= 1997 Atlantic hurricane season =

The 1997 Atlantic hurricane season was a below average season and is the most recent season to feature no tropical cyclones in August ? typically one of the most active months . The season officially began on June 1 , and lasted until November 30 . These dates conventionally delimit the period of each year when most tropical cyclones form in the Atlantic basin . The 1997 season was inactive , with only seven named storms forming , with an additional tropical depression and an unnumbered subtropical storm . It was the first time since the 1961 season that there were no active tropical cyclones in the Atlantic basin during the entire month of August . A strong El Niño is credited with reducing the number of storms in the Atlantic , while increasing the number of storms in the Eastern and Western Pacific basin to 19 and 29 storms , respectively . As is common in El Niño years , tropical cyclogenesis was suppressed in the tropical latitudes , with only two becoming tropical storms south of 25 ° N.

The first system , an operationally unnoticed subtropical storm , developed north of The Bahamas on June 1 and dissipated by the following day without impact . Tropical Storm Ana developed offshore South Carolina on June 30 and dissipated on July 4 , after causing minor affects in North Carolina . Hurricane Bill was a short @-@ lived storm between that lasted from July 11 to July 13 and produced light rainfall in Newfoundland . As Bill as dissipating , Tropical Storm Claudette developed and caused rough seas in North Carolina . The most devastating storm was Hurricane Danny , which caused extensive flooding , particularly in southern Alabama . Danny resulted in 9 fatalities and about $ 100 million (1997 USD) in damage . The outerbands of Hurricane Erika brought rough seas and gusty winds to the Lesser Antilles , causing 2 deaths in $ 10 million in losses . The precursor to Tropical Storm Grace caused minor flooding in Puerto Rico . Tropical Depression Five and Tropical Storms Fabian did not impact land . Collectively , the storms of the 1997 Atlantic hurricane season resulted in 12 fatalities and approximately $ 111 @.@ 46 million in damage .

= = Season summary = =

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

Forecasts of hurricane activity are issued before each hurricane season by noted hurricane experts such as Dr. William M. Gray and his associates at Colorado State University (CSU) . A normal season as defined by the National Oceanic and Atmospheric Administration (NOAA) , has eleven named storms , of which six reach hurricane strength , and two major hurricanes . The May 1997 forecast stated that eleven storms would form and that seven would reach hurricane status . In addition , it was predicted that three of the seven hurricanes would intensify into a major hurricane ? a Category 3 rating on the Saffir ? Simpson Hurricane Scale .

= = = Season activity = = =

The Atlantic hurricane season officially began on June 1 , and an unnamed subtropical storm developed on the same day . 1997 was the least active hurricane season in above average era of tropical cyclogenesis , which began in 1995 . Only nine tropical depressions formed . Eight of the depressions attained tropical storm status , and just three of these attained hurricane status . There was only one tropical cyclone to reach major hurricane status , which was slightly below the 1950 ? 2005 average of two per season . Only Danny made landfall at hurricane strength during the season , although Hurricane Erika and Tropical Storm Grace also caused damage and fatalities . Those three cyclones collectively caused 11 deaths and $ 111 @.@ 46 million in damage . The last storm of the season , Tropical Storm Grace , dissipated on October 17 , over a month before the official end of the season on November 30 .

The 1997 Atlantic hurricane season had a very active beginning . In June , two tropical cyclones

developed ? the unnoticed subtropical storm and Tropical Storm Ana . An unusual four tropical cyclones formed in the month of July , three of which reached tropical storm intensity , and two of them became hurricanes . Despite the active start , the other months of the season featured record low activity , especially in August and September , both of which combined produced only one tropical cyclone . As a result of the active start and subsequent lack of activity , it showed that early season activity has no correlation to the entire season . The lone tropical cyclone during the period was Hurricane Erika , which developed on September 3 . In October , two short @-@ lived tropical cyclones developed , Fabian and Grace . Tropical cyclogenesis ceased after Grace transitioned into an extratropical cyclone on October 17 .

The season 's activity was reflected with a low accumulated cyclone energy (ACE) rating of 41 . 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 . Although officially , subtropical cyclones , such as the unnamed storm , are excluded from the total , the figure above includes periods when storms were in a subtropical phase .

