= 2001 North Indian Ocean cyclone season =

The 2001 North Indian Ocean cyclone season was fairly quiet , although activity was evenly spread between the Arabian Sea and the Bay of Bengal . There were six depressions tracked by the India Meteorological Department (IMD) , which is the official Regional Specialized Meteorological Center for the northern Indian Ocean . The agency also tracked four cyclonic storms , which have maximum winds of at least 65 km / h (40 mph) sustained over 3 minutes . The American @-@ based Joint Typhoon Warning Center tracked an additional storm ? Tropical Storm Vamei ? which crossed from the South China Sea at a record @-@ low latitude .

The first storm originated on May 21 , and became the strongest recorded storm in the Arabian Sea at the time . The IMD estimated peak 3 minute winds of 215 km / h (135 mph) while the storm was off the west coast of India . The storm weakened greatly before making landfall in Gujarat , and although impact on land was minor , it left up to 950 fishermen missing . A few weeks later , the first Bay of Bengal system originated ? a short @-@ lived depression that dropped heavy rainfall upon striking Odisha . After a period of inactivity during the monsoon season , there were cyclonic storms in September and October in the northern Arabian Sea . Both lasted only a few days and dissipated due to unfavorable wind shear . Another cyclonic storm formed in the Bay of Bengal and struck Andhra Pradesh , which dropped heavy rainfall that was equivalent to 300 % of the average October precipitation total . The rains caused flooding , particularly in Cuddapah , where a dam was deliberately opened and inundated the town overnight . There were 153 deaths due to the storm and RS5 billion (Indian rupees , $ 104 million USD) in damage . The final storm of the season tracked by the IMD was a short @-@ lived depression in November in the Bay of Bengal .

= = Season summary = =

The India Meteorological Department (IMD) in New Delhi ? the official Regional Specialized Meteorological Center for the northern Indian Ocean as recognized by the World Meteorological Organization ? issued warnings for tropical cyclones developing in the region . The basin 's activity is sub @-@ divided between the Arabian Sea and the Bay of Bengal on opposite coasts of India , and is generally split before and after the monsoon season . The IMD utilized satellite imagery to track storms , and used the Dvorak technique to estimate intensity .

Toward the end of the year , convection was generally lower than normal in the Bay of Bengal , despite being a typical hotspot for activity . There were no deaths or damage throughout the year outside of India , and damage there was lower than what occurred in the previous few seasons .

= = Storms = =

= = = Extremely Severe Cyclonic Storm ARB 01 = = =

The first storm of the season originated from a tropical disturbance that formed east of Somalia on May 18 . Over the following few days , the system gradually organized , becoming a depression on May 21 . It moved eastward toward the coastline of southwestern India and rapidly intensified on May 22 , strengthening from a deep depression to a very severe cyclonic storm within 24 hours . After approaching the coastline , the storm turned to the north and northwest away from land due to a ridge . Based on the well @-@ defined eye and the storm 's satellite presentation , the IMD estimated peak winds of 215 km / h (135 mph) on May 24 , and the JTWC estimated 1 minute winds of 205 km / h (125 mph) . It became the strongest storm on record in the Arabian Sea , only to be surpassed by Cyclone Gonu in 2007 . Soon after reaching peak intensity , the cyclone rapidly weakened as it turned northward . By May 28 , it had deteriorated into a deep depression , and the IMD downgraded the storm to a remnant low before the circulation reached the Gujarat coast .

Ahead of the storm , all ports in Gujarat , including Kandla , one of the largest in the country , were closed as a precautionary measure . Over 10 @,@ 000 people were evacuated from coastal areas

in the threatened region . Offshore , between 1 @,@ 500 and 2 @,@ 000 fishing vessels lost contact with the mainland immediately after the storm . However , because the storm remained offshore , the coast only experienced minor damage , although rainfall was widespread . About 200 houses were washed away in Kosamba , and one person died in Jamnagar . About 950 fishermen were missing after the storm , which prompted a helicopter search .

