= 2002 Pacific hurricane season =

The 2002 Pacific hurricane season was a slightly above average Pacific hurricane season that saw three tropical cyclones reach Category 5 intensity on the Saffir @-@ Simpson Hurricane Wind Scale . The strongest storm this year was Hurricane Kenna , which reached Category 5 on the Saffir @-@ Simpson Hurricane Scale . It made landfall near Puerto Vallarta , located in the Mexican state of Jalisco , on October 25 . The hurricane killed four people and was the third most powerful hurricanes to ever strike the western coast of Mexico , hitting with winds of 140 mph (as well as the strongest landfall in terms of windspeed since Hurricane Madeline in 1976) . Elsewhere , Tropical Storm Julio made landfall in Mexico , and Tropical Storm Boris dumped torrential rain along the Mexican coast , despite remaining offshore .

The season officially began on May 15 , 2002 for the Eastern Pacific , and June 1 , 2002 for the Central Pacific . It ended on November 30 for both regions . These dates delimit the time when most tropical cyclones form in this part of the Pacific Ocean . The first system formed on May 24 and the final depression dissipated on November 16 .

Other storms were individually unusual . Hurricanes Elida and Hernan also reached Category 5 intensity , but neither caused any damage . Hurricane Fausto had no effect on land , but it regenerated into a weak tropical storm at an abnormally high latitude .

= = Season summary = =

The 2002 Pacific hurricane season officially started May 15 , 2002 in the eastern Pacific , and June 1 , 2002 in the central Pacific , and lasted until November 30 , 2002 . These dates conventionally delimit the period of each year when most tropical cyclones form in the northeastern Pacific Ocean . In practice , however , the season lasted from May 24 , the formation date of its first system , to November 16 , the dissipation date of the last .

There were 15 tropical storms in the eastern Pacific Ocean in the 2002 season . Of those , eight became hurricanes , of which six became major hurricanes by reaching Category 3 or higher on the Saffir Simpson Scale . Three reached Category 5 intensity , a record shared with the 1994 season . Four tropical depressions formed and dissipated before reaching the intensity of a tropical storm . In the Central Pacific Hurricane Center 's area of responsibility , one tropical storm and two hurricanes formed , with one of the hurricanes intensifying into a major hurricane . In the eastern Pacific proper , the season saw below average activity in terms of the number of total storms and hurricanes , but about average activity in terms of major hurricanes . A moderately strong El Niño , ongoing during the season , may have contributed to the disproportionate number of major hurricanes , as well as reduced activity in the Atlantic . Also of note was an unusual gap in storm formation during the first three weeks of August in this season , histrocally a prime period for tropical cyclone formation .

Only three systems , Tropical Storms Boris and Julio and Hurricane Kenna , had significant impact on land . Julio and Kenna caused the only two landfalls this year . Most of the season 's impact , including all casualties and most of the damage , was caused by Kenna .

In addition to the above systems , an area of convection persisted near a developing circulation about 575 mi (925 km) west @-@ southwest of Johnston Atoll on July 18 . An upper @-@ level low to the northeast provided outflow , and the Joint Typhoon Warning Center issued a tropical cyclone formation alert early on July 19 . Although not classified by the CPHC , the Japan Meteorological Agency remarked that a tropical depression had developed by early on July 20 , just east of the International Date Line . Soon after , it crossed into the western Pacific and briefly intensified into Tropical Storm Kalmaegi .

= = Storms = =

= = = Hurricane Alma = = =

A complex formation involving a tropical wave and a gale over the Gulf of Tehuantepec formed Tropical Depression One @-@ E on May 24 . It slowly strengthened into the first tropical storm of the season two days later . Alma then turned north , moving near the edge of a subtropical ridge over Mexico . Its rate of intensification picked up , and Alma became a hurricane on May 28 . Alma reached Category 3 intensity on May 30 . The hurricane began to weaken almost immediately thereafter under the influence of wind shear and cool water . Alma rapidly fell apart , and degenerated into a weak low pressure area by June 1 .

The hurricane did not impact land . A special feature about Alma was that it was one of only five Pacific major hurricanes in May .

= = = Tropical Storm Boris = = =

On June 8 , an area of disturbed weather that had absorbed a tropical wave spawned Tropical Depression Two @-@ E. It became a tropical storm the next day . After peaking on June 9 , with a pressure of 997 mb , steering currents collapsed and Boris stalled out in the ocean between two ridges of high pressure . Shear increased , and the cyclone weakened to a depression on June 10 . The next day , Boris degenerated into a remnant low . The remnant drifted east and then southeast before dissipating on June 12 .

