Intensity of Super Typhoon Ragasa

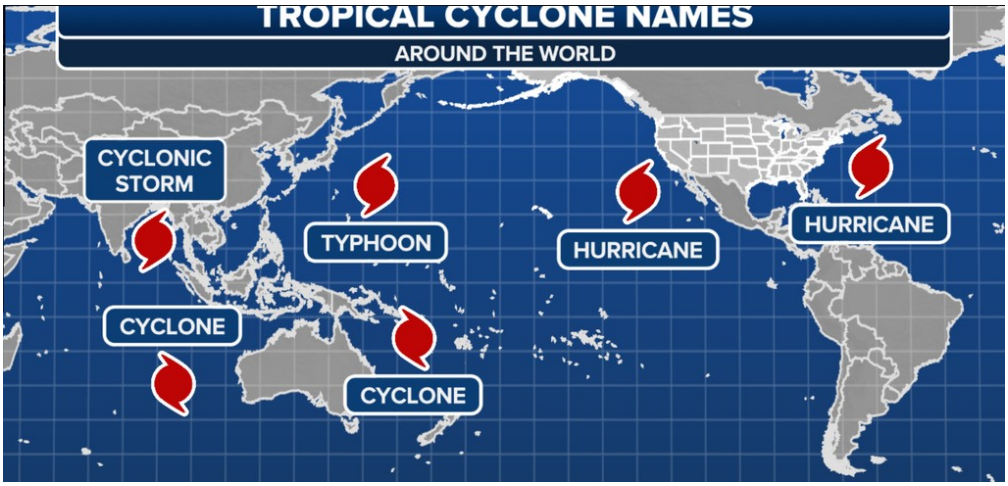
Mains: *GS I – Important Geophysical phenomena – Cyclone*

Why in News?

Super Typhoon Ragasa is recorded as intense tropical cyclone in 2025. At its peak, Ragasa was moving with the maximum sustained winds of 280 kmph effecting Hong Kong region.

What is a Typhoon?

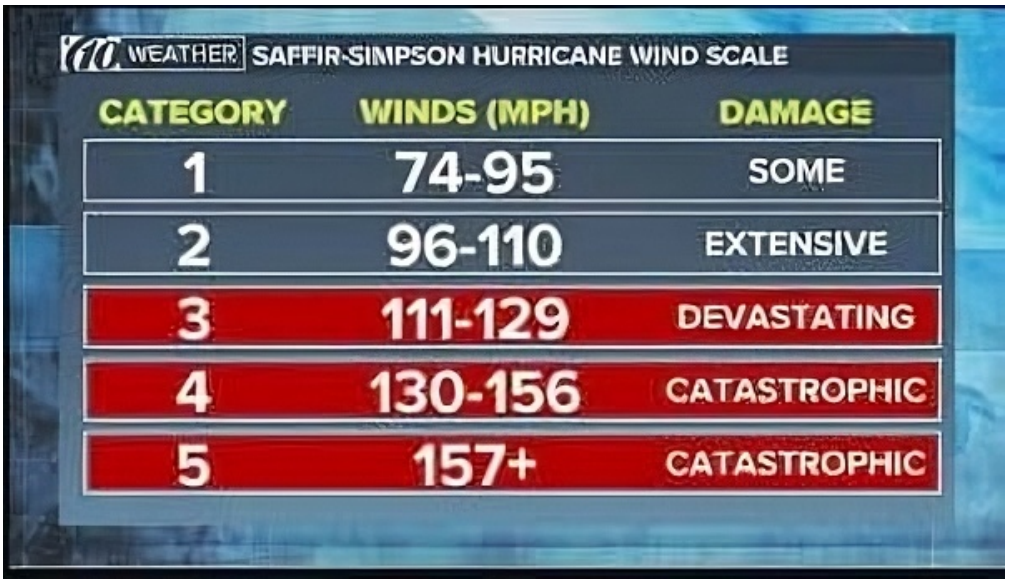
- **Typhoon** – It is the name for a powerful tropical cyclone that forms in the *western North Pacific Ocean.*
- While a typhoon and the terms for the same phenomenon in other parts of the world, their *names vary based on geographical location*.
- **Different Names for Tropical Cyclones by Region**



- **Hurricane**– This term is used for tropical cyclones in the North Atlantic Ocean, the Gulf of Mexico, the Caribbean Sea, and the eastern and central North Pacific Ocean.
- **Typhoon**– This name applies to tropical cyclones in the western North Pacific, particularly impacting areas like Japan, the Philippines, and China.
- **Cyclone** – In the Indian Ocean (including the Bay of Bengal and Arabian Sea) and the South Pacific Ocean, these powerful storms are known simply as cyclones.
- **Severe Tropical Cyclone**– In the western South Pacific and southeast Indian Ocean, the term "severe tropical cyclone" is used.
- **Characteristics** – These rotating storms are characterized by strong winds, heavy rainfall, and a low-pressure center, drawing energy from warm ocean waters.

