



# Typhoons in Southeast Asia

[Source: DTE](#)

## Why in News?

According to a **study published in** the journal **Climate and Atmospheric Science in July 2024**, [typhoons](#) are occurring frequently in [Southeast Asia](#) due to the rising global temperatures.

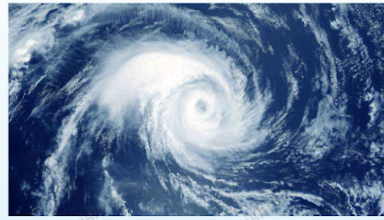
## What are Typhoons?

- A typhoon is a form of cyclone that has **wind speeds of 119 kmph** and above and develops over **warm ocean waters near the equator**.
  - When warm, moist air rises from the ocean surface, it creates a low-pressure area.
- **Cyclones** are **rapid inward air circulation** around a low-pressure area.
  - The air circulates in an **anticlockwise direction in the Northern hemisphere** and **clockwise in the Southern hemisphere**.

| Cyclones Type           | Location                                           |
|-------------------------|----------------------------------------------------|
| <b>Typhoon</b>          | China Sea and Pacific Ocean                        |
| <b>Hurricane</b>        | West Indian islands, Caribbean Sea, Atlantic Ocean |
| <b>Tornado</b>          | Guinea lands of West Africa, southern USA          |
| <b>Willy-willies</b>    | North-western Australia                            |
| <b>Tropical Cyclone</b> | Indian Ocean Region                                |

# CYCLONE

Cyclones are rapid **inward** air circulation around a **low-pressure** area.

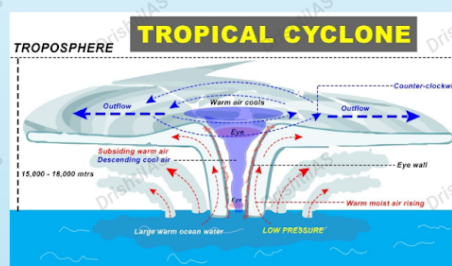


## Cyclone v/s Anticyclone

| Pressure System | Pressure Condition at the Center | Pattern of Wind Direction |                     |
|-----------------|----------------------------------|---------------------------|---------------------|
|                 |                                  | Northern Hemisphere       | Southern Hemisphere |
| Cyclone         | Low                              | Anticlockwise             | Clockwise           |
| Anticyclone     | High                             | Clockwise                 | Anticlockwise       |

## Classification

- **Tropical Cyclones;** originate between the **Tropics of Capricorn and Cancer**
- **Extra Tropical/ Temperate Cyclones;** originate in the **Polar Regions**



### Conditions for Formation

- Large sea surface with temperature  $>27^{\circ}\text{C}$ .
- Presence of the **Coriolis force**
- Small **variations in the vertical wind speed**
- A **pre-existing weak low- pressure area**
- **Upper divergence** above the sea level system

### Different Names for Tropical Cyclones

- **Typhoons** - Southeast Asia and China
- **Hurricanes** - North Atlantic and eastern Pacific
- **Tornados** - West Africa and southern USA
- **Willy-willies** - Northwest Australia
- **Tropical Cyclones** - Southwest Pacific and Indian Ocean

### Nomenclature

- Nodal Authority - **World Meteorological Organization (WMO)**
- Indian Ocean Region - **Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Sri Lanka and Thailand** contribute to naming cyclones that occur in this region.

### Cyclones in India

- **Bi-annual Cyclone Season** - March to May and October to December
- Recent Cyclones - **Tauktae, Vayu, Nisarga and Mekanu** (in Arabian Sea) and **Asani, Amphan, Fani, Nivar, Bulbul, Titli, Yaas and Sitrang** (in Bay of Bengal)

## Recent Typhoons in Southeast Asia

- **Typhoon Yagi:** It is the strongest tropical cyclone Asia has encountered till September 2024 and the second most powerful globally after **Hurricane Beryl (Atlantic Ocean)**.
  - It has caused severe damage across Southeast Asia, affecting the **Philippines, China, Laos, Myanmar, Thailand, and particularly Vietnam.**
- **Typhoon Shanshan:** It has hit Japan bringing heavy rains and strong winds.
- **Typhoon Bebinca:** It has top wind speeds of 151 kph (94 mph) near its eye, and reached category 1 storm on the **Saffir-Simpson Hurricane Wind Scale.**

## Why are Typhoons Occurring Frequently in Southeast Asia?

- **Rising Sea Surface Temperatures:**
  - Due to [global warming](#). Warmer waters in the Pacific Ocean provide more energy for the formation and intensification of typhoons.
  - Tropical storms draw their strength from **warm, moist ocean air, and the rising sea surface temperature leads to more frequent and severe storms.**
- **Changes in Atmospheric Circulation Patterns:**
  - Shifts in atmospheric circulation patterns, such as **the weakening or alteration of the [Walker Circulation](#)** (which influences the Pacific Ocean), can affect the frequency and trajectory of typhoons in Southeast Asia.
- **El Niño and La Niña Events:**
  - The [El Niño-Southern Oscillation \(ENSO\) cycle](#) significantly impacts typhoon frequency.
    - During **El Niño years**, the **warmer waters of the central and eastern Pacific shift westward**, which can increase typhoon activity in Southeast Asia.
    - **La Niña years** also contribute to this by **enhancing cyclone activity in the Western Pacific.**
- **Increased Moisture in the Atmosphere:**
  - Rising global temperatures lead to more **evaporation from the oceans, increasing moisture content in the atmosphere.** This moisture fuels stronger and more frequent typhoons as it enhances the storm's intensity and precipitation rates.
- **Geographical Location of Southeast Asia:**
  - The region lies in the **path of the Pacific Ocean's warm currents** and is a **natural hotspot** for typhoon formation.
  - The geography of Southeast Asia, with its **long coastlines and proximity to the Western Pacific**, makes it highly vulnerable to tropical cyclones.
- **Marine Heat Waves:**
  - More frequent **marine heat waves**, driven by climate change, are causing extreme warming events in the ocean.
- **Weaker Land-Sea Temperature Differences:**
  - Climate change is also altering the **temperature gradient between land and sea.**
  - **Weaker differences** between the land and the sea can lead to **slower storm dissipation**, which makes the typhoons last longer and impact areas more severely.
- **Urbanisation and Environmental Degradation:**
  - **Rapid urbanization, deforestation, and destruction of coastal ecosystems, such as [mangroves](#),** which serve as natural buffers, can exacerbate the effects of typhoons.

### UPSC Civil Services Examination, Previous Year Question (PYQ)

**Q. Consider the following statements: (2020)**

1. Jet streams occur in the Northern Hemisphere only.
2. Only some cyclones develop an eye.
3. The temperature inside the eye of a cyclone is nearly 10°C lesser than that of the surroundings.

**Which of the statements given above is/are correct?**

- (a) 1 only
- (b) 2 and 3 only
- (c) 2 only
- (d) 1 and 3 only

**Ans: (c)**

**Q. In the context of which of the following do some scientists suggest the use of cirrus cloud**

**thinning technique and the injection of sulphate aerosol into stratosphere? (2019)**

- (a)** Creating the artificial rains in some regions
- (b)** Reducing the frequency and intensity of tropical cyclones
- (c)** Reducing the adverse effects of solar wind on the Earth
- (d)** Reducing the global warming

**Ans: (d)**

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