= Typhoon Saomai (2000) =

Typhoon Saomai , known in the Philippines as Typhoon Osang , was a long @-@ tracked and intense tropical cyclone that brought flooding rainfall in Japan and the Korean peninsula in September 2000 . The torrential precipitation in Japan was considered some of the worst in the past century .

Saomai , the second strongest typhoon in the western Pacific in 2000 , developed from an area of disturbed weather in open sea on August 31 . The system was initially quick to intensify , reaching an initial peak intensity as a typhoon on September 4 . Wind shear caused a hiatus in Saomai 's strengthening phase , and as a result Saomai weakened back to a tropical storm as it tracked northwest for the next few days . On September 9 , the system regained typhoon intensity and began to rapidly intensify , reaching peak intensity on September 10 with maximum sustained winds of 175 km / h (110 mph) . Over the ensuing two days Saomai would weaken slightly before making landfall on Okinawa Island . The typhoon later entered the East China Sea , where it recurved towards the northeast before making landfall on South Korea as a severe tropical storm , later transitioning into an extratropical cyclone on September 16 . Saomai 's remnants would move into Russia before dissipating three days later .

As a developing typhoon , the outer rainbands of Saomai affected the Northern Mariana Islands and Guam , causing moderate damage . Localized power outages were reported , and damage totaled to US $ 650 @,@ 000 . Even before Saomai made landfall on Okinawa , the typhoon caused rough seas off the coast of Japan that resulted in several shipping incidents . Concurrently , the approach of a front into the country interacted with the typhoon , resulting in unprecedented rainfalls in Japan . Due to the floods , approximately 400 @,@ 000 people were evacuated in three prefectures . In Nagoya , observed rainfall totals were the highest since records began in 1891 . Despite making landfall on Okinawa , damage was not as severe , though several landslides and strong winds were reported . Overall , damage in Japan and its outlying islands totaled JP ¥ 24 @.@ 8 billion (US $ 223 million) and eleven fatalities were reported . As Saomai tracked near China , its outer rainbands and strong waves prompted the evacuation of 20 @,@ 000 people and caused record high stream heights .

In South Korea , eight people were killed and damage figures equated to US $ 71 million . Widespread power outages took a toll on as many as 422 @,@ 000 homes and heavy rains flooded numerous fields of crops . Minor damage occurred in North Korea , though the damage wrought by Typhoon Prapiroon earlier in the month was exacerbated by Saomai 's impacts . In Russia , where the typhoon made landfall as an extratropical storm , nine people were killed due to car accidents spurred by rainfall caused by the Saomai . Overall , Saomai 's affects resulted in the death of 28 people and roughly US $ 295 million in damage .

= = Meteorological history = =

Typhoon Saomai emerged from an area of convection that developed well east of Guam in late @-@ August . Though the disturbance was associated with a low @-@ pressure area , the circulation center was too weak to support persistent shower activity . Despite the satellite presentation , the Japan Meteorological Agency (JMA) classified the system as a tropical depression at 1800 UTC on August 31 . Over the next few days , the system organized and curved towards the west from its initial northerly track . At 1200 UTC on September 2 , the JMA upgraded the small depression to tropical storm intensity . Within Saomai , convection deepened near the center , signifying continued intensification . A cold central dense overcast eventually developed , and at 1200 UTC the next day , Saomai became a severe tropical storm . Early on September 4 , the tropical cyclone intensified further into a typhoon . At the time , Saomai was still well northeast of Guam .

Upon reaching typhoon strength , Saomai attained an initial peak intensity with maximum sustained winds of 120 km / h (65 mph) . Shortly after , despite the fact that a primitive eye had begun to develop , wind shear increased , shearing the storm 's convection away . As a result , the JMA

downgraded Saomai below typhoon strength on September 5 , and at roughly the same time a subtropical ridge to the storm 's southeast steered Saomai southward . This break in the storm 's westerly course was short lived , and early on September 6 , Saomai assumed its previous heading . Over time the shearing conditions gradually abated , and rainbanding about the cyclone was showing signs of organization and strengthening . On September 8 , Saomai finally re @-@ developed a central dense overcast , prompting the JMA to upgrade the tropical storm back to typhoon intensity at 0000 UTC the following day . Back in favorable conditions , the typhoon entered a phase of rapid intensification beginning six hours later . During this period a well @-@ defined eye developed , and the storm 's eyewall significantly intensified . At 1200 UTC on September 10 , Saomai reached its peak intensity with sustained winds estimated at 175 km / h (110 mph) and a minimum barometric pressure of 925 mbar (hPa ; 27 @.@ 32 inHg) . The intense typhoon held this intensity for approximately nine hours before it began to weaken .

