= Typhoon Ma @-@ on (2011) =

Typhoon Ma @-@ on , known in the Philippines as Typhoon Ineng , was a powerful typhoon that affected southern Japan in July 2011 . It was the sixth named storm and second typhoon of the 2011 Pacific typhoon season . Originating from an area of low pressure near Wake Island on July 9 , the precursor to Ma @-@ on gradually developed as it moved westward . By July 11 , it had become sufficiently organized to be declared a tropical depression , although the cyclone 's circulation remained broad . Over the following days , Ma @-@ on gradually intensified and attained typhoon status on July 14 . Favorable environmental conditions allowed for additional strengthening , and the storm ultimately attained peak ten @-@ minute sustained winds of 175 km / h (110 mph) on July 16 . After turning northward in response to a weakening subtropical ridge , the typhoon underwent a series of eyewall replacement cycles that caused it to weaken . On July 19 , the typhoon struck Shikoku before turning southeastward and moving back over water . Slow weakening continued as Ma @-@ on succumbed to the effects of high wind shear . The system ultimately became extratropical on July 24 , and was last noted by the Japan Meteorological Agency a week later near the Kamchatka Peninsula .

Initially , Ma @-@ on posed a slight threat to the Mariana Islands and prompted the issuance of tropical storm warnings . However , the system remained far away from the area and only produced scattered rainfall . In Japan , hundreds of people evacuated from mudslide @-@ prone areas . Torrential rains produced by the storm , estimated at more than 1 @,@ 200 mm (48 in) , led to widespread and damaging floods . Five people perished as a result of Ma @-@ on , and damage reached ¥ 3 @.@ 9 billion (2011 JPY , $ 50 million 2011 USD) .

= = Meteorological history = =

The origins of the typhoon were from an area of convection that meandered near Wake Island on July 9 . The disturbance slowly consolidated and developed a low @-@ level circulation . Based on the presence of low wind shear and generally favorable environmental conditions , tropical cyclone forecast models anticipated that the system would develop into a tropical cyclone . Early on July 11 , the Joint Typhoon Warning Center (JTWC) issued a tropical cyclone formation alert , and a few hours later the Japan Meteorological Agency (JMA) reported the formation of a tropical depression about halfway between Wake Island and the Northern Marianas Islands . The JTWC followed suit and initiated advisories on Tropical Depression 08W .

The depression tracked westward due to a ridge to its north . Its circulation was initially broad and ill defined , with patches of disorganized convection due to dry air . The depression was able to intensify due to generally favorable conditions , and the JMA upgraded the depression to Tropical Storm Ma @-@ on at 0600 UTC on July 12 . Gradually the thunderstorms became concentrated around the center , despite restricted outflow to the north and west . Ma @-@ on intensified at a slower than climatological rate , although an eye feature became evident by early on July 13 . At 0000 UTC that day , the JMA upgraded Ma @-@ on to a severe tropical storm , and 24 hours later the storm intensified into a typhoon to the northeast of the Northern Marianas . By that time , it was also located about 970 km (575 mi) southeast of Iwo Jima . A ragged eye became apparent on satellite imagery , and after developing an anticyclone aloft , its outflow became much better defined .

By July 15 , Typhoon Ma @-@ on had a well @-@ defined eye with the strongest convection in its southern periphery . It continued intensifying , and the JTWC estimated 1 @-@ minute sustained winds of 220 km / h (135 mph) . Late on July 15 , Ma @-@ on weakened slightly due to stronger wind shear , which caused its eyewall to break apart in the northwest quadrant . It re @-@ intensified the next day after an eyewall replacement cycle commenced . At 0600 UTC on July 16 , the JMA estimated peak 10 @-@ minute sustained winds of 175 km / h (110 mph) while the typhoon was located about 1185 km (735 mi) southeast of Okinawa . Around that time , Ma @-@ on began a motion to the northwest due to a weakening of the subtropical ridge , and it briefly entered the area warned by the Philippine Atmospheric , Geophysical and Astronomical Services

Administration (PAGASA) ; the agency gave it the local name Ineng .

