

Abstract

Thesis: Effects of Evapotranspiration on the Longitudinal Dryline Position in the Great Plains

Student: Zachary F. Johnson

Degree: Geography

College: Science and Humanities

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The dryline is among the most important meteorological phenomena in the Great Plains due to its significance in tornadogenesis, severe weather, and consistent rainfall. Past research has extensively examined the dynamics of the dryline, however, recent meteorological research looks beyond dynamics and focuses on land-atmosphere interactions. Computer modeling has determined that land-atmosphere interactions affect boundary layer processes. This study focuses on how evapotranspiration affects the climatological longitudinal positioning of the dryline; they were defined by specific humidity gradients of at least $3 \text{ g kg}^{-1}(100 \text{ km})^{-1}$, and could not deviate more than 30° from north-south orientation. Volumetric soil moisture was used as a surrogate for evapotranspiration. It was found that the dryline is sensitive to evapotranspiration, which impacts rainfall and severe weather occurrences in its vicinity, highlighting its importance to agricultural interests and population centers.