

Case study on first echo associated with cumulonimbus development observed by Ka-band radar in the Kanto region, Japan

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cumulonimbus. A cumulonimbus developed in the mountainous area in the west of the Kanto region in the morning on 18 August 2011, and initiation and developing process of the cumulonimbus were observed by the KDR and the XPDR. In this study, we defined an echo newly observed in RHI and PPI scans as "first echo". In the developing stage, first echoes occurred one after another, and maximum echo top height and maximum reflectivity of individual first echoes gradually increased. The maximum echo top height of the cumulonimbus grew up to 12 km in height. In the beginning of developing stage, only the KDR could detect several first echoes and no first echo was detected by the XPDR for more than 25 minutes. After first echo was detected by the XPDR, the time lag of first echo detection between the KDR and the XPDR tended to be shorter as the cumulonimbus developed. In the first half of the developing stage, the height of first echo appeared between 2 and 5 km in height. In the latter half of the developing stage, on the other hand, the appearance height of first echo stepped up between 5 and 12 km in height.

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