

# Madden Julian Oscillation (MJO)

[UPSC Notes]

## What is Madden Julian Oscillation?

Madden Julian Oscillation is a geographical phenomenon that was discovered in the 1970s. It is responsible for the change in the weather all around the globe. This phenomenon is a traversing phenomenon and brings weekly and monthly weather changes in the tropical weather, most prominently over the Pacific Oceans and India.

- It remains on the globe for an average of 30 to 60 days (sometimes it remains for 90 days).
- The large cluster of clouds can range from 5000 to 10,000 Km in size and move towards the warm oceans from 60 65 degrees in the East to 150 180 degrees towards the East.

Madden Julian Oscillation is responsible for creating the cyclones. But, not all cyclones are born from the Madden Julian Oscillation. Some of them might result from a simple Rossby wave. The Madden Julian Oscillation is created in the Indian Ocean and ends near the International Date Line where the wave is moist and this awareness leads to clouds all around. Along with the moist part, there is a dry part as well that comes back to its origin after moving all around the earth. This movement is called oscillation. The cycle keeps on repeating for 30 to 60 days. The Madden Julian Oscillation is said to occur at a preferred time, especially in the winter season.

## Madden Julian Oscillation Latest News

A cyclone named Cyclone Asani was seen in the Bay of Bengal region. This cyclone became the reason for the rainfall on the Indian east coast. In the southern hemisphere, A twin Cyclone happened and it was named Cyclone Karim. The major reason behind these twin cyclones is known to be caused by Madden Julian Oscillation.

## Phases of Madden Julian Oscillation

There are two phases of the Madden Julian Oscillation. In the case of the strong Madden Julian Oscillations, the earth gets divided into non-equal two halves enhanced and suppressed phases. These are explained as

- **Enhanced rainfall (or convective) phase:** In the enhanced rainfall phase, the wind gets converged at the surface and the air is raised up in the atmosphere. In contrast to it this, the wind at the top is diverse. Because of this tension in the air motion, there is an increase in the condensation and ultimately leading to rainfall. In this phase, there is more rainfall, cloudiness, and even storminess.
- **Suppressed rainfall (or suppressed) phase:** In this phase, the wind at the top is converged because of which the air is forced to sink from the high altitudes. This makes the atmosphere dry and warms it as well, thus suppressing the rainfall. There is dryness and more sunshine in Suppressed rainfall.

## Madden Julian Oscillation and India Monsoon

The weather is impacted by MJO, El Niño, and IOD (Indian Ocean Dipole). The MJO and El Niño are responsible to affect the weather globally up to the mid-latitudes while Indian Ocean Dipole is restricted to India only.

Madden Julian Oscillation is a transverse phenomenon and is said to go through eight phases. MJO brings a good amount of rainfall over the Indian subcontinent when it is over the Indian ocean during the Monsoon season. In contrast to this, when MJO remains on the Pacific Ocean with a longer cycle, there is a lack of rainfall in the Indian Monsoon.

### Periodicity of MJO

The periodicity of the is nearly 30 days. After the completion of 30 days, MJO results in Monsoon season with a good amount of rainfall. However, if it extends to 40 days, then there is a disturbance in the monsoon with low rainfall. Thus, the rainfall depends upon the MJO period. If MJO occurs for a shorter period then there is good rainfall otherwise it will lead to dry rainfall.

