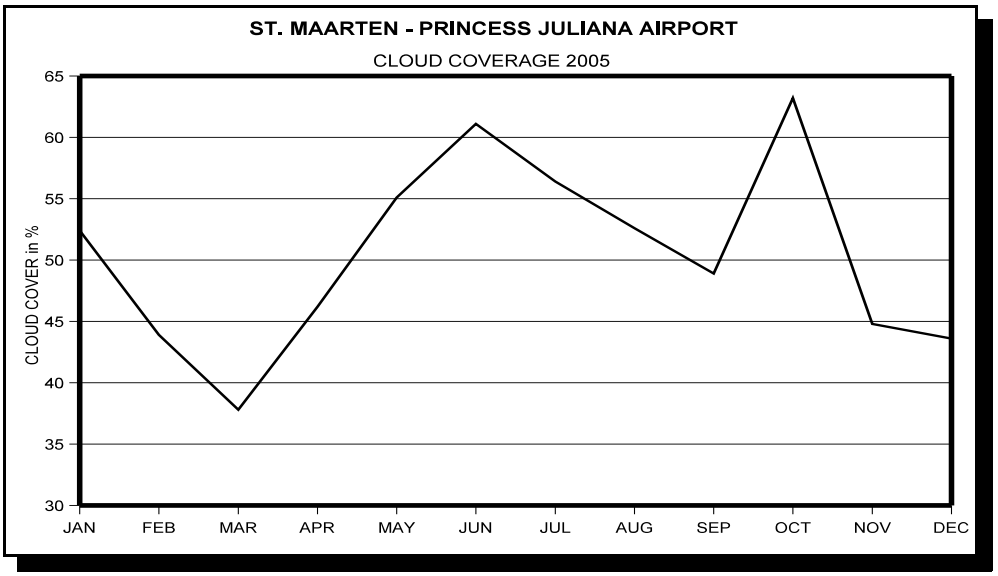
SUNSHINE

The total sunshine duration for 2005 as recorded at the Princess Juliana Airport, was 2940 hrs, 2.4% below normal (3009 hrs) and 66.4% of the maximum annual possible duration (4431.3 hrs). The daily average sunshine duration in 2005 was 8 hours and 6 minutes. This was just below the long-term average daily sunshine duration (8 hours and 16 minutes). The sunniest month was March with a daily average sunshine duration of 9 hours and 28 minutes. The month with least sunshine in 2005 was November with a daily average of 6 hours and 24 minutes. The maximum daily sunshine duration for the past year was 11 hours and 42 minutes recorded on July 30, 2005.



