= 2006 Atlantic hurricane season =

The 2006 Atlantic hurricane season was significantly less active than the record previous season . It marked the first season since 2001 in which no hurricanes made landfall in the United States , and was the first since 1994 in which no tropical cyclones formed during October . Following the intense activity of 2005 , forecasters predicted that the 2006 season would be only slightly less active . Instead activity was slowed by a rapidly forming moderate El Niño event , the presence of the Saharan Air Layer over the tropical Atlantic , and the steady presence of a robust secondary high pressure area to the Azores high centered on Bermuda . There were no tropical cyclones after October 2 .

Tropical Storm Alberto was indirectly responsible for two deaths when it made landfall in Florida . Hurricane Ernesto caused heavy rainfall in Haiti , and directly killed at least seven in Haiti and the United States . Four hurricanes formed after Ernesto , including the strongest storms of the season , Hurricanes Helene and Gordon . In total , the season was responsible for 14 deaths and $ 500 million (2006 USD ; $ 587 million 2016 USD) in damage . The calendar year 2006 also saw Tropical Storm Zeta , which arose in December 2005 and persisted until early January , only the second such event on record . The storm can be considered a part of the 2005 and 2006 seasons , although it occurred outside the June 1 ? November 30 period during which most Atlantic basin tropical cyclones form .

= = Seasonal forecasts = =

Forecasts of hurricane activity are issued before each hurricane season by noted hurricane experts Philip J. Klotzbach , Dr. William M. Gray , and their associates at Colorado State University ; and separately by NOAA forecasters .

Klotzbach 's team (formerly led by Gray) has defined the average number of storms per season (1950 ? 2000) as 9 @.@ 6 tropical storms , 5 @.@ 9 hurricanes , and 2 @.@ 3 major hurricanes (storms exceeding Category 3 strength in the Saffir @-@ Simpson Hurricane Scale) . A normal season , as defined by NOAA , has 6 ? 14 named storms , with 4 ? 8 of those reaching hurricane strength , and 1 ? 3 major hurricanes .

= = = Pre @-@ season forecasts = = =

On December 5 , 2005 , Klotzbach 's team issued its initial extended @-@ range forecast for the 2006 season , predicting an above average of 17 named storms , nine of them hurricanes , and five classified as Category 3 intensity or higher .

As in the 2005 season , the team predicted it was highly probable that at least one major hurricane would directly impact the United States . The forecast suggested an 81 % probability that at least one major hurricane would strike the U.S. mainland , a 64 % chance of at least one major hurricane striking the East Coast of the United States (including the Florida peninsula) , and a 47 % chance of at least one major hurricane striking the Gulf Coast of the United States from the Florida Panhandle westward . The team also predicted that the potential for major hurricane activity in the Caribbean was above average . A few months later , on April 4 , 2006 , CSU issued another forecast confirming its December predictions .

On May 22 , 2006 , NOAA released its pre @-@ season forecast for the 2006 season . The prediction was for 13 ? 16 named storms , 8 ? 10 of those becoming hurricanes , and 4 ? 6 becoming major hurricanes .

On May 31 , 2006 , Klotzbach 's team released its final pre @-@ season forecast for 2006 , confirming its earlier prediction .

= = = Midseason outlooks = = =

On August 3 , 2006 , Klotzbach 's team lowered its season estimate to 15 named storms , with 7

becoming hurricanes and 3 becoming major hurricanes , noting that conditions had become less favorable for storms than they had been earlier in the year . The sea @-@ level pressure and trade wind strength in the tropical Atlantic were reported to be above normal , while sea surface temperature anomalies were on a decreasing trend .

On August 8 , 2006 , NOAA revised its season estimate to 12 ? 15 named storms , with 7 ? 9 becoming hurricanes and 3 ? 4 becoming major hurricanes . The reduction was attributed to less favorable environmental conditions , a decrease in La Niña conditions , and the lack of a " very persistent upper @-@ level ridge pattern over the eastern U.S. and western Atlantic . "

On September 1 , Klotzbach 's team also revised its season estimate , to 13 named storms , 5 hurricanes and 2 major hurricanes , citing a larger volume of the Saharan Air Layer and an El Niño trend in the Pacific . The team again reduced the number of tropical storms expected for the season a month later , on October 3 , with an updated forecast of 11 named storms , 6 hurricanes and 2 major hurricanes , citing the ongoing El Niño .

= = Season summary = =

Tropical Storm Zeta formed on December 30 , 2005 , and lasted until January 6 , 2006 . Although the majority of its existence was spent in 2006 , it is officially a storm of the 2005 Atlantic hurricane season because that is the year in which it formed . Zeta joined Hurricane Alice as only the second North Atlantic tropical cyclone in recorded history to span two calendar years .

