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Cyclone Asani : 9th – 12th May 2022

Cyclone **Asani** was the first cyclonic storm of the season over the Bay of Bengal (BoB) named by Sri Lanka. In Sinhalese, **Asani** denotes wrath. The storms are termed after the multiple nations that are devastated by them each year.

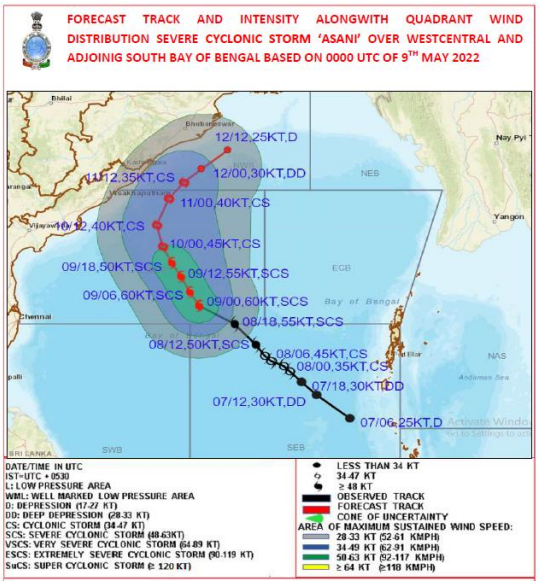
The **Severe Cyclonic Storm 'Asani'** over Southeast & adjoining Westcentral Bay of Bengal moved nearly west-northwestwards with a speed of 25 kmph & lay centered at 05:30 hours IST on the 09th May, over Westcentral and adjoining South Bay of Bengal, near latitude 13.7°N & longitude 86.3°E, about 870 km west-northwest of Car Nicobar (Nicobar Islands), 730 km west-northwest of Port Blair (Andaman Islands), 550 km southeast of Visakhapatnam (Andhra Pradesh) and 680 km south-southeast of Puri (Odisha).

It was very likely to move northwestwards till 10th May and reach Westcentral & adjoining Northwest Bay of Bengal off North Andhra Pradesh & Odisha coasts. Thereafter, it was very likely to recurve north-northeastwards & move towards Northwest Bay of Bengal off Odisha coast. It was likely to weaken gradually into a Cyclonic Storm during next 48 hours.

While advanced models and skilled forecasters usually predict the trajectory of most cyclones more or less accurately, the job was very tricky for Asani. Models could not agree on the landfall location until the morning of May 11, making the last two days of the storm eventful and scary.

On Wednesday, May 11 evening, Cyclone Asani completed its landfall over the Andhra Pradesh coast, between Machilipatnam and Narsapur, before re-emerging into the Bay of Bengal post-midnight. Thankfully, the system had already de-intensified into a deep depression ahead of landfall — sustaining a wind speed of 55-65 kmph, gusting to 75 kmph. No casualties were reported due to the storm, while Andhra and the neighboring states of Telangana, Tamil Nadu, Karnataka and even Kerala witnessed intense rainfall.

Date/Time(IST)	Position (Lat. ^{0}N/ long. ^{0}E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
09.05.22/0530	13.7/86.3	100-110 gusting to 120	Severe Cyclonic Storm
09.05.22/1130	13.2/86.0	100-110 gusting to 120	Severe Cyclonic Storm
09.05.22/1730	14.8/85.7	95-105 gusting to 115	Severe Cyclonic Storm
09.05.22/2330	15.3/85.4	90-100 gusting to 110	Severe Cyclonic Storm
10.05.22/0530	15.9/85.1	85-95 gusting to 105	Severe Cyclonic Storm
10.05.22/1730	16.7/84.9	75-85 gusting to 95	Cyclonic Storm
11.05.22/0530	17.7/85.3	70-80 gusting to 90	Cyclonic Storm
11.05.22/1730	18.3/85.8	60-70 gusting to 80	Cyclonic Storm
12.05.22/0530	18.8/86.4	50-60 gusting to 70	Deep Depression
12.05.22/1730	19.5/87.3	40-50 gusting to 60	Depression



Forecast track and intensity are given in the above table:
Source: IMD

However, the cyclone eventually crossed the Andhra Pradesh coast between Machilipatnam and Narsapur from 5.30 pm to 7.30 pm. Here's how the storm-induced clouds covered the entire southern peninsula during the landing hours:

