

Modulation of the diurnal cycle of precipitation over the Maritime Continent by the Madden-Julian Oscillation

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It is well known that the diurnal cycle of precipitation is dominant over the Maritime Continent. There have been disputes on the impact of the diurnal cycle of precipitation by the Madden-Julian Oscillation (MJO). Many studies used cloud top height observed by infrared radiation (IR) or outgoing long-wave radiation (OLR) as a proxy for precipitation. Peatman et al. (2014), however, claimed that IR and OLR are not good proxy for the rainfall over Maritime Continent. In this study, modulation of diurnal cycle of precipitation by the MJO is examined using a Tropical Rainfall Measuring Mission Precipitation Radar (TRMM PR) dataset spanning 16 years.

Composite analysis of the MJO shows that mean daily precipitation and the diurnal precipitation have a strong correlation. It is also shown that distribution of precipitation observed by PR does not agree with that of IR brightness temperature. It is remarkable that they differ from each other over land. Especially, maximum precipitations are observed before/after minimum brightness temperature is observed on the west/east coast of Sumatera and Borneo. Examining diurnal propagation the coast precipitation of these islands shows that the west coastal propagation gets much stronger before MJO large convection locates on the Maritime Continent while the east coastal one gets slightly stronger after that. Thus, it is likely that west coastal propagation of diurnal precipitation have a great effect on propagation of MJO large convection.