

Dual Doppler Radar Analysis for 3-Dimensional Structure of Precipitation System Occurred on 6 July 2007 around Jeju Island, Korea

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An orographically-enhanced regional heavy rainfall system (difference of rainfall amount ≥ 30 mm across the island for an hour) caused damages on 6 July 2007 in the vicinity of Mt. Halla (1,950 m ASL) in Jeju Island, northern part of Korea. Comprehensive understanding of such a regional severe rainfall has been required for developing QPF and mitigating damages from flood and landslide. To study orographic enhancement of rainfall and 3 dimensional structure of precipitation system, we used an actual isolated island with a simple topography and two S-band Doppler radar data (Gosan and Seongsanpo) which are collected every 10 minutes by Korea Meteorological Administration.

The localized heavy rainfall system was observed in the vicinity of Jeju Island during the passage of convective system from 0000 to 0130 LST (LST = UTC + 9h) on 6 July 2007. Just before the convective system approached to the island, high relative humidity (RH ~ 92 %) concentrated around Jeju Island under the stationary front, while low RH (≤ 88 %) was distributed over the east of the island, relatively. From dual Doppler radar analysis, the convective system passed over the island to eastward, and stationary updraft motion which was probably induced by orographic effect was observed in the northwestern island. While the convective system passed over the low-level updraft region, we found the enhancement in reflectivity intensity and the increase of echo top height in northern area of Jeju Island. Furthermore, it is considered that the moving direction of the convective system seems to be modified by the orographic effect.

Keywords : orographic effect, dual-Doppler radar analysis, convective system

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