= 2002 Pacific typhoon season =

The 2002 Pacific typhoon season was an active season , with many tropical cyclones affecting Japan and China . Every month had tropical activity , with most storms forming from July through October . Overall , there were 37 tropical depressions declared officially or unofficially , of which 26 became named storms ; of those , there were 15 typhoons , which is the equivalent of a minimal hurricane , while 8 of the 15 typhoon intensified into super typhoons unofficially by the JTWC .

The season began early with the first storm , Tapah , developing on January 10 , east of the Philippines . Two months later , Typhoon Mitag became the first super typhoon ever to be recorded in March . In June , Typhoon Chataan dropped heavy rainfall in the Federated States of Micronesia , killing 48 people and becoming the deadliest natural disaster in the state of Chuuk . Chataan later left heavy damage in Guam before striking Japan . In August , Typhoon Rusa became the deadliest typhoon in South Korea in 43 years , causing 238 deaths and $ 4 @.@ 2 billion in damage . Typhoon Higos in October was the third strongest typhoon to strike Tokyo since World War II . The final typhoon of the season was Typhoon Pongsona , which was one of the costliest storms on record in Guam ; it did damage worth $ 700 million on the island before dissipating on December 11 .

The western Pacific basin covers the Pacific Ocean , north of the equator and west of the International Date Line . Storms that form east of the date line and north of the equator are called hurricanes ; see 2002 Pacific hurricane season . Tropical Storms formed in the entire Northwest Pacific basin are assigned a name by the Japan Meteorological Agency (JMA) . Tropical depressions in this basin have the " W " suffix added to their number when classified by the Joint Typhoon Warning Center (JTWC) . Tropical depressions that enter or form in the Philippine area of responsibility are assigned a name by the Philippine Atmospheric , Geophysical and Astronomical Services Administration (PAGASA) , which can result in the same storm having two names ; in these cases both storm names are given below , with the PAGASA name in parentheses .

= = Seasonal summary and predictions = =

On March 6 , meteorologists from University College London at TropicalStormRisk.com issued a forecast for the season for above average activity , since sea surface temperatures were expected to be slightly warmer than usual ; the group used data by the Joint Typhoon Warning Center (JTWC) , and compared the potential 28 @.@ 6 storms to the 30 @-@ year average of 26 @.@ 3 . The group raised the number of predicted storms in April to 29 @.@ 6 , and again in early May to 30 @.@ 5 . They ultimately overestimated the number of storms that would form . The Laboratory for Atmospheric Research at the City University of Hong Kong also issued a season forecast in April 2002 , predicting 27 storms with a margin of error of 3 , of which 11 would become typhoons , with a margin of error of 2 . The agency noted a stronger than normal subtropical ridge over the open Pacific Ocean , as well as ongoing El Niño conditions that favored development , but expected below @-@ normal development in the South China Sea . These predictions proved to be largely accurate .

During the year , the Japan Meteorological Agency (JMA) issued advisories on tropical cyclones west of the International Date Line to the Malay Peninsula , and north of the equator , in its role as the official Regional Specialized Meteorological Center , as designated by the World Meteorological Organization in 1989 . The JMA issued forecasts and analyses every six hours starting at midnight UTC using numerical weather prediction (NWP) and a climatological tropical cyclone forecast model . They used the Dvorak technique and NWP to estimate 10 @-@ minute sustained winds and barometric pressure . The JTWC also issued warnings on storms within the basin , operating from Pearl Harbor in Hawaii and supplying forecasts to the United States Armed Forces in the Indian and Pacific Oceans . The agency moved their backup facility from Yokosuka , Kanagawa in Japan to Monterey , California in 2002 . Several meteorologists left the agency near the beginning of the year , although the new forecasters compensated for their inexperience by relying on the consensus of various forecast models . In 2002 , the JTWC began experimenting with five @-@ day forecasts .

During most of the year , sea surface temperatures were above normal near the equator , and were highest around 160 ° E from January to July , and in November . Areas of convection developed farther east than usual , causing many storms to develop east of 150 ° E. The average point of formation was 145 @.@ 9 ° E , the easternmost point since 1951 . Partially as a result , no tropical storms made landfall in the Philippines for the first time since 1951 , according to the JMA . Two storms ? Ele and Huko ? entered the basin from the Central Pacific , east of the International Date Line . Overall , there were 26 named storms in the basin in 2002 , which was slightly below the norm of 26 @.@ 7 . A total of 15 of the 26 storms became typhoons , a slightly higher than normal proportion .

The season began early , but did not become active until June , when six storms passed near or over Japan after a ridge weakened . Nine storms developed in July , many of which influenced the monsoon trough over the Philippines to produce heavy rainfall and deadly flooding . The flooding was worst in Luzon , where 85 people were killed . The series of storms caused the widespread closure of schools and offices . Many roads were damaged , and the floods left about $ 1 @.@ 8 million (? 94 @.@ 2 million PHP) in crop damage , largely to rice and corn . Overall damage from the series of storms was estimated at $ 10 @.@ 3 million (? 522 million PHP) . From June to September , heavy rainfall affected large portions of China , resulting in devastating flooding that killed over 1 @,@ 500 people and left $ 8 @.@ 2 billion (￥ 68 billion CNY) in damage . During this time , Tropical Storm Kammuri struck southern China with a large area of rainfall that damaged or destroyed 245 @,@ 000 houses . There were 153 deaths related to the storm , mostly inland in Hunan , and damage totaled $ 322 million (￥ 2 @.@ 665 billion CNY) . Activity shifted farther to the east after September , with Typhoon Higos striking Japan in October and Typhoon Pongsona hitting Guam in December .

= = Storms = =

All storms named by the JMA , as well as other notable tropical cyclones , have complete sections below . The track maps plot the track and intensity of the storms ; light and dark blue indicate tropical depression and tropical storm status , respectively , and intensifying colors of yellow through red correspond to the Saffir ? Simpson hurricane wind scale from 1 to 5 .