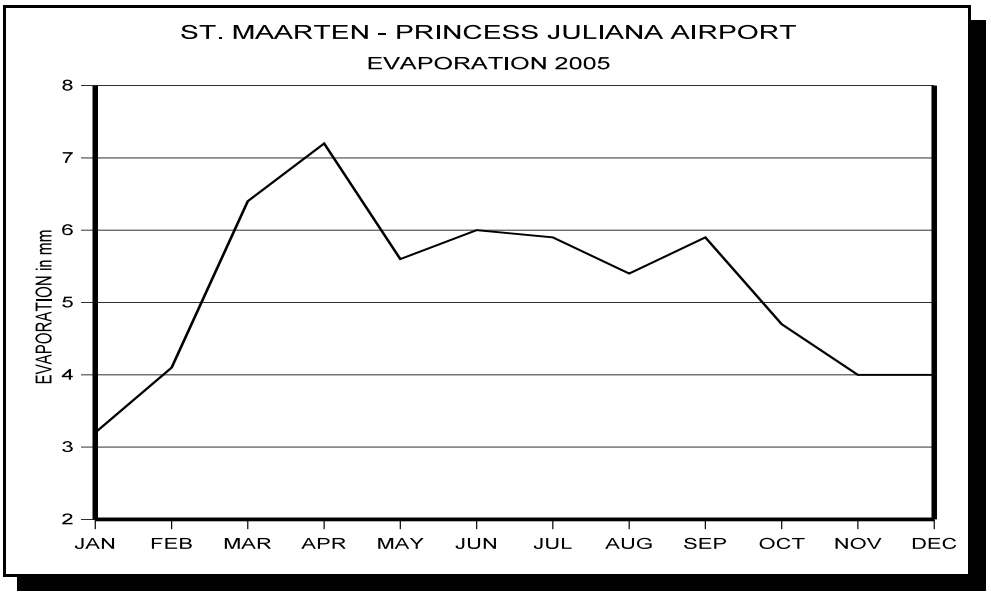
CLOUD COVER

The daily average cloud coverage for St. Maarten over the year 2005 as recorded at Princess Juliana Airport was 63.2%. The highest monthly average cloud cover of 61.1% was observed in June while March had the lowest cloud coverage value of 37.8%.



EVAPORATION

The average daily evaporation, measured at the Princess Juliana Airport, over the year 2005 was 5.2 mm per day. April had the maximum monthly average evaporation value for 2005 of 7.2 mm per day while January had the lowest value of 3.2 mm per day.

