

Fine structure of meso- γ -scale convective system developed over/around the MU radar

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We present characteristics of vertical motions and precipitation particles within a meso- γ -scale convective system (M γ CS; spatial scale <20 km) in a special observation of MU radar with high time resolution of ~ 12 sec. During the observational period, several M γ CS organized within a line-shaped convective system, approached the MU site. One of them suddenly developed while it passed over the MU radar. The MU radar data indicated a detailed wind circulation within/around the M γ CS. Based on the characteristics of vertical motions, the passage time of M γ CS was classified into four stages (formation, development I and II, and mature stages). In formation stage, weak updraft and downdraft coexisted below the melting layer level. In development I stage, strong updrafts appeared and they extended from 4 km to 12 km in altitude. In development II stage, remarkable updrafts exceeding over 4 m/s were dominant in altitude range of 6-10 km. In mature stage, updrafts weaken and their regions descended to 4 km in altitude.

The temporal and spatial changes of the M γ CS were also investigated with a meteorological radar data of the Japan Meteorological Agency at intervals of 10 min. We revealed a vertical structure of precipitation echoes associated with the wind circulation within the M γ CS. Furthermore, we discussed characteristics of raindrop size distribution associated with vertical motions from raindrop echoes observed by the MU radar.