

= 1988 Pacific hurricane season =

The 1988 Pacific hurricane season was a Pacific hurricane season that saw a below @-@ average amount of tropical cyclones form , the first time since 1981 . It officially began May 15 , 1988 in the eastern Pacific , and June 1 , 1988 in the central Pacific and lasted until November 30 , 1988 . These dates conventionally delimit the period of each year when most tropical cyclones form in the northeastern Pacific Ocean . The first named storm , Tropical Storm Aletta , formed on June 16 , and the last @-@ named storm , Tropical Storm Miriam , was previously named Hurricane Joan in the Atlantic Ocean before crossing Central America and re @-@ emerging in the eastern Pacific ; Miriam continued westward and dissipated on November 2 .

The season produced 23 tropical depressions , of which 15 attained tropical storm status . Seven storms reached hurricane status , three of which became major hurricanes . The strongest storm of the season , Hurricane Hector , formed on July 30 to the south of Mexico and reached peak winds of 145 mph (230 km / h) ? Category 4 status ? before dissipating over open waters on August 9 ; Hector was never a threat to land . Tropical Storm Gilma was the only cyclone in the season to make landfall , crossing the Hawaiian Islands , although there were numerous near @-@ misses . Gilma 's Hawaiian landfall was unusual , but not unprecedented .

= = Seasonal summary = =

The total tropical activity in the season was below @-@ average . There were 13 cyclones in the Eastern Pacific , as well as two in the Central . Of the 15 cyclones , one crossed from the Atlantic Ocean into the Pacific , and another moved from the Central Pacific to the Western Pacific . In the Eastern Pacific , there were seven cyclones peaking as a tropical storm , and six hurricanes , of which two reached Category 3 intensity or higher on the Saffir @-@ Simpson Hurricane Scale . A tropical storm and a major hurricane occurred in the Central Pacific .

Tropical Storm Gilma made the only landfalls of the season in the Hawaiian Islands , causing some rainfall , but no direct deaths or damage occurred as a result of it . These were the only landfalls in the season that were made , which is unusual as most landfalls in the Eastern Pacific occur on the Mexican coast . This is due to the closeness of the Mexican region to the major source of tropical activity to the west of Central America . Hurricane Uleki , the strongest hurricane in the Central Pacific region during the season , caused two drownings in Oahu and heavy waves hit the coast of the Hawaiian Islands . Tropical Storm Miriam , the last storm of the season , formed as a result of Hurricane Joan from the Atlantic , and flooding resulted in parts of Central America , due to heavy rainfall .

= = Storms = =

= = = Tropical Depression One @-@ E = = =

A tropical disturbance organized into the first eastern Pacific tropical depression of the season on June 15 . A convective band on the north and west sides of the system became well @-@ defined , and anticyclonic outflow allowed for initial organization . After forming , the depression tracked west @-@ southwestward and intensified due to disrupted outflow from a large air stream disturbance . On June 16 , strong convection with spiral banding developed over the depression , although it failed to strengthen further . A low pressure system northwest of the depression in combination with Tropical Storm Aletta to the northeast caused the depression to weaken , and it dissipated on June 18 .

= = = Tropical Storm Aletta = = =

A tropical wave moved off the coast of Africa and progressed westward through the Atlantic Ocean

and Caribbean Sea , before crossing over Central America on June 13 and emerging into the warm waters of the east Pacific on June 14 . Shortly after , satellite imagery showed good upper @-@ level outflow , although cloud banding remained disorganized . On June 16 , the broad circulation better organized on the northeastern section , with deep convection developing . A tropical depression formed later that day about 200 miles (320 km) to the southeast of Acapulco , Mexico . It developed further as it moved northward toward the southwest coast of Mexico , and had organized sufficiently to be named Tropical Storm Aletta on June 17 . The cyclone drifted north @-@ northwest for the next 36 hours before turning westward , parallel to the Mexican coast . The storm began to lose its convection on June 19 and weakened into a tropical depression later that day . The depression weakened further into a weak low @-@ level circulation before dissipating on June 21 . Although Aletta approached the Acapulco area of the Mexican coast , it did not make landfall . The portion of coast affected by Aletta received heavy rainfall ; unofficial reports state that one person died as a result of the storm , and the storm produced some damage due to rainfall and flooding .