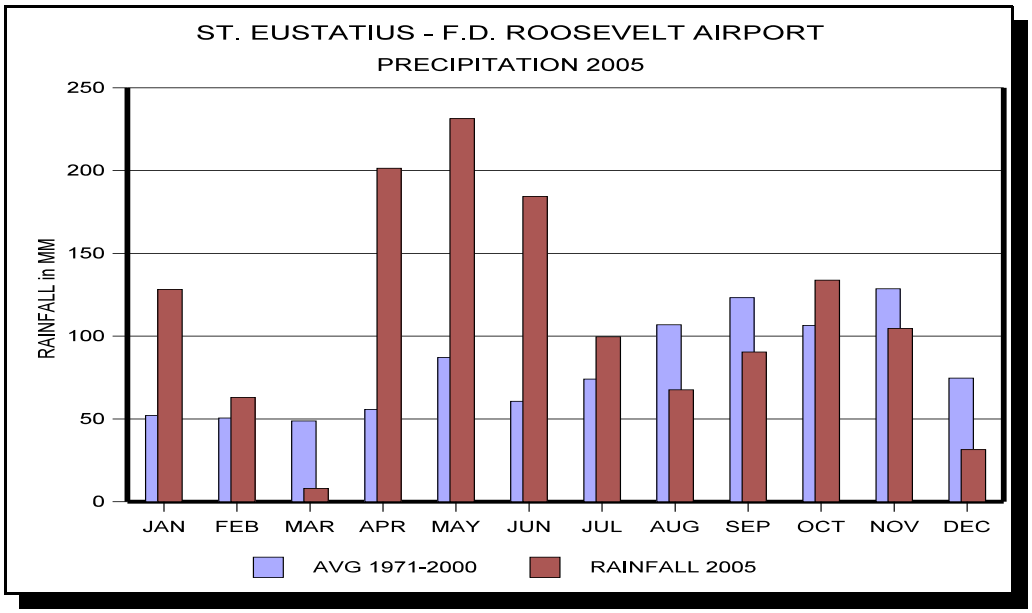


Return to Table of Contents

St. Eustatius

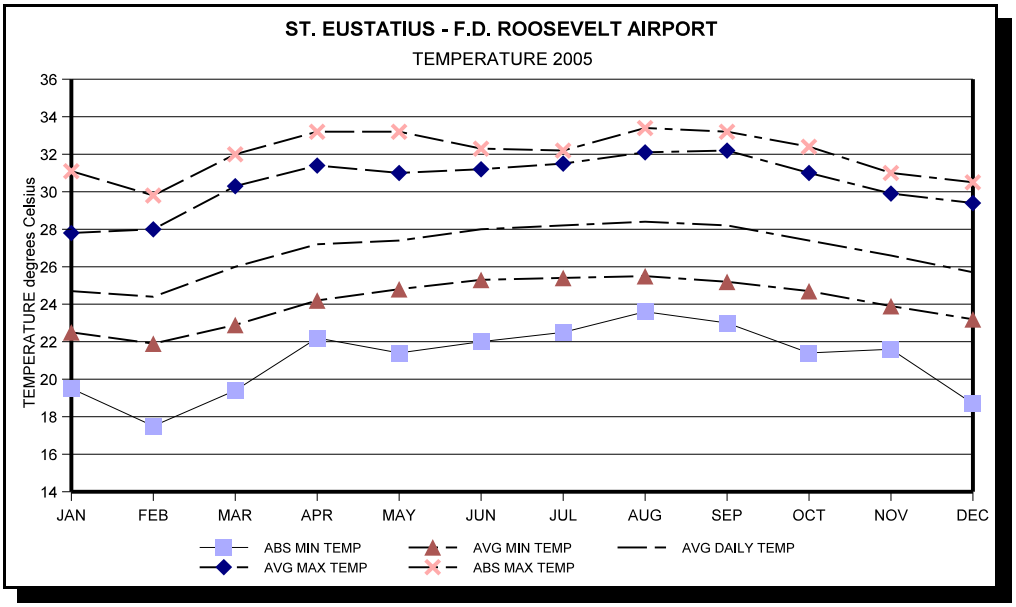
PRECIPITATION

The rainfall distribution over 2005 on St. Eustatius was very peculiar, to say the least.
The first half of the year was the wettest, usually the driest, with May topping the list of the months with the highest rainfall total for 2005 with 231.4 mm. This monthly total for May 2005 is the seventh highest since 1882 with the record being 320.3 mm in May 1897.
The total rainfall amount, recorded at the Roosevelt Airport, for 2005 was 1343.8 mm. This amount is 38.8% above the 30-year average (1971-2000) which is 968.6 mm. The 24-hour maximum rainfall, 132.0 mm and was recorded on May 14. The number of days with precipitation greater than or equal to 1.0 mm was 139. The driest month of 2005 was March with 8.0 mm.



