Typhoon Dujuan (2003)

Typhoon Dujuan , known in the Philippines as Typhoon Onyok , was the strongest tropical cyclone to strike the Pearl River delta since Typhoon Hope in 1979 . The 13th storm and 7th typhoon of the 2003 Pacific typhoon season , Dujuan developed on August 27 to the east of Taiwan . It initially moved to the northwest , slowly intensifying into a tropical storm while drawing moisture and rainfall over the Philippines . On the island of Luzon , one person was killed and areas were flooded . Dujuan quickly intensified after turning and moving quicker to the west @-@ northwest , developing an eye . It reached peak winds of 150 km / h (90 mph) on September 1 , and shortly thereafter passed just south of Taiwan . There , Dujuan left 590 @,@ 000 people without power , killed three , and caused NT $ 200 million (NWD , $ 115 million USD) in crop damage . While moving through the South China Sea , the typhoon developed concentric eyewalls . Dujuan weakened to severe tropical storm status before making landfall on September 2 in southern China , just east of Hong Kong near Shenzhen , Guangdong . The storm dissipated the next day after causing 40 deaths and ¥ 2 @.@ 3 billion (CNY , $ 277 million USD) in damage . Most of the deaths were in Shenzhen where the storm moved ashore , and the city experienced a near @-@ total power outage .

Meteorological history

On August 25 , an area of convection persisted on satellite imagery on August 25 . The thunderstorms pulsed and became better organized by August 27 . That day , the Japan Meteorological Agency (JMA) estimated that a tropical depression formed southeast of the Japanese island of Okinotorishima , or about 520 km (325 mi) northwest of Guam . The Joint Typhoon Warning Center (JTWC) also estimated a tropical cyclone formed on August 27 . With a ridge to the north , the depression tracked slowly to the southwest . The system gradually organized while developing improved outflow to the south , although a tropical upper tropospheric trough to the north caused wind shear . On August 29 , the JMA upgraded the depression to Tropical Storm Dujuan , although the JTWC had upgraded a day prior . That day , the Philippine Atmospheric , Geophysical and Astronomical Services Administration (PAGASA) began issuing advisories as the storm approached the region , naming it Onyok .

Shortly after it was named , Dujuan quickly intensified after an upper level low to the northwest improved outflow to the north . On August 30 , the ridge to the north built eastward , causing the storm to slow and turn more to the northwest . That day , an eye developed in center , and the JMA upgraded Dujuan to typhoon status . Subsequently , the typhoon accelerated to the west @-@ northwest and later to the west . On September 1 , the JMA estimated Dujuan attained peak 10 ? minute sustained winds of 150 km / h (90 mph) . Around the same time , the JTWC assessed peak 1 ? minute winds of 230 km / h (145 mph) , making it the equivalent of a Category 4 on the Saffir @-@ Simpson hurricane wind scale . While near peak intensity , the center of Dujuan passed about 45 km (30 mi) south of the southern tip of Taiwan . While moving westward through the South China Sea , the typhoon weakened slightly after its peak intensity due to an eyewall replacement cycle . Radar from the Hong Kong Observatory indicated an inner eye about 20 km (12 mi) in diameter , and an outer eye about 100 km (60 mi) in diameter . At around 1200 UTC on September 2 , Dujuan made landfall just east of Hong Kong , near Shenzhen . The JMA estimated the typhoon had weakened into a severe tropical storm by the time of landfall , while the JTWC estimated winds of 185 km / h (115 mph) . It was considered the strongest typhoon to strike the Pearl River Delta since Typhoon Hope in 1979 . Dujuan rapidly weakened while continuing westward through China , dissipating on September 3 over Guangxi .