Following peak intensity , Saomai 's eye became cloud @-@ filled , and the storm began to develop concentric eyewalls . Shortly after 1000 UTC on September 12 , the typhoon made landfall on central Okinawa , Japan with sustained winds of 140 km / h (85 mph) and a pressure of 945 mbar (hPa ; 27 @.@ 91 inHg) . Saomai quickly passed over the island , and concurrently its weakening phase came to a halt . After tracking into the East China Sea , the typhoon began to track towards the northeast in response to a mid @-@ latitude trough . At its westernmost point along its track , Saomai was located approximately 345 km (215 mi) east of Wenzhou , China . Atmospheric conditions became increasingly more hostile as Saomai tracked northeast , and the typhoon became elongated and ragged in appearance . At 1200 UTC on September 15 , Saomai was downgraded to severe tropical storm intensity as the cyclone began to undergo extratropical transition . At around 2030 UTC that day , Saomai made its final landfall as a tropical system west of Pusan , South Korea ; after emerging into the Yellow Sea the storm was declared extratropical at 0600 UTC the next day . These remnants later tracked inland near Vladivostok , Russia before dissipating on September 19 .

= = Preparations , impact , and aftermath = =

= = = Northern Mariana Islands and Guam = = =

Early in Saomai 's developmental history , the rainbands associated with the storm dropped heavy rain across the Northern Mariana Islands . Schools across the archipelago nation were closed , and ferry service between Saipan and Tinian was cancelled . Reports of flooding were widespread , including in Saipan . In Tianan , some banana trees were damaged by the storm 's affects . Damage from the islands amounted to US $ 650 @,@ 000 , with $ 600 @,@ 000 to infrastructure .

The presence of the nearby tropical cyclone caused the delaying of two flights and the cancellation of another at Antonio B. Won Pat International Airport . On Guam , the United States Navy ordered the release of ships from the local harbor . There , peaked at 251 mm (9 @.@ 90 in) over a 24 @-@ hour period at Piti . At the National Weather Service office in Tiyan , a gauge observed 100 mm (3 @.@ 95 in) of rain . Gusty winds were also associated with Saomai 's outer rainbands , with gusts peaking at a measured 105 km / h (66 mph) on September 4 . The winds caused power outage in localized areas and downed two telephone poles . Severe flooding occurred in Merizo after a storm drain became clogged with debris , inundating six houses .

= = = Japan = = =

On September 10 , rough seas caused by Saomai capsized a fishing boat off of Shizuoka Prefecture , causing one person to go missing . Another occupant of the boat was rescued three hours after the sinking by police helicopter . The waves also caused a dozen containers from the South Korean Heunga Nagoya to fall into the sea 5 @.@ 5 km (3 @.@ 4 mi) off the coast of Susami and Wakayama Prefecture . Off of Oita Prefecture , the waves were the impetus for red

tides , resulting in significant marine loss . The approach of the typhoon towards Okinawa coincided with the approach of a weather front over mainland Japan , resulting in prolonged rainfall over the mainland . The rains caused extensive flooding , prompting the Cabinet of Japan to make reassurances in the repair of the ensuing damage . Rail service along the T?kaid? Shinkansen between Tokyo and Osaka was suspended for more than 18 hours at one point , the longest delay to be enforced in the rail 's service history . As a result , 50 @,@ 000 passengers were forced to wait out the storm in the line 's stopped trains . Toyota closed 24 of its manufacturing plants , resulting in the incompletion of 10 @,@ 000 vehicles . Similarly , Mitsubishi stopped production at two of its facilities in Nagoya . Japan Airlines , All Nippon Airways , and Japan Air System cancelled a combined 114 fights , which adversely affected about 21 @,@ 000 people .

Across the country , rainfall peaked at 1 @,@ 000 mm (39 @.@ 37 in) in Miyagawa , Mie ; the same station also recorded 522 mm (20 @.@ 55 in) of rain in a single 24 @-@ hour period . As a result of the flooding in Mie , 2 @,@ 819 homes were inundated and 25 landslides occurred . Several buildings succumbed to the water and thus collapsed . Extensive power outage occurred in Kagoshima Prefecture , affecting approximately 4 @,@ 500 households . In addition , the heavy rains caused damage to agriculture , including sugar cane crops . Damage in the prefecture totaled JP ¥ 356 million (US $ 3 million) . Similar effects were felt across Kyushu . Several flights into Nagasaki Prefecture were cancelled ; the rains there also caused agricultural damage totaling JP ¥ 99 million (US $ 900 @,@ 000) . Flooding also occurred on Shikoku , where rainfall totals peaked at 976 mm (38 @.@ 43 in) in Funato , K?chi . Severe damage occurred elsewhere in K?chi , where combined forestry and agricultural damage figures reached JP ¥ 2 @.@ 1 billion (US $ 19 million) . In Tokushima Prefecture , several landslides occurred , disrupting transportation routes .

