

# AN ANALYSIS OF ENVIRONMENTAL INFLUENCES ON MORPHOLOGIES AND TORNADOGENESIS WITHIN QUASI-LINEAR CONVECTIVE SYSTEMS

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## ABSTRACT

Mesoscale convective systems (MCSs) often take the form of quasi-linear convective systems (QLCSs) within the mid-latitudes of the United States. QLCSs have a quasi-linear convective precipitation structure either followed or led by stratiform precipitation, and often produce strong winds, hail, and tornadoes. Quasi-linear convective systems have been the subject of research for more than a half-century. Early work was performed to classify different morphologies and structures, whereas more recent work has been focused heavily on the dynamics associated with QLCS structures, and investigating forecasting problems that QLCSs pose, in particular the 3-12 hour time period. Thirty-two cases were selected for this investigation, comprised of 8 “tornado” events, 8 “hybrid” events, 8 “wind” events, and 8 “marginal” events. These thirty-two events were selected based on a general geographic location in the central United States. The purpose of this investigation was to better understand the atmospheric conditions resulting in the variety of observed event “types,” to improve event predictability, and therefore forecasting, especially with regards to tornadic QLCS cases.