= 1988 ? 89 South @-@ West Indian Ocean cyclone season =

The 1988 ? 89 South @-@ West Indian Ocean cyclone season was an active season that featured several storms moving near or over the Mascarene Islands or Madagascar . The eleven tropical storms was two greater than average , of which five became tropical cyclones ? a storm with maximum sustained winds over 10 minutes of 120 km / h (75 mph) or greater . Storms were monitored by the Météo @-@ France office (MFR) on Réunion island in an official capacity , as well as the American Joint Typhoon Warning Center (JTWC) on an unofficial base . The season began early with Moderate Tropical Storm Adelinina forming in early November , and continued through the middle of April . Adelinina was one of two storms to form in November , the other being Tropical Cyclone Barisaona which crossed from the adjacent Australian basin .

After no activity in December , there were four storms in January , including the most notable of the season ? Cyclone Firinga . The storm caused ? 1 billion (1989 francs , $ 157 million 1989 USD) in damage when it struck Réunion . Tropical Cyclone Calasanjy also formed in the month , causing heavy damage when it struck western Madagascar . Three storms formed in February , the second of which , Hanitra , also crossed from the Australian basin . This storm , as well as later Tropical Cyclone Krisy , were the strongest of the season , attaining peak 10 ? minute winds of 150 km / h (95 mph) . Tropical Cyclone Jinabo was the first of three storms to form in quick succession in late March , the others being Krisy and Tropical Storm Lezissy . Jinabo originated off the east coast of Madagascar and dropped heavy rainfall on Réunion . Krisy took a similar track and passed within 100 km (60 mi) of Rodrigues and Mauritius , causing heavy crop damage . Lastly , Tropical Storm Lezissy merged with Krisy and dissipated on April 11 to end the season .

= = Seasonal summary = =

During the season , the Météo @-@ France office (MFR) on Réunion island issued warnings in tropical cyclones within the basin . Using satellite imagery from National Oceanic and Atmospheric Administration , the agency estimated intensity through the Dvorak technique , and warned on tropical cyclones in the region from the coast of Africa to 90 ° E , south of the equator . At the time , the World Meteorological Organization recognized the MFR as a Regional Tropical Cyclone Advisory Centre , and would later label the agency as a Regional Specialized Meteorological Center in 1993 . The Joint Typhoon Warning Center (JTWC) , which is a joint United States Navy ? United States Air Force task force , also issued tropical cyclone warnings for the southwestern Indian Ocean . The season 's 11 named storms is slightly above the long term average , while the five tropical cyclones ? a storm attaining maximum sustained winds of at least 120 km / h (75 mph) ? was the same as the long term average . There was an ongoing La Niña event in the middle of the season . The MFR considered the tropical cyclone year to begin on August 1 and continue to July 31 of the following year .

In addition to the storms monitored by the MFR , the JTWC tracked a storm in March that formed off the west coast of Madagascar on March 7 . It moved generally to the south or south @-@ southeast , failing to intensify beyond 1 ? minute winds of 65 km / h (40 mph) . After passing west of Madagascar , the storm dissipated on March 11 .

= = Storms = =

= = = Moderate Tropical Storm Adelinina = = =

The Intertropical Convergence Zone (ITCZ) over the eastern Indian Ocean was the origin of what would become Tropical Storm Adelinina . On October 30 , the JTWC began monitoring the system to the south of Diego Garcia , and classified it as Tropical Cyclone 01S on November 1 . On the next day , the MFR began issuing advisories on the system and quickly upgraded it to Moderate Tropical Storm Adelinina . The agency estimated 10 ? minute winds of 65 km / h (40 mph) as the storm

moved to the southeast . By contrast , the JTWC assessed that Adelinina rapidly intensified into the equivalent of a minimal hurricane on November 2 , estimating peak 1 ? minute winds of 140 km / h (85 mph) the next day . Without strengthening further , Adelinina began weakening on November 4 , turning to the east and later turning back to the northwest ; the track was influenced by a ridge to the south . Adelinina completed its five @-@ day loop on November 7 as it crossed westward over its former track . That day , the MFR re @-@ upgraded the system to tropical storm status , but discontinued advisories on November 8 .

