Study on 3D Structure of the Heavy Rainfall in Chuzhou with Dual-Doppler

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Due to the effect of the low-pressure system of Fung-Wong and the cold air, it produced a heavy precipitation in the east region of Anhui province in China, up to 429mm rainfall in Chuzhou and 414mm in Quanjiao from 0800 LST 1 August to 0800 LST 2 August 2008. It is a local, sudden and short time heavy rain. The three dimensional wind fields were retrieved by the volume scan data of the dual-Doppler radar located in Nanjing and Maanshan cities. The evolution of the 3D wind fields and the formation mechanism of the sudden heavy rainfall were investigated. It is a convective cloud precipitation based on the radar echo analyses. The meso-β-scale convective system (MβCS) and the meso-γ-scale system located on the MβCS played an important role on this heavy rainfall. The meso-β-scale convective cloud has high precipitation efficiency. The dual-Doppler retrieved wind reveals that the heavy rainfall was caused by the meso-β-scale shear line and the meso-β-scale convergence lines at the low and the medium levels. The shear line spread from west to east. It stayed on the Chuzhou and Quanjiao area for period of time. The shear line triggered and maintained the heavy rainfall. On the other hand, the plentiful water vapour was transported to the rainfall area continuously. These factors greadtly availed to the heavy rainfall. There were strong convergence and vorticity at the low and medium levels of the MβCS. When the shear line at the low and medium levels moved out of the rainfall area, the precipitation began to weak remarkably too.

Keywords: Rainstorm; Dual-Doppler radar; Wind retrieval; Three-dimensional structure

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