

= Cyclone Leon ? Eline =

Cyclone Leon ? Eline was the longest @-@ lived Indian Ocean tropical cyclone on record , traveling over 11 @,@ 000 km (6 @,@ 800 mi) during its 29 day duration . It formed on February 1 , 2000 , in the Australian basin as Tropical Cyclone Leon . After crossing 90 ° E , the Météo @-@ France office in Réunion (MFR) began tracking the system as Tropical Storm Eline on February 8 . Late on February 17 , Eline made landfall near Mahanoro , Madagascar , with 10 ? minute winds of 165 km / h (103 mph) . The storm rapidly weakened over land , but restrengthened in the Mozambique Channel to reach peak 10 ? minute winds of 185 km / h (115 mph) . On February 22 , Eline made landfall about 80 km (50 mi) south of Beira , Mozambique , near peak intensity , and quickly weakened over land . The well @-@ defined circulation moved across southern African , finally dissipating over eastern Namibia on February 29 .

While moving across much of the Indian Ocean , Eline brought high waves , gusty winds , and rainfall to several islands . Later , Eline struck Madagascar while the country was in the midst of a cholera epidemic that had killed over 1 @,@ 000 people . The storm directly killed at least 64 people , although Tropical Storm Gloria struck shortly thereafter , compounding upon the damage and making it difficult to discern the individual damage totals . Damage from Eline was estimated at \$ 9 million (USD) , and collectively the two storms killed 205 people and left another 10 @,@ 000 homeless . In the region around Vatomandry , where Eline made landfall , 65 % of houses were damaged , 90 % of crops were lost , and 75 % of health facilities were wrecked .

Before Eline 's final landfall , Mozambique was experiencing the worst floods since 1951 , killing about 150 people . The additional rainfall and flooding from Eline created the country 's worst natural disaster in a century . The combined effects destroyed over 250 @,@ 000 ha (620 @,@ 000 acres) of crop fields and killed 40 @,@ 000 cattle . Eline 's passage disrupted ongoing relief efforts . High levels along the Limpopo River isolated the town of Xai @-@ Xai , with water levels along the river reaching as high as 11 m (36 ft) above normal in some areas , as well as 15 km (9 @.@ 3 mi) wide . A dam broke along the river , flooding the town of Chokwe in the middle of the night and trapping several unprepared residents ; this accounted for nearly half of the death toll . About 55 people drowned in Sofala Province after rescue helicopters arrived too late to save them . Around 20 @,@ 000 people in the capital city of Maputo lost their homes . In addition to the floods , strong winds blew away many roofs and some entire houses made of mud . The combined effects of the preceding floods and Eline left about 329 @,@ 000 people displaced or homeless , about 700 deaths , and damage estimated at \$ 500 million (USD) . The cyclone and the floods disrupted much of the economic progress Mozambique had made in the 1990s since the end of its civil war .

Elsewhere in southern Africa , Eline brought strong winds and heavy rainfall when it crossed into eastern Zimbabwe , maintaining a well @-@ defined structure . Rivers overflowed their banks in the country , damaging crops and houses while leaving 15 @,@ 000 people homeless . The storm killed 12 people in the country . Flooding from the storm extended southward into Swaziland and South Africa . In the latter country , Eline dropped 503 mm (19 @.@ 8 in) of rainfall in Levubu over three days , causing the Limpopo River to reach its highest level in 15 years . Officials opened dams along the river to prevent structural damage , which caused higher levels along the river to the east . At least 21 people died in the country , and about 80 @,@ 000 people were left homeless , forcing many people into churches and schools . Damage in Limpopo Province alone was estimated at \$ 300 million (USD) . To the north , Eline dropped about 90 mm (3 @.@ 5 in) of rainfall in southern Malawi , while gusty winds caused a power outage in Blantyre . Farther west , rainfall rates of 50 ? 100 mm (2 @.@ 0 ? 3 @.@ 9 in) were also reported in Botswana .