= = = Tropical Storm Bud = = =

Satellite imagery first detected a low @-@ level circulation on June 20 , associated with some heavy convection , 200 miles (325 km) south of the Mexico ? Guatemala border , and it intensified into a tropical depression . The cyclone moved northwest then west @-@ northwest over two days . A 40 mph (65 km / h) wind report from a ship on June 21 allowed the depression to be upgraded to Tropical Storm Bud later that day . For the next day , the low @-@ level circulation moved away from its deep convection , dissipating near Acapulco , Mexico . A portion of Bud remaining over land may have been part of the reason for the lack of strengthening of the cyclone .

= = = Tropical Depression Four @-@ E = = =

A system developed in the eastern Pacific , and later strengthened into a tropical depression on July 1 , when it obtained a better defined low @-@ level circulation . The center was exposed , with little convection on the northeast side , due to shear aloft . The system moved to the northwest , while shear continued to move the deep convection of the cyclone to the southwest of its center of circulation . The circulation completely lacked deep convection late on July 2 , although it continued to have a well @-@ defined low @-@ level center . The depression drifted slowly northward , located south of Baja California , before dissipating just south of the peninsula on July 4 , with no circulation or deep convection detected . A small amount of associated rainfall affected Baja California , as the cyclone passed near the peninsula .

= = = Hurricane Carlotta = = =

A tropical wave moved off the western coast of Africa on June 23 , and for the next two weeks , moved through the tropical waters of the Atlantic Ocean and later crossed Central America . It began developing further when it entered the Pacific Ocean and became a dense area of moisture and cloudiness . The wave developed into a disturbance on July 8 , and attained tropical depression status in the afternoon on July 8 , south of Mexico . After entering a favorable area of warm waters , the depression strengthened to Tropical Storm Carlotta on July 9 . Carlotta continued to develop , reached peak strength , and developed into Hurricane Carlotta on July 11 . During the duration of the storm , Carlotta was not considered a hurricane , however after post @-@ season reanalysis Carlotta 's strength was upgraded to minimal hurricane status . As it moved into less favorable conditions it lost strength and weakened to a tropical storm on July 12 . Carlotta began to lose its deep convection , and weakened into a tropical depression on July 13 as it moved into cooler waters . It later moved west @-@ southwest and dissipated on July 15 .

= = = Tropical Storm Daniel = = =

A tropical wave moved off the coast of northwestern Africa on July 4 , and moved through tropical regions of the northern Atlantic and Caribbean Sea without the indication of development . The tropical disturbance crossed Central America on July 14 , and from then until July 18 , the westward motion decreased , as convection and organization increased over warm waters . It developed into a tropical depression on July 19 , and into Tropical Storm Daniel 600 miles (970 km) southwest of the southern tip of Baja California on July 20 . A high pressure system over the western United States and northern Mexico forced Daniel and an upper @-@ level low on parallel west @-@ northwest paths . Daniel stayed generally the same strength for the next few days , reaching peak strength on July 23 . Daniel declined into a tropical depression on July 25 and dissipated on July 26 .

= = = Tropical Storm Emilia = = =

On July 15 , a tropical wave exited Africa and crossed the Atlantic Ocean . It crossed into the Pacific Ocean on July 24 , developing convection and outflow . On July 27 , it organized into a tropical depression off the southwest coast of Mexico . Continuing generally westward , the thunderstorm activity fluctuated , and slowly developing , it intensified into Tropical Storm Emilia on July 29 . The storm attained peak winds of 70 mph (110 km / h) on July 30 , although wind shear and interaction with nearby Tropical Storm Fabio prevented further intensification ; the low @-@ level circulation was located along the northwest edge of the deepest convection . It became disorganized and difficult to locate on satellite imagery , and soon the circulation was exposed from the thunderstorms . On August 1 , Emilia weakened to tropical depression status , and late on August 2 , the last advisory was issued as the system had become very disorganized with minimal convection . Its remnants were tracked for the next few days , and although some deep convection returned momentarily , the system 's convection soon disappeared .

