

A Preliminary Evaluation of Forecasting Techniques for Severe Convection in High-shear, Low-CAPE Environments across Northern Indiana

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High-shear, low-CAPE (HSLC) environments (characterized by surface-based CAPE ≤ 500 J/kg and 0-6 km shear ≥ 35 kts) pose a significant challenge to operational forecasters, especially across the Ohio Valley and Midwest. A majority of tornado outbreaks across northern Indiana during the past 15 years have been a result of these environments. However, despite the relatively high frequency of HSLC environments, they only occasionally produce severe convection. Much effort has been placed on nowcasting and radar signatures associated with these events, but little focus has been on the forecasting aspect. Sherburn and Parker (2014) addressed this concern and used a statistical analysis of significant severe HSLC events to develop a new composite parameter for improving future forecasts. The SHERBS3 parameter consists of 0-3 km lapse rates, 700-500 mb lapse rates, and 0-3 km bulk shear.

A local database of HSLC events (including nulls) across northern Indiana was developed to evaluate the effectiveness of the SHERBS3 parameter for any severe HSLC convection (not just significant severe). This local database was also utilized to determine other commonalities associated with severe convection vs. null events. Preliminary results show that SHERBS3 has some utility for predicting severe HSLC events. However, the database is limited and there have been some exceptions. A few brief case studies of successes and failures will be presented. The ultimate goal of this research is to evaluate the SHERBS3 parameter as a potential tool for improving our ability to forecast HSLC convection.