= 1993 ? 94 South @-@ West Indian Ocean cyclone season =

The 1993 ? 94 South @-@ West Indian Ocean cyclone season was the most active since the start of reliable satellite coverage in 1967 , with 15 named storms including one named tropical depression . Activity lasted from mid @-@ November , when Moderate Tropical Storm Alexina formed , until mid @-@ April , when Tropical Cyclone Odille became extratropical . Four tropical cyclones ? Daisy , Geralda , Litanne , and Nadia ? struck eastern Madagascar , of which Geralda was the costliest and deadliest . With gusts as strong as 350 km / h (220 mph) accompanied by heavy rainfall , the cyclone destroyed more than 40 @,@ 000 homes and left 356 @,@ 000 people homeless . Geralda killed 231 people and left more than $ 10 million in damage . Cyclone Nadia was the second deadliest cyclone , having killed 12 people in northern Madagascar and later severely damaging portions of northeastern Mozambique , killing about 240 people and leaving $ 20 million in damage in the latter country . In February , Cyclone Hollanda struck Mauritius near peak intensity , causing $ 135 million in damage and two deaths .

Three storms ? Alexina , Bettina , and Cecilia ? formed in late 1993 , of which Cecilia affected land ; it produced heavy rainfall in Réunion while dissipating . Cyclone Daisy was the first storm in 1994 , which struck Madagascar twice and affected many areas that were later struck by Geralda . One cyclone ? Farah ? previously formed in the Australian basin as Tropical Cyclone Pearl before crossing into the south @-@ west Indian Ocean . Tropical Cyclone Ivy threatened Mauritius just days after Hollanda struck , and Intense Tropical Cyclone Litanne in March was the third of the season to hit northeastern Madagascar . The basin is defined as the area west of 90 ° E and south of the Equator in the Indian Ocean , which includes the waters around Madagascar westward to the east coast of Africa . Tropical cyclones in this basin are monitored by the Regional Specialised Meteorological Centre in Réunion (MFR) , as well as by the Joint Typhoon Warning Center (JTWC) .

= = Seasonal summary = =

On July 1 , 1993 , the Météo @-@ France office in Réunion (MFR) became a Regional Specialized Meteorological Center , as designated by the World Meteorological Organization . In the year , MFR tracked tropical cyclones south of the equator from the coast of Africa to 90 ° E. Due to the high activity during the season , MFR issued twice the number of advisories as in the previous year . Every six hours in the season , the agency issued bulletins when there was a tropical system within the basin . Storms were named by advisory centers in Mauritius and Madagascar .

During the year , there were neutral El Niño Southern Oscillation conditions , and for several months there was a well @-@ established monsoon trough that extended into the Australian basin . The average storm duration was 9 days , although the final storm , Odille , lasted 16 days , a record at the time . The season was the most active on record since the start of reliable satellite coverage in 1967 . Due to the high number of storms , there were a record number of cyclone days ? days in which a tropical cyclone is active ? as well as intense tropical cyclone days , the latter with 27 . The next season approach either total was the 2001 ? 02 season . MFR had an alphabetically prepared list of names for the season , the last seven of which went unused : Pemma , Ronna , Sydna , Telia , Valentina , Williana , and Yvanna .

In addition to the named storms , MFR tracked three other tropical systems that did not last for more than 24 hours . The first , designated Tropical Depression C1 , formed on December 5 near the eastern portion of the basin , and quickly dissipated . The other two , designated E1 and H1 , formed in January and February , respectively . In addition , Tropical Cyclone Willy crossed into the basin as a dissipating tropical depression , for which MFR did not issue advisories .