= = = Hurricane Fabio = = =

A well @-@ organized ITCZ disturbance with deep convection organized further over the northeastern Pacific Ocean on July 28 . It developed into a tropical depression later that day , while 1 @, @ 000 miles (1 @, @ 600 km) southwest of the southern tip of Baja California . The position of Fabio 's formation was much further south and west than where most tropical cyclones form during the same time period . The depression moved westward while gradually strengthening and it developed into Tropical Storm Fabio on July 29 . It intensified further over the next few days and it intensified into a hurricane on July 31 . The system increased its speed as it steadily strengthened further . A trough turned the storm west @-@ northwestward on August 3 . Satellite estimates indicated that Fabio reached its maximum intensity later on August 3 , with a well @-@ defined eye with very deep convection surrounding it . The Central Pacific Hurricane Center issued a tropical storm watch for the Big Island on August 4 , due to the threatening west @-@ northwest turn towards it . However , the retreat of a trough later turned Fabio back to the west and the CPHC discontinued the tropical storm watch on August 5 . Fabio 's good upper @-@ level conditions later weakened and began to lose its convection over cooler waters . Fabio quickly weakened and it weakened into a tropical storm again later on August 5 , and back to a depression on August 6 . The depression turned west @-@ northwestward again on August 8 , but Fabio dissipated on August 9 . As the cyclone moved near the Hawaiian islands , heavy rainfall fell across the chain , peaking at 18 @. @ 75 in (476 mm) near P?pa 'ikou on the island of Hawaii .

= = = Tropical Depression Nine @-@ E = = =

A tropical depression developed in the eastern Pacific on July 28 , forecast to be absorbed by a very close nearby depression , later Tropical Storm Gilma . The depression moved northward , although in unfavorable conditions . The cyclone weakened as the depression to the southwest strengthened further . Limited deep convection developed with the system , although the cyclone

continued in unfavorable conditions with shearing . Visible satellite imagery later showed a very weak system , and the storm dissipated on July 29 .

== Tropical Storm Gilma ==

A wave that previously moved through the Atlantic from the northwest coast of Africa , crossed over Central America into the Pacific on July 17 or July 18 . On July 19 , this disturbance was 700 miles (1125 km) to the southeast of the developing Tropical Storm Daniel . The system moved westward for the following week without any signs of intensification . However , on July 26 and 27 , the system appeared to be strengthening due to a banding pattern . By July 28 , the convection underwent further organization with some weak outflow high in the storm . It developed into a tropical depression later on July 28 , much further west than most east Pacific storms develop at . For the next day the cyclone remained fairly stationary , but began to strengthen over warm waters . On July 29 the depression strengthened into Tropical Storm Gilma , based on satellite imagery . Limited intensification followed , due to shear high in the storm . It weakened a tropical depression again on July 30 , due to weakness depicted in satellite imagery . Gilma then moved west @-@ northwestward through the northeast Pacific . The depression skirted the Hawaiian Islands , but dissipated near Oahu on August 3 . On the Hawaiian Islands there were no direct damage or deaths , although some rainfall occurred on the islands .

== Hurricane Hector ==

A tropical depression formed on July 30 , while 400 miles (645 km) south of Acapulco , Mexico . The depression tracked west @-@ northwestward , becoming Tropical Storm Hector on July 31 . Its west @-@ northwest motion continued , due to an area of high pressure to its north , and Hector intensified into a hurricane on August 2 . Based on satellite data , the hurricane is estimated to have reached its peak intensity of 145 mph (235 km / h) on August 3 ; this made Hector a Category 4 hurricane on the Saffir @-@ Simpson Hurricane Scale , which was the strongest storm of the season . Hector began to move due west on August 5 and it had already begun weakening . The storm continued westward increasing its forward speed . On August 6 it had appeared Hector had strengthened , but steadily weakened afterwards and finally dissipated on August 9 , while 650 miles (1 @, @ 045 km) east of Hilo , Hawaii . Hector never a threat to land .

