



Propagating diurnal precipitation disturbances associated with the Madden Julian Oscillation in the Indonesian maritime continent

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The Madden-Julian Oscillation (MJO) is a planetary-scale tropical atmospheric disturbance that originates over the Indian Ocean which embeds organized super-cluster cloud systems and propagate eastward with a periodicity of about 30-60 days over the Indonesian maritime continent. An interesting but unresolved problem is how this slowly-moving MJO disturbance can develop and penetrate eastward over the Indonesian maritime continent, where diurnal cycle of convection and precipitation and associated local-circulation is predominant over the islands and surrounding seas. Here, by using high-resolution precipitation data based on TRMM-PR and geostationary satellites, we show an evidence of propagating diurnal disturbances (PDDs) with faster eastward phase speed which are embedded in the slowly-moving MJO system. It is particularly worth noting that these PDDs are likely to trigger a sudden shift of the convection center of the MJO from the western part of the maritime continent to the east of it. Thus, our results strongly suggest that the PDDs forced by the complex island-sea geography in the maritime continent play an active role in development and propagation of the MJO over there.