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3D Structure of the Heavy Precipitation in South China by Dual-Doppler Radar

z . haiguang

State key laboratory of severe weather, Chinese Academy of Meteorological Science, Beijing, China (zhg@cams.cma.gov.cn)

As a result of the effect of the trough at 500hPa, the shear line at 850hPa and the low level cold air, it produced a heavy precipitation in the north region of Guangdong province and Pearl River Delta in China, up to 199.5mm rainfall from 01LST to 04LST and 99.1mm rainfall on 02LST 7 May 2010 at Wushan, 107.4mm rainfall on 02LST 7 May at Dongguan station. The one hour precipitation at Wushan has broken the record. The three dimensional wind fields were retrieved by the volume scan data of the dual-Doppler radar located in Guangzhou and Shenzhen cities. The structure evolution of the 3D wind fields of the heavy rainfall was investigated.

It is a convective cloud precipitation as the radar echo analyses shown. The reflectivity is very strong at the heavy precipitation period time that the maximum value is more than 55dBZ. The supercell, bow-echo and the squall line located on the MβCS played an important role on this heavy rainfall.

The dual-Doppler retrieval wind show that the heavy rainfall was induced by the meso-β-scale convergence line and the meso-γ-scale vortex at the low and medium levels. The meso-β-scale convergence line triggered and maintained the heavy rainfall. The meso-β-scale convergence line moved southeastward. It stayed at Guangzhou and Dongguan city for period of time. There were strong convergence and vorticity at the low and medium levels of the MβCS. The rainband moved southeastward while the convergence line propagated along the same direction.

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