== Hurricane Iva ==

A wave that first came off the northwest coast of Africa moved through the Atlantic , before entering the East Pacific on August 4 . The wave developed more organized convection when it entered the region , and it turned into a tropical depression on August 5 , while 165 miles (270 km) south of Oaxaca , Mexico . It developed into Tropical Storm Iva on August 6 . Iva turned on a west @-@ northwestward course and continued strengthening , before it developed into a hurricane on August 7 . The cyclone moved northwestward after becoming a hurricane , and satellites estimate it reached peak intensity on August 8 . On the same day Iva passed within 50 miles (80 km) of Socorro Island . Winds of 45 mph (70 km / h) were reported on the island along with moderate rain . The storm moved through cooler waters for the next day , and began to weaken . Ivo declined into a tropical storm again on August 9 , and by August 10 the cyclone lost its deep convection along with organization . It intensified into a tropical depression again on August 11 , and moved southwest due to a high pressure before dissipating on August 3 . For unknown reasons , Iva was retired from the lists of Eastern Pacific storm names , but it was probably to avoid confusion with Hurricane Iva of the 1982 Pacific season , which was itself retired due to its damage in Hawaii . The name was replaced with Ileana for 1994 .

== Tropical Depression Thirteen @-@ E ==

A tropical depression formed on August 12 , with movement towards the west @-@ northwest . It continued toward the west @-@ northwest , near the circulation of Tropical Storm Iva . The low @-@ level circulation of the cyclone was displaced to the east of the deep convection , and the system moved to the northwest . The depression lost much of its convection later on August 13 , and it had a less defined center . The cyclone turned to the south , and lost its associated deep convection . Some weak convection redeveloped near the center , but the depression dissipated later on August 14 .

= = = Tropical Storm John = = =

A disturbance that passed off the northwestern African coast on August 3 crossed the Atlantic Ocean , before entering into the Pacific . A tropical depression formed in the East Pacific on August 16 , 150 miles (240 km) southwest of Manzanillo , Mexico , based on satellite estimates . The cyclone progressed slowly northwestward , and intensified Tropical Storm John on August 17 , less than 24 hours after its formation . John continued northwest for a short while , before the low @-@ level center of circulation had been exposed . John degenerated to a tropical depression on August 18 due to a lack of convection , made a loop while less than 100 miles (160 km) south of the southern tip of Baja California . It shortly became a little better organized after completing the loop on August 20 , but John dissipated on August 21 , southwest of Baja California , due to shearing and cold waters . Its remnants continued northwestward parallel to the southwest coast of Baja California . John caused no reported deaths or damage .

= = = Tropical Depression Fifteen @-@ E = = =

On August 26 , a disturbance south of Baja California organized into Tropical Depression Fifteen @-@ E. Initially , the system moved northwest towards cooler waters as the location of the low @-@ level circulation was to the southwest of the deep convection associated with the cyclone . The center drifted to the east of the small area of concentrated convection , and its intensity remained steady . It weakened and became loosely defined due to upper @-@ level wind shear , and the storm lost all of its convection before dissipating and degenerating into a low @-@ level swirl .

= = = Hurricane Uleki = = =

Towards the end of August , tropical activity in the ITCZ southeast of the Hawaiian Islands began to be monitored . On August 28 , this tropical disturbance organized into a tropical depression , as it was located about 800 miles (1 @, @ 285 km) southeast of the Big Island . It intensified at a fair rate , and intensified Tropical Storm Uleki the next day . It continued to strengthen , and reached hurricane intensity on August 31 . It moved slowly west @-@ northwest until steering currents collapsed on September 1 . Now a Category 3 hurricane , Uleki slowly edged north towards the Hawaiian Islands . After looping , Uleki resumed its westward path on September 4 . Its stalling in the ocean had weakened it , and the hurricane passed midway between Johnston Island and French Frigate Shoals . Uleki crossed the dateline on September 8 . It turned slightly to the north and meandered in the open Pacific days until it dissipated on September 14 .

