= Typhoon Joan (1997) =

Typhoon Joan of October 1997 was the longest @-@ lasting super typhoon at the time , maintaining 1 @-@ minute maximum sustained winds of at least 240 km / h (150 mph) for 4 @.@ 5 days . Joan , concurrently with Typhoon Ivan to its west , also became the strongest typhoons at the same time in the northwest Pacific Ocean . The 25th named storm during the active 1997 Pacific typhoon season , Joan developed from the same trough as Typhoon Ivan on October 11 . It moved northwestward and later to the west , undergoing explosive deepening to its peak intensity on October 15 . One typhoon warning agency estimated that Joan was among the strongest storms on record in the basin , and that Ivan and Joan marked the first occurrence of simultaneous super typhoons . While near peak intensity , Joan passed between Anatahan and Saipan in the Northern Marianas Islands . Later , the typhoon weakened and turned to the north and east , becoming extratropical on October 24 .

On Saipan , Typhoon Joan destroyed 37 houses and caused an island @-@ wide power outage . Three people were injured due to boarding up their house during the storm . On nearby Anatahan , high winds caused $ 200 @,@ 000 (1997 USD) worth of crop and property damage . Later , high waves affected southern Japan and northwestern Hawaii . On Chichi @-@ jima , Joan caused a boat to capsize , killing one of its occupants and leaving two others missing .

= = Meteorological history = =

In the first week of October 1997 , westerly winds near the equator in the western Pacific Ocean produced troughs ? extended areas of low pressure ? at a low latitude in the northern and southern hemisphere . The system in the South Pacific eventually developed into Tropical Cyclone Lusi , while the trough in the northern hemisphere eventually spawned two systems ? Typhoon Ivan formed to the west , and the system that would eventually become Typhoon Joan developed along the eastern periphery . By October 10 , the eastern system consisted of an area of poorly @-@ organized convection , moving slowly to the northwest . On the next day , satellite imagery suggested a circulation had developed . The system increased in size and the convection organized further , prompting the Joint Typhoon Warning Center (JTWC) to initiate advisories on Tropical Depression 28W on October 13 . Also on that day , the Japan Meteorological Agency (JMA) estimated that a tropical depression had developed near the Marshall Islands .

After its development , the depression turned more to the west , intensifying into Tropical Storm Joan on October 14 . Early in the storm 's duration , neither the JTWC nor most tropical cyclone forecast models anticipated significant strengthening beyond 1 @-@ minute winds of 185 km / h (115 mph) ; this was due to a fairly weak monsoon trough and normal atmospheric pressures in the region . Late on October 15 , the JTWC upgraded Joan to typhoon status , and the JMA followed suit the next day . Over a 36 ? hour period beginning at 1800 UTC on October 15 , the JTWC estimated that the pressure decreased by 100 mbar (3 @.@ 0 inHg) , or roughly 2 @.@ 4 mbar (0 @.@ 071 inHg) per hour ; based on the agency 's assessment , Joan underwent explosive deepening during that time , reaching an estimated minimum pressure of 872 mbar (25 @.@ 8 inHg) . Near peak intensity , Joan had a well @-@ defined eye within a circular area of very deep convection , organized to such an extent that it warranted a Dvorak rating of at least T8.0 , the highest number on the scale used to estimate tropical cyclone intensities via satellite imagery . If the estimate were correct , it would make Joan among the top five Pacific typhoons on record . On October 17 , the JTWC estimated 1 @-@ minute peak winds of 295 km / h (185 mph) , making Joan a super typhoon , the ninth of the season . By contrast , the JMA estimated peak 10 @-@ minute winds of 195 km / h (120 mph) with a pressure of 905 mbar (26 @.@ 7 inHg) .

While near peak intensity on October 17 , Joan was located about 2100 km (1300 mi) east of Typhoon Ivan , which had also reached super typhoon status ; the JTWC later noted that it was " the first observation of two tropical cyclones of such extreme intensity existing simultaneously in the Northwest Pacific . " Despite the proximity to Ivan , the two typhoons did not undergo the Fujiwhara effect . The JTWC estimated that Joan weakened slightly after reaching peak winds , although the

JMA maintained the typhoon at peak intensity for nearly three whole days . Joan gradually turned more to the northwest , passing between Anatahan and Saipan in the Northern Marianas Islands (NMI) on October 18 . On October 20 , the JMA estimated that the typhoon began weakening , and on the same day Joan turned sharply to the north . On the next day , Joan weakened below super typhoon intensity for the first time in 4 @.@ 5 days , a record at the time based on JTWC analysis . This record was later surpassed by Typhoon Fengshen in 2002 and Typhoon Ioke in 2006 . By October 21 , the typhoon had accelerated to the east and was quickly weakening . The next day , Joan passed about 230 km (145 mi) north of the Japanese island of Iwo Jima . On October 24 , the typhoon turned to the northeast while losing tropical characteristics , and that day the JMA ceased tracking Joan . The JTWC declared the typhoon as extratropical on October 25 around the same time it crossed the international date line . Former Typhoon Joan merged with a cold front and re @-@ intensified while approaching the Aleutian Islands , and was noted by the Mariners Weather Log as an extratropical storm on October 26 .

= = Impact and records = =

While passing about 80 km (50 mi) of Saipan , Joan produced wind gusts of 157 km / h (98 mph) , strong enough to destroy 37 homes and damage the roofs of several other houses . Residents were slow to prepare for the typhoon , and as a result , three people were injured while boarding up their house during the arrival of the strong winds . The passage of Joan left the entire island of Saipan without power , although electrical crews quickly worked to restore the outages . During the storm 's passage , about 900 people stayed in shelters , after the government opened six schools for residents . In nearby Anatahan , Joan left heavy damage to boats , machinery , and public buildings . The typhoon damaged various crops , and monetary damage was estimated at $ 200 @,@ 000 (1997 USD) . As a result of the damage , both islands within the NMI were declared disaster areas , which allowed residents and businesses to apply for federal loans through the United States Small Business Administration .

While passing between Saipan and Anatahan in the NMI , the eye of Joan was visible by NEXRAD from Guam , despite being 285 km (180 mi) north of the island . An outer rainband moved across the island , producing 56 mm (2 @.@ 2 in) of rainfall at Anderson Air Force Base and a wind gust of 66 km / h (41 mph) at the National Weather Service office in Tiyan .

Typhoon Joan produced waves as high as 7 m (22 ft) in the southern islands of Japan . In Chichi @-@ jima , the typhoon dropped 115 mm (4 @.@ 5 in) and brought winds as strong as 91 km / h (60 mph) . The combination of strong winds and high waves on the island broke a boat from a moorings , causing it to capsize when the boat struck rocks . Of the five people on board , two swam safely to shore , two were reported missing , and one person was confirmed killed . The extratropical remnants of Joan also produced high swells in Hawaii , with wave heights of 4 @.@ 6 m (15 ft) along northern shores .