= = Storms = =

= = = Moderate Tropical Storm Alexina = = =

The first storm of the season formed from a low pressure area with associated convection that persisted east of the Chagos Archipelago on November 7 . It formed in tandem with two tropical depressions in the North Indian ocean . The JTWC began tracking the system that day , although MFR did not follow suit until two days later . On November 10 , the depression intensified into Moderate Tropical Storm Alexina , having developed a central dense overcast . A narrow eastward @-@ moving trough caused the storm to move generally southward for its entire duration , the only such storm of the season to maintain a largely north @-@ south track . On November 11 , MFR estimated that Alexina attained peak winds of 85 km / h (55 mph) , while JTWC estimated peak winds of 110 km / h (70 mph) . Increased wind shear disrupted the convection , while a building ridge to the south caused its movement to slow . By late on November 12 , Alexina weakened to tropical depression status , which subsequently drifted to the west until dissipating on November 16 .

= = = Severe Tropical Storm Bettina = = =

On November 23 , the intertropical convergence zone spawned a low pressure area in the far northeastern portion of the basin , which the JTWC assessed as having formed in the western Australian basin . Located north of a large ridge , the system tracked southwestward initially before turning more to the west . Late on November 25 , MFR began classifying the system as a tropical disturbance , and within 12 hours the agency upgraded it to Moderate Tropical Storm Bettina . On November 26 , the storm turned to the southwest . The next day , Bettina developed an eye feature , and MFR upgraded it to a severe tropical storm , with winds of 110 km / h (70 mph) . By comparison , the JTWC estimated winds of 100 km / h (65 mph) . After wind shear increased sharply on November 28 , the storm quickly weakened and within 24 hours was devoid of convection . Bettina again turned to the west as a tropical depression , moving around the large ridge . It briefly re @-@ intensified on December 1 , but dissipated on December 3 south of the Mascarene Islands .

= = = Severe Tropical Storm Cecilia = = =

The intertropical convergence zone spawned a tropical disturbance in the northeast portion of the basin on December 9 . Initially the system did not develop , and MFR did not classify it until December 12 . The next day , the depression intensified into a moderate tropical storm , and was named Cecilia . The strengthening was short @-@ lived , and the storm quickly weakened to tropical depression status on December 14 . After initially tracking to the southwest , Cecilia turned to the west on December 15 due to a strengthening ridge to the south , by which time it had restrengthened and developed a central dense overcast . On December 17 , MFR upgraded the storm toa severe tropical storm , with winds of 100 km / h (65 mph) according to MFR . The next day , JTWC estimated that Cecilia intensified to reach winds of 160 km / h (100 mph) . While near peak intensity , the storm turned to the southwest and began weakening after wind shear increased . By December 19 , Cecilia had weakened to tropical depression status , and dissipated on December 21 after passing west of Réunion . An approaching trough had caused thunderstorms to reform in the eastern portion of the circulation , which resulted in heavy rainfall over Mauritius and later Réunion . In the latter island , the rainfall was heaviest in the northern portion , peaking at 475 mm (18 @.@ 7 in) in Salazie in 24 hours ; the same station recorded 286 mm (11 @.@ 3 in) in a 6 hour period , including 47 mm (1 @.@ 9 in) in just 30 minutes .

= = = Tropical Cyclone Daisy = = =

In early January , the intertropical convergence zone persisted off the northeast coast of Madagascar , spawning a low pressure area on January 6 . The next day , the system developed into a tropical disturbance , which initially moved to the east due to high pressure to the south . On

January 8 , the system developed a curved area of convection , which later developed into a central dense overcast . Initially located within a broader trough , the disturbance gradually became better defined as a distinct system . On January 10 , it intensified into Moderate Tropical Storm Daisy while passing near St. Brandon . A trough to the south weakened the ridge , causing the storm to turn to the southwest toward Madagascar . Daisy intensified into a severe tropical storm on January 11 , and later into a tropical cyclone the next day . At around 1200 UTC on January 13 , the cyclone made landfall near Brickaville in eastern Madagascar , with MFR estimating winds of about 155 km / h (100 mph) ; at around the same time , the JTWC estimated peak winds of 175 km / h (110 mph) . At landfall , Daisy had a symmetrical cloud pattern 400 km (250 mi) in diameter . The high mountains of Madagascar caused the storm to quickly weaken , although it emerged into the Mozambique Channel as a tropical disturbance on January 15 . That day , a trough turned Daisy to the south , and it briefly re @-@ intensified into a tropical storm over warm waters . On January 16 , Daisy made a second landfall in southern Madagascar and dissipated the next day .

