#### **S 85**

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outbreaks was the main motivating factor in this study.



# **Synoptic-scale Precursors and Characteristics of High-end Tornado Outbreaks in the Southeastern Region of the United States**

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### **1.) Introduction/Motivation**

Atmospheric conditions and patterns preceding high-end tornado outbreaks (HETO) are important to understand as such events often lead to loss of life and property. This study examines the synoptic conditions in the days surrounding a HETO to identify large-scale atmospheric structures that can be used to improve forecasts of HETOs. The domain in this study includes Alabama, Georgia, Kentucky, Mississippi, the Carolinas, and Tennessee. Tornadic events were examined using NCEP Reanalysis 2 from 1 January – 31 May, 2001-2014, inclusive. This time of the year encompasses the peak severe weather season for the southeast United States.

## **Composite Plots**





#### 2.) Data and Methodology

Examined primary tornado season history in the southeast for years 2001-2014 and categorized tornado events in the following way:

90 <sup>th</sup> Percentile	High –End Tornado
(≥20 Tornadoes)	Outbreak
85 <sup>th</sup> – 75 <sup>th</sup> Percentile	Moderate Tornado
(9-14 Tornadoes)	Outbreak
70 <sup>th</sup> Percentile	Low-end Tornado
(≤5 Tornadoes)	Outbreak

Composites of daily NCEP Reanalysis 2 data were produced for the HETO and moderate groups. Each composite consisted of 20 cases.

Using Gempak, soundings and several atmospheric variables were plotted in order to compare HETO and moderate cases side-by-side

	4.) Future Work
TO and	The data sets used for the HETO and
stronger,	moderate composites were just one particular set of data. In the future,
vo days	comparing different percentiles of number of storms, and using 48 or 72 hour NCEP
outheast	Reanalysis 2 data to create the composites would result in additional data for HETO to
n with a	moderate outbreak comparison . Moreover, looking at more severe weather-related
with an	better describe the difference between high- end and moderate tornado outbreaks
tighter	References & Acknowledgements
TO and	Andrew E. Mercer, Chad M. Shafer, Charles A. Doswell III, Lance M. Leslie, and Michael B. Richman, 2009: Objective Classification of Tornadic and Nontornadic Severe Weather Outbreaks. <i>Mon. Wea. Rev.</i> , <b>137</b> , 4355–4368.
between	Christopher M. Fuhrmann, Charles E. Konrad II, Margaret M. Kovach, Jordan T. McLeod, William G. Schmitz, and P. Grady Dixon, 2014: Ranking of Tornado Outbreaks across the United States and Their Climatological Characteristics. <i>Wea. Forecasting</i> , <b>29</b> , 684–701.
	David M. Gaffin and Stephen S. Parker, 2006: A climatology of synoptic conditions associated with significant tornadoes across the southern appalachian region. <i>Wea. Forecasting</i> , <b>21</b> , 735–751.
rface to	Kanamitsu, Masao, Wesley Ebisuzaki, Jack Woollen, Shi-Keng Yang, J. J. Hnilo, M.