= Tropical Storm Kammuri (2002) =

Severe Tropical Storm Kammuri , known in the Philippines as Tropical Storm Lagalag , killed hundreds of people in the wake of a deadly flood season in China . The system developed from a large monsoonal system that 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 . The storm made landfall with 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 that 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 , destroying 12 @,@ 400 houses . Across its path , the floods damaged or destroyed 245 @,@ 000 houses and destroyed 60 ha (150 acres) of crop fields . Kammuri caused 153 deaths , most of which were related to the remnants , and damage was estimated at $ 509 million (¥ 4 @.@ 219 billion yuan) .

= = Meteorological history = =

The origins of Kammuri are uncertain ; they were possibly related to the monsoon trough that moved across the Philippines toward Guam . In late July , a large area of convection persisted in the Philippine Sea , organizing enough for the Philippine Atmospheric , Geophysical and Astronomical Services Administration (PAGASA) to initiate advisories on Tropical Depression Lagalag on August 1 . Around that time , the system had several weak circulations , one of which persisted in the South China Sea ; this center was located east of an area of thunderstorms due to moderate wind shear . Early on August 2 , the Japan Meteorological Agency (JMA) classified the system as a tropical depression to the north of Luzon . Shortly thereafter , the Joint Typhoon Warning Center (JTWC) followed suit by initiating advisories on Tropical Depression 17W , and the Hong Kong Observatory (HKO) followed suit early on August 3 . Initially , it moved generally to the west @-@ northwest , owing to a mid @-@ level ridge over eastern China . The convection became more concentrated , and the JMA upgraded the depression to Tropical Storm Kammuri late on August 3 , to the south of Hong Kong .

An upper @-@ level low connected to a trough weakened the ridge over China , allowing Kammuri to move slowly northward . Continued wind shear initially prevented the thunderstorms from being located over the center , although the shear gradually decreased , allowing the convection to organize . Kammuri quickly intensified into a severe tropical storm ; the JMA estimated peak 10 @-@ minute sustained winds of 100 km / h (65 mph) at 1800 UTC on August 4 . The JTWC estimated the storm was weaker , with 1 @-@ minute winds of 95 km / h (60 mph) . At around 2300 UTC on August 4 , Kammuri made landfall east of Hong Kong in Guangdong Province , just east of Shanwei . An approaching mid @-@ latitude storm caused it to accelerate over land . Kammuri quickly weakened to a tropical depression , and the JTWC discontinued advisories at 1200 UTC on August 5 . The JMA continued tracking the system until Kammuri dissipated on August 7 over central China . The remnants were absorbed by a cold front .

= = Preparations , impact , and aftermath = =

On August 3 , when Kammuri was located about 390 kilometres (240 mi) southeast of Hong Kong , the HKO issued Standby Signal No. 1 , the first such signal for a storm that season . By that time , the outer rainbands had begun affecting the region . Kammuri dropped heavy rainfall in Hong Kong

that reached 280 mm (11 in) in the town of Kwai Chung , most of which fell after the storm passed the region . The rains caused one landslide and damaged one road . Wind gusts in the city reached 99 km / h (62 mph) , and sustained winds of 65 km / h (40 mph) were reported on Waglan Island . There , a storm surge of 0 @.@ 49 m (1 @.@ 6 ft) was also reported . In nearby Macau , outer rainbands delayed airplane flights , and there was some flooding .

In Guangdong Province where Kammuri made landfall , rainfall peaked at 275 mm (10 @.@ 8 in) in Jieyang , and several other stations reported totals of over 100 mm (3 @.@ 9 in) . The rains caused flash flooding in the province , which destroyed 6 @,@ 810 houses , leaving thousands homeless . At Guangzhou Baiyun International Airport , officials delayed or canceled 56 flights because of the storm . Similarly , Shantou Waisha Airport was closed for four hours , which delayed or canceled 10 flights . Heavy damage was reported in three coastal cities . Two small electrical dams were destroyed by the storm , causing additional flooding . Widespread areas lost power or water , and floods damaged or destroyed roads , tunnels , and large areas of crop lands . The storm killed two people by electrocution in Shantou , and a landslide killed 10 people in Wuhua County . Another landslide disrupted rail traffic between the region and Beijing . About 100 @,@ 000 people had to evacuate their houses in two cities . There were 27 deaths in the province , and damage was estimated at $ 109 million (¥ 904 million yuan) . After the storm , provincial officials coordinated the rescue effort for missing people . Despite the destruction , the rainfall from Kammuri helped alleviate drought conditions in the province . However , elsewhere in China , the rainfall occurred after months of heavy rainfall had killed 800 people .

Neighboring Fujian Province to Guangdong experienced heavier rainfall , peaking at 315 mm (12 @.@ 4 in) in Quanzhou . Two stations in the city reported the highest daily total on record . In a six @-@ hour period , a total of 104 mm (4 @.@ 1 in) was recorded in Pingtan County . Wind gusts reached 79 km / h (49 mph) in Putian , Fujian . The province experienced river flooding due to the heavy rains ; the Dazhang Stream crested at 34 @.@ 62 m (113 @.@ 6 ft) in Yongtai County , which was above " danger " flood levels . Damage in the province totaled $ 131 million (¥ 1 @.@ 085 billion yuan) . There were 19 deaths in Fujian . Significant flooding from Kammuri occurred inland , related to the storm 's remnants ' merging with a cold front . Rainfall reached 147 millimetres (5 @.@ 8 in) at a station in Jiangxi Province . In Hunan Province , the storms destroyed 12 @,@ 400 houses , leaving over 10 @,@ 000 people homeless . Also in the province , 14 reservoirs surpassed their capacity . A total of 107 people were killed in Hunan , and damage totaled $ 322 million (¥ 2 @.@ 665 billion yuan) .

Across Guangdong , Fujian , and Hunan provinces , floods forced 394 @,@ 000 people to evacuate , and there were 153 deaths . Overall , 72 @,@ 000 houses were destroyed and 173 @,@ 000 sustained damage . In the three provinces , the floods destroyed 60 ha (150 acres) and damaged 292 @,@ 000 ha (720 @,@ 000 acres) of crop fields . After the storm , thousands of soldiers in the People 's Liberation Army placed sandbags and maintained dykes along Dongting Lake , and , by the end of August , most floods had receded nationwide .

While Kammuri was moving ashore , several ships offshore reported winds of over 74 km / h (40 mph) . High rainfall totals spread as far east as Taiwan , where 591 mm (23 @.@ 3 in) was reported in Taitung County ; this was the station 's highest daily total . Stations in Okinawa reported rainfall totals as high as 178 mm (7 @.@ 0 in) . The remnants of Kammuri spread across South Korea with rainfall .