When Daisy struck Madagascar , it produced 200 km / h (120 mph) wind gusts on Île Sainte @-@ Marie , along with heavy rainfall . The storm destroyed over 90 schools and government buildings and damaged the road network . Madagascar 's capital Antananarivo was flooded , forcing 6 @,@ 000 people to evacuate . Many of the same areas affected by Daisy were later affected by Geralda in February .

= = = Severe Tropical Storm Edmea = = =

The intertropical convergence zone spawned a low pressure area south of the Chagos archipelago on January 12 , and developed a large area of convection the next day . On January 13 , MFR began classifying the system as a tropical depression , and following further intensification , the agency upgraded the depression to Moderate Tropical Storm Edmea later that day . With a ridge to the southeast , the storm tracked generally to the southwest . Its initial strengthening rate slowed until Edmea reached peak winds of 95 km / h (60 mph) on January 17 . An approaching trough turned the storm to the south away from any landmasses , and also increased shear which caused weakening . Turning to the southeast on January 18 , Edmea became extratropical the following day and was later absorbed by the trough .

= = = Tropical Cyclone Pearl ? Farah = = =

On January 11 , a tropical low formed northwest of Broome , Western Australia . It was named Pearl a few hours later by the Bureau of Meteorology . The cyclone continued westward and reached a peak intensity of 155 km / h (100 mph) . As the system moved west of 90 ° E , MFR took over warning responsibility on January 18 and renamed the cyclone Farah . At that time , MFR estimated winds of about 120 km / h (75 mph) . After having moved westward due to a ridge to the south , Farah turned to the south upon entering the basin due to an approaching trough , which previously absorbed Edmea . High wind shear caused rapid weakening , and by January 19 , there was little remaining convection . The next day , Farah weakened to tropical depression status and turned to the southeast . The ridge built behind the trough , causing the depression to stall and drift northward , and by February 22 , Farah dissipated .

= = = Intense Tropical Cyclone Geralda = = =

Cyclone Geralda originated from an area of low pressure from the monsoon trough on January 25 . Over the following few days , the depression underwent gradual intensification , and MFR estimated peak winds of 200 km / h (125 mph) on January 31 . Cyclone Geralda made landfall near Toamasina , Madagascar after weakening from its peak intensity . Within hours of moving onshore , the system had substantially weakened , and by February 5 , Geralda had degenerated into a land depression . After briefly emerging into the Mozambique Channel , Geralda crossed southern Madagascar , and it became extratropical on February 8 . Geralda was the strongest of the season

and the strongest to hit Madagascar since a cyclone in March 1927 .

Geralda was the second cyclone in as many months to strike eastern Madagascar , after Daisy in January . Geralda produced wind gusts as strong as 350 km / h (220 mph) , which were the highest worldwide for several decades . The cyclone also dropped heavy rainfall that caused flooding , particularly in valleys . About 80 % of the city of Toamasina was destroyed , including most schools , homes , and churches . The cyclone heavily damaged roads and rail lines , which later disrupted relief efforts . In the capital Antananarivo , Geralda killed 43 people after flooding many houses . Overall , more than 40 @,@ 000 homes were destroyed , leaving 356 @,@ 000 people homeless . Nationwide , the cyclone killed 231 people and caused over $ 10 million in damage . Relief work in the storm 's aftermath was hampered by lack of coordination , and the Malagasy military were deployed to help storm victims . Few stocks were pre @-@ positioned , causing food prices to rise greatly . Several countries and departments of the United Nations donated money or supplies to the country .

