

Cyclone Asani, About, Features, Tropical Cyclone Formation, Regional Names

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Cyclone Asani was a **tropical cyclone** that developed over the **Bay of Bengal** in May **2022**. It was the strongest storm of the 2022 North Indian Ocean cyclone season.

Cyclone Asani Key Features

Key features of **Cyclone** Asani are:

- The name Cyclone Asani has been given by **Sri Lanka** under the World Meteorological Organization (WMO) naming system for cyclones in the North Indian Ocean region. It means 'wrath' in Sinhalese.
- Cyclone Asani originated over the southeast Bay of Bengal on 8 May 2022.
- It mainly affected the eastern coast of India, especially Andhra Pradesh and Odisha.
- Cyclone Asani initially formed as a low-pressure area and intensified into a severe cyclonic storm.

About Tropical Cyclones

A tropical cyclone is a rapidly rotating storm that begins over tropical oceans, and they can vary in speed, size, and intensity. It is characterized by strong winds, heavy rainfall, thunderstorms, and storm surges.

Conditions for Tropical Cyclone Formation

Tropical cyclones form over warm ocean waters under specific atmospheric and oceanic conditions. These conditions help create a low-pressure system, supply energy, and allow the storm to intensify.

- **Warm Sea Surface Temperature:** Ocean temperature must be at least 26–27°C. Warm water provides the heat and moisture needed to fuel the cyclone.
- **Low Pressure:** A low-pressure area or tropical disturbance is necessary.
- **Coriolis Force:** Coriolis Force is needed to give the system rotational movement. Tropical cyclones do not originate between 5°N and 5°S latitudes because the Coriolis force is absent or too weak there.
- **High Humidity in the Mid-Troposphere:** Moist air helps in cloud formation and convection.
- **Low Vertical Wind Shear:** The difference in wind speed/direction between surface and upper levels should be small. High wind shear can break the structure of a developing cyclone.
- **Upper-level high pressure / divergence:** There should be a high-pressure or anticyclonic condition in the upper atmosphere. This causes air to spread outward at higher levels, which allows rising air below to escape easily. As a result, a vacuum-like effect is created that pulls more air toward the low-pressure center, helping the cyclone to intensify. If this upper-level divergence is absent, air will accumulate and sink downward, which can stop the cyclone from developing.

Structure of a Tropical Cyclone

A cyclone is a large low-pressure system in which air spirals inward toward the center. In a tropical cyclone, the structure is organized into three main parts: the eye, the eyewall, and the spiral rainbands, along with an upper-level outflow.

- **Eye:** The eye is the central, calm region of the cyclone with the lowest air pressure and relatively clear skies.
- **Eyewall:** Surrounding the eye is the eyewall, a ring of towering cumulonimbus clouds where the strongest winds, heaviest rainfall, and most destructive weather occur.
- **Spiral rainband:** Outside the eyewall are the spiral rainbands, which are curved bands of clouds and thunderstorms extending outward for hundreds of kilometers, bringing intermittent heavy rain and gusty winds. Vertically, warm moist air rises in the eyewall, and at the upper levels it spreads outward as outflow, which helps maintain the low-pressure center and sustain the cyclone.

Tropical Cyclones in India

India is highly vulnerable to tropical cyclones because of its long coastline of over 7,500 km. The **Bay of Bengal is more prone to severe cyclones compared to the Arabian Sea** due to warmer waters and favorable atmospheric conditions. States such as Odisha, West Bengal, Andhra Pradesh, and Tamil Nadu are particularly vulnerable to cyclone impacts.

Reasons for Higher Frequency in Bay of Bengal

The Bay of Bengal experiences a 35% greater frequency of cyclones compared to the Arabian Sea.

- **Warmer Waters:** The Bay of Bengal is generally warmer, a key condition for cyclone formation.
- **Enclosed Nature:** It is more enclosed, being surrounded by land on three sides. This allows the adjacent land to transfer excess heat to the water, contributing to higher temperatures.
- **Weaker Vertical Wind Shear:** The Bay of Bengal generally has less vertical wind shear (upward and downward motion of wind), which is a favourable condition for tropical cyclones. Cyclones require a consistent upward movement of wind.
- **Remnants of Typhoons:** The Bay of Bengal's connection to the Pacific Ocean means that remnants of typhoons, after crossing the South China Sea, can enter and intensify in the Bay of Bengal

Tropical Cyclones Regional Names

Tropical cyclones are known by different names in different parts of the world. In the Atlantic Ocean and Eastern Pacific, they are called **Hurricanes**. In the Western Pacific, they are known as **Typhoons**. In the Indian Ocean and South Pacific region, they are referred to as **Cyclones**.

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