Observation of vertical wind in the equatorial upper troposphere by the Equatorial Atmosphere Radar

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From 10 March to 9 May 2004, Coupling Processes in the Equatorial Atmosphere (CPEA) projects, Japan carried out the first intensive observation campaign over the Indonesian Maritime Continent. As a part of the intensive observation campaign, Intensive observation of upper troposphere by VHF-band wind profiler, Mie lidar, and Radiosondes were carried out over Sumatra, Indonesia (at 0.2S, 100.32E) from 5 to 9 May 2004. Temporal variations of upper-tropospheric vertical wind in relation to convection will be presented using the VHF-band wind profiler data derived from 5 to 9 May 2004. A VHF-band wind profiler, called the Equatorial Atmosphere Radar, observed a continuous updraft (5-20 cm/s) in the upper troposphere (8-13 km) when large-scale convective envelope existed over the observation site (from 5 to 6 May 2004). Updraft in the upper troposphere decreased as large-scale convective envelope moved to the northeast of Sumatra (5N, 110E), and reached to about 0 cm/s on 8 May 2004. Mie lidar observed cirrus clouds at 12-15 km altitude during 7-8 May 2004. Cirrus clouds transported to the observation site by the northeasterly flow originated from the active convection around 5N, 110E. In the region of 0-1km above the top of cirrus, continuous downdraft of about 4.3 cm/s was observed. The downdraft caused by the downward tilt of isentropic surface from the northeast towards the southwest was estimated by radiosonde data at several stations. The tilt of isentropic surface and northeasterly flow along it explained the 55-90 % of observed downdraft in the region of 0-1 km above the top of cirrus.