= = = Tropical Storm Tapah (Agaton) = = =

The first storm of the season was Tropical Storm Tapah , which formed on January 9 near Palau . It developed from the monsoon trough and was first observed by the JTWC two days before its formation . The system initially consisted of an area of convection with a weak circulation , located in an area of weak wind shear . On January 10 , the JMA classified the system as a tropical depression , the same day that the JTWC initiated advisories on Tropical Depression 01W and PAGASA classified it as " Agaton " . The storm moved west @-@ northwestward due to a ridge to the north , and the system gradually became better organized . On January 12 , the JMA upgraded the depression to Tropical Storm Tapah , and later that day estimated peak winds of 75 km / h (45 mph) . Around that time , Tapah developed an eye feature beneath its convection , prompting both the JTWC and PAGASA to estimate peak winds of 95 km / h (60 mph) . An approaching trough weakened the ridge , which turned the storm to the northwest . Due to increasing wind shear , convection gradually weakened , and the JMA downgraded Tapah to a tropical depression on January 13 ; however , other agencies maintained the system as a tropical storm . The next day , Tapah dissipated along the eastern coast of Luzon in the Philippines .

= = = Typhoon Mitag (Basyang) = = =

Typhoon Mitag developed from a trough near the equator on February 25 near the Federated States of Micronesia (FSM) . It moved westward through the archipelago and intensified into a typhoon , before passing near Yap on March 2 . High winds and heavy rainfall affected the state ,

causing an islandwide power outage and destroying hundreds of houses . Mitag severely damaged crops , resulting in food shortages . The rainfall and storm surge flooded much of the coastline as well as Yap 's capital , Colonia . Damage totaled $ 150 million , mostly to crops . There was one death related to the storm 's aftermath .

After affecting Yap , Mitag turned to the northwest and later to the north due to an approaching trough . It passed to the north of Palau , contributing to one death there . Despite predictions of weakening , the typhoon continued to intensify , reaching peak 10 @-@ minute winds of 175 km / h (110 mph) on March 5 . The JTWC estimated peak 1 @-@ minute winds of 260 km / h (160 mph) when the storm was about 610 km (380 mi) east of Catanduanes in the Philippines ; this made Mitag a super typhoon , the first one on record in the month of March . The combination of cooler air and interaction with the westerlies caused Mitag to weaken significantly . Only four days after reaching peak winds , the storm had dissipated well to the east of the Philippines .

Tropical Depression 03W (Caloy)

On March 15 , the JTWC began monitoring a tropical disturbance , and four days later upgraded it to a tropical depression near Palau . The next day , both the JMA and PAGASA classified the system as a depression , and PAGASA named it " Caloy " . Moving west @-@ northwestward due to a ridge to the north , the depression moved across the Philippine island of Mindanao on March 21 and continued through the archipelago . Owing to strong wind shear , the system never intensified , and the JMA discontinued advisories on March 23 after the system reached the South China Sea . The JTWC maintained the system as a tropical depression until March 25 , when a mid @-@ latitude trough absorbed the system off the east coast of Vietnam .

Heavy rains from the depression affected the southern Philippines , causing flash flooding and landslides . The storm damaged 2 @,@ 703 homes , including 215 that were destroyed . Damage totaled about $ 2 @.@ 4 million (? 124 million PHP) . There were 35 deaths in the Philippines , mostly in Surigao del Sur in Mindanao from drownings .

Typhoon Hagibis

The monsoon trough spawned a tropical disturbance near the Caroline Islands in the middle of May . By that time , the system was an area of convection with a weak circulation , although the system organized as outflow improved . It tracked northwestward within the monsoon trough , steered by a mid @-@ level ridge . The system developed into a tropical depression on May 14 about 500 km (310 mi) southwest of Chuuk Lagoon , and early the next day the JTWC initiated advisories . For several days the depression remained weak , until it intensified into Tropical Storm Hagibis on May 16 about 200 km (120 mi) southwest of Guam . The developing storm dropped rainfall on Guam that ended the island 's wildfire season . The storm quickly intensified , developing an eye feature later that day . Early on May 18 , the JMA upgraded Hagibis to a typhoon , and around that time , an approaching trough turned the storm to the northeast .

While accelerating northeastward , Hagibis developed a well @-@ defined eye and underwent a period of rapid deepening . On May 19 , the JMA estimated peak 10 @-@ minute winds of 175 km / h (110 mph) , and the JTWC estimated 1 @-@ minute winds of 260 km / h (160 mph) ; this made Hagibis a super typhoon , the second of the year . At the time of its peak , the typhoon was located about 305 km (190 mi) west @-@ southwest of the northernmost Northern Marianas Islands . Hagibis only maintained its peak for about 12 hours , after which the eye began weakening . The trough that caused the typhoon 's acceleration also caused the storm to lose tropical characteristics , and dry air gradually became entrained in the circulation . On May 21 , Hagibis became extratropical to the east of Japan after having weakened below typhoon intensity . The remnants continued to the northeast and dissipated south of the Aleutian Islands on May 22 .

Severe Tropical Storm Noguri (Espada)

In early June , a disturbance within the monsoon trough persisted in the South China Sea to the east of Vietnam . On June 4 , a tropical depression developed just off the east coast of Hainan , with a broad circulation and scattered convection . The system tracked slowly eastward due to a ridge to the north , and conditions favored intensification , including favorable outflow and minimal wind shear . The JTWC initiated advisories on June 6 , and despite the favorable conditions , the depression remained weak . On June 7 , the system briefly entered the area of responsibility of PAGASA , and the agency named it Espada . Later that day , the JTWC upgraded the depression to a tropical storm , and on June 8 the JMA upgraded the depression to Tropical Storm Noguri halfway between Taiwan and Luzon . Increased outflow from an approaching trough allowed the storm to quickly intensify . The JTWC upgraded Noguri to a typhoon late on June 8 , after an eye developed . By that time , the storm was moving to the northeast due to a building ridge to the southeast . The JMA only estimated peak 10 @-@ minute winds of 110 km / h (70 mph) , making it a severe tropical storm . However , the JTWC estimated peak winds of 160 km / h (100 mph) , after the eye became well @-@ organized . Increasing wind shear weakened Noguri , and the storm passed just west of the Miyako @-@ jima on June 9 . The convection diminished , and the JTWC declared Noguri extratropical while the storm was approaching Japan . The JMA continued tracking the storm until it dissipated over the Kii Peninsula on June 11 .