As Uleki drifted towards the Hawaiian Islands , tropical storm watches were issued for Oahu , Kauai , and Niihau on September 3 . In addition , reconnaissance missions were flown into the hurricane . Uleki caused heavy surf on the Hawaiian Islands , that being its only significant effect . This heavy surf flooded the southeastern runway on Midway Island , and produced two drownings on Oahu . Nineteen people were also rescued from rough surf , with five- to six @-@ foot (1 @. @ 5 to 1 @. @ 8 meter) waves , off the coast of beaches in Hawaii .

= = = Hurricane Kristy = = =

A tropical wave passed off the northwestern coast of Africa on August 6 . It did not develop as it

passed through the Atlantic Ocean , until August 19 when convection began to form . On August 20 the disturbance turned into Tropical Depression Six in the Atlantic basin . It passed from the Leeward Islands up to the central Caribbean , until it dissipated on August 23 . As it passed over Central America , the disturbance had little remaining convection . However , the convection associated with the system began to organize when it entered the Pacific , and it strengthened into a tropical depression on August 29 , while located 300 miles (485 km) south @-@ southeast of Acapulco , Mexico . Later that day the depression intensified into Tropical Storm Kristy , based on ship reports of tropical storm force winds . Kristy strengthened into a hurricane on August 31 , based solely on satellite imagery . Hurricane Kristy had short lifespan though , and weakened to a tropical storm on September 2 . The easterly shear associated with an anticyclone south of Baja California , which caused Kristy 's convection to be forced west of the low @-@ level center of the system , and therefore weakened it . Kristy weakened further to a depression on September 3 , and weak steering currents allowed the cyclone to remain stationary on September 4 , loop the following day , and then began to move eastward . The depression dissipated on September 6 , weakening to a low @-@ level swirl . Kristy caused heavy rains and flooding in the Mexican states of Chiapas and Oaxaca .

Although the storm passed relatively close to the coast , no tropical cyclone warnings and watches were required as the storm remained offshore . However , Kristy produced heavy rains and widespread flooding in the Mexican states of Chiapas and Oaxaca ; as a result , several rivers overflowed their banks . Thousands of tourists were stranded from the beaches . At least 21 deaths were attributed to Kristy : 16 in Oaxaca and 5 in Chiapas . More than 20 @,@ 000 people in the former were evacuated from their homes ; consequently , a state of emergency was declared . The outer rainbands of Kristy delayed the rescue of the victims of a Brazilian @-@ made aircraft that crashed west of the Sierra Madre Occidental mountain range . No official damage figures were reported by the Mexican government .

= = = Tropical Depression Seventeen @-@ E (Debby) = = =

The remnants of Hurricane Debby moved over the mountainous areas of Mexico , passing into the Pacific from the Pacific coast of Mexico near Manzanillo . The disturbance moved towards the north @-@ northwest and organized into a tropical depression on September 6 just south of the Gulf of California . The cyclone remained stationary due to weak low @-@ level steering currents , later drifting to the north @-@ northwest with an area of deep convection causing rain on the Mexican coast . It later moved to the northwest , with partial exposure of the center of the system , and with some shear still affecting it . The cyclone continued to have shear over the system , which caused it not to strengthen , and its movement became nearly stationary . After remaining stationary longer , the system dissipated as a low @-@ level swirl .

= = = Tropical Depression Eighteen @-@ E = = =

A disturbance organized , and based on satellite imagery it strengthened into a tropical depression on September 12 . The center of circulation remained on the eastern fringe of its deep convection and the storm moved west or west @-@ northwestward . On September 13 , the depression underwent shearing , while its low @-@ level circulation center had only a small amount of deep convection associated with it . The cyclone became poorly defined , and its movement turned stationary on September 14 . The low @-@ level circulation of the system remained visible , even though it weakened due to shearing . Little deep convection remained associated with the system , and the cyclone stayed stationary . The depression having no remaining convection and having become just a low @-@ level cloud swirl , dissipated on September 15 .

