

*An Examination of North Central Gulf Coast Cold Season
Pre-Tornadic Vertical Wind Shear Environments since 1996*

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ABSTRACT

The purpose of this research is to document and investigate pre-existing ambient vertical wind shear characteristics immediately prior to the occurrence of twenty-one cold-season (October-May) F1 and EF-1 or higher rating tornado-producing mesocyclones occurring across the US Central Gulf Coast region from 1996-2007. Using the KMOB WSR-88D Velocity Azimuth Display (VAD) winds for all tornadoes within ~120 km (60 n mi) of Mobile, Alabama, hodographs are constructed closest to the time of tornado occurrence using VAD winds every 305 m (1 kft) to a height of 6.1 km (~20 kft). The time-matched KMOB METAR observations are used for the surface wind.

Particular attention will be paid to the distribution of vertical wind shear, the observed storm motion and the resultant vertical profile of storm-relative winds. It is desired to establish a local benchmark for the interpretation of various vertical wind shear quantities relating to hodograph interpretation and the corresponding short-term prediction of the potential occurrence of such events. With an eventual initial benchmark established, it is envisioned that any future deviations will be more easily identified and will also more readily point to where additional in-depth research is needed. This study also represents the beginning stages of a regional vertical wind shear climatology that can be quickly integrated into National Weather Service radar warning operations to assist in the anticipation of tornado events. This research will also compare the predicted supercell motions to observed tornado-producing mesocyclone motions in order to assess predictive accuracy. Results from this study will be updated as additional events become available.