While the storm passed south of Taiwan , it dropped heavy rainfall peaking at 320 mm (13 in) in Pingtung County . Rainfall in Japan peaked at 123 mm (4 @.@ 8 in) at a station in Kagoshima Prefecture . The threat of the storm prompted school closures and 20 airline flight cancellations . Noguri injured one person , damaged one house , and caused about $ 4 million (￥ 504 million JPY) in agricultural damage .

= = = Typhoon Rammasun (Florita) = = =

Typhoon Rammasun was the first of four typhoons to contribute to heavy rainfall and deadly flooding in the Philippines in July 2002 ; there were 85 deaths related to the four storms , with 2 @,@ 463 homes damaged or destroyed . Rammasun developed around the same time as Typhoon Chataan , but farther to the west . The storm tracked northwestward toward Taiwan , and on July 2 it attained its peak intensity with winds of 160 km / h (100 mph) . Rammasun turned northward , passing east of Taiwan and China . In Taiwan , the outer rainbands dropped rainfall that alleviated drought conditions . In contrast , rainfall in China followed previously wet conditions , resulting in additional flooding , although less damage than expected ; there was about $ 85 million in crop and fishery damage in Zhejiang .

After affecting Taiwan and China , Rammasun began weakening due to an approaching trough , which turned the typhoon northeastward . It passed over the Japanese island of Miyako @-@ jima and also produced strong winds in Okinawa . About 10 @,@ 000 houses lost power on the island , and high surf killed two sailors . On the Japanese mainland , there was light crop damage and one serious injury . After weakening to a tropical storm , Rammasun passed just west of the South Korean island of Jejudo , where high waves killed one person . The storm crossed the country , killing three others and leaving $ 9 @.@ 5 million in damage . High rains also affected North Korea and Primorsky Krai in the Russian Far East .

= = = Typhoon Chataan (Gloria) = = =

Typhoon Chataan formed on June 28 , 2002 , near the FSM , and for several days it meandered while producing heavy rainfall across the region . In Chuuk , a state in the FSM , the highest 24 @-@ hour precipitation total was 506 mm (19 @.@ 9 in) , which was greater than the average monthly total . The rain produced floods up to 1 @.@ 5 m (4 @.@ 9 ft) deep , causing deadly landslides across the island that killed 47 people ; this made Chataan the deadliest natural disaster in the island 's history . There was also one death on nearby Pohnpei , and damage in the FSM totaled over $ 100 million .

After affecting the FSM , Chataan began a northwest track as an intensifying typhoon . Its eye

passed just north of Guam on July 4 , though the eyewall moved across the island and dropped heavy rainfall . Totals were highest in southern Guam , peaking at 536 mm (21 @.@ 1 in) . Flooding and landslides from the storm severely damaged or destroyed 1 @,@ 994 houses . Damage on the island totaled $ 60 @.@ 5 million , and there were 23 injuries . The typhoon also affected Rota in the Northern Mariana Islands with gusty winds and light rainfall . Typhoon Chataan attained its peak intensity of 175 km / h (110 mph) on July 8 . It weakened while turning to the north , and after diminishing to a tropical storm , Chataan struck eastern Japan on July 10 . High rainfall , peaking at 509 mm (20 @.@ 0 in) , flooded 10 @,@ 270 houses . Damage in Japan totaled about $ 500 million (￥ 59 billion JPY) .

= = = Typhoon Halong (Inday) = = =

 The monsoon trough spawned a tropical depression on July 5 near the Marshall Islands , near where Chataan originated . For much of its duration , Halong moved toward the northwest , gradually intensifying into a tropical storm . Early on July 10 , Halong passed just south of Guam as a tropical storm , according to the JMA , although the JTWC assessed it as a typhoon near the island . It had threatened to strike the island less than a week after Chataan 's damaging landfall , and although Halong remained south of Guam , it produced high waves and gusty winds on the island . The storm disrupted relief efforts following Chataan , causing additional power outages but little damage .
 After affecting Guam , Halong quickly strengthened into a typhoon and reached its peak winds on July 12 . The JTWC estimated peak 1 @-@ minute winds of 250 km / h (155 mph) , while the JMA estimated 10 @-@ minute winds of 155 km / h (100 mph) . The typhoon weakened greatly while curving to the northeast , although its winds caused widespread power outages on Okinawa . Halong struck southeastern Japan , dropping heavy rainfall and producing strong winds that left $ 89 @.@ 8 million (￥ 10 @.@ 3 billion JPY) in damage . There was one death in the country and nine injuries . Halong became extratropical on July 16 and dissipated the next day .