The season started on June 1 , 2006 , and officially ended on November 30 , 2006 . These dates conventionally delimit the period of each year when most tropical cylones form in the Atlantic basin . Ten days into the start of the season , Tropical Storm Alberto developed in the Caribbean Sea , and after four months of activity , Hurricane Isaac dissipated on October 3 south of Newfoundland . Compared to the devastating 2005 Atlantic hurricane season , 2006 was not severe in terms of deaths and damage . Three tropical storms made landfall in the United States . The first of them , Tropical Storm Alberto , made landfall in Florida with winds of 50 mph (80 km / h) , causing flooding and light damage . Tropical Storm Beryl made landfall on Nantucket , but left little impact . The third and more significant storm was Hurricane Ernesto , which killed two people in Virginia and two in Florida , as well as causing $ 500 million in damage (2006 USD) . During the season , only one tropical cyclone in the Atlantic ? Alberto ? affected Mexico . Canada was affected by several tropical cyclones during 2006 , including Alberto , the unnamed storm , Beryl , Florence , and Isaac .

On June 20 , an upper @-@ level disturbance formed east of the Bahamas and moved westward across the islands . Between June 24 and 26 , areas of convection developed occasionally , and a low @-@ level disturbance formed . The system turned northward and upon reaching the Gulf Stream on June 27 , it began to mature . It made landfall near Morehead City , North Carolina and moved northeastward along the U.S. East Coast . The storm contributed to severe and deadly flooding in the Mid @-@ Atlantic States . While the NHC did not operationally classify it , data from reconnaissance aircraft , NEXRAD weather radar , and surface observations suggest it may have met the criteria for a tropical cyclone .

The National Hurricane Center 's pre @-@ season activity outlook predicted 13 ? 16 named storms , 8 ? 10 hurricanes and 4 ? 6 major hurricanes . They also predicted a high risk of at least one major hurricane strike to the Southeast United States . In the event , only ten storms formed during the season , the lowest number since the 1997 season , when there were seven . Five of the ten storms developed into hurricanes ? also the lowest number since 1997 ? and only two attained major hurricane status , tying with 2002 for the fewest since 1997 . Only one named storm was observed during October , the lowest number since 1994 , when none were seen during that month . Additionally , only three named storms made landfall in the United States , the fewest since 2001 . Because of several factors , including a rapidly forming El Niño event , the Saharan Air Layer over the tropical Atlantic and the presence of a high pressure area to the Azores high situated near Bermuda , it contributed to a below average season . Also , sea surface temperatures in the western Atlantic were just at or slightly below average . In contrast , sea surface temperatures during the 2005 season were well above average .

Overall , the season 's activity was reflected with a low cumulative accumulated cyclone energy (ACE) rating of 79 . ACE is , broadly speaking , a measure of the power of the hurricane multiplied by the length of time it existed , so storms that last a long time , as well as particularly strong hurricanes , have high ACEs . ACE is only calculated for full advisories on tropical systems at or exceeding 34 knots (39 mph , 63 km / h) or tropical storm strength . Subtropical cyclones are excluded from the total .

= = Storms = =

= = = Tropical Storm Alberto = = =

On June 10 , an area of disturbed weather associated with a broad low pressure area off the coast of Belize organized over the warm waters of the Caribbean Sea into the first tropical depression of the season . It dropped light rainfall in Mexico , with a 24 @-@ hour total peaking at 4 inches (100 mm) in Peto , Yucatán . Southwesterly vertical wind shear initially prevented significant development , but as it moved closer to Florida , the depression strengthened into a tropical storm on June 11 . Passing over the warm , deep water of the Loop Current allowed accelerated development , and the cyclone reached its peak winds of 70 mph (115 km / h) , just shy of hurricane strength . Subsequent weakening occurred as it moved over the cooler waters of the continental shelf , and Alberto made landfall near Adams Beach , Florida , on June 14 with winds of about 45 mph (72 km / h) . Losing its tropical characteristics , Alberto moved northeastward and produced heavy rainfall in South Carolina and North Carolina . The remnants tracked off the East Coast and transitioned into a powerful extratropical storm which affected Nova Scotia with high winds , heavy rain , and rough surf , leaving four fisherman missing offshore .

Alberto caused record rainfall in North Carolina , peaking at eight in (200 mm) . In Florida , two people died , and damage was estimated at $ 250 @,@ 000 (2006 USD) . Later , the storm left four sailors missing about 230 miles (370 km) south of Nova Scotia .

