Analysis of a Complex Mesovortex Evolution during the Second 30 June - 1 July 2014 Derecho Event

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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 a total of 29 tornadoes and was responsible for 2 fatalities.
• A mesovortex (named mesovortex G) formed in northeastern Illinois and then tracked east splitting into two subvortices (G-1 and G-2).
• G-1 (the northern subvortex) produced 8 tornadoes, with up to 3 simultaneous tornadoes in close proximity to each other.
• G-2 (the southern subvortex) produced 6 tornadoes with only one instance of 2 simultaneous tornadoes.
• Single-Doppler analysis showed significant structural and intensity differences between G-1 and G-2.

Key Findings

• G-1 measured nearly 9 km deep, which scales more closely with supercell mesocyclones more so than QLCS mesovortices.
• G-1 eventually became dominant, with the G-2 rotating around it.
• G-1 maintained a greater diameter than G-2 for much of its existence.
• Low-level rotational velocity tended to be much higher in G-1 than G-2.

Future Work

• Future work will include comparing radar signatures to detailed damage surveys conducted along mesovortex G’s track.
• The dual-polarization radar data collected during this case will be analyzed with an emphasis on debris detection and evaluation of precipitation particle size sorting.

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