= = = Severe Tropical Storm Nakri (Hambalos) = = =

 A circulation formed on July 7 in the South China Sea , with associated convection located to the south . Outflow increased as the system became better organized , and late on July 7 a tropical depression formed to the southwest of Taiwan . A ridge located over the Philippines caused the system to track northeastward . Early on July 9 , the JMA upgraded the depression to Tropical Storm Nakri near western Taiwan . It was a small storm , and while moving along the northern portion of the island , Nakri weakened as its convection diminished . However , it intensified while moving away from Taiwan , reaching peak winds of 95 km / h (60 mph) on July 10 . The monsoon trough turned Nakri to the east for two days , until a weakening ridge turned it to the north on July 12 . That day , the storm passed just west of Okinawa , and shortly thereafter Nakri weakened to a tropical depression , after experiencing cooler waters and increasing shear . On July 13 , Nakri dissipated west of Kyushu .
 While passing over Taiwan , Nakri dropped heavy rainfall that reached 647 mm (25 @.@ 5 in) at Pengjia Islet . A total of 170 mm (6 @.@ 7 in) fell in one day at the Feitsui Dam , representing the highest daily total at that point in the year . Taiwan had experienced drought conditions prior to earlier Typhoon Rammasun , and additional rainfall from Nakri eliminated all remaining water restrictions . Airline flights were canceled throughout the region due to the storm , and some schools and offices were closed . Nakri killed one fisherman and a shipworker during its passage . High rains also affected southeastern China , and later Okinawa . The storm induced heavy rainfall in the Philippines , as well as in Japan , where landslides and flooding were reported along a cold front .

= = = Typhoon Fengshen = = =

The monsoon trough spawned a tropical depression on July 13 , which quickly intensified due to its

small size . By July 15 , Fengshen attained typhoon status , and after initially moving to the north , it began a movement toward the northwest . On July 18 , the typhoon reached peak 10 @-@ minute winds of 185 km / h (115 mph) , according to the JMA , making it the strongest storm of the season . The JTWC estimated peak 1 @-@ minute winds of 270 km / h (165 mph) , and the agency estimated that Fengshen was a super typhoon for five days . This broke the record for longest duration at that intensity , previously set by Typhoon Joan in 1997 , and later tied by Typhoon Ioke in 2006 .

While near peak intensity , Typhoon Fengshen underwent the Fujiwhara effect with Typhoon Fung @-@ wong , causing the latter storm to loop to its south . Fengshen gradually weakened while approaching Japan , and it crossed over the country 's ?sumi Islands on July 25 as a severe tropical storm . When the typhoon washed a freighter ashore , four people drowned and the remaining fifteen were rescued . In the country , Fengshen dropped heavy rainfall and produced heavy rains , causing mudslides , $ 4 million (￥ 475 million JPY) in crop damage , and one death . After affecting Japan , Fengshen weakened in the Yellow Sea to a tropical depression , before moving across China 's Shandong Peninsula and dissipating on July 28 .

= = = Tropical Depression 13W (Juan) = = =

On July 16 , an area of convection increased northwest of Palau with a weak circulation . Moderate shear dispersed the thunderstorms , although the system gradually organized . It tracked northwestward due to a ridge to the north , becoming a tropical depression on July 18 . PAGASA gave the system the local name " Juan " , and the JTWC classified it as Tropical Depression 13W , although the JMA did not classify it as a tropical storm . Early on July 19 , the depression struck Samar Island in the Philippines , and continued northwestward through the archipelago . An increase in convection the next day prompted the JTWC to upgrade the system to a tropical storm before it moved over Luzon and the Metro Manila area . Increasing shear and disrupted outflow due to land interaction weakened the system , and the JTWC discontinued advisories on July 22 . PAGASA continued tracking the system until the following day .

The depression dropped heavy rainfall in the Philippines during its passage , only weeks after several consecutive tropical systems caused deadly flooding in the country . The rains forced 2 @,@ 400 people to evacuate . Storm @-@ related tornadoes and landslides killed at least three people . Three people were electrocuted , and flash flooding killed at least two people . In all , Tropical Depression Juan killed 14 people and injured two others . There were 583 houses that were damaged or destroyed , and damage totaled about $ 240 @,@ 000 (? 12 @.@ 1 million PHP) , mostly on Luzon .

= = = Typhoon Fung @-@ wong (Kaka) = = =

A small circulation formed northeast of the Northern Marianas Islands on July 18 . Later that day , the JMA classified the system as a tropical depression . Convection and outflow increased the next day , and the system moved slowly westward due to a ridge over Japan . After further organization , the JTWC initiated advisories on July 20 while the depression was just southwest of Iwo Jima . Shortly thereafter , the JMA upgraded it to Tropical Storm Fung @-@ Wong . On July 22 , the storm began undergoing the Fujiwhara effect with the larger Typhoon Fengshen to the east , causing Fung @-@ wong to turn southwestward . Around that time , the storm entered PAGASA 's region , earning it the local name " Kaka " . Fung @-@ wong quickly intensified after developing a small eye , becoming a typhoon on July 23 , with peak winds of 130 km / h (80 mph) . It turned to the south and later southeast while interacting with the larger Fengshen , which passed north of it . On July 25 , the typhoon weakened to a severe tropical storm while at the southernmost point of its track . The storm turned to the north and completed a large loop between the Ryukyu and Northern Marianas Islands that day . The combination of cooler waters , wind shear , and dry air caused weakening , and the storm deteriorated into a tropical depression on July 27 . Passing a short distance south of Kyushu , Fung @-@ wong dissipated later that day .

The storm dropped heavy rainfall in Japan , reaching 717 mm (28 @.@ 2 in) at a station in Miyazaki Prefecture . The rains caused two landslides and resulted in delays to bus and train systems , as well as cancellations to ferry and airline routes . There was also minor crop damage .

= = = Tropical Storm Kalmaegi = = =

A tropical disturbance developed on July 17 in the Central Pacific Ocean , near the International Date Line . Deep convection with outflow persisted around a circulation , and at 06 : 00 UTC on July 20 the JMA classified the system as a tropical depression , just east of the date line and about 980 km (610 mi) west @-@ southwest of Johnston Atoll . The system crossed the line shortly thereafter and quickly intensified into Tropical Storm Kalmaegi . The JMA classified the system as a tropical storm , although the JTWC maintained it as a tropical depression . Kalmaegi moved northwestward due to a ridge to the north , and initially a tropical upper tropospheric trough provided favorable conditions . However , the trough soon increased wind shear and restricted outflow , which caused quick weakening . The thunderstorms diminished from the circulation , and around 12 : 00 UTC on July 22 , Kalmaegi dissipated about 30 hours after forming .

