

# ANALYSIS OF HEAVY-RAIN-PRODUCING ELEVATED THUNDERSTORMS IN THE MO-KS-OK REGION OF THE UNITED STATES

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## ABSTRACT

Presented is a composite analysis of elevated thunderstorms that produced heavy rainfall in the Springfield, Kansas City, Topeka, Wichita, and Tulsa National Weather Service County Warning Areas (CWAs) during the warm season (April through September) between 1979 and 2012. These CWAs encompass the region which Colman (1990) found experiences the most elevated thunderstorms in the United States. The events composited produced over two inches of rain in 24 hours, and composites were generated for the time just prior to the heaviest rainfall, six hours prior, and twelve hours prior. The results concluded that in all five CWAs, heavy-rainfall-producing elevated thunderstorms resulted from the cooperation of the low-level jet with the right-entrance region of the upper-level jet. Convection and heavy rainfall commences just as the low-level jet ramps up from the south-southwest in the region of maximized convergence above the stable boundary layer. Ample moisture is present even 12 hours prior to the event, with the low-level jet advecting in even more moisture at the beginning of the event. K-index values show well the destabilization of the layer above the low-level stable layer, with values increasing from 30 to 35 just prior to the event at the location of maximum precipitation. The location of the nose of the low-level jet, the K-index maximum, and the 250-hPA divergence maximum together give a very good indication of where the placement of the heaviest precipitation is located.