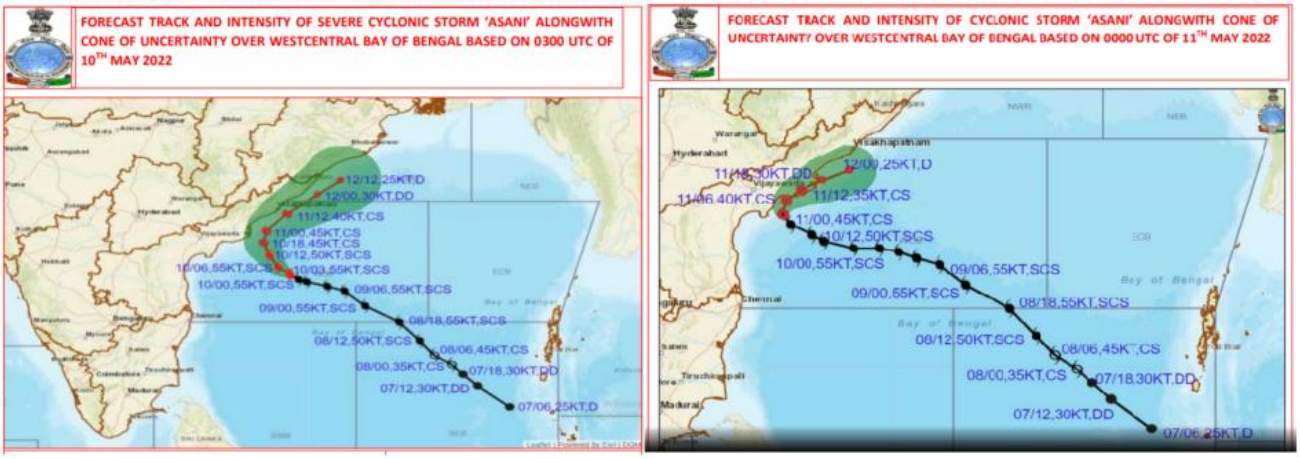
As the storm touched the North Andhra Pradesh coast near Machilipatnam, the state experienced heavy rains and thunderstorms along with a blanket of thick clouds. Here's how the satellite images captured the event:

Source: weather.com

Why Did Cyclone Asani Deviate from Its Path And Storm The Andhra Coast?

It was all going well until the penultimate day. Severe cyclonic storm Asani intensified rapidly over the Bay of Bengal and advanced towards India's east coast till Tuesday, May 10th evening as predicted. The IMD was positive that the storm, likely, would recurve towards the sea when it reached near the north Andhra Pradesh coast, and eventually fizzle out. But the plan went awry. The cyclone did not turn.

On May 10, IMD revised its forecast, suggesting that the cyclone was likely to move along the Narsapur, Yanam, Kakinada, Tuni, and Visakhapatnam coasts and emerge into west-central Bay of Bengal off north Andhra Pradesh coasts by Wednesday, May 11th night. But early on May 11, the day it made its landfall, the IMD issued a cyclone warning for Andhra Pradesh. The weather department also swiftly added a storm surge warning of 0.5 m, expecting inundation of low-lying areas of Krishna, East and West Godavari districts of Andhra Pradesh, and Yanam of Puducherry.



Source: IMD

"A mid-latitude westerly trough was approaching, and the forecast models suggested that it would counter the cyclone in the sea and steer it north-northeastwards. But that did not happen because the height of the cyclone had decreased as it weakened into a deep depression near the coast. By the time, the cyclone had already moved a little ahead and crossed the coast. However, even then, it remained half over the land, and half over the sea".

The mid-latitude trough is basically a low-pressure weather system that is an indicator of a shift in the wind, and meteorologists expected that it would push the cyclone towards the sea.

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Why are cyclones becoming more frequent in India?

Threshold value for sea surface temperatures (SSTs) for the formation of cyclones is 28 degree Celsius. At present, SST over Bay of Bengal as well as Arabian Sea is around 31-32 degree Celsius. Rapid intensification is expected to continue to become much more frequent this century with continued climate change. One study found that intensification rates that happen once a century now could happen every 5-10 years by 2100.


Representational Image. (File Photo)

Why is climate change fueling them?

Oceans soak up more than 90% of the heat generated by greenhouse gases, leading to rising water temperatures. As cyclones draw their energy from warm waters, the rising temperatures are causing intense storms to become more common, experts say.

"Now what is happening -- the Arabian Sea temperatures, the ocean's surface temperatures are warming rapidly". Rising sea levels could also boost storm surges from cyclones, making them even more deadly and destructive.

Why cyclones are more in the Arabian Sea?

Scientists say historically, the Arabian Sea averaged 2 or 3 cyclones, that were typically weak, in a year. The Arabian Sea also previously experienced fewer severe cyclones than the Bay of Bengal off India's eastern coast. But rising water temperatures because of global warming is changing that. This is the first time since the start of satellite records in 1980 in India that there have been 4 consecutive years of pre-monsoon cyclones in the Arabian Sea.

One of the reasons that we are seeing more and more storms and cyclones in the tropical regions, especially regions like Arabian Sea and all, is because of ocean warming, rapid ocean warming. “The Arabian Sea is one of the fastest-warming basins across the global oceans”.

What else is making them more deadly?

Cyclones can unleash catastrophic storm surges -- tsunami-like flooding when they make landfall. They can be the deadliest part of a cyclone and are only partially affected by wind speeds. The term “storm surge” refers to rising seas whipped up by a storm, creating a wall of water several meters higher than the normal tide level.