= = = Severe Tropical Storm Kammuri (Lagalag) = = =

A large monsoonal system persisted toward the end of July 2002 near the Philippines . On August 2 , a tropical depression formed off the northwest coast of Luzon and moved west @-@ northwestward . Late on August 3 , it intensified into Tropical Storm Kammuri off the coast of Hong Kong . A weakening ridge turned the storm northward toward the coast of China . Tropical Storm Kammuri made landfall late on August 4 , after reaching peak winds of 100 km / h (65 mph) . The system dissipated over the mountainous coastline of eastern China and merged with a cold front on August 7 .
High rainfall from Kammuri affected large portions of China , particularly in Guangdong province where it moved ashore . In Hong Kong , the rains caused a landslide and damaged a road . Two dams were destroyed in Guangdong by the flooding , and 10 people were killed by a landslide . Throughout the province , over 100 @,@ 000 people had to evacuate due to flooding , and after 6 @,@ 810 houses were destroyed . The floods damaged roads , railroads , and tunnels , and left power and water outages across the region . Rainfall was beneficial in alleviating drought conditions in Guangdong , although further inland the rains occurred after months of deadly flooding . In Hunan Province , the storm 's remnants merged with a cold front and destroyed 12 @,@ 400 houses . Across its path , the floods damaged or destroyed 245 @,@ 000 houses , and destroyed about 60 hectares (150 acres) of crop fields . Kammuri and its remnants killed 153 people , and damage was estimated at $ 509 million (¥ 4 @.@ 219 billion CNY) .

= = = Tropical Storm Vongfong (Milenyo) = = =

A tropical depression developed on August 10 east of the Philippines . Initially it was disorganized due to hostile conditions , and it failed to intensify significantly before crossing the Philippine island of Luzon . There , flooding forced 3 @,@ 500 people to evacuate their homes . In the Philippines , the storm killed 35 people and caused $ 3 @.@ 3 million in damage , with 13 @,@ 178 houses damaged or destroyed . It was the final storm named by PAGASA during the season .
After affecting the Philippines , the tropical depression dissipated in the South China Sea on August 14 . The next day , the system reformed , although the JTWC labeled the new depression as a separate cyclone . It moved northwestward , strengthening into Tropical Storm Vongfong on August 18 . It brushed eastern Hainan before making landfall on August 19 in southern China near Wuchuan , Guangdong . Soon after the circulation dissipated , it dropped heavy rainfall across the region . One person died in a traffic accident in Hong Kong , and landslides killed twelve people . The storm destroyed 6 @,@ 000 houses , mostly in Guangdong , and damage in the country totaled at least $ 86 million .

= = = Typhoon Phanfone = = =

The monsoon trough spawned a tropical depression on August 11 , just west of Ujelang Atoll . It moved generally northwestward due to a ridge to the north , quickly intensifying into Tropical Storm Phanfone by August 12 . With good outflow and developing rainbands , the storm continued to strengthen , becoming a typhoon on August 14 . Phanfone developed a well @-@ defined eye , surrounded by deep convection . On August 15 , the JMA estimated 10 @-@ minute winds of 155 km / h (100 mph) , and the JTWC estimated 1 @-@ minute winds of 250 km / h (155 mph) , making it a super typhoon . Diminished outflow and an eyewall replacement cycle caused weakening , and it passed near Iwo Jima on August 16 . Phanfone turned to the northeast two days later due to a weakening ridge , and dry air caused rapid deterioration . Passing southeast of Japan , it fell to tropical storm status on August 19 before becoming extratropical the next day ; the remnants continued to the northeast and crossed the International Date Line on August 25 .

Wind gusts on Iwo Jima reached 168 km / h (105 mph) . Rainfall in mainland Japan peaked at 416 mm (16 @.@ 4 in) near Tokyo , and the typhoon flooded 43 houses . High rains caused road damage and landslides , as well as some aquaculture damage . The storm caused 22 ferry routes and 10 flights to be canceled , and temporarily shut down refineries near Tokyo . On the offshore island of Hachij? @-@ jima , high winds caused a temporary power outage .

= = = Typhoon Rusa = = =

Typhoon Rusa developed on August 22 from the monsoon trough in the open Pacific Ocean , well to the southeast of Japan . For several days , Rusa moved to the northwest , eventually intensifying into a powerful typhoon . The JMA estimated peak 10 @-@ minute winds of 150 km / h (90 mph) , and the JTWC estimated peak 1 @-@ minute winds of 215 km / h (135 mph) . On August 26 , the storm moved across the Amami Islands of Japan , where Rusa left 20 @,@ 000 people without power and caused two fatalities . Across Japan , the typhoon dropped torrential rainfall peaking at 902 mm (35 @.@ 5 in) in Tokushima Prefecture .

After weakening slightly , Rusa made landfall on Goheung , South Korea with 10 @-@ minute winds of 140 km / h (85 mph) . It was able to maintain much of its intensity due to warm air and instability from a nearby cold front . Rusa weakened while moving through the country , dropping heavy rainfall that peaked at 897 @.@ 5 mm (35 @.@ 33 in) in Gangneung . A 24 @-@ hour total of 880 mm (35 in) in the city broke the record for the highest daily precipitation in the country ; however , the heaviest rainfall was localized . Over 17 @,@ 000 houses were damaged , and large areas of crop fields were flooded . In South Korea , Rusa killed at least 233 people , making it the deadliest typhoon in over 43 years , and caused $ 4 @.@ 2 billion in damage . The typhoon also dropped heavy rainfall in neighboring North Korea , leaving 26 @,@ 000 people homeless and killing three . Rusa also destroyed large areas of crops in the country , which was already affected by ongoing famine conditions . The typhoon became extratropical over eastern Russia on September 1 , dissipating three days later .

