

The first detection of a significant tornado in China with Doppler weather radar

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On the night of 8 July 2003, in the history of China, an significant tornado (EF3), occurred in Wuwei county, Anhui province, was first detected with the first operational Doppler weather radar (WSR-98D) in China, which was installed in 1999 in Hefei city, Anhui province.

Based on the Hefei Doppler weather radar data, detailed analysis are made on the tornadoes occurred during the night of 8 July 2003 in Lujiang and Wuwei county, Anhui province. From the night of 8 to the early morning of 9 July, associated with the organized convective rain belts embodied in the large area of stratiform precipitation, several meso- γ -scale vortices formed along the leading edge of the convective rain-belt within the lower atmosphere. A mesocyclone formed at the south tip of the convective rain-belt led to the severe tornado occurred at 23:20 in Wuwei county, Anhui province. This tornado, ranked F3, killed 16 people and wounded 166 persons. The convective system which caused the Wuwei tornado is a classic supercell located at the south end of a convective rainbelt. During the lasting period of the tornado, a TVS formed within the strong mesocyclone, the vertical vorticity associated with the TVS is about $5.0 \times 10^{-2} \text{ s}^{-1}$. This supercell is a low centroid convective system, the above 45 dBZ reflectivity region is limited to below 6km, the severe tornado is the major severe weather, accompanied by heavy rain, without hail. The analysis indicate that, for the Wuwei tornado, a tornado warning could be issued with 8 minutes lead time, mainly based on the strong mesocyclone on velocity map, illustrating the greatly enhanced capability to detect tornadoes with the deployment of the China new generation (Doppler) weather radar. The mechanisms for this tornado occurrence are also discussed.

Keywords: First Tornado , Detected, China , Doppler weather radar, Environmental Background