= = Storms = =

= = = Unnamed Subtropical Storm = = =

A cluster of thunderstorms developed over Florida in late May . A shortwave trough brought it to the northeast , enhancing convection around a developing center of circulation . The low pressure area , which formed on May 31 , developed into a subtropical depression on June 1 . Operationally , it was treated as a frontal low , but post @-@ analysis suggested it remained separate throughout its lifetime , and was classified as an unnamed subtropical storm . It reached subtropical storm strength six hours later as it moved rapidly parallel to the East Coast of the United States . The convection continued to wrap around the center , and despite unfavorable conditions from an approaching cold front it continued to intensify . Late on June 1 , it reached its peak intensity with maximum sustained winds of 50 mph (85 km / h) while off the coast of North Carolina . The storm turned to the east , and transitioned extratropical late on June 2 southeast of Massachusetts . Shortly thereafter , the remnants of the storm merged with a cold front .

= = = Tropical Storm Ana = = =

A frontal low pressure system off the coast of South Carolina developed into Tropical Depression One at 1200 UTC on June 30 . It moved slowly eastward , and attained tropical storm status on July 1 . After becoming a tropical storm , Ana slightly intensified . Early on July 2 , Ana attained its peak intensity with maximum sustained winds of 50 mph (85 km / h) and a minimum central pressure of 1 @,@ 000 mbar (30 inHg) . Later on July 2 , a shortwave trough forced Ana to northeastward , into a region of increasing vertical wind shear . Simultaneously , Ana began to weaken , as it was moving into an area of decreasing sea surface temperatures (SST) .

By late on July 3 , Ana weakened to a tropical depression . The storm also lost tropical characteristics and transitioned into an extratropical cyclone early on July 4 , over the western Atlantic Ocean . The extratropical remnants persisted until dissipating about twenty @-@ four hours later . Minimal impact was reported as a result of Ana , other than rip currents in coastal North Carolina . Due to the rough seas , 14 rescues and one serious injury occurred at Carolina Beach . In addition , five rescues were made at Kure Beach and at least one person was hospitalized . However , there were no fatalities at either location .

= = = Hurricane Bill = = =

A large upper @-@ level low separated from a trough north of Puerto Rico in early July . Convection increased on July 7 after a surface trough developed , and a low pressure area formed east of the Bahamas once the upper @-@ level low retreated to the southwest . Wind shear decreased across the region , allowing the convection to increase and organize , and it is estimated the system developed into a tropical depression on July 11 about 330 miles (530 km) southwest of Bermuda . After developing , the cyclone moved northeastward in advance of an approaching cold front . It quickly intensified into Tropical Storm Bill , and briefly threatened to pass near Bermuda . As a result , a tropical storm warning was issued , although it was quickly dropped ; there was no impact on the island from Bill .

Bill quickly intensified as it continued northeastward . By midday on July 12 , an eye feature was observed on satellite images , which suggested that Bill intensified into hurricane status at a relatively high latitude . Bill had in fact intensified into a hurricane , and the storm had attained its peak intensity with maximum sustained winds of 75 mph (120 km / h) minimum pressure of 986 mbar (29 @.@ 1 inHg) . After only 12 hours at hurricane status , Bill weakened back to tropical storm status , and on July 13 was absorbed by the cold front about 185 miles (298 km) south of Cape Race , Newfoundland . Bill dropped very light rainfall on Newfoundland , peaking at slightly less than 1 inch (25 mm) .

= = = Tropical Storm Claudette = = =

The frontal system that influenced the track of Hurricane Bill spawned a non @-@ tropical low off the southeast United States on July 11 . The low remained nearly stationary as the front dissipated , and it developed into Tropical Depression Three on July 13 about 325 miles (523 km) south @-@ southeast of Wilmington , North Carolina . The depression quickly intensified into Tropical Storm Claudette , based on reconnaissance aircraft data . It moved northeastward , passing southeast of the Outer Banks . Despite the presence of wind shear it developed banding features . On July 14 , the storm reached peak winds of 45 mph (72 km / h) . Thereafter , Claudette turned eastward ahead of a frontal system .

