Public Abstract

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Title:Evaluation of the Non-Supercell Tornado Parameter for the Green Bay, Wisconsin Tornado Event of 07 August 2013

The difficulty of detecting and forecasting the development of non-supercell tornadoes (NST) is well documented. The rapid, low level development of NSTs decreases the warning time as they often develop in minutes and can last only a short amount of time. Even though most NSTs are relatively weak, EF0-EF2, they still cause damage. Research for non-supercell tornadoes has been focused on the amount of Convective Available Potential Energy (CAPE), Convective Inhibition (CIN), shear, vorticity, and low-level lapse rate of non-supercell tornadoes. These five variables were compiled into the Non-Supercell Tornado Parameter (NSTP) by Baumgardt and Cook (2006), currently in use by the Storm Prediction Center.

The research presented focused on the evaluation of this parameter using 24 different experimental runs of the Weather and Research Forecasting (WRF) model. Here, we study an event from 07 August 2013 that passed through the Green Bay, WI area, between 0400 UTC and 0600 UTC and produced 6 NSTs. The predictability of the event was analyzed by using different WRF simulations with varying moisture parameter schemes at a 13-km scale. In addition, a detailed synoptic and radar analysis was conducted to further increase the understanding of NST environments and radar features. The research found that the 0000 UTC RUC initial fields on 07 August 2013 forecasted the tornadic event. On a finer scale, dual-polarization radar products were used to aid in NST detection. The WRF model solutions highlighted areas of potential NST development that matched the RUC initial field when using an ensemble model approach, while statistical results showed little skill. NSTs are difficult to forecast and the results here show that the NSTP is another potential tool to help aid forecasters.