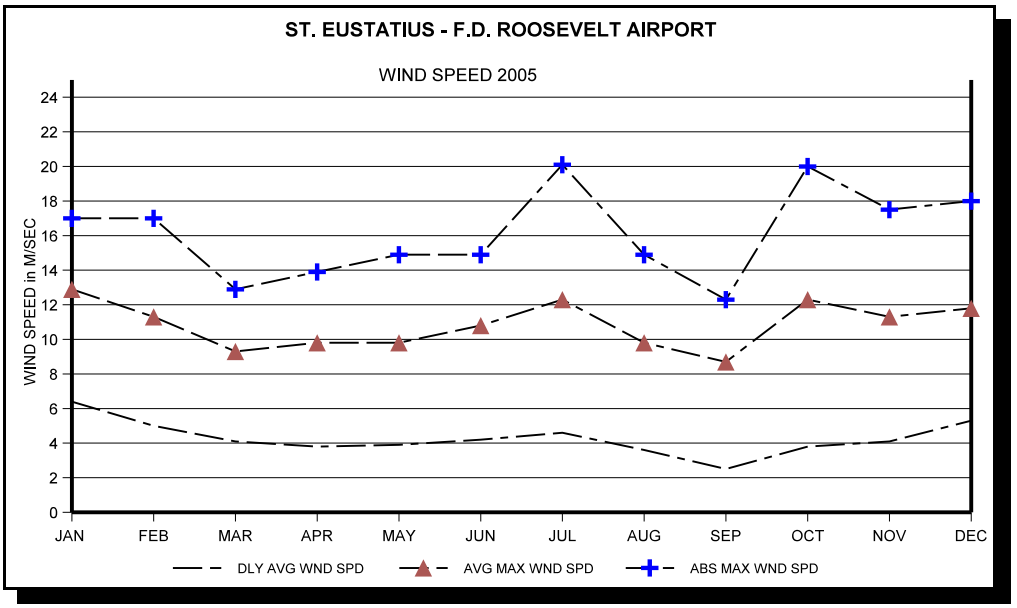
TEMPERATURE

The average air temperature as recorded at Roosevelt Airport over the year 2005 was **26.9**°C (normal 26.9°). August was the warmest month with an average temperature of **28.4**°C. September had the highest average maximum temperature of **32.2**°C. The absolute maximum temperature, **33.4**°C, was recorded on August 29 at 13:41 hours. The warmest day of 2005 was August 3 with a 24-hour average temperature of **30.9**°C.
February was the coolest month with an average temperature of **24.4**°C and had also the lowest monthly average minimum temperature of **21.9**°C. The absolute minimum temperature was **17.5**°C and was recorded on February 2 at 06:14 hours local time.
The coolest day of 2005 was February 2 with an average temperature of **23.1**°C.



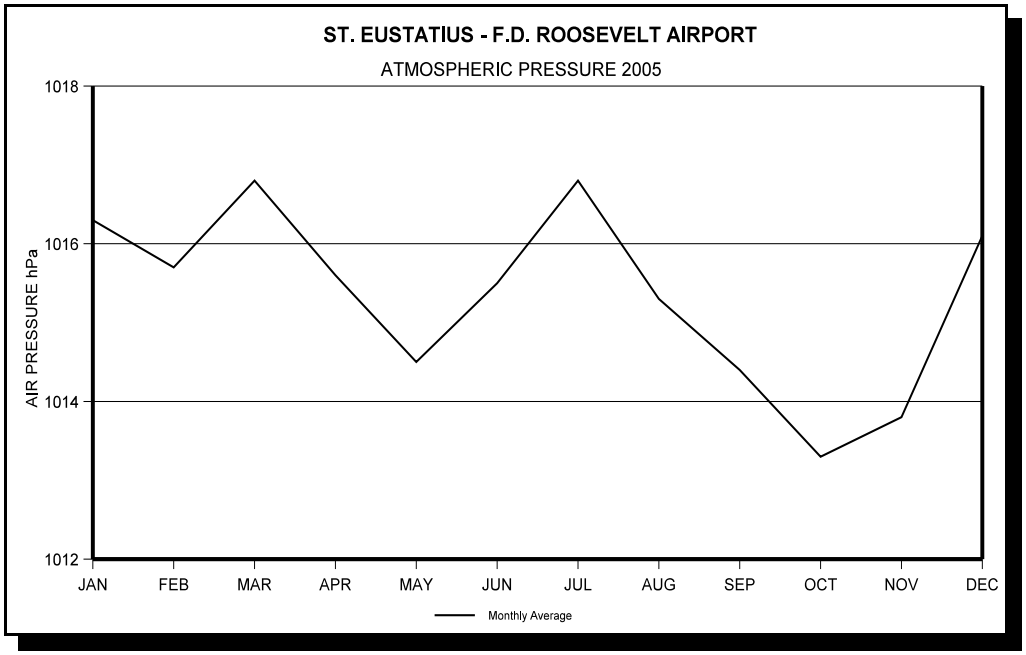
WIND

The average wind speed for 2005, at 10 m height, recorded at the Roosevelt Airport was 4.3 m/sec (15.4 km/hr). January was the month with the highest average wind speed 6.4 m/sec (23.0 km/hr). September had the lowest average wind speed of 2.5 m/sec (9 km/hr).
The day with the highest 24-hour average wind speed, 9.9 m/sec (35.6 km/hr), was recorded on July 19. The highest wind gust 20.1 m/sec (72.4 km/hr) was recorded on July 19 at 21:43 hours local time.



ATMOSPHERIC PRESSURE

The average atmospheric pressure recorded at Roosevelt Airport the year 2005 was 1015.3 hPa. The maximum atmospheric pressure of 1021.3 hPa was recorded on the February 20 while the minimum atmospheric pressure of 1002.1 hPa was recorded on October 8.