The large swells move faster than the cyclone and are sometimes spotted up to 1,000 kilometers ahead of a major storm. The surge can extend for dozens of kilometers inland, overwhelming homes and making roads impassable.

A storm surge is shaped by several different factors, including storm intensity, forward speed, the size of a storm and the angle of approach to the coast. The underlying features of the land at the coast, including bays and estuaries, are also at play.

A storm surge of up to four meters (13 feet) had inundated some coastal districts of Gujarat during Tauktae's landfall, according to the Indian Meteorological Department.

Details of recent cyclones in India:

“Similarity between Cyclone Yaas and Tauktae is that both are preceded by very high sea surface temperatures reaching 31-32 degree Celsius. These high temperatures were conducive for cyclone Tauktae to intensify into an extremely severe cyclone in a short time. Similarly, high temperatures are predicted to assist Yaas also for intensifying rapidly”. However, Tauktae spent several days in the Arabian Sea where it could draw the heat and moisture continuously, reaching peak intensity of more than 220 kmph.

“In the case of Yaas, it had formed in the north Bay of Bengal, and the travel distance to landfall is shorter. As a result, it didn’t get a long period over the ocean to blow up to the intensity of Tauktae”. Here the common thread is that rising ocean temperatures in both the basins are assisting these cyclones in their rapid intensification process. Otherwise, we don’t see a significant increase in the number of cyclones over the BoB as we see in the Arabian Sea.

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Indian seas have been exceptionally warmer than usual these years, making atmospheric and ocean conditions favourable for frequent formation of cyclones and their rapid intensification. Rapid intensification is the key point to focus on, as it will have direct impact on rainfall, destruction in terms of floods and gusty winds and evacuation process.

Although the intensity of Cyclone Yaas was less than that of Tauktae, but it was quite strong in terms of Damage. At the time of landfall, Yaas give flooding rains along with sustained wind speed of 165-175 kmph gusting up to 185 kmph. Coastal Odisha, Gangetic West Bengal and Jharkhand were on red alert for widespread torrential rains and damaging winds.

Very Severe Cyclonic Storm Yaas	Extremely Severe Cyclonic Storm Tauktae
Very severe cyclonic storm (IMD scale) Category 1 tropical cyclone (SSHWS)	Extremely severe cyclonic storm (IMD scale) Category 4 tropical cyclone (SSHWS)
	
Cyclone Yaas before landfall in Odisha on May 26 near peak intensity.	Cyclone Tauktae near peak intensity approaching Gujarat in India on May 17
Formed May 23, 2021 **Dissipated** May 28, 2021	**Formed** May 14, 2021 **Dissipated** May 19, 2021
Highest winds 3-minute sustained: 140 km/h (85 mph) 1-minute sustained: 120 km/h (75 mph)	**Highest winds** 3-minute sustained: 185 km/h (115 mph) 1-minute sustained: 220 km/h (140 mph)
Lowest pressure 970 hPa (mbar); 28.64 inHg	**Lowest pressure** 950 hPa (mbar); 28.05 inHg
Fatalities 20 total **Damage** $2.84 billion (2021 USD)	**Fatalities** 174 total, 81 missing **Damage** $2.12 billion (2021 USD)

Source : Wikipedia

The chances of having a storm in the Indian Seas during pre monsoon season now roll over to May. Over the last 2 years, significant tropical storms, including super cyclone 'Amphan' developed in the month of May.

Nisarga and Tauktae sailed over warm waters of the Arabian Sea and Amphan & Yaas battered the east coast ravaging West Bengal and Odisha.

Between 2011 and 2019, only 2 storms developed over the Arabian Sea, both in 2018 and rest of the time, the ocean bed was dormant in the month of May. During the same period, BoB witnessed 3 tropical storms : Viyaru (2013), Roanu (2016), Mora (2017). These 3 storms struck Bangladesh near Chittagong.

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Asani causes loss of INR 2,500 crore (USD 325 million) in Andhra Pradesh, agriculture bears brunt

Global consultancy RMSI has estimated that severe cyclone Asani, which hit Andhra Pradesh, may have caused a potential loss of INR 2,500 crore with a maximum impact on agriculture INR 2,000 crore (USD 260 million).

Impact of the cyclone:

- Breaking of tree branches and uprooting of small trees
- Electricity and communication lines disrupted partially
- Localised flooding of roads leading to disruption of traffic and long travel time
- Water logging and inundation in low lying areas
- Occasional reduction in visibility due to heavy rainfall
- Adverse impact on marine and tourist activities along the coasts
- Damage to kutcha roads & possibilities of damage to vulnerable structures
- Localised landslides / mudslides
- Damage to horticulture and standing crops in some areas due to squally wind and inundation

References:

- India Meteorological Department (IMD)
- Indian Institute of Tropical Meteorology (IITM)
- Weather.com