

# The MJO cycle

THE MJO CYCLE in the SOUTHWEST PACIFIC

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The MJO or Madden-Julien Oscillation is a wave oscillation travelling eastward around the globe on an average of 40 days. It was discovered by Madden and Julian in 1971 who called it the 40 to 50 day oscillation. Cycles have varied from 30 to 60 days. The MJO directly affects the weather for cruising yachts. When the MJO is overhead the yacht will expect light to heavy rain and squally conditions. The downflow winds can be gale force and may come from an inconvenient direction making a safe anchorage a lee shore. In addition to direct effects there is a major indirect effect for global weather. During heavy showers a tremendous amount of heat is released into the upper atmosphere and this affects what we call planetary Rossby Waves. These become the Long Wave pattern that affects global weather. If the MJO coincides with the Australian Monsoon it will increase the monsoon effects. If there is an existing quasi-stationary front or trough the MJO will exacerbate the feature. And perhaps most dangerous of all is the MJO's interaction with Tropical Cyclones.

The MJO begins its life in the Indian Ocean . It starts as a small area of precipitation south of the equator near 60 East. It then grows and moves eastward at about 8-12 knots. So, it becomes an eastward propagation of deep convection and rainfall from the Indian Ocean to the western Pacific. The convective pulse and precipitation from a cruising yachts perspective affect the area between roughly 10 North to approximately 30 South when between the longitudes 150E and about 140W. As the pulse moves eastward from 140W it becomes more or less nondescript as it moves over cooler waters of the eastern Pacific, but later reappears over the tropical Atlantic and Indian Ocean as the cycle ends.

The convective pulse is detected by usually two sources. The first is Satellite Infrared and Visual imagery. The second is also a satellite but one that uses radiometers and detects what we call OLR or Outgoing Longwave Radiation. As OLR decreases it's an indication of increased cloud build-up.

*( MJO prognostic charts on the internet typically use OLR with two colours, Blue and Red, with blue indicating the convective area. Other prognostic models are used as well, one such is called the velocity potential at 200 hPa. These forecasts use colours as well; green being divergent flow at upper levels which corresponds to enhanced convection, while red is used for suppressed convection).*

There are many atmospheric cycles on earth, and they all affect our day to day weather. Many climatologists look dumb struck when appraised of them. Cycles of one sort can affect cycles of another sort. An example being strong MJO activity is often observed during weak La Nina years or during ENSO-neutral years, while weak or absent MJO activity is typically associated with strong El Nino episodes. This discussion revolves around the Southwest Pacific, but the MJO in actual fact affects global weather. A good example is a strong MJO pulse creates what is known as the

'Pineapple Express' which brings several days of significant rain and flooding to Western North America. (as in April 2018)

Yachties should be aware of the MJO forecasting that BoM offers available on the internet.