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Convection Over Sumatera in Relation to MJO

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Convection over the mountainous region of Sumatra when synoptic-scale super cloud cluster (SCC) associated with Madden Julian Oscillation (MJO) observed over Sumatra is investigated. In June 2002, convective activities over the Indian Ocean, the maritime continent, and the western Pacific are significantly modulated by the MJO. Blackbody brightness temperature observed by GMS (TBB) shows that two super cloud clusters (SCCs) develop in the Indian Ocean (70–90 E) in the first half of June 2002, and propagate eastward from the Indian Ocean to the western Pacific. Convective activities are enhanced over the western Pacific (130–160 E) in the latter half of June 2002. Convergence at 1000 hPa which prevails over the Indian Ocean in the first half of June 2002 propagate eastward to the western Pacific in the latter half of June 2002. Zonal wind observed by EAR and surface pressure observed by the surface station suggests the existence of Kelvin-wavelike structure of ISV. From temporal variations of TBB, zonal wind at 850 hPa, and vertical shear of horizontal wind between 700 and 150 hPa, we classify the observation periods into the inactive phase (1-9 June), active phase (10-19 June), and postwesterly wind burst phase of ISV (20-26 June). During the inactive phase of ISV, convective activities caused by local circulation are prominent over Sumatera. Results of radar observations indicate the dominance of convective rainfall events over the mountainous area of Sumatera during the inactive phase of ISV. During the active phase of the ISV, cloud clusters (CCs) which develop in the convective envelope of SCC with a period of 1-2 days mainly induce the formation of convective activities over Sumatera. Results of radar observations indicate that both of convective and stratiform rainfall events occur over the mountainous area of Sumatera during the active phase of ISV. In the postwesterly wind burst phase of ISV, convective activities are suppressed over Sumatera. Features of convective activities found over Sumatera generally agree well with those found in Tropical Ocean and Global Atmosphere/Coupled Ocean-Atmosphere Response Experiment (TOGA COARE). However, local circulation plays an important role on the formation of convective activities over Sumatera in the inactive phase of ISV.