P0. 98

Composite Analysis of Heavy-Rain-Producing Elevated Thunderstorms in the MO-KS-OK Region

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Introduction

- Convection that develops above a boundary that is statically stable often generates heavy precipitation (Moore et al. 1998).
- Most elevated thunderstorms occur in the Midwest (Colman 1990).
- Corfidi et al. (2006) called for additional study of elevated convection of precisely the kind proposed here
- Our study composites heavy-rain-producing elevated thunderstorm events from 1979-2012, which produced >2" of rainfall within 24-hrs .
- Composites were generated for the following NWS County Warning Areas:
  - Kansas City, Mo (60 Events)
  - Springfield, Mo (46 Events)
  - Tulsa, Ok (63 Events)
  - Wichita, Ks (68 Events)
  - Topeka, Ks (51 Events)
- Project aims to 1) aid in prediction of heavy rain events, and 2) optimize deployment of equipment for their study.

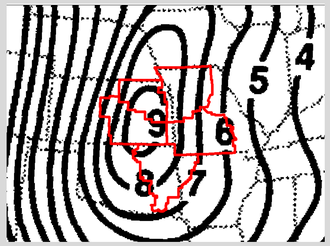


Fig. 1. *Colman's (1990) climatology of elevated thunderstorm events reported by stations from September 1978-August 1982 overlaid with chosen NWS county warning areas.*

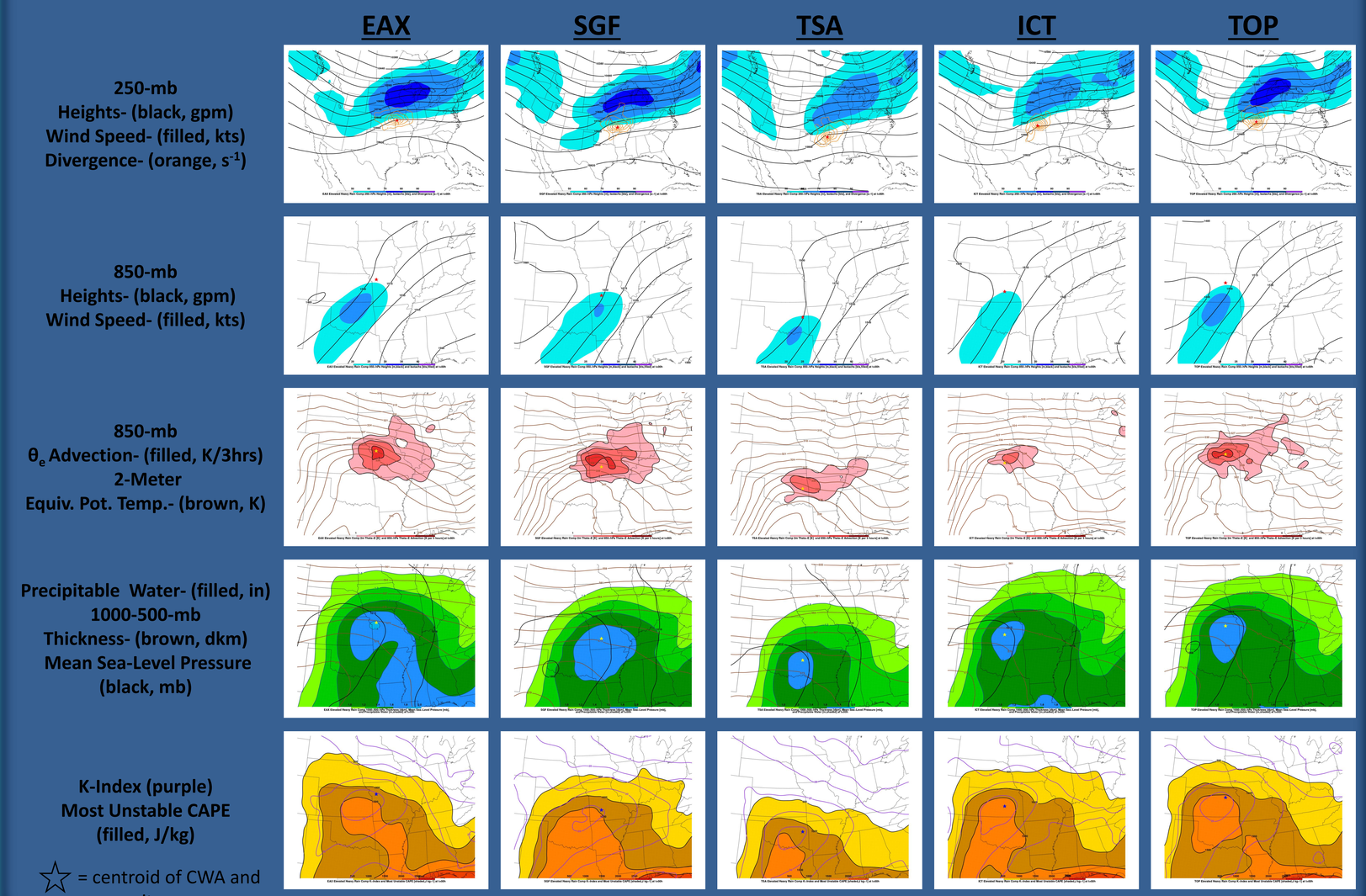
Data

- U.S. Unified Daily Precipitation Analyses
- North American Regional Reanalysis (NARR) Data from NOMADS

Method

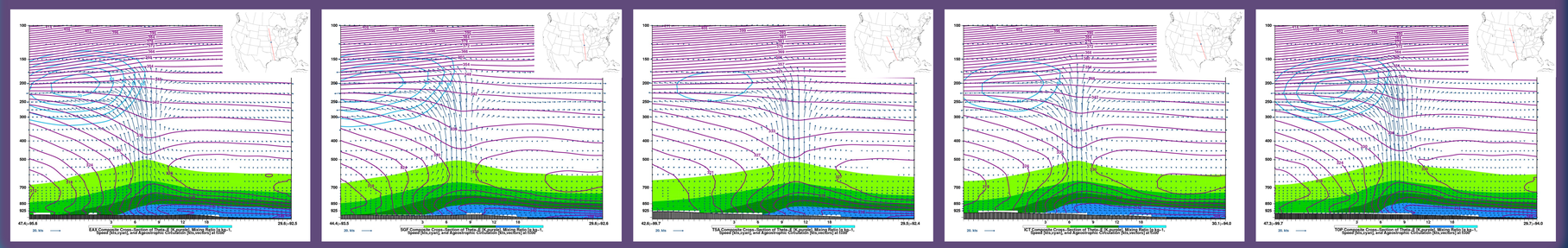
1. Event criteria:
   - Local precipitation maximum of >2" in 24-hrs (12Z-12Z) within CWA
   - Rainfall max on the cold side of a frontal boundary and/or a NARR model sounding showed a stable inversion layer near the surface.
2. Composite grids were created using software developed at Saint Louis U.
3. Results shown were then produced using GEMPAK

T-00 Composite Analysis



☆ = centroid of CWA and composite

T-00 Composite Cross-Section



Acknowledgements

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