= = = Tropical Storm Wila = = =

A tropical depression formed on September 21 as an area of deep convection . The cyclone

organized slowly though , drifting slowly , initially west then to the northwest . However , the depression recurved northeast , due to a trough . As the cyclone moved northeast , the system strengthened as indicated by an Air Force reconnaissance plane showing tropical storm force winds . It therefore intensified into Tropical Storm Wila on September 25 . Wila , however , weakened within a day , and therefore became a tropical depression . The remnant low of Wila produced some heavy rain over the Hawaiian Islands on September 26 and 27 .

== Hurricane Lane ==

A wave moved westward off the coast of Africa , passed through the Caribbean Sea , and into the ITCZ of the eastern Pacific on September 20 . The system developed organized deep convection , and strengthened into a tropical depression on September 21 , while 300 miles (485 km) southeast of Acapulco , Mexico . As the low @-@ level circulation organized further in the depression it intensified into Tropical Storm Lane , later on September 21 . Lane developed further with an upper @-@ level outflow pattern , and the cyclone turned into a hurricane on September 23 . Later on September 23 and on September 24 , an eye appeared on satellite imagery . A trough to the northwest of Lane disturbed its upper @-@ level outflow on September 24 . Diminishing convection and loss of its eye caused Lane to weaken to a tropical storm on September 27 , and into a depression on September 28 . Later on September 28 , the cyclone moved into cooler waters and Lane lost nearly all of its deep convection . It weakened into a low @-@ level swirl , and Lane dissipated on September 30 . Lane caused no reported casualties or damage .

== Tropical Depression Twenty @-@ E ==

The remnants of Atlantic basin Tropical Storm Isaac moved into the eastern Pacific . These remnants underwent better organization and strengthened into a tropical depression on October 11 south of Baja California . Strong vertical southwesterly wind shear affected the cyclone , with the center of circulation later seen on the west side of the lessening amount of deep convection . The system remained poorly organized and had trouble strengthening to this continual poor organization as it moved westward . The system could not be located on satellite imagery and therefore dissipated on October 12 .

== Tropical Storm Miriam ==

Atlantic hurricane , Hurricane Joan survived the passage over Central America and entered the Pacific , although greatly weakened . Following the policy at the time , Joan was renamed Miriam .

Miriam brought heavy rains to parts of Central America . Isolated flooding and mudslides happened , although casualties and damage reports are not available . 10 @. @ 37 in (263 mm) of rain fell in Kantunilkin / Lazaro Cardenas , Mexico as a result of Miriam and the former Joan . Guatemala 's ports along its Pacific coast were closed and people in El Salvador were evacuated from low @-@ lying areas due to the storm . Miriam then turned away from Central America and weakened to a depression . The depression survived for over a week until it dissipated on October 30 . Tropical Depression Miriam 's remnants regenerated the next day , and Miriam finally dissipated on November 2 .

== Accumulated Cyclone Energy (ACE) ==

The table on the right shows the Accumulated Cyclone Energy for each storm in the season . ACE is a measure of the power of a tropical cyclones multiplied by the length of time it existed , so storms that last a long time , as well as particularly strong tropical cyclones , 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 .

The figures in parentheses are for storms in the Central Pacific basin west of 140 ° W ; those not in

parenthesis are for the Eastern Pacific basin .

The cumulative ACE for the Eastern Pacific this season fell within the official " Near Normal " grading .

= = Season effects = =

This is a table of all of the storms that have formed in the 1988 Pacific hurricane season . It includes their duration , names , landfall (s) , denoted in parenthesis , 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 of the damage figures are in 1988 USD .

= = 1988 storm names = =

The following names were used for named storms that formed in the eastern Pacific in 1988 . The names not retired from this list were used again in the 1994 season . This is the same list used for the 1982 season . Names that were not assigned are marked in gray .

Two names from the Central Pacific list were used ? Uleki and Wila , both being their first usage .

= = Retirement = =

The World Meteorological Organization retired one name in the spring of 1989 : Iva . Ileana replaced the name of Iva in the 1994 season .