The 30 June 2014 Double Derecho Event in Northern Illinois & Northwest Indiana

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In a seven hour period on the evening of 30 June 2014, two separate quasi-linear convective systems (QLCSs) exhibited derecho characteristics as they tracked across northern Illinois. As the first derecho gradually waned and moved northeast, the second derecho intensified behind it and progressed southeast. Both lines of storms resulted in widespread wind damage, gusts of 26-35 m/s (58-80 mph) or higher, sporadic reports of large hail, and areas of flooding. The second derecho also was responsible for 29 documented tornadoes across northern Illinois and northern Indiana.

Stronger dynamics in the presence of only slightly elevated instability supported a more favorable tornado environment in the second derecho, though additional factors also may have been involved. The passage of the second QLCS through a relatively dense observational network (surface, radar, and AMDAR) makes it possible to explore these additional factors. These include the bore-driven nature of the second QLCS for its entire lifecycle; apparent wave interactions with the QLCS, one of which was spatially and temporally associated with tornadogenesis; a remarkable detection of a tornado within 10 km of the Chicago-Romeoville NEXRAD radar (KLOT); and growth and intensification of a mesovortex upon interacting with a remnant thermal boundary from the first derecho-producing QLCS.

This presentation will explore the synoptic, mesoscale, and storm-scale processes involved in this unusual event. It also will describe how the atmospheric evolution after the first derecho supported the prolific tornado production of the second one. Key factors include a limited cold pool imprint from the first derecho, strengthening of a surface theta-e boundary, more pronounced deep layer shear, and enhanced storm relative helicity in advance of the second storm complex. It then examines specific observations recorded during the event and discusses how some more subtle mesoscale and especially storm-scale interactions may have contributed to the tornadic nature of the second QLCS. Finally, it briefly notes how these observations raise additional questions to be addressed through further research into this case and others.