= = Meteorological history = =

A low pressure area developed within the monsoon trough on February 1 about 250 km (160 mi) south of the Indonesian island of Bali . Associated convection was initially sparse due to wind shear , although a developing anticyclone allowed the thunderstorms to persist . At 22 : 00 UTC on February 3 , the Perth Tropical Cyclone Warning Center (PTCWC) upgraded the low to a Category

1 on the Australian tropical cyclone scale , naming it Tropical Cyclone Leon . On February 4 , the Joint Typhoon Warning Center (JTWC) began issuing advisories on the storm as Tropical Cyclone 11S while southeast of Christmas Island . A ridge to the south steered the storm generally westward . Late on February 5 , the PTCWC estimated an initial peak of 140 km / h (87 mph) , although increased shear caused weakening . Leon crossed 90 ° E on February 8 into the south @-@ west Indian Ocean , and was renamed Eline by the Mauritius Meteorological Service . Météo @-@ France (MFR) estimated 10 ? minute winds of 65 km / h (40 mph) at that time .

On February 11 , wind shear began decreasing as convection reformed . Early on February 14 , the JTWC upgraded Eline to the equivalent of a minimal hurricane . That day , the storm passed about 85 km (53 mi) south of St. Brandon and 180 km (110 mi) northwest of Mauritius , although its small structure limited the strongest winds . Early on February 16 , Eline attained tropical cyclone status while passing about 160 km (99 mi) northwest of Réunion . The eye became better defined , and while approaching eastern Madagascar on February 17 , Eline intensified to reach 10 ? minute winds of 165 km / h (103 mph) . Around that time , the cyclone made landfall near Mahanoro . Eline rapidly weakened into a tropical depression over land . After crossing Madagascar for 26 hours , Eline emerged into the Mozambique Channel near Belo , quickly re @-@ intensifying into a moderate tropical storm on February 19 . The storm rapidly intensified as it approached eastern Mozambique , becoming an intense tropical cyclone early on February 22 with 10 ? minute winds of 185 km / h (115 mph) . The JTWC estimated peak 1 ? minute winds of 215 km / h (134 mph) , the equivalent of a Category 4 on the Saffir @-@ Simpson hurricane scale . While at peak intensity , Eline made landfall about 80 km (50 mi) south of Beira , Mozambique with gusts of 260 km / h (160 mph) , making it the strongest storm to hit the nation in several decades . Although the winds rapidly decreased after landfall , the storm maintained a well @-@ defined structure as it crossed into Zimbabwe late on February 22 and progressed across southern Africa . It eventually reached eastern Namibia , where the circulation dissipated on February 29 and merged with an approaching cold front .

Throughout its duration , Leon @-@ Eline lasted 29 days , a record longevity for a storm in the southern Indian Ocean . The track was over 11 @, @ 000 km (6 @, @ 800 mi) , or about 25 % of the Earth 's circumference . However , Eline was in the south @-@ west Indian Ocean for 21 days , which is the third most on record since the start of satellite imagery . It was behind Cyclone Alibera in 1989 and Cyclone Georgette in 1968 , the latter of which lasted 24 days in the basin .

= = Preparations and impact = =

Early in its duration while it was still in the Australian basin , the cyclone produced high waves near Christmas Island , forcing a boat of about 500 refugees to be escorted to port . Later , Eline brought wind gusts of 76 km / h (47 mph) to St. Brandon . On Mauritius , the cyclone produced wind gusts of 137 km / h (85 mph) , along with heavy rainfall that peaked at 405 mm (15 @. @ 9 in) at Sans Souci . This rainfall was about 70 % of the average February precipitation total . After Eline began restrengthening and turned more to the southwest , officials on Réunion declared a red alert , but this was dropped when the cyclone passed the island . Ultimately , the storm brushed the island with gusts of 101 km / h (63 mph) along the coast , and 187 km / h (116 mph) in the mountainous peak of Maïdo . Rainfall was heaviest in the mountainous peaks , as well , reaching 1 @, @ 500 mm (59 in) at Bébourg . Significant wave heights remained below 3 m (9 @. @ 8 ft) .

= = Madagascar = =

Moving ashore in eastern Madagascar , Eline produced strong winds along its path , with gusts estimated at 250 km / h (160 mph) by MFR at landfall . However , the storm blew away local weather stations , which made the true landfall intensity unknown . Winds remained strong farther inland ; Ivato International Airport near the capital Antananarivo reported winds of 100 km / h (62 mph) , and winds in the capital were likely stronger . Eline also dropped heavy rainfall , with a 24 ? hour total of 131 mm (5 @. @ 2 in) at Ivato airport . The rains also caused flooding along

Madagascar 's west coast , which is usually spared from precipitation by mountains . Eline struck while Madagascar was in the midst of a cholera epidemic that had killed over 1 @, @ 000 people .