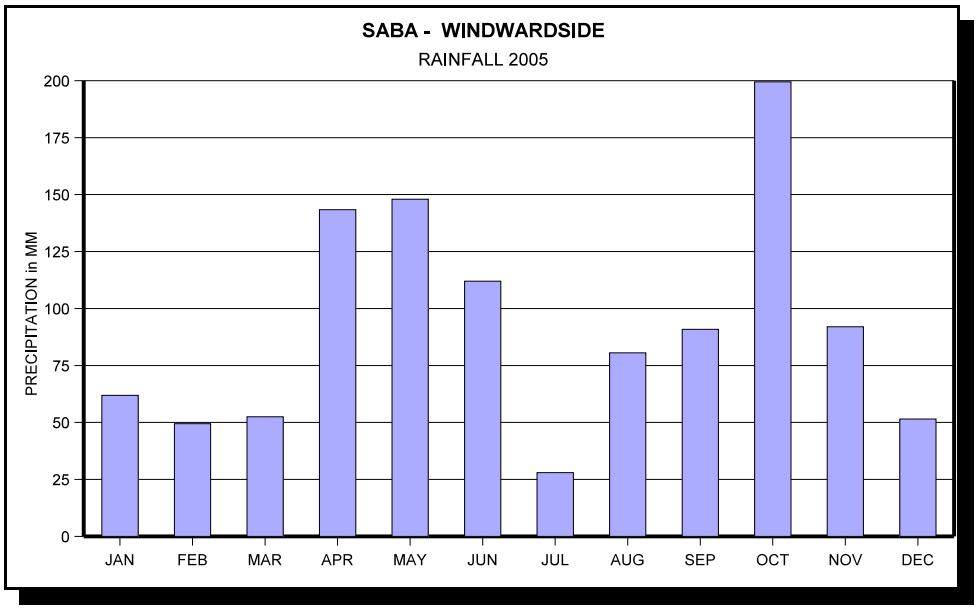


Return to Table of Contents

Saba

PRECIPITATION

The rainfall total recorded at Windwardside, for the year 2005 was 1109.8 mm. That's just above the long term average of 1050.4 mm.
October was the wettest month with a total of 199.5 mm while July was the driest month with a total of 28.0 mm. The 24 hour maximum for 2005 was 112.0 mm measured on October 4.
The number of days with rainfall 1.0 mm or more was 59.



Return to Table of Contents

Climatological Summary in Tabular Form

METEOROLOGICAL SERVICE NETHERLANDS ANTILLES & ARUBA
CLIMATOLOGICAL DATA 2005

Abs. Minimum Temp. (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CURAÇAO	21.6	22.4	24.0	24.8	23.8	22.8	23.8	25.7	23.3	22.1	22.8	22.0
ST. MAARTEN	20.5	18.8	19.1	22.0	23.1	23.4	23.2	23.8	24.4	21.8	21.6	20.3
BONAIRE	22.2	22.4	25.0	25.2	24.8	24.9	24.3	26.7	24.7	24.3	23.3	22.5
ST. EUSTATIUS	19.5	17.5	19.4	22.2	21.4	22.0	22.5	23.6	23.0	21.4	21.6	18.7
ARUBA	23.2	23.2	24.3	25.8	25.8	22.8	23.6	26.1	24.6	23.2	23.5	22.2

Avg. Minimum Temp. (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CURAÇAO	23.9	24.1	25.1	25.5	26.2	26.0	25.9	26.4	26.3	25.0	24.7	23.5
ST. MAARTEN	22.5	22.0	23.4	24.8	25.3	25.9	25.5	25.7	26.5	25.4	23.9	23.0
BONAIRE	24.5	24.5	26.3	26.6	27.7	27.6	27.1	28.0	27.8	27.1	25.6	24.5
ST. EUSTATIUS	22.5	21.9	22.9	24.2	24.8	25.3	25.4	25.5	25.2	24.7	23.9	23.2
ARUBA	26.3	24.9	26.2	26.6	27.3	27.3	27.1	27.5	27.7	26.3	25.2	24.4

