Characteristics of Tornado Debris Signatures in the 30 June – 1 July 2014 Quasi-Linear Convective System Tornado Outbreak

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Overview

- A tornadic quasi-linear convective system (QLCS) impacted northern Illinois and northern Indiana on 30 June – 1 July 2014
- The QLCS produced 29 tornadoes and areas of straight-line wind damage were also reported
- Several tornadoes from this event, as well as other areas of damage that were not confirmed as tornadoes featured debris detected by the radar
- Characteristics of each tornado debris signature (TDS) were examined to analyze structural differences

Key Findings/Results

- ρhv values observed during this event were generally in the 0.85 to 0.95 range
- Damage occurred in most of the areas these values were associated with
- In some areas where signatures occurred, an official survey was not performed, making it impossible to know if damage was present
- Since most of the values did not meet the < 0.85 criteria at the start of the project, the criteria was revised to < 0.95 ρhv values, co-located with a velocity couplet
- Some of the official tornado tracks from this project are now being changed because of this research
- This exemplifies the importance of performing surveys where damage has occurred and radar signatures suggest the damage may have been caused by tornadoes

Fig. 1. Vertical cross-section of a TDS using cross-polar correlation coefficient (ρhv) showing debris lofted up to 1.5 km (5,000 ft.) using level II radar data from the northern Indiana (KIWX) weather surveillance radar – 88 Doppler (WSR-88D) at 0456 UTC 1 July 2014.

Impact/Conclusions

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