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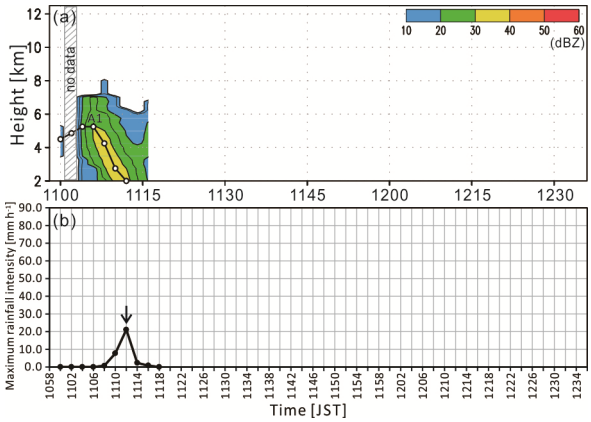
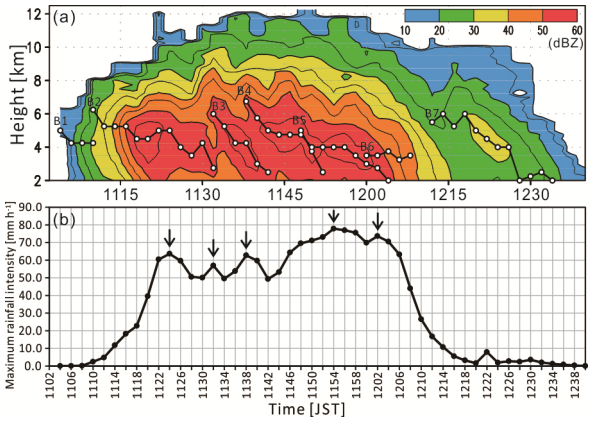
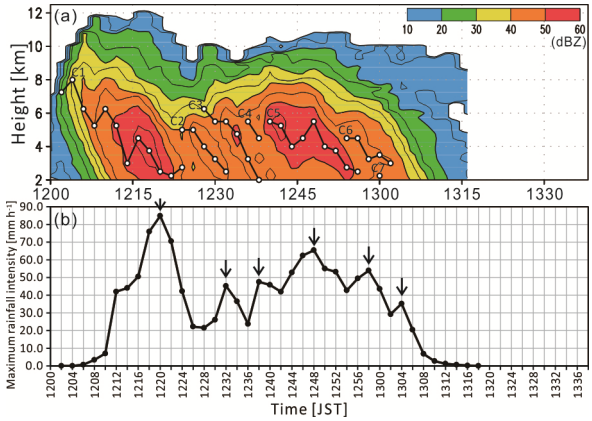


←

Figure 9. Temporal change in (a) the vertical profile of maximum Z_h and the height of the precipitation core, and (b) the maximum rainfall intensity for storm A. The height of the precipitation core is indicated by open circles and connected by the line in (a) for each precipitation core.



↑ Figure 10. As for Fig. 9, but for storm B.



↑ Figure 11. As for Fig. 9, but for storm C.

- The behavior of the precipitation cores (PCOs) in three cumulonimbus clouds and their relationship with temporal variations in surface rainfall intensity are analyzed using 3D X-band dual-polarization radar data every 2 min. A PCO region was defined as a 3D contiguous region that contained one local maximum of horizontal radar reflectivity Zh. After the automatic detection and subjective tracking of PCO regions, 15 PCOs were identified during the total lifespan of the three cumulonimbus clouds.
- The PCOs generally descended towards the ground after their appearance aloft (Figs. 9–11). Of the 12 temporal peaks in maximum surface rainfall intensity (>10 mm h–1) recorded from the three cumulonimbus clouds, 10 were associated with the descent of PCOs. In each cumulonimbus cloud, the first PCO was detected 10–12 min before the rainfall heavier than 10 mm h^{-1} was recorded. These results indicate that the behavior of PCOs is closely related to the onset of strong surface rainfall and subsequent fluctuations in surface rainfall intensity.