Relating Surface Divergence Tendency to Convective Initiation
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May 01, 2008
CI Occurred

May 10, 2008
CI Occurred

June 11, 2012
CI Failed

May 18, 2011
CI Failed

INGREDIENTS

- Little to No SBCIN
  The presence of SBCIN limits the likelihood of CI occurring at a point of increasing convergence.

- Presence of a Cumulus Field
  The presence of a cumulus field indicates shallow convection is occurring, and the environment may favor CI.

- Presence of a Surface Boundary
  The surface boundary serves as a focus for CI and a location where low level convergence is established.

Forecasting Convective Initiation (CI) continues to be an issue today. This investigative study attempts to relate surface divergence trends to areas of CI. In this study, Oklahoma Mesonet 10 meter wind data were used to calculate divergence through a Delaunay triangulation scheme and the linear vector point function method. Divergence ‘observations’ were then objectively analyzed to a 12 km grid via a one-pass Barnes analysis with a 40 km radius of influence. 5 cases where CI occurred were analyzed to establish a pattern, and then 4 cases where CI failed were analyzed to test any patterns found. While the sample size is relatively small, the results from these test cases suggest that given the ingredients on the left, CI is preceded by a time-rate change of divergence below the 0 axis of -5 x 10^-4 S^-1 per hour. Special thanks to: Timothy A. Supinie and David John Gagne II.

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LIMITS

- Choosing a Gridpoint
  Choosing a gridpoint from which to make a time series is subjective.

- Tendency Maps are Erratic
  This may be solved by plotting temporally averaged divergence tendency instead.

- Exploratory
  Because of the exploratory nature of this research, the definitions of CI used and interpretations of the data are somewhat flexible at this time.

- Lack of Data
  High spatial and temporal resolution upper air and satellite data for these test cases are limited.