Boris dumped heavy rains on sections of the Mexican coast . The maximum amount was 10 @.@ 60 inches (269 mm) at San Felipe Usila . These rains damaged several homes at an unspecified location . In addition , rainfall damaged several homes in Tequila , Jalisco , but the National Hurricane Center believes that Boris likely did not cause the rain . No deaths were attributed to this storm .

= = = Tropical Depression Three @-@ E = = =

A tropical wave that crossed Central America organized and developed into a tropical depression on June 27 . Contrary to forecasts , the depression did not strengthen further because of strong wind shear . By June 29 , the depression had become a remnant low , which was observed as a swirl of clouds for a few more days before dissipating .

= = = Tropical Storm Cristina = = =

An area of disturbed weather near Panama drifted to a location south of Puerto Ángel , Oaxaca , and organized into Tropical Depression Four @-@ E on July 9 . It moved westward through a hostile environment of strong shear . The wind shear disrupted the cyclone 's convection and weakened its circulation . Despite the shear , the depression strengthened into a tropical storm early on July 12 and was named Cristina . This broke down the steering ridge , and Cristina turned to the north and peaked on July 14 . Then , the wind shear won out and Cristina quickly weakened . Cristina dissipated into a swirl of clouds on July 16 , without ever threatening land . No impact was reported .

= = = Hurricane Douglas = = =

A tropical wave exited the west coast of Africa on July 8 and crossed the Atlantic without much development . In the Caribbean , showers increased , but wind shear prevented development . The wave crossed into the eastern Pacific on July 16 , and wind shear decreased to allow the convection to organize . Tropical Depression Five @-@ E developed on July 20 about 395 miles (636 km) south of Manzanillo , Mexico . At that time , gradual strengthening was anticipated . The depression quickly intensified into Tropical Storm Douglas . Around that time , most of the deep convection was situated south of the atmospheric circulation . Initially expected to become a hurricane only briefly , late on July 21 , the NHC reported that Douglas had become a hurricane . Upon becoming a hurricane , Douglas was situated in low wind shear environment ; however , Hurricane Douglas was

expected to reach cold waters in 36 hours , and thus was not predicted to become a major hurricane . Douglas became a Category 2 hurricane on July 22 , reaching peak winds of 105 miles per hour (170 km / h) . Douglas held this intensity for 18 hours as it traveled westward . When Douglas weakened from its peak intensity , it had an organized cloud pattern , but the thunderstorm activity was weakening , typical of most Pacific hurricanes that reach cooler waters . The weakening briefly stopped after Douglas went through an eyewall replacement cycle , but Douglas was downgraded to a tropical storm late on July 24 as the storm only had a small area of deep convection left . Tropical storm Douglas briefly stopped weakening as convection increased , only to fade away again hours later . The storm was downgraded to a tropical depression early on July 26 , and later that day degenerated into a remnant low pressure area . The remnant low dissipated the next day .

= = = Hurricane Elida = = =

A tropical wave generated into Tropical Depression Six @-@ E on July 23 . It moved westward and reached storm strength 12 hours after it formed . Elida rapidly deepened , developing a pinhole eye , and becoming a hurricane on July 24 and further reaching major hurricane intensity six hours later . Elida 's rapid intensification continued , becoming a Category 5 hurricane for six hours on July 25 .

Despite moving over warm waters , Elida began to weaken because it began an eyewall replacement cycle . When the cycle ended , the cyclone was over cooler water and unsteadily weakened . Elida fell to a tropical storm on July 27 , then degenerated into a remnant low and turned to the northeast . The remnant dissipated over the open ocean about 535 mi (861 km) west of Los Angeles .

Elida is one of the fastest intensifying eastern Pacific hurricanes . Its rate of intensification is rivaled only by 1997 's Linda and 2015 's Patricia . Elida had no direct impact on land . However , it did send heavy waves along the shores of Mexico . No one was killed and no damage was reported .

= = = Tropical Depression Seven @-@ E = = =

A tropical wave that had reached the Eastern Pacific from Africa was first spotted on July 23 . The wave continued westward with little development occurring until August 3 , when convection increased . After additional slow organization , the wave was classified as Tropical Depression Seven @-@ E on August 6 near the tip of Baja California . The system did not strengthen much , and development was halted when wind shear destroyed the system on August 8 . The depression never came near land and hence no one was killed or injured . Like Tropical Depression Three @-@ E , this cyclone was forecast to reach tropical storm intensity , but it never did .