= = = Unnamed Tropical Storm = = =

A cold front exited the eastern United States on July 13 and subsequently stalled over the western Atlantic Ocean . It decayed and dissipated , leaving behind two areas of low pressure . The southern area near North Carolina became Tropical Storm Beryl , and the northern system became an extratropical low on July 16 south @-@ southeast of Cape Cod , Massachusetts . Moving northeastward over warm waters , the system separated itself from the dissipating front later that day . Convection developed near the center , and the system transitioned into a tropical depression early on July 17 about 240 miles (390 km) southeast of Nantucket , Massachusetts . Accelerating northeastward , the depression intensified into a tropical storm six hours later . Banding features became prominent , and after continued strengthening , the storm attained peak winds of 50 mph (85 km / h) late on July 17 , while located about 245 miles (395 km) south of Halifax , Nova Scotia . Shortly thereafter , the storm encountered much cooler water temperatures after leaving the Gulf Stream . The storm quickly weakened as the convection rapidly diminished , and on July 18 degenerated into a non @-@ convective remnant low . The remnants crossed Newfoundland before turning to the east @-@ northeast and dissipating on July 19 . The storm greatly weakened prior to moving across Newfoundland , and as a result impact was minimal .

Operationally , the storm was considered as a non @-@ tropical gale , connected to a cold front . However , a post @-@ season analysis provided enough evidence of tropical characteristics , indicating no frontal features and no cold air intrusion at the time of peak winds . Observations analyzed the storm as having a symmetric warm @-@ core , whereas in real time it was considered subtropical . The National Hurricane Center officially re @-@ classified the system as an unnamed tropical storm on December 15 , 2006 .

= = = Tropical Storm Beryl = = =

The same frontal system that developed the previous system spawned another low pressure area east of North Carolina . On July 18 , it developed into a tropical depression , and with associated deep convection , the storm organized sufficiently to be upgraded to Tropical Storm Beryl on July 19 . It tracked northeast and passed over Nantucket before dissipating southwest of Nova Scotia on July 21 . Waves along the southern coast of Nantucket reached 10 feet (3 @.@ 0 m) in height as the storm approached the island , resulting in four people being rescued by lifeguards from rip currents . The remnants of Tropical Storm Beryl dropped moderate precipitation in Atlantic Canada , with totals of up to 3 @.@ 5 inches (88 mm) ; in some locations 1 inch (25 mm) of rain fell in an hour . Moderate winds were reported along its path , which peaked at 60 mph (96 km / h) in southern Nova Scotia .

= = = Tropical Storm Chris = = =

By late July , a tropical wave moved off the coast of Africa and traversed the Atlantic Ocean . The associated convection organized and became a tropical depression on July 31 about 160 miles (260 km) east of Antigua . The depression tracked westward and soon intensified into Tropical Storm Chris before reaching peak winds of 65 mph (100 km / h) northeast of the United States Virgin Islands . The storm was forecast to strengthen further and become a hurricane as it moved into the Bahamas . However , Chris began to be affected by wind shear and became disorganized . The storm weakened to a tropical depression on August 4 , and dissipated as it approached the Cuban coast on August 5 .

The storm 's effects were limited to moderate rainfall in Hispaniola and Cuba . Cruise lines such as Royal Caribbean re @-@ routed their ships to avoid the storm . In Puerto Rico , rainfall from the storm caused the Fajardo River to overflow its banks . The overflown waters temporarily closed a highway in the northeastern portion of the island . Rainfall reached up to 2 inches (50 mm) across portions of Hispaniola , the Turks and Caicos , the Bahamas , and eastern Cuba , and reached 4 inches (100 mm) in some mountainous areas .

= = = Tropical Storm Debby = = =

On August 20 a tropical wave emerged off the coast of Africa for the Atlantic Ocean . Immediately following , the wave developed convective banding and a broad circulation . At 1800 UTC on August 21 , a tropical depression formed to the south @-@ southeast of the Cape Verde Islands . The depression was a large , well @-@ organized system , and tracking west @-@ northwestward it intensified into Tropical Storm Debby on August 23 .

Later on August 23 , the storm attained peak winds of 50 mph (80 km / h) , which it maintained for about two days . However , Debby entered a dry and stable air mass and deteriorated in organization . An upper @-@ level trough increased southerly wind shear and displaced the convection from the center . The cyclone began to weaken , and on August 26 Debby weakened to a tropical depression before degenerating into a remnant low . The circulation lasted another two days .

= = = Hurricane Ernesto = = =

Hurricane Ernesto originated from a tropical wave which moved off the coast of Africa on August 18 . The wave progressed westward and reached the Western Atlantic , spawning a tropical depression on August 24 near the Windward Islands . It moved west @-@ northwestward through the Caribbean Sea and intensified into Tropical Storm Ernesto on August 25 . The storm briefly attained hurricane status on August 27 to the southwest of Haiti , before land interaction caused weakening . Ernesto made landfall near Guantanamo Bay , Cuba , early in the morning on August 28 as a tropical storm . At one point the storm was predicted to become a major hurricane in the Gulf of

Mexico and threaten parts of the Gulf Coast . However , Ernesto moved much farther east than anticipated , and made landfall as a tropical storm on the southern tip of Florida on August 29 . Ernesto retained tropical storm strength as it crossed Florida and emerged from land near Cape Canaveral , and was just below hurricane strength when it made landfall again in North Carolina on August 31 . Ernesto transitioned into an extratropical cyclone over Virginia on September 1 , which ultimately dissipated over Quebec on September 4 .

