= Cyclone Hellen =

Very Intense Tropical Cyclone Hellen of March 2014 was one of the most powerful tropical cyclones in the Mozambique Channel on record , as well as the second most intense of the 2013 ? 14 South @-@ West Indian Ocean cyclone season . It formed on March 27 in the northern portion of the channel , and in its formative stages brought rainfall to coastal Mozambique . While moving southeastward , it developed an organized area of convection over the center . Warm waters allowed Hellen to rapidly intensify while passing south of the Comoros , with a well @-@ defined eye forming in the middle of the thunderstorms . The cyclone attained peak intensity March 30 , with maximum sustained winds estimated 230 km / h (145 mph) according to the Regional Specialized Meteorological Center , Météo @-@ France in La Réunion . Subsequently , Hellen weakened quickly due to dry air and interaction with Madagascar , and the eye dissipated . On March 31 , the storm made landfall in northwestern Madagascar as a weakened cyclone , despite previous forecasts for the center to remain over water . By April 1 , Hellen was no longer a tropical cyclone after most of the convection dissipated . The remnants turned to the west , moving over Mozambique without redeveloping .

Early in its duration , Hellen 's rainfall in Mozambique destroyed hundreds of houses and a bridge . Flooding killed four people in the country , three of whom due to a home collapsing . Later , the cyclone passed south of the Comoros islands , causing flooding due to high storm surge and waves that killed one person . The storm forced 8 @,@ 956 people to evacuate their homes due to the threat for landslides , while 901 houses were damaged or destroyed . On nearby Mayotte , high rainfall flooded rivers , sweeping one car away . In northwestern Madagascar , Hellen damaged or destroyed 611 houses , leaving 1 @,@ 736 people homeless . The storm killed three people after capsizing a boat .

= = Meteorological history = =

On March 25 , 2014 , a weak area of low pressure accompanied by broad , flaring convection became increasingly organized over Mozambique . Owing to favorable environmental conditions , featuring low wind shear , vorticity became more enhanced and symmetrical . A compact system , the low steadily organized as it emerged over the Mozambique Channel on March 26 . Though continued land interaction initially hindered development , enhanced outflow supported convective development as it straddled the Mozambique ? Tanzania border . With high sea surface temperatures in the storm 's track , the JTWC anticipated further organization and issued a Tropical Cyclone Formation Alert at 2000 UTC on March 26 . Once further offshore on March 27 , the Regional Specialized Meteorological Center Météo @-@ France in La Réunion classified the system as Disturbance 14 . Drifting slowly east , a prominent feeder band developed along the system 's eastern side ; however , this band disrupted low @-@ level inflow of warm , moist air and suppressed convection over the circulation center .

Though convection later began to consolidate into a small central dense overcast (CDO) feature by March 28 , continued disruption of the low @-@ level inflow prevented much development . Météo @-@ France noted that despite forecasting the storm to peak as a moderate tropical storm , with winds of 75 km / h (45 mph) , there was potential for rapid intensification due to the storm 's small size . Conversely , the JTWC noted that proximity to land and dry mid @-@ level air , represented by surface outflow boundaries , could hamper significant development . Once further over the Mozambique Channel , the system became increasingly organized and the JTWC initiated advisories on the storm as Tropical Cyclone 21S . Météo @-@ France followed suit at 0000 UTC on March 29 and classified the cyclone as a moderate tropical storm , with the tropical cyclone warning center in Madagascar assigning the name Hellen . Hellen soon assumed an east @-@ southeast track toward Madagascar as a ridge established itself to the northeast . Throughout March 29 , the storm became increasingly organized with an eye apparent on microwave satellite imagery .

Rapid to explosive intensification ensued during the later half of March 29 into March 30 at a rate Météo @-@ France later referred to as " astounding " . Deep convective banding wrapped around a

ragged eye , which soon contracted to " pinhole " size . This prompted Météo @-@ France to upgrade Hellen to a tropical cyclone with winds estimated at 150 km / h (90 mph) at 0000 UTC on March 30 . Six hours later , they further upgraded the storm to an intense tropical cyclone with winds of 195 km / h (120 mph) . Hellen attained its peak intensity between 1100 and 1500 UTC as a very intense tropical cyclone , with winds of 230 km / h (145 mph) and a barometric pressure of 925 mbar (hPa ; 27 @.@ 32 inHg) . This ranked it as one of the most powerful storms over the Mozambique Channel on record . The storm featured a 20 km (12 mi) wide eye embedded within a symmetrical and intense CDO , spanning 240 km (150 mi) across . The JTWC estimated Hellen to have attained one @-@ minute sustained winds of 250 km / h (155 mph) , making it a high @-@ end Category 4 @-@ equivalent cyclone on the Saffir ? Simpson hurricane wind scale , although this was lowered to 240 km / h (150 mph) in reanalysis .