= = = Tropical Cyclone Hollanda = = =

The monsoon trough remained active , spawning a tropical depression on February 6 south of the Chagos archipelago . The system moved generally southwestward for much of its duration , steered by a ridge to the south . On February 8 , the depression intensified into Moderate Tropical Storm Hollanda , and the next day became a tropical cyclone , developing a small 20 km (12 mi) eye . On February 10 , the cyclone attained peak winds of 155 km / h (100 mph) , as assessed by MFR , and that day Hollanda struck the island of Mauritius at that intensity . Subsequently , the cyclone weakened while turning more to the south . A trough turned Hollanda to the east on February 13 , and the next day the storm became extratropical .

While moving across the island , Hollanda produced wind gusts of 216 km / h (134 mph) in the capital city of Port Louis , while heavy rainfall reached 711 mm (28 @.@ 0 in) in Mare aux Vacoas . The cyclone destroyed or severely damaged 450 houses , which left at least 1 @,@ 500 people homeless . High winds downed about 30 % of the island 's trees and left half of the island without power . Hollanda also caused severe crop damage ; nearly half of the island 's sugar crop was destroyed , which necessitated for the government to assist in replanting efforts . Hollanda killed two people and caused $ 135 million in damage on Mauritius . The highest rainfall from the cyclone fell on Réunion , with 741 mm (29 @.@ 2 in) recorded at Grand Coude . On that island , there was also damage to crops and power lines .

= = = Tropical Cyclone Ivy = = =

The origins of Cyclone Ivy were from a disturbance that the JTWC began tracking on February 6 in the Australian basin . The next day , the disturbance crossed into the south @-@ west Indian Ocean , and on February 8 , MFR began tracking it . A ridge to the south imparted a general westward movement . With the convection gradually organizing , MFR upgraded the system to a tropical depression on February 9 and later to Moderate Tropical Storm Ivy the next day . A trough associated with the stronger Cyclone Hollanda turned the storm to the southwest . Although the JTWC upgraded Ivy to the equivalent of a minimal hurricane on February 12 , MFR estimated the storm weakened slightly , due to wind shear obscuring the center . By the following day , convection reorganized and the storm re @-@ strengthened , first to severe tropical storm status on February 15 and then to tropical cyclone status the next day . Around that time , Ivy approached within 100 km (62 mi) of Rodrigues , where gusts reached 130 km / h (81 mph) , and there was some damage .

After passing near Rodrigues , Ivy strengthened further , developing a well @-@ defined eye 50 km (31 mi) in diameter , while turning more to the south due to a trough associated with the remnants of Hollanda . The JTWC estimated peak winds of 185 km / h (115 mph) on February 17 , around the same time MFR estimated peak winds of 140 km / h (85 mph) . The strengthening ridge caused Ivy to slow its motion to the southwest while increased shear caused weakening . On February 18 ,

the cyclone weakened to tropical storm status , and by the next day was downgraded to tropical depression status . On February 20 , Ivy became extratropical , which dissipated the subsequent day .

= = = Tropical Depression Julita = = =

In the middle of February , the monsoon trough persisted over the Mozambique Channel and spawned a circulation on February 15 to the west of Juan de Nova Island . Thunderstorms increased around the circulation , and later that day , MFR began tracking the system as a tropical depression . Despite warm air temperatures , the system did not develop a warm core like most tropical cyclones as it moved to the southeast . On February 16 , the storm passed about 40 km (25 mi) south of Juan de Nova Island , producing gusts of 75 km / h (47 mph) . The next day , MFR estimated peak winds of about 55 km / h (35 mph) ; despite that the system did not intensify into a moderate tropical storm , the Meteorological Service of Madagascar named the depression Julita on February 17 . It weakened as its structure deteriorated , and Julita moved ashore in western Madagascar near Morondava early on February 18 . It dissipated shortly thereafter . Julita affected areas impacted by earlier cyclones Daisy and Geralda , but caused minimal damage and no deaths .

