

## **Diurnal convection and water vapor peaks over the eastern Indian Ocean off Sumatra during different MJO phases**

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Diurnal variation characteristics over the eastern Indian Ocean off the island of Sumatra during different phases of the Madden-Julian oscillation (MJO) were investigated with precipitable water vapor (PWV) data derived by Global Positioning System (GPS). During MJO phases 2 to 3 (P2 and P3) defined by Wheeler and Hendon, prominent diurnal variation in PWV and precipitation was observed when moderate low-level westerly winds were dominant over the eastern Indian Ocean. Diurnal precipitation peaks were prominent over the island of Sumatra in the evening, while migrations of the convection toward the Indian Ocean were observed in the early morning. Around the western region offshore of Sumatra, a significant reduction in water vapor was observed from evening until midnight, compensating for the upward motion over the island. During midnight to early morning, the water vapor increased in the western offshore region as the convections migrated from the island. During P2 to P3, the atmosphere over the eastern Indian Ocean contains abundant water vapor, while the Maritime Continent is fairly well heated by solar radiation under calm conditions. This situation should be favorable for the development of two diurnal convection peaks: the evening convection over the land induced by solar radiative heating and the midnight convection over the ocean triggered by convergence of the low-level westerly wind and the land breeze.