Its associated thunderstorm activity was sporadic and relatively disorganized , and the storm weakened to a tropical depression on July 16 . Claudette briefly re @-@ intensified into a tropical storm before becoming extratropical later that day . Shortly thereafter , it merged with a cold front , while the remnants were last noted near the Azores on July 23 . Tropical Storm Claudette had minimal effects on land . Severe rip currents from Claudette in North Carolina caused several rescues and one person was injured , although no fatalities occurred . Some residents of coastal North Carolina were even disappointed that Claudette was to remain offshore , as the region was suffering from dry conditions .

= = = Hurricane Danny = = =

A tropical low over the northern Gulf of Mexico developed into Tropical Depression Four on July 16 . The depression headed slowly east @-@ northeastward , and intensified into Tropical Storm Danny on the following day . Danny continued east @-@ northeastward , and reached hurricane strength just before landfall near Buras , Louisiana . Because of the narrowness of that piece of land , most of Danny remained over water and it lost little strength . Danny re @-@ emerged into the Gulf of Mexico , and strengthened slightly making two landfalls in Alabama as a low @-@ end Category 1 hurricane on July 19 . After remaining stationary for a day , Danny moved northward and weakened to a tropical depression . Heading northward across Alabama , Danny turned to the east and crossed over the Southeastern United States . While centered over North Carolina , Danny interacted with a developing trough , which caused it to re @-@ intensify into a tropical storm . Shortly thereafter , Danny emerged over the Atlantic Ocean near the North Carolina / Virginia border on July 24 . Danny took a northward turn , and came within 30 mi (48 km) of Nantucket Island on July 26 . It then turned out to sea and was absorbed by a front on July 27 .

Although Danny was a hurricane upon landfall , strong winds were confined to a small area , with

only portions of extreme eastern Louisiana reporting hurricane @-@ force winds . Danny also dropped torrential amounts of rain in Louisiana , peaking at 11 @.@ 40 in (290 mm) in Buras @-@ Triumph . Flooding occurred in portions of the state due to heavy rainfall . The floods and high winds produced by Danny damaged over 300 houses and more than 170 businesses in Louisiana alone . In Mississippi , Danny dropped heavy rainfall on the southern portion of the state , resulting in minor street and house flooding . As Danny crossed Dauphin Island , Alabama on July 19 , it dropped 37 @.@ 75 inches (959 mm) of rain . This made Danny the wettest tropical cyclone on record in Alabama . Hurricane force @-@ winds were reported on Dauphin Island and the western shores of Mobile Bay . In the same area , many buildings had sustained roof damage . In addition , many homes on the Fowl and Fish Rivers reported significant damage . Further north in South Carolina and Virginia , Danny spawned several tornadoes ; some of them caused significant damage . Heavy rainfall also occurred in some isolated areas ; in central North Carolina between 8 ? 12 inches (200 ? 300 mm) of rain was reported . Danny eventually affected Massachusetts , bring light rainfall and tropical storm @-@ force winds to the southeastern portions of the state . Overall , Danny caused nine fatalities , and approximately $ 100 million in damage .

= = = Tropical Depression Five = = =

A tropical wave emerged into the Atlantic Ocean from the west coast of Africa on July 11 . The wave moved westward across the tropical Atlantic , and finally began to show consistent evidence of a cloud system center . Deep convection associated with the wave became concentrated on satellite images on July 17 , and it is estimated that the disturbance became Tropical Depression Five around 0600 UTC on that day while centered about 547 miles (880 km) east of Barbados . The tropical depression moved west @-@ northwestward and started showing signs of falling apart on July 18 . Early on the following day , the depression degenerated into a tropical wave . Recon observations before the storm fell apart suggested that it may have briefly reached tropical storm strength . The tropical wave continued westward without regenerating and lost its identity on July 23 over the eastern Gulf of Mexico .