= = = Moderate Tropical Storm Kelvina = = =

The intertropical convergence zone spawned an area of convection on March 5 off the northeast coast of Madagascar , which was classified by both JTWC and MFR that day . A large anticyclone to the east caused the system to track generally to the south , and initially wind shear prevented significant strengthening . On March 6 , the Meteorological Service of Madagascar named the system Kelvina , although the depression did not intensify into a moderate tropical storm until the next day . At around that time , the convection became better organized , extending away from the center to the east . On March 8 , MFR estimated peak winds of about 85 km / h (50 mph) , although further strengthening was prevented by an increase in wind shear . On March 10 , Kelvina passed near Reunion , where it dropped heavy rainfall . The next day , the storm became extratropical , which continued south for several days , eventually degenerating into a trough that influenced the tracks of subsequent tropical cyclones .

= = = Intense Tropical Cyclone Litanne = = =

In late February , low pressure area developed near the Cocos Islands , associated with the monsoon trough . After initially moving eastward , a ridge turned it to the west , and on March 7 , the system crossed 90 ° E into the south @-@ west Indian Ocean as a developing tropical depression . The next day , MFR upgraded it to Tropical Storm Litanne . For much of its track , Litanne moved generally to the west @-@ southwest , to the north of a large ridge . The storm quickly intensified , developing an eye feature within its central dense overcast by late on March 8 . Late on March 9 , MFR upgraded Litanne to a tropical cyclone , after the storm developed a small , well @-@ defined eye 20 km (12 mi) in diameter . With warm sea surface temperatures , Litanne intensified into an intense tropical cyclone by late on March 10 , although it subsequently weakened slightly . The cyclone turned to the southwest due to a trough from the remnants of Kelvina . Around 2000 UTC on March 12 , Litanne passed near St. Brandon , and the next day the cyclone passed about 300 km (190 mi) north of Réunion island . At the time , the storm 's eye was 40 km (25 mi) wide , and the wind radius was about 175 km (109 mi) wide . The islands reported high surf but little effects . Subsequently , the storm turned more to the west , and Litanne restrengthened into an intense tropical cyclone while approaching the eastern coastline of Madagascar . MFR estimated peak winds of 195 km / h (120 mph) on March 14 .

Weakening slightly after peaking in intensity , Cyclone Litanne continued to the west , making landfall near Brickaville in east @-@ central Madagascar at 1600 UTC on March 15 . This occurred

months after cyclones Daisy and Geralda affected the same general area . Four hours before landfall , the storm had peak winds of 165 km / h (105 mph) . A strengthening trough turned Litanne southward over the eastern portion of the country , and the storm dropped heavy rainfall . Flooding was limited , although high winds severely damaged the rice crop . Increasing wind shear removed the convection , causing quick weakening . On March 17 , Litanne emerged from southeastern Madagascar into the Indian Ocean as a tropical depression , and the next day transitioned into an extratropical cyclone after being absorbed by a nearby trough . Five days later after accelerating to the southeast , the storm dissipated about 2 @,@ 000 km (1 @,@ 200 mi) south of where it first developed .

= = = Severe Tropical Storm Mariola = = =

The monsoon trough persisted east of the Cocos Islands in early March in the Australian basin , spawning the earlier Cyclone Litanne and the system that would eventually become Mariola . An area of convection developed on March 5 , and gradually organized with favorable upper @-@ level winds . The JTWC began tracking it on March 7 , and MFR followed suit the next day , when the system was located about 2 @,@ 000 km (1 @,@ 200 mi) east of Litanne . On March 10 , the MFR estimated the system became a tropical depression once it developed a central dense overcast , and that night the system crossed into the basin as a moderate tropical storm , making it one of three concurrent storms , along with Kelvina and Litanne . With the ridge to the south , the storm tracked generally westward for much of its duration . After MFR named the storm Mariola early on March 11 , steady strengthening continued . On March 12 , a small eye feature developed , indicating the storm was near tropical cyclone intensity . MFR estimated peak winds of 115 km / h (70 mph) , and JTWC estimated peak winds of 165 km / h (105 mph) .