= = = Typhoon Sinlaku = = =

Sinlaku formed on August 27 northeast of the Northern Marianas Islands . After initially moving to the north , it began a generally westward motion that it maintained for the rest of its duration . Sinlaku strengthened into a typhoon and attained its peak winds on August 31 . Over the next few days , it fluctuated slightly in intensity while moving over or near several Japanese islands . On September 4 , the typhoon 's eye crossed over Okinawa . It dropped heavy rainfall and produced strong winds that left over 100 @,@ 000 people without power . Damage on the island was estimated at $ 14 @.@ 3 million , including $ 3 @.@ 6 million in damage to Kadena Air Base .

After affecting Okinawa , Sinlaku threatened northern Taiwan , which had been affected by two deadly typhoons in the previous year . Damage ended up being minimal on the island , although two

people were killed . Sinlaku weakened slightly before making its final landfall in eastern China near Wenzhou on September 7 . The storm produced a record wind gust there of 204 km / h (127 mph) , and just south of the city , high waves destroyed several piers and a large boat . High rainfall and winds from Sinlaku wrecked 58 @,@ 000 houses , and large areas of crops were destroyed . Damage in China was estimated at $ 709 million , and there were 28 deaths there .

= = = Typhoon Ele = = =

An eastern extension of the monsoon trough southwest 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 demise of Alika , Ele intensified to winds of 205 km / h (125 mph) before crossing the International Date Line on August 30 .
Reclassified as a typhoon , Ele moved north @-@ northwestward due to a weakness in the ridge to the north . Early on August 31 , the JTWC estimated the storm 's peak 1 @-@ minute winds at 165 km / h (105 mph) . On September 2 , the JMA estimated peak 10 @-@ minute winds of 165 km / h (105 mph) while Ele was northeast of Wake Atoll . The typhoon turned to the northeast due to an approaching trough , although Ele resumed its previous north @-@ northwest motion after a ridge built behind the trough . It gradually weakened due to cooler waters and increasing wind shear , and on September 6 Ele deteriorated below typhoon status . The thunderstorms became detached from the circulation , causing Ele to weaken to a tropical depression late on September 9 . By that time , it began moving to the northeast , and on September 10 it transitioned into an extratropical storm . The remnants of Ele continued to the northeast until moving back into the central Pacific as an extratropical storm on September 11 and dissipating on September 13 .

= = = Tropical Storm Hagupit = = =

An area of convection developed on September 8 to the northeast of Luzon . Moving to the west due to a ridge to the north , it slowly organized , forming into a tropical depression on September 9 in the South China Sea . As it approached southeastern China , the depression intensified into Tropical Storm Hagupit and reached peak winds of 85 km / h (50 mph) . At around 19 : 00 UTC on September 11 , the storm made landfall west of Macau and quickly weakened into a tropical depression . The JTWC promptly discontinued advisories , although the JMA continued tracking Hagupit over land . The remnants executed a loop over Guangdong before moving offshore and dissipating on September 16 near Hong Kong .
Hagupit dropped heavy rainfall along the coast of China for several days , peaking at 344 mm (13 @.@ 5 in) in Zhanjiang City . The rains flooded widespread areas of crop fields and resulted in landslides . In Guangdong , 330 houses were destroyed , and damage was estimated at $ 32 @.@ 5 million . In Hong Kong , 32 people were injured due to the storm , and 41 flights were canceled . In Fuzhou in Fujian Province , thunderstorms related to Hagupit flooded hundreds of houses . Further west in Jiangxi , floods from the storm destroyed 3 @,@ 800 houses , ruined 180 bridges , and killed 25 . Offshore , a helicopter rescued the crew of 25 from a sunken boat during the storm .

= = = Tropical Storm Changmi = = =

An area of thunderstorms increased near the FSM on September 15 within the monsoon trough . Located within an area of moderate wind shear , its convection was intermittent around a weak circulation . On September 18 , the JTWC issued a Tropical Cyclone Formation Alert (TCFA) , and the JMA classified the system as a tropical depression ; however , the two warning agencies were tracking different circulations within the same system , and by September 19 the circulation JMA was tracking became the dominant system . Shortly thereafter , the agency downgraded the system to a low pressure area after it weakened . The next day , JMA again upgraded the system to a tropical depression , and the JTWC issued a second TCFA when the system had a partially exposed

circulation near an area of increasing convection . Late on September 21 , the JMA upgraded the depression to Tropical Storm Changmi to the south of Japan . The next day , Changmi attained peak winds of 85 km / h (50 mph) . However , the JTWC noted that the system was absorbing dry air and becoming extratropical , and thus did not issue warnings on the storm . Moving northeastward , Changmi became an extratropical cyclone on September 22 , and gradually became more intense until crossing the International Date Line early on September 25 .

= = = Tropical Storm Mekkhala = = =

An elongated trough with associated convection developed in the South China Sea by September 21 . Light shear and increasing outflow allowed the system to become better organized , and it formed into a tropical depression on September 22 between Vietnam and Luzon . A ridge to the northeast allowed the system to track northwestward . For several days the depression failed to organize further , despite favorable conditions ; however , late on September 24 the circulation developed rainbands and a weak eye feature . Early the next day , the JMA upgraded it to Tropical Storm Mekkhala , which quickly intensified to a peak intensity of 85 km / h (50 mph) . At around 12 : 00 UTC on September 25 , Mekkhala made landfall on western Hainan near peak intensity . Soon after , it moved into the Gulf of Tonkin and weakened due to land interaction and increasing shear . Mekkhala remained a weak tropical storm until September 28 , when it weakened to a tropical depression and dissipated soon after in the extreme northern portion of the Gulf of Tonkin .
Mekkhala dropped heavy rainfall along its path , peaking at 479 mm (18 @.@ 9 in) in Sanya , Hainan . Along the island , high winds washed ashore or sank 20 boats , and 84 fishermen were rescued . Throughout Hainan , the high rains wrecked 2 @,@ 500 houses and left $ 80 @.@ 5 million in damage . High rains spread into southwestern China , particularly in Guangxi . In Beihai , the storm destroyed 335 houses , resulting in $ 22 million in damage .