Early in its duration , Ernesto killed five people in Haiti from rainfall . Later , two people died in Florida in traffic accidents due to slick roads . Damage was heaviest in Virginia , where heavy rains left severe flooding . Damage in the United States was estimated at $ 500 million (2006 USD) .

= = = Hurricane Florence = = =

Hurricane Florence originated on September 3 from the complex merging of two tropical waves , creating one large low pressure area . The disturbance moved westward and became a tropical depression in the open waters of the Atlantic . On September 5 , it organized further and was upgraded into Tropical Storm Florence . With a disorganized structure and multiple circulation centers , Florence remained a weak tropical storm for several days , even after external conditions became favorable for strengthening . Florence tracked west @-@ northwest and intensified into a hurricane on September 10 while south of Bermuda . The storm passed just to the east of Bermuda as a Category 1 hurricane on the Saffir @-@ Simpson hurricane scale as it reached its peak intensity of 90 mph (145 km / h) . It moved north before losing its tropical characteristics and passing over the Canadian Maritimes as a strong extratropical storm .

Large swells , rip tide , and undertow were reported on Bermuda , the Leeward Islands , the Virgin Islands , and Hispaniola . Florence affected Bermuda with wind gusts up to 115 mph (185 km / h) and heavy rain which left 23 @,@ 000 houses without electricity . In all , the storm caused $ 200 @,@ 000 (2006 USD ; $ 235 thousand 2016 USD) in damage . Florence then brought heavy rains across Newfoundland as an extratropical storm , destroying one house and causing minor damage to several others . There were no fatalities as a result of the hurricane .

= = = Hurricane Gordon = = =

A tropical wave moved off the coast of Africa on September 1 . The wave tracked westward across the Atlantic for several days until it reached an area of relaxed wind shear and its associated low pressure area organized into a tropical depression . It moved east @-@ northeast and was upgraded to Tropical Storm Gordon on September 11 , while located over the open waters of the Atlantic . Gordon turned north , and became a hurricane on September 13 . It intensified to Category 3 status on the Saffir @-@ Simpson hurricane scale and reached its peak intensity of 120 mph (195 km / h) on September 14 . Tracking northward , it began to lose tropical characteristics . On September 20 , the system affected Britain with high winds and heavy rain as an extratropical cyclone . During Gordon 's passage through Britain , 120 @,@ 000 homes were left without power after winds of 80 mph (130 km / h) affected the country .

= = = Hurricane Helene = = =

On September 11 , a vigorous tropical wave moved off the west coast of Africa . The wave organized rapidly and spawned a tropical depression to the south @-@ southeast of Cape Verde . On September 14 , the depression intensified into Tropical Storm Helene while tracking west @-@ northwest . Helene continued to intensify and was upgraded to a hurricane on September 16 . The storm began to execute a northward track , and reached Category 3 hurricane status on the Saffir @-@ Simpson hurricane scale on September 18 , before reaching its peak intensity of 120 mph (195 km / h) . It started to weaken when it reached the cold waters of the North Atlantic , and Helene dissipated on September 20 , without having had major effects on land other than moderate wind gusts in the British Isles .

= = = Hurricane Isaac = = =

Hurricane Isaac originated in a tropical wave that moved off the coast of Africa on September 18 . The wave tracked west , produced a tropical depression , and became a tropical storm on September 28 . Isaac moved north @-@ northwest and was upgraded to a hurricane on September 30 . It turned north and reached its peak intensity of 85 mph (135 km / h) before weakening and brushing Nova Scotia . Isaac produced moderate winds on land in Newfoundland , peaking at 60 mph (96 km / h) with a sustained wind of 46 mph (74 km / h) was recorded .

= = Storm names = =

The following names were used for storm names in the North Atlantic in 2006 . This is the same list used in the 2000 season except for Kirk , which replaced Keith . No storm was given a previously unused name , for the first time since the 1993 season . It was the first hurricane season since the 1997 season that no Atlantic names were retired . The same list was used for the 2012 season .

The World Meteorological Organization determined at its annual meeting in the spring of 2006 to again use names from the Greek alphabet , starting with Alpha , if the main list should become exhausted .

= = Season effects = =

This is a table of all the storms that have formed in the 2006 Atlantic hurricane season . It includes their duration , names , landfall (s) , denoted in parentheses , damages , and death totals . Deaths in parentheses are additional and indirect (an example of an indirect death would be a traffic accident) , but were still related to that storm . Damage and deaths include totals while the storm was extratropical , a wave , or a low , and all the damage figures are in 2006 USD .