In Mahanoro , the biggest city near the cyclone 's landfall in Madagascar , Eline disrupted power and water supplies while also leaving the town isolated . About 80 % of buildings were damaged or destroyed there . In Marolambo , a village in eastern Madagascar , Eline killed six people . Heavy rainfall in the central portion of the nation caused landslides and flooding . Flooding also occurred in the west coast near Belo . The storm disrupted portions of at least three highways . The storm left about 10 @, @ 000 people homeless , with about 1 @, @ 500 people forced to stay in storm shelters . Damage to public buildings was estimated at \$ 300 @, @ 000 (2000 USD) , Nationwide , Eline killed at least 64 people and affected about a half @-@ million people affected .

Only 13 days after Eline struck the country , Cyclone Gloria also hit northeastern Madagascar , bringing additional damage and flooding . The two storms collectively killed at least 140 people , although there was initial uncertainty in the toll due to disrupted communications . Floods from the two storm inundated 70 % of homes and wrecked 70 % of the crops in the districts of Andapa , Sambava , Antalaha , and Vohemar . About 12 @, @ 000 people in 114 villages were isolated . Rice fields were flooded for over a week , and coffee and banana crops had severe losses . Collectively , 12 @, @ 230 people were left without access to clean water .

= = = Mozambique = = =

Before Eline struck Mozambique , storm warnings and later hurricane warnings were issued on February 21 . Flooding had affected the nation since January , with some areas receiving a year 's worth of rainfall in two weeks . Widespread areas were inundated , with about 220 @, @ 000 people displaced , and about 150 people killed . Eline moved ashore with very powerful winds , although there were no direct observations of the strongest winds . In Beira , the closest major city to the landfall point , winds reached storm force . However , the rainfall from Eline was the most impacting following the preexisting flooding , which were the worst since 1951 . The floods were beginning to recede by the time Eline arrived , and by the end of February 2000 , the situation was considered the country 's worst natural disaster in a century . Flooding continued for days after Eline moved through southern Africa due to waters flowing downstream from neighboring countries . By early March the floods were beginning to recede again , leaving behind a deep layer of mud , ponds of contaminated water , and piles of rotten corpses .

While Eline moved ashore , high winds knocked over coconut trees , destroying over 250 @, @ 000 ha (620 @, @ 000 acres) of crop fields in conjunction with the floods . The floods killed 30 % of the cows in Gaza Province , and about 40 @, @ 000 cattle died nationwide , with many chickens and goats also killed . Many schools were closed after the storm , including 308 due to damage and others that housed storm victims . The storm knocked over telegraph power lines and caused widespread power and water outages from Inhambane to Beira , while also disrupting ongoing relief efforts . The cities of Chokwe , Chibuto , and Xai Xai all had damage to their water systems .

After the storm knocked over 90 power poles , about two @-@ thirds of Beira was without power and water , and two people were killed due to downed power lines . Flooding damaged the World Food Program warehouse in the city . Also in Beira , the combination of strong winds and waves sank five ships in the harbor , including one at the entrance ; this halted port traffic for about two weeks . Floods submerged the primary highway connecting the north and south of the country , and damaged several other roads and rail lines , halting the region 's economy by preventing movement of goods . About 4 km (2 @. @ 5 mi) of the rail line between Maputo and Zimbabwe was under water . The swollen Limpopo River isolated the town of Xai @-@ Xai after all connecting roads and the airport were inundated , and the bridge connecting the rest of the region to the south was damaged . Water levels along the river reached as high as 11 m (36 ft) above normal in some areas , as well as 15 km (9 @. @ 3 mi) wide , which broke the record for highest crest by 3 m (9 @. @ 8 ft) . A dam broke along the river , flooding the town of Chokwe in the middle of the night and trapping several unprepared residents . Flooding there surpassed the previous water depth record by 2 m (6 @. @ 6 ft) , set in 1977 , thus inundating the town up to ceiling of one story buildings . In

the city of Inhambane , the flooded Save River swept away several houses . Along the river , 50 @, @ 000 people were unaccounted for as of March 1 , many of whom were washed away . In nearby Nova Mambone , thousands of people became homeless due to storm flooding , killing at least ten people . About 55 people drowned in Sofala Province after rescue helicopters arrived too late to save them . Around 20 @, @ 000 people in the capital city of Maputo lost their homes .

