

Westerly Wind Burst Event Over Sumatra Indonesia During the First Cpea Observation Campaign

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This study presents features of convection and wind motions over the mountainous region of Sumatra when synoptic-scale super cloud cluster (SCC) caused a westerly wind burst over Sumatra. Synoptic-scale convective envelope of SCC existed over Sumatra on 5 and 6 May 2004, and then moved to the east of Sumatra after 7 May. At Kototabang, which is located at the mountainous region of Sumatra (0.2°S, 100.32°E, 865 m above sea level), lower-tropospheric zonal wind changed in accordance with the eastward movement of SCC. Westerly at 2-4 km altitude showed an increase on 5 May, then reached to its peak (~ 16 m s-1) on 7 May. Until 8 May, large westerly of > 10 m/s continued at 2-4 km altitude. This low-level westerly at the equator area extended from the Indian Ocean to Sumatra, and caused an intrusion of dry and warm air at 2-4 km altitude from the Indian Ocean to Sumatra after 7 May. As dry and warm air advected from the Indian Ocean prevailed below 2-5 km altitude, convection over Sumatra was suppressed. While vertical wind below 5 km altitude was significantly modulated by convective events on 5 and 6 May, oscillations of vertical wind with a time scale of ~ 12 hours and an amplitude of > 0.2 m/s were observed below 5 km altitude from 7 to 9 May, when deep convection did not observed at Kototabang. These oscillations of vertical wind below 5 km altitude penetrated a stable layer existed below and lower part of warm and dry layer (2.0-3.0 km altitude), and terminated around an altitude where large vertical wind shear of > 10 m/s formed by the intrusion of large low-level westerly. Updraft was enhanced when westerly at 1.5-2.5 km altitude enhanced, and unstable and wet layer was observed below 2 km altitude. This fact implies that that the topography of moutainous region of Sumatra and the instability below 2 km altitude might play a role in the formation of oscillations found in the lower-tropospheric vertical wind.