= = = Tropical Cyclone Barisaona = = =

On November 5 , a tropical depression formed in the Australian basin south of Indonesia from a trough . It moved slowly and erratically to the west , only gradually organizing . On November 8 , the JTWC classified the system as Tropical Cyclone 02S . Before entering the south @-@ west Indian Ocean , the Bureau of Meteorology (BoM) estimated that the system reached 10 ? minute winds of 105 km / h (65 mph) . However , the BoM did not include the system in its annual summary of the season , and at the time it was considered a tropical depression in the Australian region . On November 12 , the system crossed 90 ° E , classified as Moderate Tropical Storm Barisaona by the MFR . By that time , the storm was moving steadily to the west @-@ southwest , steered by a ridge to the south , and it attained tropical cyclone status two days later . Also on November 14 , the MFR estimated peak 10 ? minute winds of 135 km / h (85 mph) , based on the well @-@ defined eye . Barisaona briefly weakened to tropical storm status on November 15 , only to regain tropical cyclone status the next day . On November 16 , the JTWC estimated peak 1 ? minute winds of 185 km / h (115 mph) . A passing trough turned the cyclone to the southwest . It gradually weakened thereafter , and JTWC discontinued advisories on November 20 . The MFR tracked Barisaona for a few more days as a ridge steered the system back to the north ; the system dissipated on November 23 .

= = = Tropical Cyclone Calasanjy = = =

The origins of Calasanjy were from the ITCZ in the Mozambique Channel off the northwest coast of Madagascar in early January . An area of disturbed weather moved southwestward at first , but gradually curved to the northwest . On January 9 , the MFR classified it as a tropical disturbance , but upgraded it to Moderate Tropical Storm Calasanjy on the next day . Also on January 10 , the JTWC designated the storm as Tropical Cyclone 06S . By that time , Calasanjy was just off the east coast of Mozambique , although it executed a tight loop to the southeast spare a landfall . Moving along its former path , the storm gradually intensified ? the JTWC upgraded it to the equivalent of a minimal hurricane on January 12 , and the MFR upgraded Calasanjy to tropical cyclone status two days later . Both agencies estimated peak winds of around 135 km / h (85 mph) . Later on January 14 , Calasanjy made landfall in western Madagascar near Morondava , and soon after moving ashore it turned to the southwest , its motion changed due to a ridge to the southeast . It weakened to tropical depression status before re @-@ emerging into the Mozambique Channel on January 16 , becoming extratropical the next day .

Cyclone Calasanjy caused heavy damage in western Madagascar , with a peak wind gust of 195 km / h (120 mph) in Maintirano . The storm caused the Morondava River to increase to a flow rate of 2 @,@ 702 m3 / s (95 @,@ 420 ft3 / s) , with a peak height of 4 @.@ 08 m (13 @.@ 4 ft) during the storm . Reforms enacted after previous cyclones Kamisy and Honorinina helped facilitate repairs following this storm .

= = = Tropical Depression Dona = = =

On January 10 , a tropical disturbance formed east @-@ northeast of St. Brandon , which is a small archipelago belonging to Mauritius . It originally consisted of a small , weak vortex , although it gradually organized . The system moved to the southwest and quickly intensified into a tropical depression , reaching peak winds of 50 km / h (30 mph) . Despite it only being a depression , the

Mauritius Meteorological Service named the depression Dona due to the threat to the island . The system turned more to the south ahead of a trough , passing east of St. Brandon and later to the west of Rodrigues . Later , Dona turned to the southeast , dissipating on January 14 without affecting land .

= = = Severe Tropical Storm Edme = = =

On January 20 , a tropical disturbance formed about 240 km (150 mi) west of the Cocos Islands . That day , the JTWC classified it as Tropical Cyclone 07S , although it had monitored the system for the preceding three days . The nascent disturbance moved to the south and gradually intensified , becoming Moderate Tropical Storm Edme on January 21 . On the next day , the JTWC upgraded the storm to the equivalent of a minimal hurricane , as Edme was aided by favorable upper level conditions beneath an anticyclone . On January 23 , the agency estimated peak 1 ? minute winds of 215 km / h (130 mph) ; however , the MFR only assessed peak 10 ? minute winds of 115 km / h (70 mph) , just shy of tropical cyclone status . By the time of peak intensity , Edme had begun moving southwestward and thereafter weakened due to increasing wind shear , imparted by a trough in the Westerlies . On January 26 , the storm weakened to tropical depression status as it turned to the south . Edme dissipated the following day .

