

ABSTRACT

Intraseasonal variability in the tropics is modulated by Madden-Julian oscillation (MJO), a large-scale convective disturbance which propagates eastward across the equatorial Indian Ocean and western-central Pacific at a rate of 5 ms^{-1} . Impact of MJO on Philippine rainfall during boreal winter of 1987-2017 was studied using composite analysis of rainfall, convective and circulation anomalies. MJO events have been defined using the RMM index. Compositing analysis used strong MJO events (amplitude greater than 1) to obtain the mean for each MJO phase. Normally, Philippines experiences a northeasterly wind with convection mostly occurring in the Eastern Philippines. High amount of rainfall is experienced in the windward direction while places in the leeward direction receive no or less rainfall. However, rainfall was found to deviate from normal winter values coherent with the MJO phases, with generally negative anomalies during phases 1,2,3,7 and 8 (MJO convective center in Indian Ocean and western Hemisphere) and positive anomalies during phases 4-6 (MJO convective center in Maritime Continent and Western Pacific). The greatest impact of MJO occurred in type I and III climate regions (dry climate during boreal winter) which experienced enhanced (suppressed) rainfall during rainy (dry) phases of MJO. MJO's influence on rainfall can be explained not just by the direct influence of tropical convective anomalies but also by the result of enhancement (suppression) of the winter monsoon, induced anomalous low (high) sea level pressure, rising (sinking) air and troughs (ridges). "Active" (days of strong MJO events with positive rainfall anomaly in conjunction with MJO rainy phases) and "break" (days of strong MJO events with negative rainfall anomaly in conjunction with MJO dry phases) during strong ENSO years have also been studied. There was observed higher number of breaks during El Nino, normal years and 1988-1989 and 2007-2008 La Nina while active days were dominant during 1998-1999 and 1999-2000 La Nina. Several non-typhoon associated floods coincided with MJO rainy events during 1988-1989 and 2007-2008 La Nina. The dominance of breaks during La Nina 1988-1989 and 2007-2008 and MJO associated flooding was hypothesized to be due to strong MJO amplitudes.

Keywords: MJO, RMM, rainfall anomalies