



Fujiwhara Effect

Why in News?

With typhoon Hinnamnor and another tropical storm called Gardo, meteorologists observed a phenomenon called the Fujiwhara Effect.

- Typhoon Hinnamnor, known in the Philippines as Super Typhoon Henry, was a very large and powerful **tropical cyclone** in Pacific Ocean that impacted Japan and South Korea.

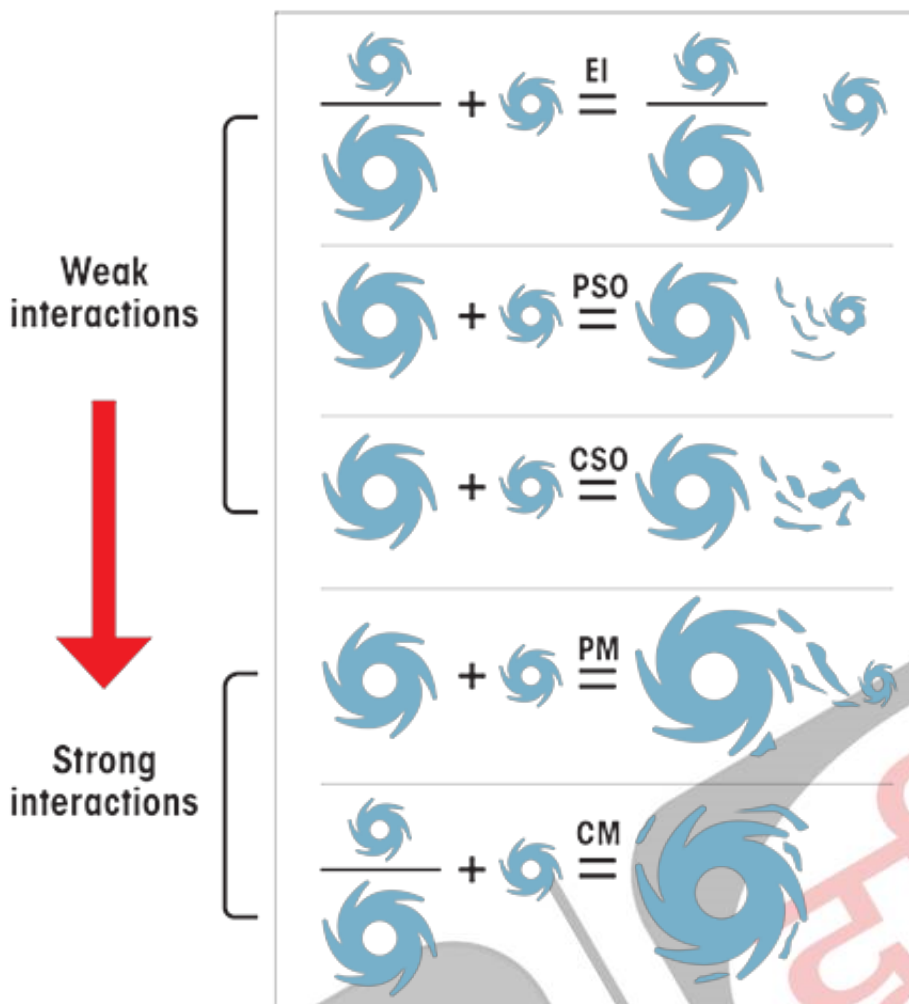
What is the Fujiwhara Effect?

▪ About:

- The Fujiwhara Effect is any **interaction between tropical storms formed around the same time** in the same ocean region with their centres or eyes at a distance of less than 1,400 km, with intensity that could vary between a depression (wind speed under 63 km per hour) and a super typhoon (wind speed over 209 km per hour).
- The **interaction could lead to changes in the track** and intensity of either or both storm systems.
- In rare cases, the two systems could merge, especially when they are of similar size and intensity, to form a bigger storm.

▪ Different ways in which Fujiwhara Effect can take place:

- **Elastic Interaction:**
 - In this interaction, **only the direction of motion of the storms changes** and is the most common case. These are also the cases that are difficult to assess and need closer examination.
- **Partial straining out:**
 - In this interaction, a part of the smaller storm is lost to the atmosphere.
- **Complete Straining Out:**
 - In this interaction, the smaller storm is completely lost to the atmosphere and the straining out does not happen for storms of equal strength.
- **Partial Merger:**
 - In this interaction, the **smaller storm merges into the bigger one.**
- **Complete Merger:**
 - In this interaction, **complete merger takes place between two storms of similar strength.**



Elastic Interaction (EI): Interaction of vortices (storms) of same or different sizes, resulting in changes only in the direction of motion. This is the most commonly seen interaction

Partial Straining-Out (PSO): Interaction of vortices of unequal sizes. Part of the smaller vortex lost to the atmosphere.

Complete Straining-Out (CSO): Interaction of vortices of unequal sizes. The smaller vortex completely lost to the atmosphere

Partial Merger (PM): Interaction of vortices of unequal sizes
Part of the smaller vortex merged to the bigger vortex

Complete Merger (CM): Interaction of vortices of same or different sizes, resulting in complete merger of both the storms

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)

Exp:

- **Jet Stream is a geostrophic wind** blowing horizontally through the upper layers of the troposphere, generally from west to east, at an altitude of 20,000 - 50,000 feet. Jet Streams develop where air masses of different temperatures meet. So, usually surface temperatures determine where the Jet Stream will form. Greater the difference in temperature, faster is the wind velocity inside the **jet stream. Jet Streams extend from 20° latitude to the poles in both hemispheres. Hence, statement 1 is not correct.**
- Cyclones are of two types, tropical cyclone and temperate cyclone. **The center of a tropical cyclone is known as the 'eye', where the wind is calm at the center with no rainfall.** However, in a temperate cyclone, there is not a single place where winds and rains are inactive, so the eye is not found. **Hence, statement 2 is correct.**
- The warmest temperatures are found in the eye itself, not in the eyewall clouds where the latent heat occurs. The air is saturated only where convective vertical motions pass through flight level. Inside the eye, the temperature is greater than 28°C and the dewpoint is less than 0°C. These warm and dry conditions are typical of the eyes of extremely intense tropical cyclones. **Hence, statement 3 is not correct.**
- **Therefore, option (c) is the correct answer.**

Source: DTE

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