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Evaluating the Impact of Atmospheric Infrared Sounder (AIRS) Data On Convective Forecasts

One challenge that forecasters face is using numerical models that do not correctly predict mesoscale convective weather. In order to address this specific forecast challenge, SPoRT produces real-time mesoscale model forecasts using the Weather Research and Forecasting (WRF) model that includes unique NASA products and capabilities. One of these capabilities is assimilated retrieved thermodynamic profiles from the Atmospheric Infrared Sounder (AIRS). The study presented here was specifically designed to evaluate the impact of AIRS data on convective forecasts.

Results from a case study that covered the significant tornado outbreak across Central and Southeastern United States during the days of April 25-27, 2011 will be presented for three different forecasts: NSSL WRF, the SPoRT WRF and the SPoRT WRF without AIRS data. Radar reflectivities from these three forecasts were then verified against Q2 radar analysis data developed by NSSL. Differences between the simulated reflectivities were further investigated using variables that describe how conducive the atmosphere is for convective weather including convective available potential energy (CAPE), total precipitable water (TPW), helicity, convective inhibition (CIN) along with the model atmospheric soundings and observed soundings taken from AIRS.