Record rainfall was observed in Aichi Prefecture , with 511 mm (21 @.@ 69 in) of rain in Tokai and 532 mm (20 @.@ 94 in) of rain in Nagoya in a span of a single day ; both observations were the highest since records began in 1891 . Due to the threat of landslides in Nagoya , the municipal government ordered the evacuation of 140 @,@ 000 families . In the ward of Nakagawa @-@ ku , two rivers overflowed their banks and over @-@ topped the surrounding embankment . Two tornadoes occurred in the prefecture , with one striking Mihama and another striking Minamichita ; the former tornado injured 22 people , of which two were hospitalized . Another 41 @,@ 000 families encompassing 400 @,@ 000 people were evacuated across Aichi , Gifu , and Mie prefectures as a precautionary measure .

Damage in Okinawa , the site of Saomai 's first landfall , was considerable but not unprecedented . On September 10 , the provincial government established a disaster warning headquarters on Daito Island to more efficiently deal with the typhoon 's effects . Rainfall peaked on Mount Yonaha , where a station recorded 537 mm (21 @.@ 14 in) of rain . During the storm , 31 roads sustained damage and 26 landslides occurred . Damage in Okinawa Prefecture reached JP ¥ 636 million (US $ 6 million) . Overall , Saomai caused the destruction of 609 homes and the inundation of 70 @,@ 017 others in Japan . Damage costs in the country totaled JP ¥ 24 @.@ 8 billion (US $ 223 million) . Eleven people were killed and 103 others suffered injury . At the height of the storm , over 17 @,@ 000 people had been displaced in emergency shelters .

= = = Korean peninsula = = =

As Saomai approached South Korea , the typhoon forced the cancellation of flights beginning on September 12 . Four airports had their air service suspended . Other suspensions of transportation included the refuge of 362 fishing boats in ports and the closure of 10 national parks and 43 mountain paths . As a result , about 16 @,@ 600 campers and hikers were evacuated to safer areas . As a result of the inclement weather , the operation of 149 passenger ships were cancelled . On September 13 , the Korea Meteorological Administration (KMA) issued a typhoon warning for waters south of South Korea and Jeju Province . The administration anticipated heavy rainfall , though not as much as what had taken place in Japan . Offshore , an Indonesian freighter with 39 crewmen became stranded by the typhoon in waters south of Pusan . The crew were rescued by maritime police , but 270 tons of oil spilled into the ocean from a broken oil container .

In South Korea , the northern and southern Gyeongsang provinces were the most heavily impacted . At least 6 @,@ 000 ha (15 @,@ 000 ac) of paddy fields were flooded . Heavy rains caused the Nakdong River to breach a section of embankment , prompting the evacuation of 100 families . Flood warnings were issued by the KMA on sections of the river for the first time in 2000 . In South Gyeongsang , an electricity pylon collapsed , cutting power supply to about 700 houses . Strong winds uprooted trees and destroyed homes and fishing boats in Pusan . Countrywide , losses were initially estimated at KR ? 20 billion (US $ 18 million) , though these figures later rose to US $ 71 million . As a result of Saomai , eight people were killed , and 411 others were displaced . More than 600 buildings were either inundated or destroyed entirely . At the height of the storm , roughly 422 @,@ 000 households were without power , primarily in northern and southern Gyeongsang provinces .

Relatively minor damage occurred in North Korea , previously impacted by Typhoon Prapiroon earlier in September . Rainfall peaked at 147 mm (5 @.@ 79 in) in Kaesong . Saomai somewhat exacerbated the unprecedented damage caused by Prapiroon , and damaged maize crops which were set to be harvested in the coming weeks .

= = = Elsewhere = = =

At its closest approach to China , Saomai generated high waves that coincided with high tide , resulting in extensive damage . In preparation for the storm , schools in Ningbo were forced to close , and ferry service was discontinued . Over 20 @,@ 000 people were evacuated by the Chinese government onto higher land . The most severely affected Chinese province was Zhejiang . A station in Dinghai District observed 102 mm (4 @.@ 02 in) of rain in 18 hours , equivalent to more than half of that station 's monthly average . In Zhoushan , 20 @,@ 000 hectares of farmland were inundated and 2 @,@ 500 homes collapsed . Off the island , ten fishing boats collided , and another oil tanker capsized . Areas in Gaoting were submerged under as much as 1 m (3 @.@ 3 ft) of water . Off the coast , 225 boats and 130 piers were damaged . In Shanghai , 20 streets were flooded and hundreds of homes were flooded with water . At nearby Hongquiao Airport , an Airbus A340 bound for Paris slipped off the runway . Though no people were injured , the airport was closed for eight hours . The typhoon also caused the Huangpu River to rise to its third highest level in recorded history .

Despite being a much weaker storm upon impacting Russia , Saomai 's rains flooded coal retrieval sites , cutting down on electric power supplies in Primorsky Krai . Due to the shortages , electric power was transferred there from other surrounding areas . Furthermore , a 50 percent decrease in electricity output was documented at the local power station in Luchegorsk . To the south , an overflowing of the Kazachka River prompted the evacuation of over 60 people . Overall , 55 automobile accidents occurred in eastern Russia , leading to nine fatalities and 76 people injured .