= = = Hurricane Fausto = = =

After a rather lengthy lull punctuated by only Tropical Depression Seven @-@ E , a tropical wave formed Tropical Depression Eight @-@ E on August 21 . Initially taking a westward track , the depression strengthened into Tropical Storm Fausto on August 22 . It turned to the west @-@ northwest and stayed on that path for the next six days . Fausto steadily strengthened and intensified into a hurricane on August 22 . It continued to intensify , peaking as a Category 4 on August 24 , and also substantially increased in size . The hurricane began to weaken thereafter , and was a minimal tropical storm by the time it entered the Central Pacific Hurricane Center 's area of responsibility on August 27 . The tropical cyclone dropped to a depression and degenerated into a non @-@ convective swirl of clouds on August 28 .

Fausto 's remnants passed north of the Hawaiian Islands uneventfully until they interacted with a tropical upper @-@ tropospheric trough (TUTT) on August 30 . In combination with warm waters , a tropical depression with some subtropical features developed . At this time it was located around latitude 30 ° N. By September 1 , Fausto had redeveloped into a tiny but tropical ministorm . Its rebirth was brief , however , as a mid @-@ latitude cyclone absorbed the system early on September 3 .

Fausto 's regeneration north of Hawaii was unusual but not unprecedented . The other time this happened since 1966 was in the 1975 season . That time , another TUTT absorbed the remnant of Hurricane Ilsa , which led to the formation of an unnamed hurricane at high latitude . Other tropical cyclones have strengthened north of Hawaii , but the actual formation of one is rare .

= = = Tropical Storm Alika = = =

An area of convection acquired a closed circulation and became Tropical Depression One @-@ C on August 22 . It stayed disorganized for the next several days . It organized more fully and intensified into a tropical storm on August 25 and was named Alika . After peaking as a moderately strong tropical storm on August 25 , wind shear caused by the pre @-@ Ele tropical depression and an upper @-@ level low near Hawaii weakened the storm to a depression on August 27 . Alika dissipated the next day , having never threatened land .

= = = Tropical Storm Genevieve = = =

A tropical wave formed Tropical Depression Nine @-@ E on August 26 . It was upgraded to a tropical storm and named Genevieve the next day . It moved westward and nearly strengthened to a hurricane , peaking in intensity on August 28 . At that point , the cyclone encountered cooler waters , which caused it to weaken slowly , weakening to a depression on August 30 . The depression hung on until it lost convection on the September 2 . A swirl of remnant clouds persisted for a few more days . Genevieve had no impact on land , with no reports of casualties or damage being received by the National Hurricane Center .

= = = Hurricane Ele = = =

An eastern extension of the monsoon trough south of Hawaii organized into Tropical Depression Two @-@ C on August 27 and strengthened into Tropical Storm Ele six hours later . Despite the nearby presence of Alika , Ele developed rapidly and strengthened into a hurricane on August 28 . After contributing to the dissipation of Alika , Ele continued intensifying . It reached Category 2 intensity late on August 28 and quickly became a major hurricane six hours later . The hurricane then crossed the International Date Line and became a typhoon in the 2002 Pacific typhoon season . Typhoon Ele turned to the northwest after crossing the dateline and continued to strengthen . It reached Category 4 before turning north and weakening again . After briefly restrengthening back into a Category 4 , the typhoon weakened and turned to the northwest . Ele was downgraded to a tropical storm on September 7 , a depression on September 9 , and then dissipated shortly afterwards . Ele did not affect land .

= = = Hurricane Hernan = = =

A weak wave in the ITCZ organized into Tropical Depression Ten @-@ E on August 30 . It headed west @-@ northwest and quickly intensified into a tropical storm and eventually , a hurricane . Hernan then began rapidly deepening , reaching Category 5 intensity on September 1 . It maintained that intensity for 12 hours before tracking over cooler waters . The storm weakened steadily , with wind shear contributing to its deterioration . Hernan then degenerated into a remnant low on September 6 . The low turned to the southwest and dissipated three days later .

Hernan passed close enough to Socorro Island to bring strong winds to the island . In addition , the hurricane 's large and powerful wind field caused waves between 12 foot (3 @.@ 7 m) and 20 foot (6 @.@ 1 m) in height and strong rip currents on the southwest coast of California . Other than the aforementioned regions , Hernan had no significant impact on land .