Average Temp. (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CURAÇAO	26.0	26.1	27.6	27.6	28.5	28.6	28.5	29.0	28.9	28.0	26.9	26.1
ST. MAARTEN	24.8	24.4	25.9	27.2	27.8	28.5	28.6	28.5	29.1	27.8	26.6	25.5
BONAIRE	26.9	27.0	28.6	28.7	30.1	30.0	29.6	30.3	30.2	29.9	28.3	27.4
ST. EUSTATIUS	24.7	24.4	26.0	27.2	27.4	28.0	28.2	28.4	28.2	27.4	26.6	25.7
ARUBA	29.1	26.9	28.4	28.7	29.6	29.5	29.1	29.7	30.0	29.1	27.7	27.1

Avg. Max. Temp. (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CURAÇAO	28.7	29.0	31.4	31.3	32.0	32.1	32.6	33.1	32.7	31.5	29.8	29.3
ST. MAARTEN	28.1	27.8	29.4	30.3	31.2	31.5	31.9	31.7	32.2	30.5	29.9	28.9
BONAIRE	30.2	30.6	32.3	32.2	33.8	33.4	33.0	33.7	33.8	33.6	31.9	31.0
ST. EUSTATIUS	27.8	28.0	30.3	31.4	31.0	31.2	31.5	32.1	32.2	31.0	29.9	29.4
ARUBA	32.3	30.1	32.3	32.5	33.0	32.8	32.6	33.4	33.6	32.3	30.8	30.5

Abs. Max. Temp. (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CURAÇAO	29.9	31.0	32.5	32.4	33.8	34.2	35.0	34.7	34.4	33.2	32.0	30.0
ST. MAARTEN	29.2	29.6	30.7	31.7	33.0	32.8	33.2	32.4	33.2	31.8	31.0	29.9
BONAIRE	30.9	32.1	32.9	33.7	35.4	34.8	34.2	35.2	34.7	35.9	33.5	32.0
ST. EUSTATIUS	31.1	29.8	32.0	33.2	33.2	32.3	32.2	33.4	33.2	32.4	31.0	30.5
ARUBA	33.6	32.5	33.3	34.1	34.3	34.4	34.4	34.4	35.6	33.6	32.6	31.4

Rainfall (mm)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CURAÇAO	108.4	26.0	0.0	0.6	88.2	91.4	9.0	1.4	58.2	122.8	229.6	107.2
ST. MAARTEN	100.6	28.8	14.6	121.6	104.4	153.2	211.6	220.6	74.0	219.5	107.4	66.2
BONAIRE	165.8	27.2	2.4	1.4	5.0	15.4	15.4	0.0	16.0	39.0	283.0	114.6
ST. EUSTATIUS	128.2	63.0	8.0	201.4	231.4	184.4	99.6	67.6	90.4	133.8	104.6	31.4
ARUBA	93.4	19.2	0.2	0.0	49.8	69.0	48.4	11.0	43.0	149.0	228.4	69.2

METEOROLOGICAL SERVICE NETHERLANDS ANTILLES & ARUBA
CLIMATOLOGICAL DATA 2005

Average Air Pressure (hPa)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	1013.9	1014.0	1014.0	1012.4	1012.0	1012.0	1013.4	1012.7	1012.0	1011.2	1011.4	1013.6	1012.7
ST. MAARTEN	1016.7	1015.9	1017.0	1015.4	1014.6	1015.7	1016.8	1015.5	1014.3	1013.7	1013.8	1016.3	1015.5
BONAIRE	1014.1	1014.1	1014.2	1012.6	1012.2	1012.4	1013.8	1013.0	1012.3	1011.4	1011.5	1013.8	1013.0
ST. EUSTATIUS	1016.3	1015.7	1016.8	1015.6	1014.5	1015.5	1016.8	1015.3	1014.4	1013.3	1013.8	1016.1	1015.3
ARUBA	1012.5	1012.6	1012.2	1010.6	1010.3	1010.2	1011.5	1010.9	1010.3	1009.7	1010.1	1012.2	1011.1

