Convective activity in/around Sumatera during CPEA campaign period

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In order to clarify coupling processes of equatorial atmosphere (CPEA), a field experiment of convective activity with upper soundings was conducted in/around Sumatera during 10 April-09 May 20004. The equatorial atmosphere radar, boundary layer radar, weather radar, and weather Doppler radar were also operated at Koto Tabang (KT), west Sumatera. By utilizing a satellite-IR data and the ground-based observation data, we investigated characteristics of convective activity which has an influence on the upper atmosphere, during the CPEA campaign period.

In the campaign period, regional convections with a diurnal cycle are predominant over Sumatera. In the second half of the period, three super cloud clusters (SCCs) associated with an intraseasonal oscillation (ISO) pass over Sumatera at intervals of 5-7 days. From the difference of large-scale field, the first half and the second half of the period are defined as inactive and active phases of ISO, respectively. In the inactive phase, regional convections appear around the west coast of Sumatera in the evening. Meanwhile, they are prominent over the whole equatorial region of Sumatera from the evening to early morning in the active phase. The difference of convective activities between the both phases is closely related to a low-level convergence over Sumatera, which is obtained from upper sounding network data. The low-level convergence significantly intensifies in the passage of SCCs.

The relation of regional convections to SCC is also discussed. The structure and movement of SCC are related to a successive formation of regional convections from the western to eastern Sumatera. In the ground-based observations at KT, a low-level intense westerly wind is found in the passage of SCC. It is suggested that the eastward shift of regional convections occurs in accordance with the low-level westerly wind in SCC.