= = = Tropical Depression Eleven @-@ E = = =

Of the four tropical depressions this season that did not become named storms , only Eleven @-@ E threatened land . An area of disturbed weather associated with a tropical wave formed into a tropical cyclone on September 5 . It tracked northwestward , before turning southwest . It weakened into a remnant low on September 8 . The remnant turned north and dissipated on September 10 offshore of the Baja California peninsula . The cyclone was nearly a tropical storm when it peaked on September 6 . It was forecast to become a tropical storm and pass close to the peninsula . This prompted a tropical storm warning and a hurricane watch . With the weakening of the cyclone the watch and warning were discontinued . No damage or casualties were reported in association with this tropical cyclone .

= = = Tropical Storm Iselle = = =

Part of the same tropical wave that formed Tropical Depression Seven in the Atlantic basin organized into Tropical Depression Twelve @-@ E on September 15 . It strengthened further into Tropical Storm Iselle the next day . The storm headed northwest and paralleled the coast of Mexico , nearly strengthening into a hurricane late on September 17 . While near its peak intensity , a trough abruptly recurved the system to the northeast . Wind shear also increased , and Iselle consequently fell apart on satellite imagery . It weakened to a depression on September 19 . Iselle then degenerated into a remnant low the next day and rapidly degenerated , dissipating on September 20 . Iselle never made landfall .

Iselle threatened parts of southwestern Mexico and warnings and watches were issued for that area . Heavy rains were reported over parts of the Baja California Peninsula . The highest amount of rainfall was 6 @.@ 16 inches (156 mm) at Guadeloupe and Mulege , Baja California Sur . There were no reports of damage or casualties .

= = = Tropical Storm Julio = = =

An area of convection and disturbed weather , possibly related to outflow from Hurricane Isidore in the Atlantic basin , developed a circulation on September 23 and organized into Tropical Depression Thirteen @-@ E on September 25 . The depression headed northward and strengthened into a tropical storm that same day . Julio turned to the northwest and peaked in intesty as a minial tropical storm near Lázaro Cárdenas , Michoacán . On September 26 , Juli made landfall . The storm rapidly dissipated over Mexico .

Three fatalities were reported from Julio . However , in Guerrero , around 100 houses in Acapulco and Zihuatanejo were damaged or washed away by flash flooding . The highest rainfall reported was 16 @.@ 10 inches (409 mm) at Zihuatanejo and La Unión , Guerrero .

= = = Hurricane Kenna = = =

A disturbance possibly associated with a tropical wave organized into Tropical Depression Fourteen @-@ E on October 22 . It strengthened into a tropical storm that same day and a hurricane on October 23 . The next day , Kenna became the third Category 5 hurricane of the season . A trough over Mexico recurved the hurricane , and it started accelerating towards Mexico . Despite moving over waters that were still warm , wind shear weakened the system to a minimal Category 4 by the time of its landfall over Mexico late on October 25 . Mountainous terrain rapidly weakened Kenna , and the system dissipated early on October 26 .

Hurricane Kenna was the third @-@ strongest Pacific hurricane to make landfall on record . It was also the second @-@ strongest October hurricane in any season , and the third strongest Pacific hurricane overall . In San Blas , Nayarit , 8 @,@ 800 people were affected ; 1 @,@ 540 houses were damaged or destroyed , which was 80 % to 90 % of houses in the town . In Santiago Ixcluintla , 3 @,@ 770 houses were damaged . Agriculture in the affected area was disrupted . Farmers required aid , and many fruit crops were destroyed . Tourism in Puerto Vallarta was disrupted , with much of the damage to hotels . Insurance companies reported that Kenna 's total damage was $ 96

million (2002 USD) .

Kenna killed four people in Mexico and injured over a hundred . The low death toll is likely due to massive evacuations in San Blas , Nayarit , and elsewhere ahead of the hurricane .

= = = Tropical Storm Lowell = = =

A weak tropical wave located over the open Pacific Ocean organized into Tropical Depression Fifteen @-@ E on October 22 . It strengthened into a tropical storm the next day . Shortly afterwards , wind shear increased . Lowell 's convection was disrupted , and its center of circulation became exposed . The cyclone crossed into the Central Pacific Hurricane Center 's area of responsibility on October 26 . The shear relaxed , and the depression restrengthened into a tropical storm . Lowell drifted in slow steering currents until it approached Hurricane Huko . The proximity of Huko caused a gradual weakening in Lowell , and it dissipated on October 31 .