= = = Typhoon Higos = = =

Typhoon Higos developed on September 25 east of the Northern Marianas Islands . It tracked west @-@ northwestward for its first few days , steadily intensifying into a powerful typhoon by September 29 . Higos weakened and turned to the north @-@ northeast toward Japan , making landfall in that country 's Kanagawa Prefecture on October 1 . Shortly thereafter , it crossed over Tokyo , becoming the third strongest typhoon to do so since World War II . It weakened while crossing Honshu , and shortly after striking Hokkaidō on October 2 , Higos became extratropical . The remnants passed over Sakhalin and dissipated on October 4 .
Before striking Japan , Higos produced strong winds in the Northern Marianas Islands while passing to their north . These winds damaged the food supply on two islands . Later , Higos moved across Japan with wind gusts as strong as 161 km / h (100 mph) , including record gusts at several locations . A total of 608 @,@ 130 buildings in the country were left without power , and two people were electrocuted in the storm 's aftermath . The typhoon also dropped heavy rainfall that peaked at 346 mm (13 @.@ 6 in) . The rains flooded houses across the country and caused mudslides . High waves washed 25 boats ashore and killed one person along the coast . Damage in the country totaled $ 2 @.@ 14 billion (¥ 261 billion JPY) , and there were five deaths . Later , the remnants of Higos affected the Russian Far East , killing seven people in two shipwrecks near Primorsky Krai .

= = = Severe Tropical Storm Bavi = = =

A tropical disturbance organized within the monsoon trough in early October near the FSM . The convection gradually consolidated around a single circulation , developing into a tropical depression on October 8 . Wind shear was weak and outflow was good , which allowed for slow strengthening ; however , the system was elongated , with a separate circulation to the west . Around this time , the system produced gale force winds on Kosrae in the FSM . Late on October 9 , the JMA upgraded the depression to Tropical Storm Bavi to the east of Guam , although it was still a broad system at

the time . After becoming a tropical storm , Bavi moved generally northward due to a ridge retreating to the northeast . By October 11 , winds were fairly weak near the center and were stronger in outer rainbands . That day , the JMA estimated peak winds of 100 km / h (65 mph) . Despite the broad structure , with an exposed circulation at the peak , the JTWC estimated winds as high as 130 km / h (80 mph) , making Bavi a typhoon . Shortly after reaching peak winds , the storm turned to the northeast and entered the westerlies . Increasing shear weakened the convection , and Bavi became extratropical on October 13 . It continued to the northeast and crossed into the Central Pacific on October 16 .

Severe Tropical Storm Maysak

On October 25 , an organized area of convection persisted southeast of Wake Island . With minimal wind shear , it quickly developed a circulation , becoming a tropical depression on October 26 . Due to a ridge to the east , it moved generally northwestward and slowly intensified . Late on October 27 , it strengthened into Tropical Storm Maysak . Initially , the system absorbed nearby dry air , although the storm was able to continue developing deep convection . An approaching trough turned Maysak to the northeast , and on October 29 it reached peak winds of 100 km / h (65 mph) , according the JMA . On two occasions , the JTWC assessed Maysak as briefly intensifying into a typhoon , based on an eye feature , although increased shear later caused weakening . Continuing to the northeast , Maysak moved into the central Pacific Ocean on October 30 , by which time it had become extratropical .

Typhoon Huko

In the central Pacific Ocean , a tropical depression developed in the monsoon trough on October 24 to the south of Hawaii . It moved generally west @-@ northwestward , intensifying into Tropical Storm Huko on October 26 . It became a hurricane two days later , and briefly weakened back to tropical storm status before becoming a hurricane again on October 31 . On November 3 , Huko crossed the International Date Line into the western Pacific . Despite favorable inflow patterns and warm sea surface temperatures , Huko only strengthened to reach peak winds of 140 km / h (85 mph) . It moved quickly to the west @-@ northwest due to a strong ridge to its north . Dry air caused Huko to weaken slightly , and on November 4 the typhoon passed about 95 km (60 mi) northeast of Wake Island . The typhoon brought heavy rains and winds gusts of 40 ? 45 mph (64 ? 72 km / h) to the island . Huko moved through a weakness in the ridge , resulting in a turn to the north and northeast . Late on November 5 , Huko weakened below typhoon status , and increasing shear caused further weakening . On November 7 , Huko became extratropical , and later that day its remnants crossed back into the central Pacific . Several days later , the remnants affected northern California .

Typhoon Haishen

In the middle of November , an area of thunderstorms developed southwest of Chuuk in the FSM within the monsoon trough . With weak shear and good outflow , it slowly organized , becoming a tropical depression on November 20 . It moved quickly to the west @-@ northwest , intensifying into Tropical Storm Haishen late on November 20 to the southeast of Guam . While passing south of the island , Haishen produced gale @-@ force winds . The convection organized into a central dense overcast and developed an eye feature . Early on November 23 , Haishen intensified into a typhoon ; around that time , it began moving to the north due to an approaching trough . The typhoon quickly intensified to peak winds of 155 km / h (100 mph) . Soon after , Haishen began weakening due to increasing shear , and the eye quickly dissipated . Late on November 24 , it weakened below typhoon status , and early on November 25 Haishen became extratropical . The remnants continued to the northeast , dissipating on November 26 .