In addition to the floods , strong winds blew away many roofs and some entire houses made of mud , leaving thousands of people homeless . The combined effects of the preceding floods and Eline left about 463 @, @ 000 people displaced or homeless , including 46 @, @ 000 children five years old or younger . Overall , the preceding floods and Eline caused about 700 deaths , half of whom in Chokwe. with damage estimated at \$ 500 million (2000 USD) . At least 17 people died directly due to Eline , although many bodies were washed away and unable to be counted . The cyclone and the floods disrupted much of the economic progress Mozambique had made in the 1990s since the end of its civil war .

= = = Elsewhere in mainland Africa = = =

The MFR issued a gale warning for Zimbabwe in anticipation of strong winds well inland . However , the Zimbabwe government did not issue any storm warnings until the storm moved over the country . Due to Eline maintaining a well @-@ defined structure , it brought strong winds and heavy rainfall when it crossed into eastern Zimbabwe . The heavy rains caused rivers to overflow their banks . Officials opened flood gates along several dams to maintain their integrity , which increased flooding downstream , including in Mozambique . However , eight dams were destroyed that were used for irrigation purposes . The storm destroyed over 3 @, @ 800 homes in the eastern portion of the country while killing 17 @, @ 000 heads of livestock . Flooding also washed away roads , bridges , and some power lines . Mutare , the country 's third largest city , lost power during Eline 's passage . Overall the storm killed 12 people in the country .

Flooding from the storm extended southward into Swaziland and South Africa . In the latter country , Eline dropped 503 mm (19 @.@ 8 in) of rainfall in Levubu over three days , causing the Limpopo River to reach its highest level in 15 years . In Limpopo Province , a station recorded 284 mm (11 @.@ 2 in) of rainfall in just 24 hours . Officials opened dams along the Limpopo River to prevent structural damage , which caused higher levels along the river to the east . However , 16 dams failed in the country , causing further damage to irrigation systems . The floodwaters isolated the town of Louis Trichardt after N1 road was covered , and most border crossings were closed . The floods covered roads and caused several houses to collapse , hospitalizing 12 people in Thohoyandou . Eline also damaged crops in the country , namely pulses , maize , and other vegetables . At least 21 people died in the country , and about 80 @, @ 000 people were left homeless , forcing many people into churches and schools . Damage in Limpopo Province alone was estimated at \$ 300 million (USD) , with crop damage estimated at \$ 11 million . Flooding began receding by the end of February .

To the north , Eline dropped about 90 mm (3 @.@ 5 in) of rainfall in southern Malawi . The storm 's gusty winds wrecked houses and knocked over trees , causing power outages in Blantyre . Farther west , rainfall rates of 50 ? 100 mm (2 @.@ 0 ? 3 @.@ 9 in) were also reported in Botswana . In Namibia , Eline 's rainfall contributed to the third wettest summer in 50 years , as well as the wettest since 1976 . Several locations in the southern portion of the country reported daily rainfall rates of 60 mm (2 @.@ 4 in) .

= = Aftermath = =

Immediately after Eline struck Madagascar , the government began distributing relief items , such as rice , tents , and sheets . On February 21 , survey flights helped indicate the extent of damage across the nation . Supplies were distributed by road from Antananarivo to the worst affected areas , with helicopters dropping off aid to isolated communities . After receiving request from the Malagasy government , UNICEF flew 15 tons of supplies from Copenhagen , such as medicine , 10 @.@ 5

tons of food , and equipment to help coordinate relief work . The agency also transported thousands of blankets and water purification tablets from Antananarivo . However , UNICEF faced difficulties in distributing the supplies . The government of France sent two helicopters with teams of doctors to Madagascar , and Médecins Sans Frontières sent about 35 tons of supplies , such as medicine , water purifying devices , and food . The World Food Programme flew about 400 tons of food to affected residents across the country , including 25 tons to Mahanoro . Due to the combined impacts of Eline and Gloria , the government of Madagascar requested for international assistance on March 7 , which was coordinated through the United Nations Office for the Coordination of Humanitarian Affairs . In response , the government of the United Kingdom donated £ 1 @. @ 3 million (\$ 1 @. @ 9 million USD) to Madagascar . The Organisation of African Unity donated \$ 200 @, @ 000 to Madagascar on March 10 . In addition to Cyclone Gloria striking the country in March , Cyclone Hudah hit eastern Madagascar in early April , causing additional deaths and damage .