Average Wind Speed 10m height (in m/sec)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	5.4	6.1	5.7	5.6	4.8	5.9	5.6	5.4	5.1	3.8	4.4	4.9	5.2
ST. MAARTEN	5.2	4.9	3.6	3.6	3.3	4.0	4.5	3.4	2.8	4.1	4.1	5.5	4.1
BONAIRE	4.9	4.8	6.6	7.0	5.9	7.0	6.2	6.2	5.7	4.2	3.9	4.7	5.6
ST. EUSTATIUS	6.4	5.0	4.1	3.8	3.9	4.2	4.6	3.6	2.5	3.8	4.1	5.3	4.3
ARUBA	5.6	6.1	7.6	7.6	6.3	7.4	7.4	7.4	6.5	4.1	4.4	5.5	6.3

Average Maximum Wind Speed 10m height (in m/sec)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	12.3	11.8	12.3	12.9	11.3	13.3	13.4	12.3	11.8	11.3	11.3	12.3	12.2
ST. MAARTEN	13.4	12.9	9.8	9.8	9.8	10.7	12.9	10.3	9.8	11.8	11.3	12.9	11.3
BONAIRE	12.3	11.3	13.4	14.4	12.9	14.4	13.3	12.9	12.3	11.3	10.8	12.3	12.6
ST. EUSTATIUS	12.9	11.3	9.3	9.8	9.8	10.8	12.3	9.8	8.7	12.3	11.3	11.8	10.8
ARUBA	12.9	12.9	14.9	15.4	12.9	14.9	14.9	14.4	13.4	11.8	11.8	12.9	13.6

Absolute Maximum Wind Speed (in m/sec)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	18.0	15.9	16.5	17.5	15.4	16.3	18.0	15.4	15.4	15.9	15.4	21.6	16.8
ST. MAARTEN	20.0	17.0	13.9	14.4	14.4	15.3	19.5	15.4	12.3	19.5	17.5	17.0	16.4
BONAIRE	18.5	16.4	19.5	18.5	19.0	22.1	16.5	16.5	16.5	13.9	16.5	21.1	17.9
ST. EUSTATIUS	17.0	17.0	12.9	13.9	14.9	14.9	20.1	14.9	12.3	20.0	17.5	18.0	16.1
ARUBA	17.5	16.5	20.6	19.5	19.5	18.0	18.5	17.5	17.5	19.5	17.0	17.0	18.2

Potential Wind Energy (in Kwhr/m/day)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	2.8	3.8	3.0	3.1	2.3	3.4	3.1	2.7	2.7	1.2	1.7	2.2	2.7

Sunshine Duration (in hours)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	7.1	7.7	9.9	8.3	7.7	9.8	9.4	10.5	9.2	7.6	6.6	8.1	8.5
ST. MAARTEN	7.2	7.7	9.5	9.2	7.6	7.6	8.2	8.7	8.8	6.4	8.5	8	8.1

Cloud Coverage (in %)