= = = Typhoon Pongsona = = =

Typhoon Pongsona was the last typhoon of the season , and was the second costliest disaster in 2002 in the United States and its territories . It formed on December 2 , having originated as an area of convection to the east @-@ southeast of Pohnpei in late November . With a ridge to the north , the depression tracked generally westward for several days , intensifying into Tropical Storm Pongsona on December 3 . After an eye developed on December 5 , the storm attained typhoon status to the north of Chuuk . Steady intensification continued , until it became more rapid on December 8 while approaching Guam . That day , the JMA estimated peak winds of 165 km / h (105 mph) , and the JTWC estimated peak winds of 240 km / h (150 mph) , making Pongsona a super typhoon . Around its peak intensity , the eye of the typhoon moved over Guam and Rota . After striking Guam , Pongsona began moving to the north and later to the northeast , quickly weakening due to the presence of dry air and interaction with an approaching mid @-@ latitude storm . After the convection diminished over the center , Pongsona became extratropical early on December 11 . Early the next day , it dissipated east of Japan .

On Guam , Pongsona was the third most intense typhoon on record to strike the island , with wind gusts reaching 278 km / h (173 mph) . Damage totaled $ 700 million , making it one of the five costliest storms on Guam . The typhoon injured 193 people and killed one person . In addition to its strong winds , Pongsona dropped torrential rainfall that peaked at 650 @.@ 5 mm (25 @.@ 61 in) . A total of 1 @,@ 751 houses were destroyed on Guam , and another 6 @,@ 740 were damaged to some degree . Widespread areas lost water , and the road system was heavily damaged . On neighboring Rota , Pongsona damaged 460 houses and destroyed 114 , causing an additional $ 30 million in damage . Both Guam and the Northern Marianas Islands were declared federal disaster areas , which made federal funding available for repairing storm damage . In Guam , the federal government provided about $ 125 million in funding for individuals and other programs .

= = = Other storms = = =

On February 15 , a weak tropical depression developed east of Mindanao , according to the JMA ; by the next day , the system dissipated . In the beginning of April , a tropical disturbance developed along the southern end of a stationary cold front west of Enewetak Atoll . While gradually organizing , the system produced gale @-@ force wind gusts in the FSM . On April 5 , the JTWC initiated advisories on Tropical Depression 04W . The system moved northwestward due to a nearby extratropical storm , which later caused the depression to also become extratropical about 650 km (405 mi) west @-@ southwest of Wake Atoll . The JMA issued its last advisory on April 8 .

A tropical depression formed in the South China Sea on May 28 , given the name " Dagul " by PAGASA . The JTWC never anticipated significant strengthening , and the system largely consisted of convection displaced to the southeast of a broad circulation . A ridge to the southeast steered the depression to the northeast , and on May 30 the depression made landfall in southwestern Taiwan . The combination of land interaction and wind shear caused dissipation that day .

The JMA monitored a tropical depression east of Iwo Jima on July 25 , although by the next day the agency was no longer tracking the system . On August 3 , a small circulation was located just off the southeast coast of Japan , which later developed an area of convection over it . The JTWC initiated advisories on Tropical Depression 17W at 06 : 00 UTC on August 5 , describing the system as a " midget cyclone " . A mid @-@ level ridge to the southeast steered the depression eastward away from Japan . Unfavorable conditions caused weakening , and the JTWC discontinued advisories six hours after its first warning . Another tropical depression formed on September 21 to the northeast of the Marshall Islands , but dissipated by the next day .

Three non @-@ developing depressions formed in October . The first was classified as a depression by the JMA on October 12 in the South China Sea . It quickly dissipated , although the system dropped heavy rainfall reaching 108 mm (4 @.@ 3 in) at a station in the Paracel Islands . The second , classified as Tropical Depression 27W by the JTWC , formed on October 17 about 1 @,@ 220 km (760 mi) east @-@ northeast of Saipan . It moved westward due to a ridge to the

north , and failed to intensify due to weak outflow and dry air . It dissipated on October 19 . The day before , another depression formed near the International Date Line . Classified as Tropical Depression 28W by the JTWC , it moved generally northward due to a break in the ridge . Wind shear dissipated the depression on October 20 .

= = Storm names = =

 Within the western Pacific Ocean , both the JMA and PAGASA assign names to tropical cyclones that develop in the basin , which can result in a tropical cyclone having two names . As part of its duty as a Regional Specialized Meteorological Center (RSMC) , the JMA 's Typhoon Center in Tokyo assigns international names to tropical cyclones on behalf of the World Meteorological Organization 's Typhoon Committee , should they be judged to have 10 @-@ minute sustained winds of 65 km / h (40 mph) . The PAGASA assigns names to all tropical cyclones that move into or form as a tropical depression in their area of responsibility , located between 135 ° E and 115 ° E and between 5 ° N @-@ 25 ° N , even if the cyclone has had an international name assigned to it . The names of significant tropical cyclones are retired , by both PAGASA and the Typhoon Committee . PAGASA also has an auxiliary naming list , of which the first ten are published , should their list of names be exhausted .

= = = International names = = =

 During the season 24 named tropical cyclones developed in the Western Pacific and were named by the Japan Meteorological Agency , when it was determined that they had become tropical storms . These names were contributed to a list of a 140 names submitted by the fourteen members nations and territories of the ESCAP / WMO Typhoon Committee .
 Two central pacific storms , Hurricane Ele 02C and Hurricane Huko 03C , crossed into this basin . They became Typhoon Ele and Typhoon Huko , keeping their original name and " C " suffix in their warnings by JTWC .

= = = Philippines = = =

 The Philippine Atmospheric , Geophysical and Astronomical Services Administration uses its own naming scheme for tropical cyclones in their area of responsibility . PAGASA assigns names to tropical depressions that form within their area of responsibility and any tropical cyclone that might move into their area of responsibility , and the lists are reused every four years . Names that were not assigned are marked in gray .

= = = Retirement = = =

 The names Chataan , Rusa , and Pongsona were retired by the WMO 's Typhoon Committee . The names Matmo , Nuri , and Noul were chosen to replace Chataan , Rusa and Pongsona respectively .

= = Season effects = =

 The following table does not include unnamed storms , and PAGASA names are in parenthesis . Storms entering from the Central Pacific only include their information while in the western Pacific , and are noted with an asterisk * .