= = = Tropical Cyclone Firinga = = =

Firinga developed on January 24 well to the northeast of Mauritius . After initially moving to the southeast , it began a southwest motion that it would continue for several days . During that time , the system intensified into Moderate Tropical Storm Firinga , and the JTWC upgraded it to the equivalent of a minimal hurricane on January 28 . Early the next day , it intensified to tropical cyclone status , reaching peak winds of 135 km / h (85 mph) . Around that time , Firinga passed 50 km (30 mi) west of Mauritius , producing 190 km / h (120 mph) wind gusts . Shortly thereafter , the cyclone struck Réunion , still at peak intensity , producing wind gusts as strong as 216 km / h (134 mph) . Firinga turned more to the south as it weakened , degenerating into a tropical disturbance on January 31 . It fluctuated in intensity after turning to the southeast and executing a loop to the southwest , dissipating on February 7 .

On Mauritius , Firinga destroyed 844 homes . Heavy crop damage occurred on the island , and damage nationwide was estimated at $ 60 million (1989 USD) . One person was killed in Mauritius . The storm dropped torrential rainfall in the southern portion of Réunion , including 24 ? hour totals of 1 @,@ 309 mm (51 @.@ 5 in) at Pas de Bellecombe and 1 @,@ 199 mm (47 @.@ 2 in) at Casabois , both of which set records for the locations . The rains caused widespread river flooding and resulted in 32 mudslides . Firinga isolated several towns from the flooding and left power and water outages . A total of 2 @,@ 746 houses were damaged or destroyed , leaving 6 @,@ 200 people homeless . Damage was estimated at around ? 1 billion (1989 francs , $ 157 million 1989 USD) , and there were 10 deaths on the island .

= = = Severe Tropical Storm Gizela = = =

A tropical disturbance formed on February 16 to the southeast of Diego Garcia . It moved to the west @-@ southwest , intensifying into Moderate Tropical Storm Gizela on February 18 . That day , the JTWC began classifying it as Tropical Cyclone 12S . Due to a passing trough , Gizela turned to the south and southeast , gradually strengthening . On February 20 , the MFR estimated peak 10 ? minute winds of 95 km / h (60 mph) , while the JTWC upgraded it to the equivalent of a minimal hurricane . Influenced by a ridge , Gizela turned back to the southwest and slowly weakened while remaining far away from any landmasses . On February 22 , it weakened to tropical depression status while turning to the south , and Gizela dissipated two days later .

= = = Tropical Cyclone Leon @-@ Hanitra = = =

A weak low pressure area was evident in the Australian basin as early as February 13 between the Cocos Islands and Christmas Island . It meandered for several days , executing a small loop , before beginning a westward motion . After passing south of the Cocos Islands , the system intensified into a tropical storm on February 18 and was named Leon . On the next day , the storm crossed into the south @-@ west Indian Ocean , whereupon the Mauritius Meteorological Service renamed it Hanitra . The storm quickly intensified once it entered the basin . The JTWC , which designated the storm as Tropical Cyclone 11S , upgraded Hanitra to the equivalent of a minimal hurricane late on February 19 . On February 22 , the agency estimated peak 1 ? minute winds of 230 km / h (145 mph) , by which time Hanitra had begun a steady southwest motion . By contrast , the MFR assessed slower strengthening , only upgrading it to tropical cyclone status on February 23 and estimating peak 10 ? minute winds of 150 km / h (95 mph) . The storm gradually accelerated to the south and weakened , becoming extratropical over time . The motion shifted to the southeast on February 28 , and Hanitra dissipated the next day .

= = = Moderate Tropical Storm Iana = = =

Before Iana formed , there was a persistent area of cloudiness across the Mozambique Channel in late February . A low pressure area originated over eastern Mozambique and moved eastward over water , emerging near Beira . On February 25 , a tropical disturbance formed off the west coast of southern Madagascar and moved east @-@ northeastward , steered by a ridge to the south . Shortly thereafter , the center passed just north of Europa Island . By the next day , it intensified into Moderate Tropical Storm Iana , reaching peak 10 ? minute winds of 85 km / h (50 mph) . Late on February 26 , the storm made landfall in western Madagascar near Morombe . Iana weakened slightly while moving east @-@ southeastward through the country , emerging into the Indian Ocean on February 27 near Farafangana . On the next day , the storm weakened to tropical depression status as it curved southward . Iana became extratropical the next day . The storm was not tracked by the JTWC .