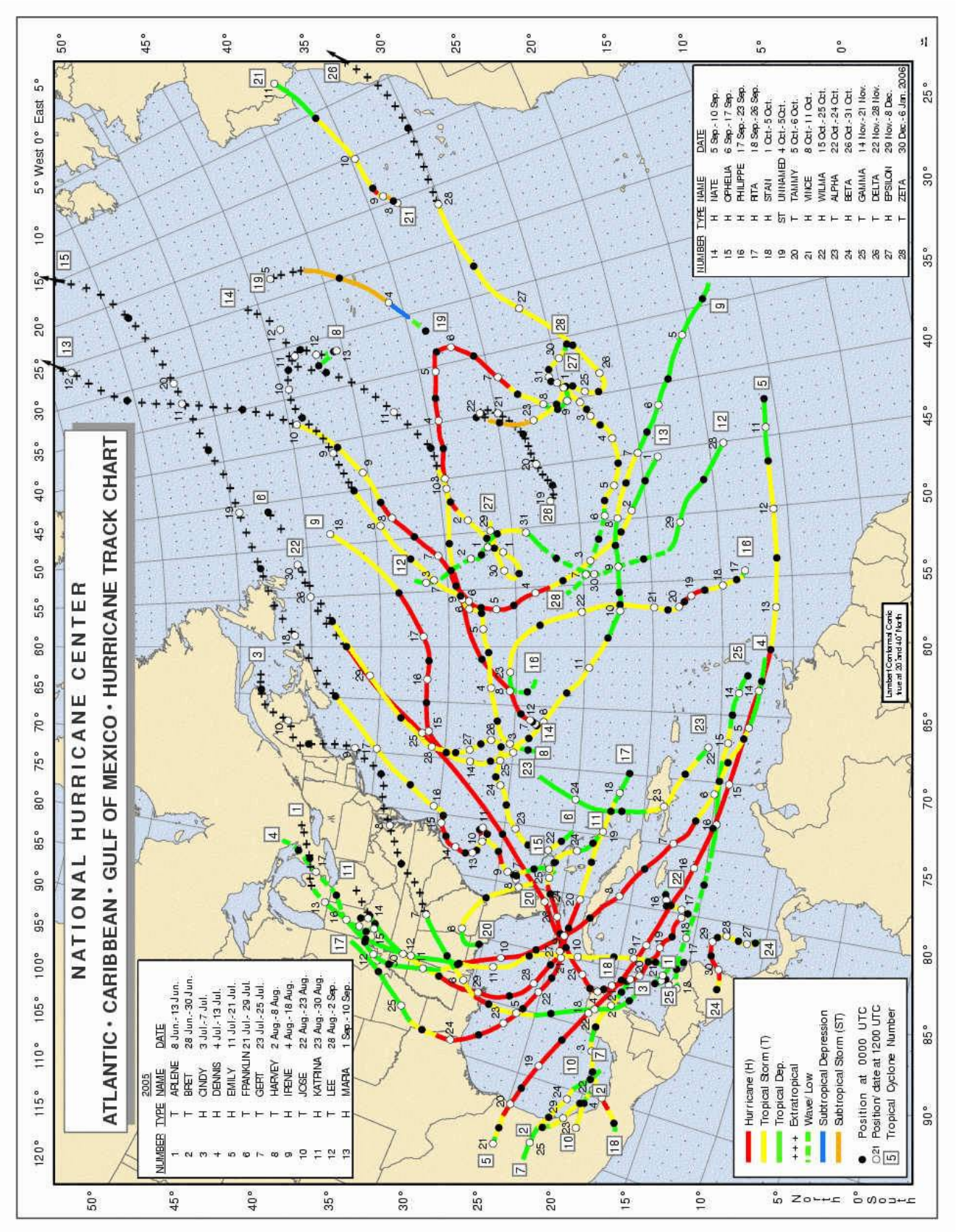
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	49.9	48.3	35.8	57.4	57.3	48.9	51.6	46.3	46.8	64.4	60.3	46.8	51.2
ST. MAARTEN	52.4	43.9	37.8	46.2	55.1	61.1	56.4	52.6	48.9	63.2	44.8	43.6	50.5

Evaporation (in mm)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CURAÇAO	4.4	5.6	7.1	6.9	6.5	7.4	7.4	7.3	7.1	5.3	4.2	5.0	6.2
ST. MAARTEN	3.2	4.1	6.4	7.2	-.-	6.0	5.9	5.4	5.9	4.7	4.0	4.0	4.7

Return to Table of Contents

Track Map of 2005 Atlantic Tropical Cyclones



[Return to Table of Contents](#)