Late on July 17 , Ma @-@ on underwent another eyewall replacement cycle and weakened , despite developing improved outflow and convection in the northern quadrant . The typhoon 's large size prevented re @-@ intensification ? gale force winds extended 370 km (200 mi) east of the center . In addition , the intrusion of dry air diminished thunderstorms in the western periphery . By July 18 , Ma @-@ on reached the western extent of the ridge and began a motion to the north toward Japan . The next day , it turned to the northeast as it paralleled the Japan coastline just offshore . At around 1400 UTC on July 19 , Ma @-@ on made landfall on Shikoku as a minimal typhoon . Turning to the east , the typhoon weakened to a severe tropical storm before moving over the southern tip of the Kii Peninsula early on July 20 . After emerging from the country , Ma @-@ on turned to the southeast . Increased wind shear displaced the convection to the east , although slight re @-@ intensification was expected . However , the JTWC downgraded Ma @-@ on to a tropical depression on July 21 after the storm lost much of its convection . The circulation became ill @-@ defined , and the JTWC discontinued advisories on July 22 , noting the system was in the process of dissipation . However , the JMA maintained Ma @-@ on as a severe tropical storm until July 23 , by which time the storm had turned to the northeast . The storm became extratropical on July 24 near the Kuril Islands , lasting another seven days before dissipating east of the Kamchatka Peninsula .

= = Preparations and impact = =

After Ma @-@ on attained tropical storm status , the Tiyan , Guam National Weather Service office issued a tropical storm watch for Agrihan , Pagan , and Alamagan . It was later upgraded to a tropical storm warning after Ma @-@ on became a typhoon , which was canceled after the storm passed the islands to the north . The typhoon produced high waves in Guam , as well as gusty winds and precipitation in an outer feeder band .

High waves in advance of the typhoon capsized a boat in the East China Sea , although the six passengers were rescued . Moisture from the storm extended west to Taiwan , where over 600 mm (24 in) of rainfall was reported . The heavy rainfall caused flooding and mudslides that blocked roadways and forced evacuations .

In Japan , the typhoon was forecast to strike areas affected by the Fukushima Daiichi nuclear disaster . Officials prepared by installing a cover to prevent rain contamination . Ultimately , there still was rain contamination , and Ma @-@ on 's passage produced 2 @,@ 000 tons of radioactive water . Before the storm struck Japan , officials in Miyakonoj? , Miyazaki advised the evacuation of about 900 people in areas prone to mudslides . At least 300 airline flights were canceled due to the storm . The typhoon also caused delays in the nation 's rail system . Nippon Oil stopped shipping oil during the storm . As Ma @-@ on moved across Japan , it produced winds of 108 km / h (68 mph) , along with heavy rainfall of up to 1200 mm (48 in) . Rainfall in a 24 ? hour period reached 860 mm (38 @.@ 5 in) in Umaji , K?chi , which set a 24 ? hour rainfall record and exceeded the average July precipitation by 265 @.@ 5 mm (10 @.@ 6 in) . The rains flooded houses and roads in the region . High rains closed several expressways , and in Shizuoka Prefecture , a blocked road stranded 96 mountain climbers . Strong winds left about 11 @,@ 000 people without power on Shikoku Island . The combination of winds and rain damaged the 385 ? year ? old Nij? Castle in Kyoto . The typhoon injured 60 people , and killed five people . One of the deaths was from a man who drowned while checking on his boat during the storm . Damage was estimated at ¥ 3 @.@ 9 billion (2011 JPY , $ 50 million 2011 USD) .

Following Ma @-@ on 's passage , temperatures decreased across Japan , which led to a marked decrease in heat stroke deaths . Throughout the month , heat stroke deaths were 70 % less than in July 2010 .