= = = Cyclonic Storm ARB 02 = = =

An upper @-@ level disturbance spawned a low pressure area in the eastern Arabian Sea on September 24 . It initially consisted of a well @-@ defined circulation on the eastern edge of an area of convection about 370 km (230 mi) west @-@ southwest of Mumbai . With low wind shear beneath the subtropical ridge , the system gradually organized and developed curved banding features while moving west @-@ northwestward . At 0900 UTC on September 24 , the IMD classified the system as a depression , and nine hours later upgraded it further to a deep depression . On the same day , the JTWC issued a Tropical Cyclone Formation Alert , although they did not begin advisories due to the center being on the east side of the convection . At 0900 UTC on September 25 , the IMD upgraded the system to a cyclonic storm , estimating peak winds of 65 km / h (40 mph) .

Early on September 26 , the circulation moved beneath the convection , prompting the JTWC to begin advisories on Tropical Cyclone 02A . Around that time , the storm 's outskirts dropped light rainfall in western India . Forecasters initially anticipated that the storm would strengthen to winds of 95 km / h (60 mph) and strike the southern Arabian Peninsula . However , persistent wind shear dislocated the circulation from the convection and imparted weakening . The IMD downgraded the storm to a deep depression and later depression on September 27 , by which time the thunderstorms were rapidly dwindling . The JTWC issued their last advisory on September 28 after the circulation had no nearby convection . At that time , the storm was located 185 km (115 mi) east @-@ southeast of Masirah Island off Oman . The IMD also downgraded the depression to a low pressure area on September 28 and noted that the remnant system became poorly defined the following day .

= = = Cyclonic Storm ARB 03 = = =

Similar to the previous storm , an area of convection formed in the Arabian Sea about 185 km (115 mi) west @-@ southwest of Mumbai on October 7 . It was associated with a circulation that moved westward from the Indian Coast , which formed as a well @-@ defined low pressure area over western India . The convection organized and increased , aided by low wind shear and good outflow . Late on October 8 , the IMD classified the system as a depression , and early the next day upgraded it to a deep depression . A low @-@ level circulation formed beneath a well @-@ defined mid @-@ level storm , with intense convection and strong winds north of the center . At 06 : 00 UTC on October 9 , the JTWC began classifying the system as Tropical Cyclone 03A .

With increasing banding features , the storm strengthened while moving west @-@ northwestward , steered by a ridge to the north . At 09 : 00 UTC that day , the IMD upgraded the system to a cyclonic storm , estimating peak winds of 65 km / h (40 mph) . Soon thereafter , the storm began weakening due to increased dry air and the upper @-@ level environment becoming unfavorable . The thunderstorms diminished and disappeared over the circulation by October 10 . That day , the JTWC discontinued advisories , and the IMD downgraded it to a remnant low pressure area south of Pakistan . The storm brushed the Indian coast with rainfall , reaching 105 mm (4 @.@ 1 in) in Gujarat state , although there was no major damage .

= = = Cyclonic Storm BOB 01 = = =

Early on October 14 , a low pressure area formed off the eastern coast of India . While moving generally westward , the system quickly organized into a depression that day . On October 15 , the

IMD estimated peak winds of 65 km / h (40 mph) , based on satellite imagery appearance warranting a Dvorak rating of 2 @.@ 5 ; this made it a cyclonic storm . However , the circulation remained removed from the deep convection . Early on November 16 , the storm made landfall near Nellore , Andhra Pradesh . It quickly weakened over land , degenerating into a remnant low pressure area over Rayalaseema on October 17 .

