Cyclone Gonu

Cyclone Gonu (IMD designation : ARB 01 , JTWC designation : 02A , also known as Super Cyclonic Storm Gonu) is the strongest tropical cyclone on record in the Arabian Sea , and is also the strongest named cyclone in the northern Indian Ocean . The second named tropical cyclone of the 2007 North Indian Ocean cyclone season , Gonu developed from a persistent area of convection in the eastern Arabian Sea on June 1 , 2007 . With a favorable upper @-@ level environment and warm sea surface temperatures , it rapidly intensified to attain peak winds of 240 km / h (150 mph) on June 3 , according to the India Meteorological Department . Gonu weakened after encountering dry air and cooler waters , and early on June 6 , it made landfall on the easternmost tip of Oman , becoming the strongest tropical cyclone to hit the Arabian Peninsula . It then turned northward into the Gulf of Oman , and dissipated on June 7 after making landfall in southern Iran , the first landfall in the country since 1898 .

Intense tropical cyclones like Gonu are extremely rare over the Arabian Sea , since most storms in this area tend to be small and dissipate quickly . The cyclone caused 50 deaths and about $ 4 @.@ 2 billion in damage (2007 USD) in Oman , where the cyclone was considered the nation 's worst natural disaster . Gonu dropped heavy rainfall near the eastern coastline , reaching up to 610 mm (24 inches) , which caused flooding and heavy damage . In Iran , the cyclone caused 28 deaths and $ 216 million in damage (2007 USD) .

Meteorological history

Toward the end of May 2007 , the monsoon trough spawned a low pressure area in the eastern Arabian Sea . By May 31 , an organized tropical disturbance was located about 645 km (400 mi) south of Mumbai , India , with cyclonic convection , or thunderstorm activity , and a well @-@ defined mid @-@ level circulation . The disturbance initially lacked a distinct low @-@ level circulation ; instead it consisted of strong divergence along the western end of a surface trough of low pressure . A favorable upper @-@ level environment allowed convection to improve , and by late on June 1 , the system developed to the extent that the India Meteorological Department (IMD) classified it as a depression . It tracked westward along the southwestern periphery of a mid @-@ level ridge over southern India . Convection continued to organize , and early on June 2 the Joint Typhoon Warning Center (JTWC) classified it Tropical Cyclone 02A about 685 km (425 mi) southwest of Mumbai .

Upon first forming , the system contended with the entrainment of dry air to the northwest of the storm , which was expected to limit intensification . The storm steadily intensified , and early on June 2 the IMD upgraded it to deep depression status . Later in the day the IMD classified the system as Cyclonic Storm Gonu about 760 km (470 mi) southwest of Mumbai , India . As a mid @-@ latitude trough developed over Pakistan , Gonu turned to the north and northeast , though it resumed a westward track after ridging built to the north of the storm . With a solid area of intense convection , it rapidly intensified to attain severe cyclonic status early on June 3 , and with good outflow the JTWC upgraded it to the equivalent of a minimal hurricane . The dry air ultimately had a smaller impact on the intensification than previously estimated . A well @-@ defined eye developed in the center of convection , and after moving over a local increase in ocean heat content , Gonu rapidly deepened .

Late on June 3 , the IMD upgraded the storm to Very Severe Cyclonic Storm Gonu . With warm waters , low amounts of vertical wind shear , and favorable upper @-@ level outflow , Gonu strengthened further to attain peak 1 @-@ min sustained winds of 270 km / h (165 mph) and gusts to 315 km / h (195 mph) , about 285 km (175 mi) east @-@ southeast of Masirah Island on the coast of Oman . The IMD upgraded it to Super Cyclonic Storm Gonu late on June 4 , with peak 3 @-@ min sustained winds reaching 240 km / h (150 mph) and an estimated pressure of 920 mbar . This made it the first super cyclonic storm in the Arabian Sea on record .

After the storm maintained peak winds for about six hours , the IMD downgraded Gonu to very severe cyclonic storm status late on June 4 . Its eye became cloud @-@ filled and ragged , and the

cyclone gradually weakened due to cooler water temperatures and drier air as it approached the Arabian Peninsula . Due to land interaction with Oman , the inner core of deep convection rapidly weakened , and over a period of 24 hours the intensity decreased by 95 km / h (60 mph) . According to the IMD , Cyclone Gonu crossed the easternmost tip of Oman still as a very severe cyclonic storm early on June 6 . Although the winds continued to gradually decrease , overall organization increased slightly in the hours prior to landfall ; Gonu maintained a well @-@ defined low @-@ level structure with a weak eye .

 After emerging into the Gulf of Oman , the cyclone briefly re @-@ intensified slightly , possibly due to the warm waters . However , increasing wind shear and entrainment of dry air from the Arabian Peninsula continued to remove deep convection from its eastern semicircle . On June 6 , the cyclone turned to the north @-@ northwest , and later that day the JTWC downgraded Gonu to tropical storm status . The IMD followed suit by downgrading Gonu to severe cyclonic storm status and later to cyclonic storm status early on June 7 . Gonu crossed the Makran coast in Iran six hours later and the IMD stopped issuing advisories on the cyclone . This made it the first tropical cyclone on record to hit the country since 1898 . After landfall , Gonu persisted as a remnant low over Iran through June 8 .