= = = Hurricane Erika = = =

A tropical wave developed into Tropical Depression Six while it was centered about 1 @,@ 150 miles (1 @,@ 850 km) east of the southernmost Lesser Antilles on September 3 . Later that day , the depression intensified enough to be upgraded to Tropical Storm Erika . It moved west @-@ northwestward and steadily intensified to attain hurricane status on September 4 . Erika passed a short distance to the north of the Lesser Antilles , and later turned to the north in response to an approaching trough . The hurricane quickly strengthen to reach peak winds of 125 mph (195 km / h) on September 8 , and after maintaining peak strength for 24 hours Erika weakened over cooler waters . It turned to the east , weakened to a tropical storm , and became extratropical after passing near the Azores on September 15 .
The hurricane produced light rainfall and winds throughout the northern Lesser Antilles . The passage of Erika brought a cloud of ash to Antigua from the eruption of the Soufrière Hills Volcano on Montserrat , a rare occurrence . Strong waves from the hurricane produced beach erosion and coastal flooding in northern Puerto Rico , and also killed two surfers . Moderate wind gusts in Puerto Rico left thousands without power , and the hurricane resulted in $ 10 million in damage to the Caribbean territory of the United States . Erika also produced gusty winds and light rain in the Azores . Later in its duration , the storm brought hurricane @-@ force wind gusts and rainfall to the Azores , though no damage was reported . Erika was the only tropical cyclone in the Atlantic Ocean in the months of August and September , the first such occurrence in a hurricane season since 1929 .

= = = Tropical Storm Fabian = = =

A tropical wave emerged into the Atlantic Ocean from the west coast of Africa near Dakar , Senegal on September 22 . The wave traveled westward with minimal tropical cyclogenesis and reached the Lesser Antilles about a week later . While passing through the islands , heavy rainfall and strong winds were reported . Eventually , the system developed into a broad area of low pressure and acquired a low @-@ level circulation . However , upper @-@ level wind shear resulted in no immediate further organization . After crossing Puerto Rico and the Virgin Islands , wind shear decreased , since the low was moving in the same direction as the upper @-@ level winds .

At 1800 UTC October 4 , it is estimated that system developed into Tropical Depression Seven , while 410 miles (660 km) north of Puerto Rico . However , the National Hurricane Center did not initiate advisories until 1500 UTC on October 7 . The depression strengthened and about 24 hours after forming , it became Tropical Storm Fabian later on October 5 . No further significant change in intensity occurred for the remainder of its duration , as Fabian had peaked with winds of 40 mph (65 km / h) . The storm began losing tropical characteristics and transitioned into an extratropical cyclone at 1200 UTC on October 8 .

= = = Tropical Storm Grace = = =

An extratropical low formed just north of Hispaniola on October 14 , and on the following day , it attained gale force winds . In addition , the system was also acquiring tropical characteristics , and was classified as Tropical Storm Grace on October 16 at 0000 UTC . Strong vertical wind shear prevented further intensification , and Grace immediately peaked with maximum sustained winds of 45 mph (75 km / h) and a minimum barometric pressure of 999 mbar (29 @.@ 5 inHg) . Though Grace was classified as a tropical cyclone , it still held onto some extratropical characteristics . Thereafter , Grace steadily weakened and eventually degenerated into an extratropical low on October 17 .

The precursor disturbance of Grace dropped moderate to heavy rainfall across Puerto Rico , peaking at 12 @.@ 69 inches (322 mm) in Aibonito . As a result , flash flooding occurred throughout the island of Puerto Rico , while landslides caused damage to roads and bridges . In addition , numerous rivers overflowed their banks , which forced 37 people to seek shelter across the island . One fatality occurred , and damage amounted to $ 1 @.@ 46 million . In addition , the extratropical system produced light to moderate rainfall in the U.S. Virgin Islands , and precipitation reached 7 inches (180 mm) along western sides of the islands .

= = Storm names = =

The following names were used for named storms that formed in the north Atlantic in 1997 . In the spring of 1998 , no names were retired , so it was used again in the 2003 season . This is the same list used for the 1991 season except for Bill , which replaced Bob . A storm was named Bill for the first time in 1997 . Names that were not assigned are marked in gray .

= = Season effects = =

This is a table of all of the storms that formed in the 1997 Atlantic hurricane season . It includes their duration , names , landfall (s) ? denoted by bold location names ? damages , and death totals . Deaths in parentheses are additional and indirect (an example of an indirect death would be a traffic accident) , but are still related to that storm . Damage and deaths include totals while the storm was extratropical or a wave or low , and all of the damage figures are in 1997 USD .