

# 1. Cyclone Montha – Geography

Severe cyclonic storm Montha created destruction in Andhra Pradesh. The name 'Montha' meaning, beautiful or fragrant flower, was contributed by Thailand. The next cyclone will be named Senyar, as suggested by UAE, after that it will be Ditwah (Yemen), Arnab (Bangladesh), and Murasu (India).

## Meaning and Origin of the Term "Cyclone"

**Definition** – Cyclones are intense, rotating low-pressure systems characterized by inward spiralling winds and violent atmospheric disturbances, usually forming over warm ocean waters.

**Etymology** – The term Cyclone comes from the Greek word "Kyklos" meaning circle or coil, symbolizing the coiling motion of storm winds.

**Historical Coinage** – It was first coined by Henry Piddington, who observed that storms over the Bay of Bengal resembled "coiled serpents".

## Global Terminology for Cyclones

**Hurricanes** – Atlantic Ocean & Caribbean Sea

**Typhoons** – Western Pacific & China Sea

**Tropical Cyclones** – Indian Ocean

**Willy-Willies** – North-western Australia

**Tornadoes** – Southern USA & West Africa

**Cyclone "Montha"** – Example of cyclonic storm nomenclature (contextual reference)

## Ideal Conditions for Cyclone Formation

**Warm Ocean Waters** – Temperature above 26°C provides heat and moisture as fuel.

**High Humidity in the Troposphere** – Enhances condensation and latent heat release.

**Coriolis Force** – Essential for cyclonic rotation; absent near the equator ( $\pm 5^\circ$ ).

**Pre-existing Low-Pressure Disturbance** – Serves as the initial trigger for uplift.

**Weak Vertical Wind Shear** – Allows the storm column to stay vertically aligned and intensify.

## Process of Cyclogenesis (Formation of a Cyclone)

**Low-Pressure Development** – Warm air rises → vacuum-like low-pressure zone formed.

**Inflow of Surrounding Air** – Air rushes from high-pressure to low-pressure region.

**Spiralling of Winds** – Coriolis effect causes air to rotate around low-pressure center.

**Latent Heat Release** – Water vapor condenses → releases heat → fuels further uplift and rotation.

**Eye Formation** – At maturity phase, calm eye forms at the center with strongest winds at eyewall.

**Vertical Structure** – Warm core system, strong upward convection, towering cumulonimbus clouds.

## Structure of a Tropical Cyclone

**Eye** – Calm, clear, lowest pressure, diameter ~20–50 km

**Eyewall** – Most violent winds, heaviest rainfall

**Rainbands** – Curved clouds producing torrential rain

**Outflow** – Spreading air at top maintaining pressure gradient

**Storm Surge** – Abnormal sea rise due to wind and pressure drop; major cause of damage

## Cyclone Dissipation

**Landfall Impact** – Loses moisture supply → rapid weakening

**Cold Water Movement** – No warm energy source → loss of intensity

**Dry Air Intrusion** – Reduces convection → weakens cyclone

**High Wind Shear** – Disrupts vertical structure

## Nomenclature and Naming Process

**Managed by WMO (World Meteorological Organization)** – Maintains rotating lists for global basins.

**North Indian Ocean Cyclone Naming** – Proposed by India, Bangladesh, Pakistan, Sri Lanka, Myanmar, Oman etc.

**Purpose of Naming** – Enhances communication, disaster preparedness, public awareness, and clarity in warnings.

## India Meteorological Department (IMD)

**Establishment** – 1875

**Parent Ministry** – Ministry of Earth Sciences (MoES)

### Functions

1. Tropical cyclone forecasting & tracking
2. Weather warnings & climate services
3. Seismological and hydrological observations
4. Early-warning dissemination and disaster support

### Significance of Cyclones

**Beneficial Aspects** – Bring rainfall to drought-prone areas, Increase nutrient mixing in oceans

**Hazardous Impacts** – Loss of life and property, Coastal flooding, storm surge, winds, Agricultural and infrastructure damage

**Key Takeaways** – Cyclones are warm-core, rotating low-pressure systems driven by oceanic heat and Coriolis force. They undergo formation, intensification, maturity, and dissipation stages. IMD plays a lead role in cyclone detection, prediction, and disaster management for India.

Source – <https://www.thehindu.com/news/national/andhra-pradesh/montha-leaves-a-trail-of-destruction-in-andhra-pradesh/article70218025.ece>