= = Preparations = =

 The Oman Chairman of the National Committee for Civil Defence , General Malek Bin Sulaiman Al Ma 'amari , remarked the nation had already developed a contingency plan , which included the activation of army and police personnel after the storm 's passage . Significant damage was expected , especially in northeastern areas , along with up to 150 mm (6 in) of rainfall and very strong winds . Officials recommended citizens evacuate from potentially affected areas , and about 7 @,@ 000 people were forced to leave Masirah Island due to the threat of high surf and strong winds . Overall , more than 20 @,@ 000 people evacuated to emergency shelters . A state of emergency was declared for the nation . The Omani national weather service warned that the cyclone was expected to be worse than the destructive cyclone that hit Masirah Island in 1977 . The Mina al Fahal oil terminal closed for over three days due to the threat of the storm . Omani officials closed government offices for two days and declared a five @-@ day @-@ long national holiday . Most businesses near the coastline were closed prior to the announcement . Authorities at the Muscat International Airport canceled of all flights after 2000 UTC on June 5 due to the cyclone .

 In Saudi Arabia and the United Arab Emirates , both members of OPEC , no official warnings had been issued due to Gonu . The storm was not expected to disrupt oil supplies from these two nations . However , oil prices rose early on June 5 because of concerns of disruptions caused by Gonu , as well as the threat of nationwide strikes in Nigeria , Africa 's biggest oil producer . Crude oil for July delivery rose $ 1 @.@ 13 , or 1 @.@ 7 percent , to $ 66 @.@ 21 Monday on the New York Mercantile Exchange , the highest close in 15 days . Futures reached $ 66 @.@ 48 , the highest intraday price since April 30 . The contract was at $ 65 @.@ 95 a barrel , down 26 cents , in after @-@ hours electronic trading at 9 : 43 a.m. Tuesday in Singapore . Tom Kloza , chief oil analyst at the Oil Price Information Service , said he doubted the increase could be attributed to Gonu . " I don 't know if you can really attribute any of the gain to the cyclone , " he said . " It 's an excuse , as opposed to a reason , for the rise in prices . "

 In Pakistan , officials recommended fishermen remain within 50 km (30 mi) of the coastline , due to anticipated rough waves in the open ocean . Naval authorities in the United States warned ships to avoid the cyclone in the Arabian Sea .

 The Iran Department of Meteorology declared storm warnings for the country 's southeastern coastline ; the agency anticipated moderate to severe precipitation and gusty winds . Prior to the arrival of the cyclone , about 40 @,@ 000 people , including around 4 @,@ 000 students at the International University of Chabahar , evacuated coastal areas of the country to at least 1 km (0 @.@ 6 mi) inland . All flights in and out of the Konarak Airport were canceled during a 48 @-@ hour period . Additionally , all hospitals in Sistan and Baluchestan Province were put on red alert . The Iran chapter of the Red Cross advanced the delivery of necessary relief supplies .

= = Impact = =

 Across its path , Cyclone Gonu caused heavy damage and many fatalities . About seven hours before passing near the northeastern Oman coastline , Cyclone Gonu began affecting the country with rough winds and heavy precipitation ; rainfall totals reached 610 mm (24 in) near the coast . Gonu produced strong waves along much of the coastline , leaving many coastal roads flooded . There was a 5 @.@ 1 meter (17 foot) storm surge and a 200 m (660 ft) incursion of seawater inland at Ras al @-@ Hadd ; other areas along the coast had similar levels .

= = = Oman = = =

 Strong winds knocked out power and telephone lines across the eastern region of the country , leaving thousands isolated until the lines were repaired hours later . The cyclone caused extensive damage along the coastline , including in the city of Sur and the village of Ras al Hadd at the easternmost point of the Omani mainland . In Muscat , winds reached 100 km / h (62 mph) , leaving the capital city without power . Strong waves and heavy rainfall flooded streets and some buildings . Police workers in the city sent text messages to keep people away from flooded streets to prevent electrocutions . Little damage was reported to the oil fields of the nation . The liquefied natural gas terminal in Sur , which handles 10 million tonnes of gas each year , was badly hit by the storm and could not be operated . Overall , the cyclone killed 50 people in the country ; by the fourth day after it struck the country , 27 people had been reported missing . Around 20 @,@ 000 people were affected , and damage in the country was estimated at around $ 4 @.@ 2 billion (2007 USD) .

= = = United Arab Emirates = = =

 Fierce waves pushed large amounts of water to coastal areas in Fujairah of the United Arab Emirates , forcing roads to be closed and traffic diverted . Civil defence and police were on duty to manage the road closures , while municipal workers pumped the excess water off the roads . The road connecting Kalba and Fujairah was closed due to the road being submerged by water . The waves along the coastline were reported to be 10 m (32 ft) high , which destroyed about a dozen fishing boats . About 300 boats were moved from the water or emptied of equipment , and overall damage to the port of Fujairah was reported as severe . A boat sank by the port , leaving its ten passengers missing .