After peak intensity , the cyclone 's eye soon began to fill and cool as weakening ensued . Defying previous forecasts , Hellen continued on a southeasterly track toward Madagascar and the likelihood of it making landfall became apparent . By the end of March 30 , Hellen 's eye had collapsed and disappeared from satellite imagery , as the combination of dry air and land interaction took their toll on the storm . At about 0800 UTC on March 31 , Hellen made landfall on northwestern Madagascar , and the previously unfavorable conditions coupled with land interaction to induce rapid weakening . The ridge to the east turned Hellen to a southwest drift over land . By early on April 1 , the convection largely dissipated as the center became difficult to locate , with peak winds dropping to 45 km / h (30 mph) . As a result , Météo @-@ France discontinued advisories that day , as did the JTWC . The remnants moved back over open waters , but were not expected to reorganize due to the poor nature of the convection . As the low continued to the west , the convection increased on April 4 while approaching the coastline of Mozambique , although the system failed to redevelop before moving onshore .

= = Preparations and impact = =

During its formative stages , Hellen meandered around northern Mozambique and produced prolonged heavy rains over the region . The city of Pemba in Cabo Delgado Province was the hardest hit area , with the Messalo River over @-@ topping its banks . Tagir Carimo , mayor of Pemba , described the rains as the heaviest he had seen in 20 years . More than 100 poorly constructed homes collapsed in the floods while severe erosion exposed and destroyed water pipes . A major bridge connecting Pemba to surrounding areas was washed away by the Messalo river . This isolated the northern portion of Cabo Delgado Province from the rest of the country , forcing ferries to transport cars . Three people died in the district of Cariaco when their home collapsed while a fourth drowned in Chiuba . Distributing assistance following the storm was disrupted by damaged roads .

= = = Comoro Islands = = =

Heavy rains and storm surge caused significant damage on all three islands of the Comoros , with the worst occurring on Anjouan . There , 901 houses were damaged , of which about 20 % were destroyed . Flooding displaced 389 people in Salamani where 33 mud @-@ built homes were destroyed . Landslides isolated the villages of Chiconi , Hamaba , Koni @-@ Djodjo , Miringoni , and Nioumachioi , and damaged a road between Ngandzalé and Domoni . On the island , 7 @,@ 879 people had to evacuate their houses due to the risk of further landslides , some of whom went to schools set up as shelters while others stayed with family or friends . Storm surge on Mohéli flooded parts of Tsamia , Walla , and Zirindani , resulting in one fatality . Several houses were damaged on the island , and Djandro lost power due to a damaged power line . The Prince Said Ibrahim International Airport in Moroni on Grande Comore was closed for about 24 hours due to the storm . Also on the island , a road was damaged , and one house was flooded . Shortly after the storm , workers began repairing roads and distributing aid .

Though the center of Cyclone Hellen remained south of Mayotte , it prompted an " orange alert " on

March 30 for the area due to the potential for hurricane @-@ force gusts . The storm 's rapid intensification caught most residents on the island off @-@ guard , with widespread disruptions to traffic and electricity taking place . Wind gusts up to 100 km / h (62 mph) downed trees and power lines , blocking off roads while heavy rains caused significant flooding . A peak 24 ? hour rainfall of 239 mm (9 @.@ 4 in) was measured in Mtsamboro between March 29 and 30 . In M 'Tsangamouji , cars were swept away by a swollen river . Along the coast , waves up to 5 m (16 ft) damaged marinas in Dzaoudzi , Hagnoundrou , and Mamoudzou where skiffs were smashed against rocks or stranded .

= = = Madagascar = = =

On March 31 , a boat capsized off the coast of northwest Madagascar , killing three and leaving nine others missing . High seas washed away 20 canoes along the coast . Initial assessments of damage across Madagascar were initially hampered by poor weather and inaccessibility . The storm flooded 7 @,@ 795 ha (19 @,@ 260 acres) of rice fields across the country , as well as 114 ha (280 acres) of other crops , threatening harvests after a locust outbreak had occurred in the months prior to the storm . The storm also killed 23 zebu and damaged two dams . Cyclone Hellen destroyed 437 houses and damaged or flooded 174 others , leaving 1 @,@ 736 people homeless during its passage . The storm also damaged two health facilities and five schools . Overall impact from Hellen was less than expected due to its weakening , with most telephone lines still intact .

Due to the storm affecting water access in northwestern Madagascar , there was concern for a disease outbreak , with a flu outbreak noted in Mahajanga . The national Red Cross utilized 54 volunteers to assist in the storm 's aftermath , such as distributing kitchen kits and agriculture units . Residents donated 2 million ariary ($ 800 USD) to the Red Cross , which were used to purchase medicines , while the government provided 600 kg (1 @,@ 300 lb) of rice for affected residents .