On Europa Island , Iana produced 86 km / h (53 mph) wind gusts , while on Madagascar , gusts peaked at 80 km / h (49 mph) at Morondava .

= = = Severe Tropical Storm Jinabo = = =

A tropical disturbance originated just east of St. Brandon on March 23 , initially consisting of a disorganized area of convection without a distinct center . Moving briskly westward , it slowly organized , becoming Moderate Tropical Storm Jinabo on March 25 . That day , the JTWC classified the system as Tropical Cyclone 19S . The storm turned to the southwest due to a trough in the region , bringing it parallel to the east coast of Madagascar . On March 26 , the JTWC upgraded Jinabo to the equivalent of a minimal hurricane , and early the next day , the MFR estimated peak 10 ? minute winds of 115 km / h (70 mph) . Around that time , the storm stalled about 110 km (70 mi) east of the coast of Madagascar , later turning to the southeast due to a ridge . Quickly weakening , Jinabo was only a minimal tropical storm by March 29 . On the next day , it turned back to the south . Jinabo weakened to tropical depression status on March 31 and dissipated the next day , having become extratropical and joining the westeries .

The storm brought gusty winds and rainfall to Madagascar and Réunion . On the former island , gusts reached 107 km / h (67 mph) at Mahanoro along the coast . On Réunion , the storm drenched the island for six days , with a peak of 565 mm (22 @.@ 2 in) at Sainte @-@ Rose .

= = = Tropical Cyclone Krisy = = =

About a week after Jinabo formed , another tropical disturbance formed in the basin on March 28 south of Diego Garcia . In its formative stages , it moved erratically , although generally to the southwest . On March 30 , it intensified into Moderate Tropical Storm Krisy , the same day that the

JTWC classified it as Tropical Cyclone 21S . Due to a ridge to the south , Krisy 's track shifted to the west that day before turning southward on April 1 . During that time , the JTWC assessed that Krisy intensified to the equivalent of a minimal hurricane . The MFR upgraded the storm to cyclone status on April 2 , and on that day the JTWC estimated peak 1 ? minute winds of 195 km / h (120 mph) . On April 3 , the MFR estimated peak 10 ? minute winds of 150 km / h (95 mph) as the cyclone turned to the west @-@ southwest . Over the next few days , the storm slowly weakened , passing 100 km (60 mi) north of Rodrigues on April 5 as a moderate tropical storm . On the next day , Krisy brushed the east coasts of Mauritius and Réunion , passing just 30 km (18 mi) east of the former island . It weakened to tropical depression status on April 7 while curving to the south and later to the east , becoming extratropical . A ridge turned the remnants of Krisy to the north toward Tropical Depression Lezissy , and the two systems merged on April 11 .

Krisy first affected Rodrigues , producing 122 km / h (76 mph) gusts and 97 @.@ 6 mm (3 @.@ 84 mm) of rainfall . Gusts reached 90 km / h (56 mph) on Réunion , and high waves affected the island for several days . However , effects were worst on Mauritius . While passing south of the island , Krisy produced wind gusts of 155 km / h (96 mph) at Plaisance Airport on Mauritius . Rainfall on the island reached 182 mm (7 @.@ 2 in) over a 24 period . On the island , the passages of Firinga and Krisy decreased the output of the sugar crop by 20 @,@ 000 tons , accounting for 15 % of the sugar cane , mostly in the southeastern portion of the island . Several other crops were affected by the two cyclones , resulting in a 50 % decrease of the banana output . As Krisy struck just two months after Firinga , residents heeded alerts and were well @-@ prepared , and 800 people sought shelter . There were no direct deaths , although one farmer committed suicide due to the threat of the storm .

= = = Moderate Tropical Storm Lezissy = = =

The final storm of the season formed on April 6 to the east @-@ southeast of Diego Garcia while Krisy was active near Rodrigues . That same day , the JTWC classified it as Tropical Cyclone 24S . It quickly intensified into Moderate Tropical Storm Lezissy as it took a westward trajectory , reaching peak winds of 85 km / h (50 mph) by late on April 6 . Influenced by a broad area of low pressure , Lezissy turned to the southwest , gradually weakening . It approached former Cyclone Krisy , and the two systems merged by April 11 , both losing their circulations and leaving behind a disorganized remnant low .