Preparations and impact

Although the center passed north of Luzon in the Philippines , Dujuan interacted with the monsoon to produce heavy rainfall over the country . Flash flooding in Metro Manila covered roads , causing traffic jams . Dangerous conditions caused many schools to close . The typhoon destroyed one

house , and one person was killed in the country . While in the vicinity , Dujuan produced gusts of 100 km / h (62 mph) on Yonaguni , a Japanese subdivision of Okinawa . Strong winds and high waves disrupted marine and airline traffic , with two flights canceled . Rainfall on Okinawa reached about 18 mm (0 @.@ 71 in) .

On August 31 , officials in Taiwan issued a sea warning , advising for boats to avoid the Bashi Channel . Schools in southern Taiwan were closed , and transport was disrupted . The Ministry of National Defense canceled a military exercise due to the storm . In Taiwan , the typhoon dropped heavy rainfall that reached 628 mm (24 @.@ 7 in) in Pingtung County , and several other locations reported over 200 mm (7 @.@ 9 in) . Sustained winds reached 176 km / h (109 mph) on Orchid Island offshore southeastern Taiwan , where gale force winds were recorded for 13 hours and gusts reached 271 km / h (168 mph) . The typhoon was so strong that it destroyed the anemometer there . On the island of Taiwan , winds peaked at 87 km / h (54 mph) at Dongshi , while gusts peaked at 184 km / h (114 mph) in a mountainous region of Nantou County . The typhoon left about 590 @,@ 000 people without power at some point on the island . Transport was disrupted , and there was about NT $ 200 million (TWD , $ 115 million USD) . Dujuan killed three people and injured eight in southern Taiwan ; one was a drowning in the Penghu islands , and another occurred when a man was blown out of his window in Taipei .

Before Dujuan made its final landfall , the Hong Kong Observatory initially issued a standby warning signal , and eventually raised it to a number 9 signal , the second @-@ highest out of 10 , for the first time since Typhoon York in 1999 . The threat of the storm caused 360 flights to be canceled or delayed at Hong Kong International Airport , and the Hong Kong Stock Exchange was closed . Officials opened 27 shelters for residents , housing over 120 people . Winds in the territory briefly reached typhoon status , or 120 km / h (75 mph) , at Lau Fau Shan . Rainfall reached over 90 mm (3 @.@ 5 in) on Lantau Island . Dujuan caused minor flooding and two small landslides In Hong Kong , the typhoon knocked down 85 trees and caused a power outage affecting 300 people in Yuen Long . Dujuan injured 24 people in the territory , and four fishermen were missing and presumed drowned after their boat sank . Despite the close passage , damage was minor in Hong Kong . During the height of the storm , three people stole $ 1 @.@ 3 million (USD) worth of jewelry , watches , and clothing from a store .

On the Chinese mainland , Dujuan produced 183 mm (7 @.@ 2 in) of rainfall in Puning in Guangdong , of which 131 mm (5 @.@ 2 in) fell in 24 hours . In Fujian province , winds reached 144 km / h (90 mph) in Quanzhou , and in Guangdong , winds peaked at 179 km / h (112 mph) in Shenzhen . In Shenzen near where Dujuan made landfall , 90 % of residents lost power , after strong winds knocked down power lines , although it was quickly restored . Also in the city , 20 people were killed , 16 of whom due to the collapse of a half @-@ finished building that they were constructing . Officials had opened 272 emergency shelters before the storm 's arrival , housing 4 @,@ 950 people . In Huizhou , nine people were killed , and another three people died in Shanwei from the storm . Across Guangdong , the typhoon damaged roads , water and power systems , and telecommunication networks . About 139 @,@ 000 ha (340 @,@ 000 acres) of crops were damaged in the province , and 54 @,@ 000 homes were destroyed . In Macau , 30 flights were delayed at Macau International Airport , and two bridges were closed . In Fuzhou in Fujian province , the storm knocked down 500 trees . Overall damage in China was estimated at ¥ 2 @.@ 3 billion (CNY , $ 277 million USD) , and across Guangdong , the typhoon injured about 1 @,@ 000 people and killed 40 people .