How are tropical cyclones formed?

- **Location of formation** – Tropical cyclones form over warm ocean waters near the equator.
- **Initial formation process** – When the warm, moist air from the ocean surface rises upward, a lower air pressure area is formed below.
- **Air movement and pressure** – Air from surrounding areas with higher air pressure rushes into this low-pressure area, eventually rising, and it becomes warm and moist.
- **Cloud and thunderstorm formation** – As warm, moist air rises, it cools down, and the water in the air forms clouds and thunderstorms.
- **Cyclone strengthening** – This whole system of clouds and winds gains strength and momentum using the ocean's heat, and the water that evaporates from its surface.
- **Cyclone types** – Tropical Depression and Tropical Storm
- The weakest tropical cyclones are called ***tropical depressions***.
- If a depression intensifies such that its maximum sustained winds reach 39 miles per hour [63 kmph], the tropical cyclone becomes a ***tropical storm***," as per the National Oceanic and Atmospheric Administration (NOAA).
- **Cyclone classification based on speed** – Storm systems *with wind speeds of 119 kmph and above* are classified as hurricanes, typhoons, or tropical cyclones.
- The category of a tropical cyclone is determined by its sustained wind speed, as measured by the ***Saffir-Simpson Hurricane Wind Scale***.



- Category 5 tropical cyclones, which are the strongest, have winds of 252 kmph or higher. *Ragasa is a Category 5 tropical cyclone.*

What made Super Typhoon Ragasa so intense?

- **Wind speed** – At its peak, Ragasa was moving with the maximum sustained winds of *280 kmph*.
- **Wave impact** – Strong waves crash against the waterfront in Heng Fa Chuen area as Super Typhoon Ragasa approaches in Hong Kong.
- **Strong rain** – Super Typhoon Ragasa battered Hong Kong with fierce winds and pounding rain, and headed into southern China.

- It has *forced two million people to evacuate* in southern China and brought a "significant storm surge".
- **Water level rise** – Waters in coastal areas rising more than 3 metres above the reference level in Hong Kong.
- **Casualties** – Ragasa left at least 14 people dead in Taiwan and at least two dead in northern Philippines.
- Super Typhoon Ragasa, the storm is the most intense tropical cyclone recorded in 2025.
- This was close to the upper limit of how intense storms can be on Earth.

What is the reason for Ragasa intense?

- **Rise in temperatures** – There is a consensus that with rising global temperatures, tropical cyclones are becoming more intense.
    - **For instance**, the journal Climate and Atmospheric Science in July 2024 showed that tropical cyclones in Southeast Asia are now forming closer to coastlines, intensifying more rapidly, and lingering longer over land.
    - This could be happening *due to warmer surface temperatures* of the ocean.

> *Average temperatures in the Pacific Ocean have risen by about 1.5 degrees Celsius in the past century, according to the* ***United Nations Environment Programme.***

- **Rise in intensity of typhoons** – The more heat in the ocean, the more tropical cyclones you get to remove the heat.
- It is obvious that if warming up the oceans, results in typhoons getting bigger.
- **Dissipation of heat** – A lot of warm water, giving typhoon a lot of energy.
- Its track is perfect for maximum destruction because it has not made landfall over any significant area to reduce its strength.
- **Reached upper limit** – Given the extreme intensity of Ragasa, some scientists have observed that the storm almost reached the upper limit of what Earth is capable of producing.

What is the impact of Ragasa typhoon?

- **The Southern China and Hong Kong** – This area have been affected by the 'dirty side' or 'right-front quadrant' of the storm.

> *A* ***tropical cyclone*** *has a 'clean' side and a 'dirty' side. In the northern hemisphere, the right-hand side of the storm (relative to its motion) is called the 'dirty' side, and the left-hand side is known as the 'clean' side.*

- The *'dirty' side* can bring more devastation as the forward motion of the storm is added to the background rotating circulation of the system, which is *always in an anti-clockwise direction*.

- **Intense wind effect** – The location at which the two movements — rotation around the eye and forward motion — combine is where the most powerful winds are found.
    - **For instance**, if a typhoon is moving at 48 kmph and has sustained winds of 161 kmph, the combination generates a wind speed of 209 kmph on the right-hand side.

Reference

The Indian Express| Intensity of Super Typhoon Ragasa