Due to Litanne crossing the same path three days earlier , Mariola was unable to intensify further . It began weakening shortly after peak intensity , and the structure gradually deteriorated . The storm turned slightly to the south @-@ west due to the remnants of Kelvina disrupting the ridge , although a west motion resumed after the ridge restrengthened . Cooler and drier air weakened the convection , and Mariola weakened below tropical storm status on March 18 . The next day , the depression dissipated north of Reunion .

= = = Intense Tropical Cyclone Nadia = = =

Cyclone Nadia formed on March 16 and moved westward for the first ten days of its duration , due to a ridge to the south . Warm waters and low wind shear allowed for the storm to gradually strengthen , first into a moderate tropical storm on March 19 and later into a tropical cyclone on March 21 . After developing a well @-@ defined eye , Nadia intensified to reach winds of 175 km / h (110 mph) early on March 22 , according to MFR . The JTWC estimated winds of about 220 km / h (140 mph) . On March 23 , the cyclone struck northern Madagascar , causing flooding and localized damage where it moved ashore . There were 12 deaths in the country . Nadia emerged into the Mozambique Channel as a weakened storm , although it reintensified slightly before making landfall in northeastern Mozambique on March 24 . The storm turned southward through the country , emerging over water on March 26 . It turned to the northeast and meandered over waters before dissipating on April 1 .

Damage was heaviest in Mozambique , estimated at about $ 20 million . Cyclone Nadia severely affected four provinces in the country , primarily Nampula Province where it moved ashore . There , 85 % of the houses were destroyed , and across its path , the cyclone left 1 @.@ 5 million people homeless . High winds caused widespread power outages , left areas without water , and significantly damaged crops , notably the cashew crop . The storm struck before the harvest , and lack of food caused 300 deaths in the months after the storm . Across Mozambique , Nadia directly caused 240 deaths and injured thousands . Effects spread as far inland as Malawi .

= = = Intense Tropical Cyclone Odille = = =

Around March 26 , an area of disturbed weather persisted just east of 90 ° E , associated with a low pressure area . That day , the JTWC began tracking the system . Located north of an anticyclone , the system tracked slowly to the south before curving to the west . On March 30 , it became a tropical depression , and that day crossed into the basin . The next day , the depression was named Odille after it intensified further . With low wind shear , the storm steadily intensified as it moved to the west , reaching severe tropical cyclone status on April 2 after an eye feature developed . The JTWC estimated winds of 150 km / h (90 mph) on April 3 , equivalent to a minimal hurricane , although subsequently Odille weakened after turning to the northwest and experiencing increased wind shear . By April 6 , the system had weakened to a tropical disturbance with a poorly defined center , which was dislocated from the remainder of the convection .

On April 4 , Odille began redeveloping convection and re @-@ intensified into a moderate tropical storm , after entering an area of more favorable conditions . Around that time , it began moving to the southwest due to a break between the ridge . On April 10 , Odille intensified into a tropical cyclone while moving slowly around a ridge . The next day , it intensified into an intense tropical cyclone while passing near St. Brandon and turning to the southeast due to an approaching trough . Odille developed a well @-@ defined eye 45 km (28 mi) in diameter , and MFR estimated peak winds of 175 km / h (110 mph) , while the JTWC estimated winds of 195 km / h (120 mph) . On April 12 , the cyclone passed about 150 km (95 mi) west of Rodrigues , where wind gusts reached 125 km / h (78 mph) at Port Mathurin . Steady weakening occurred as Odille accelerated and experienced increasing shear , weakening below tropical cyclone status on April 13 . The next day , the storm became extratropical , which lasted three more days until it was absorbed by the cold front .

= = Season effects = =

This table lists all the cyclones that developed in the Indian Ocean , during the 1993 ? 94 South @-@ West Indian Ocean cyclone season . It includes their intensity , duration , name , landfalls , deaths , and damages .