While moving ashore , the storm dropped heavy rainfall in Andhra Pradesh and extending into Tamil Nadu , causing flooding in some areas for the first time in 40 years . In a 24 ? hour period , Sullurpeta recorded 261 mm (10 @.@ 3 in) of precipitation , and 13 stations recorded daily totals of over 100 mm (4 in) ; the highest two @-@ day rainfall total was 676 @.@ 5 mm (26 @.@ 63 in) , and some areas received 300 % of the average October rainfall within 36 hours . Damage was heaviest in Andhra Pradesh , particularly in Nellore , Chittoor , and Kadapa , although floods also extended into Bihar . Several regional roads and rail lines were damaged , including portions of National Highway 5 , which stranded hundreds of trucks ; the routes were reopened within two weeks . The rains breached 1 @,@ 635 water tanks , while 125 @,@ 000 ha (310 @,@ 000 acres) of crop fields , mostly rice and groundnuts , were impaired . About 1 @,@ 000 head of cattle were killed as well . In Cuddapah , excess water was released from irrigation dams along the Buggavanka River ; water levels rose 1 @.@ 5 m (4 @.@ 9 ft) in the middle of the night , catching residents off guard , and damaging 18 @,@ 244 houses . The dam was also breached in Nellore , and many towns in the region were inundated or isolated for two days . Across the state , the storm damaged 55 @,@ 747 houses , accounting for RS5 billion (Indian rupees , $ 104 million USD) in losses . There were 153 deaths related to the floods and the storm , mostly in Cuddapah .

Following the storm , the Indian Red Cross Society used funds related to previous floods and an earthquake to help 2 @,@ 000 families . After the floods , the Indian government provided food and housing to 61 @,@ 681 residents in 130 shelters , and distributed 20 kg of rice to each household . The army flew helicopters to drop off food , candles , and kerosene to stranded families in Cuddapah . Stagnant waters were disinfected after the floods , and deceased cattle were burned to reduce infection .

= = = Other storms = = =

For several days , the JTWC monitored a disturbance in the northern Bay of Bengal for potential development , associated with the southwest monsoon . On June 9 , a low pressure area formed , and it became well @-@ defined by June 11 . By that time , there was convection located west of an exposed circulation . Early the following day , the IMD classified it as a depression , estimating peak winds of 45 km / h (30 mph) . Strong wind shear prevented much development . Shortly after forming , the system moved northwestward and made landfall near Paradip , Odisha . It quickly weakened below depression intensity on June 13 while progressing inland , degenerating into a remnant low near Madhya Pradesh on June 15 . The system dropped heavy rainfall along its path , with a daily peak of 350 mm (14 in) in Vidarbha .

On November 7 , a cycling area of convection was persistent off the east coast of India , associated with a broad circulation embedded within a trough . The thunderstorms expanded and gradually organized , aided by good outflow and low wind shear . On November 11 , the IMD upgraded the system to a depression off Tamil Nadu and Andhra Pradesh . On the same day , the JTWC began classifying the depression as Tropical Cyclone 04B . Located within a weakness of the ridge , the depression moved slowly to the north and northeast , and was initially expected to move ashore . However , increasing shear removed the convection from the center , and the storm remained offshore while weakening . On November 12 , the IMD downgraded the system back to a low pressure area . The storm brought rainfall to coastal portions of eastern India , peaking at 150 mm (5 @.@ 9 in) in Paradip .

The near @-@ equator Tropical Storm Vamei crossed Sumatra from the South China Sea at the end of December . According to the Japan Meteorological Agency ? the official agency covering the western Pacific Ocean ? the storm dissipated on December 28 along the east coast of Sumatra . On the next day , the remnants entered the Bay of Bengal , and thunderstorms soon reformed over the

circulation due to weak to moderate wind shear . After the remnants of Vamei organized further , the JTWC classified it as Tropical Cyclone 05B on December 30 , although the agency later treated it as a continuation of the original storm . Moving west @-@ northwest , the storm re @-@ intensified to a secondary peak of 65 km / h (40 mph) . However , an increase in shear left the circulation exposed from the convection . Vamei quickly weakened , dissipating early on January 1 , 2002 . The IMD never tracked the storm .