= = = Iran = = =

 Upon striking Iran , Gonu dropped moderate to heavy rainfall , including 74 mm (2 @.@ 91 in) in the city of Chabahar . Winds reached 111 km / h (69 mph) , which caused power outages and damaged some homes made of clay ; the power outage led to some fires across the city . The rainfall flooded at least 40 houses , and resulted in the temporary closure of several major roads . Cyclone Gonu produced a storm tide of 2 m (6 @.@ 5 ft) in some locations , with many homes near the coastline receiving damage . In Jask , heavy rainfall overflowed a river , killing three people in a vehicle caught in the water . Flooding from the rainfall also destroyed a dam in Nikshahr County . Throughout the country , the cyclone caused 28 deaths , including 20 from drowning ; damage in Iran was estimated at 2 billion (2007 IRR , $ 216 million 2007 USD) .

= = = Pakistan = = =

 Cyclone Gonu caused strong gusty winds and torrential rainfall along Pakistan 's Arabian Sea coast from Karachi to Gwadar . The cyclone was reported to have sunk a number of boats off the eastern coast of Gwadar . It was feared that fishing launches that had ventured into the open sea may have

been stranded . At least three houses and one school were destroyed and 210 anchored fishing boats were badly damaged anchored in the coastal town of Sar Bandar in Baluchistan province

= = Aftermath and records = =

The Muscat International Airport reopened after three days while Fujairah reopened on June 7 after it was closed the day before . The cyclone caused little impact to oil facilities along its path ; after the initial price rises , oil dropped over USD2 per barrel as a result . Across the northern Arabian Sea , the passage of Gonu produced stronger winds and significant upwelling ? an oceanographic phenomenon that involves the replacement of the nutrient @-@ depleted surface water with deeper nutrient @-@ rich water ; the passage caused a significant increase in phytoplankton . Additionally , the cyclone delayed the arrival of the Indian Ocean south @-@ west monsoon in the Western Ghats in India .

In Oman , production of desalinated water was interrupted , as both of Oman 's desalination plants failed . The first , Ghubrah , lost supplies of natural gas , halting production ; while the second , Barka , sustained a damaged switchgear due to flooding . These plants provided water to Muscat 's 631 @,@ 000 residents and surrounding areas , triggering severe water shortages across eastern Oman . To rectify the situation , officials used water tanks . The water returned to near normal in five days , as the two plants returned to service . Additionally , electricians worked quickly to repair the power outages across the region . Five days after Gonu hit , utilities were restored to most of Muscat and the coastal provinces . The Omani army assisted residents in returning to their houses . Even though the Omani government did not request any international aid , the United States offered assistance through naval ships in the area ; this was eventually rejected . The country lost an estimated $ 200 million (2007 USD) in oil exports . In the months after the storm , the government allocated funds for the removal of debris and trees , as well as restoration of roads in tourist areas . Additionally , the National Committee for Civil Defence set up 139 buildings to provide temporary housing for 8 @,@ 192 people . Services such as water and electricity were gradually restored , and people returned to their homes . By two weeks after the storm 's passage , most of those remaining in shelters were from Qurayat , one of the most severely affected villages .

After the passage of the cyclone , the Iran chapter of the Red Cross and its volunteers worked in conjunction with the military to distribute relief supplies to villages using trucks and helicopters . The branch in Sistan and Baluchestan Province distributed over 10 @,@ 000 blankets , 1 @,@ 300 tents , 400 clothing items , 82 @,@ 000 loaves of bread , and 87 @,@ 000 bottles of water to affected citizens . In total , 61 @,@ 558 families received aid from the Red Cross in Iran . The Iranian government provided monetary relief to the affected people . Officials worked to restore roads , bridges , and power systems in the affected areas , although repairs were more difficult in some locations ; by a week after the storm , several villages remained surrounded by floodwaters .

Cyclone Gonu set several intensity records . When it became a very severe cyclonic storm on June 3 , Gonu became the strongest tropical cyclone on record in the Arabian Sea . Later , it became the only super cyclonic storm , which is a tropical cyclone with 3 @-@ minute sustained winds of at least 220 km / h (140 mph) , in the region . The JTWC estimated peak winds of 270 km / h (165 mph) . Based on their estimate , Gonu was tied with the 1991 Bangladesh Cyclone for the strongest tropical cyclone in the entire northern Indian Ocean , and had the highest windspeed of any cyclone in this basin . On June 6 , Gonu made landfall in extreme eastern Oman with winds of 150 km / h (90 mph) , making it the strongest tropical cyclone on record to strike the Arabian Peninsula . With a damage total of $ 4 @.@ 2 billion (2007 USD) and 50 deaths , Gonu became the worst natural disaster on record in Oman . Additionally , the storm was only the second cyclonic storm on record to strike Iran , the other doing so on June 4 , 1898 .