The government of Zimbabwe declared a state of emergency in three provinces . Nearby Botswana donated 15 million litres of fuel to the country to help with their recovery . Although Botswana was affected by the floods , their government was able to provide food and relief to the storm victims . In South Africa , families were forced to keep corpses in their houses due to the ongoing flooding . The country 's government authorized R7.1 million (ZAR , \$ 1 @. @ 1 million USD) to pay for emergency assistance . Limpopo Province was declared a disaster area . The South African government issued a warning on March 1 , stating they flood refugees from Mozambique would be deported if they entered illegally . The country of Australia donated \$ 250 @, @ 000 to assist relief work in both Zimbabwe and South Africa .

= = = Mozambique = = =

By the time Eline struck Mozambique , there was already incoming assistance from the international community , responding to the earlier flooding . Mozambique 's president at the time , Joaquim Chissano , requested for additional aid after the storm struck , asking for \$ 65 million for both reconstruction and emergency aid , and later increasing the request to \$ 160 million . By the end of February 2000 , various countries had pledged \$ 13 @. @ 5 million to Mozambique , well short of the required needs , but that rose to nearly \$ 119 million by March 17 . By March 4 , 39 @. @ 6 tons of various relief goods reached the country , to be distributed from the towns of Bilene and Magul . The supplies nearly overwhelmed the small airport at Maputo , as lack of distribution caused food to decay in the sun .

The Mozambique government worked to evacuate residents in newly flooded areas using boats , and set up 121 camps for evacuees . By early March , there were 35 @, @ 000 people at camps in Chiaquelane , and another 10 @, @ 000 in Macia . However , the country had a limited capacity for widespread rescues due to insufficient helicopters . In some locations , the floodwaters were so strong that boats were unable to operate search and rescue missions . Residents left homeless by the storm were forced to stay in churches and schools , although some residents in the country 's capital , Maputo , provided a spare bedroom . Citizens in the city also provided clothing to those who lost their homes in the flood . About 2 @, @ 000 residents from the flooded town of Chokwe walked 40 km (25 mi) to receive shelter in Macie . Following the storm , the residual floodwaters contributed to outbreaks of malaria and cholera , with malaria infections at four times the usual rate killing at least 11 people . Areas in southern Mozambique also lost access to clean water , furthering dehydration and illnesses . In addition , the United Nations Mine Action Service expressed concern that the floods shifted the locations of landmines leftover from the nation 's civil war . Later , the remnants of Cyclone Gloria halted relief work due to heavy rainfall .

Soon after the storm struck , CARE operated airlifts of food to flooded areas . The World Food Programme approved \$ 2 million to help airlifting 53 @, @ 000 metric tons of food . A fleet of 29 helicopters had rescued 14 @, @ 204 people by March 7 as well as operating airlifting missions . This included 12 planes and helicopters from South Africa , six helicopters with crews along with 100 motorboats from the United Kingdom , ten helicopters from Germany , and two from Malawi . Many residents in flooded areas initially had to hold onto trees and roofs due to lack of helicopters , with

100 @, @ 000 people needing rescue as of March 1 . After the floodwaters receded , the need for rescue diminished , allowing families to return home , although helicopters were still required to airlift relief goods . Emergency road repairs allowed supplies to be delivered by road in some areas by March 5 . The United States sent a crew of 700 soldiers in what became Task Force Atlas Response , a \$ 37 million operation to coordinate disaster relief , rebuild roads , deliver crop seed , and drop off aid . This was ordered by U.S. President Bill Clinton on March 2 after criticism that the international assistance was insufficient . The Save the Children organization helped reunited separated children from their families , while World Relief flew seeds and tools to help 26 @, @ 260 farmers regrow their damaged crops . The United Kingdom assisted by canceling the country 's \$ 150 million debt earlier than scheduled , and urged other nations to follow suit ; Italy canceled its \$ 500 million debt in March . On February 24 , the World Bank provided \$ 2 @. @ 5 million to rebuild roads , and later provided an additional \$ 15 million . The same agency delayed debt payments for one year . Portugal and Spain canceled \$ 150 million and \$ 20 million worth of debt , respectively . Through the Jubilee 2000 , most wealthy nations postponed debt payments for one year on March 16 .