= = = Hurricane Huko = = =

In late October , an active monsoon trough persisted south of Hawaii along 10 ° N latitude , developing an area of convection on October 24 . Later that day , the disturbance was classified as Tropical Depression Three @-@ C about 850 mi (1 @,@ 370 km) south @-@ southeast of Honolulu . Initially poorly organized , it moved to the north and steadily intensified , becoming Tropical Storm Huko early on October 26 while turning northwestward . Late on October 28 , Huko reached hurricane strength , but its close proximity to Tropical Storm Lowell and a brief increase in wind shear weakened it back to a tropical storm on October 30 . Shortly after turning to the west , conditions allowed for Huko to re @-@ attain hurricane strength on October 31 while it was passing around 140 mi (225 km) south of Johnston Atoll . On November 2 , a ridge caused the hurricane to accelerate , and the next day it crossed the International Date Line into the Western Pacific , becoming a typhoon .

While passing near Johnston Atoll , the outer rainbands of the hurricane produced wind gusts up to 30 mph (48 km / h) and locally heavy rainfall . The remnants of Huko later reentered the basin , eventually affecting California . The system was responsible for heavy rains , causing flooding along a small stream in Bakersfield . Total damage was approximately $ 23 @,@ 000 (2002 USD) .

= = = Tropical Depression Sixteen @-@ E = = =

Tropical Depression Sixteen @-@ E formed from a disturbance in the intertropical convergence zone . Despite being located in a hostile environment , it managed to organize into a tropical depression on November 14 . It was briefly forecast to strengthen into a tropical storm . However , wind shear prevented that from occurring . Consequently , the depression degenerated into a remnant low on November 16 and dissipated soon after that .

= = Other storms = =

= = = Tropical Depression Kalmaegi = = =

According to the Joint Typhoon Warning Center and Japan Meteorological Agency , on July 17 a tropical depression formed east of the International Dateline , and 3 days later it exited CPHC 's area of responsibility ; however , this storm wasn 't included into CPHC database . As it entered into western Pacific , it strengthened as a tropical storm and received the name Kalmaegi .

= = Accumulated Cyclone Energy = =

Accumulated Cyclone Energy (ACE) is a measure of the activity of a hurricane season . It is

calculated by squaring the windspeed of a cyclone with at least tropical storm @-@ force winds every six hours , summing the results , and dividing that total by 104 . As a tropical cyclone does not have gale @-@ force winds until it becomes a tropical storm , tropical depressions are not included in these tables . For all storms , ACE is given to three significant figures . The ACE in the east Pacific proper (140 ° W to North America) is given ; the ACE in the central Pacific (the International Date Line to 140 ° W) is given in parentheses .

The table includes the ACE for Ele and Huko accumulated only when those storms were located east of the dateline ; their ACE west of the dateline is part of the totals of the 2002 typhoon season .

The National Hurricane Center uses ACE to rank hurricane seasons as above @-@ normal , near @-@ normal , and below @-@ normal . It defines below @-@ normal as having an ACE less than 95 * 104 kn2 ; It defines above normal as having an ACE above 150 * 104 kn2 along with the numbers of any two of the following above average : tropical storms (15) , hurricanes (9) , or major hurricanes (4) ; It defines near @-@ normal as having an ACE between 100 * 104 kn2 and 150 * 104 kn2 , or an ACE above 150 * 104 kn2 with fewer than two of the numbers of the following above average : tropical storms (15) , hurricanes (9) , or major hurricanes (4) .

The 2002 season had a total of fifteen tropical storms , eight hurricanes , and 6 major hurricanes . The total ACE of the season was 101 * 104 kn2 in the east Pacific proper . This qualifies the 2002 season as near to slightly above normal .

= = Storm names = =

The following names were used for named storms that formed in the Northeastern Pacific Ocean during 2002 . The names not retired from this list were used again in the 2008 season . This is the same list used for the 1996 season . Names that were not assigned are marked in gray .

For storms that form in the Central Pacific Hurricane Center 's area of responsibility , encompassing the area between 140 degrees west and the International Date Line , all names are used in a series of four rotating lists . The next four names that were slated for use in 2002 are shown below . Three of them , Alika , Ele , and Huko , were used throughout the course of the year .

= = = Retirement = = =

The World Meteorological Organization retired one name in the spring of 2003 , Kenna . It was replaced in the 2008 season by Karina .