

Diurnal cycle over Jakarta as revealed by sounding-based thermodynamic budget analyses during HARIMAU2010 field campaign

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The diurnal cycle over Jakarta, Indonesia, was investigated by utilizing special sounding data during HARIMAU2010 field campaign. The 8 times/day radiosonde soundings at four sites surrounding Jakarta coastal area enable us to calculate thermodynamic budget in meso-beta-scale to reveal the mechanism to variate heat and moisture, with the precipitation morphology obtained by a C-band radar. The obtained diurnal cycle basically resembles that in the previous studies; morning heating of the bottom of the troposphere, afternoon heavy rain, widespread night light rain. The further detailed processes were clarified by the present analyses. First one is the moistening in the lower troposphere around the noon to precede the onset of afternoon heavy rain. The plausible mechanisms are suggested as cumulus- and eddy-scale vertical transport, gravity wave from the preceding mountainous precipitation, and / or evaporation from the pre-existing cloud water. The second one is the "cloud storage" effects in the nighttime rain. Until midnight, the precipitation was maintained by both consuming local vapor and cloud storage. After midnight, water vapor was consumed more than precipitation to suggest to be stored as the cloud storage. The period-averaged vertical profiles of Q1 and Q2 are also shown to be the deep-convective type.

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