High Resolution Diagnostics and Short Term Prognostics in Support of Weather Forecast & Warning Operations at NWS Melbourne, FL

Peter F. Blottman, Scott M. Spratt, David W. Sharp and Justin J. Mosely
NOAA/National Weather Service
Melbourne, FL

Local modeling efforts have been underway at the National Weather Service (NWS) in Melbourne, FL (MLB) since the late 1990s. The local goal has been to provide mesoscale forecasters at the Weather Forecast Office (WFO) with timely and accurate high-resolution guidance for both routine and event-specific applications. Focus has resided within the first 24 hours, with the greatest emphasis placed upon the initial 12-hour time frame. It is within this short time scale where mesoscale forecaster expertise can provide the greatest utility to meet increasing demands for highly detailed weather information.

Versions of the Advanced Regional Prediction System (ARPS) and the ARPS Data Analysis System (ADAS) are run operationally at WFO MLB. ADAS analyses and ARPS 0-9 hour forecasts are produced every 15 minutes with a horizontal resolution of 4 km, then are ported to the Advanced Weather Interactive Processing System (AWIPS). ADAS integrates both traditional and non-traditional observational data sets from within central Florida, including a dense network of local observing systems supporting the United States space program. This network is comprised of 44 wind towers, five 915 MHz boundary layer Doppler wind profilers and a 50 MHz wind profiler. In addition, other data include level II radial velocity and reflectivity information from several Florida Weather Surveillance Radar-1988 Doppler (WSR-88D) sites, GOES-12 visible and infrared satellite imagery, METAR surface observations, buoy data, Florida Automated Weather Network observations, Automatic Position Reporting Station (amateur radio) observations and aircraft flight level data.

Using ADAS and ARPS output upon AWIPS together with other traditional guidance has allowed forecasters the ability to enhance many facets of the WFO forecast program. Demonstrated utilities have encompassed improved detail and timing of freeze events, real-time monitoring and short-term forecasts of critical thresholds for wildfire dangers, and better depiction and forecast of mesoscale features such as sea breeze onset and progression, as well as the evolution of thunderstorm outflow boundaries. Improved simulations of near-storm environments have helped define areas most favorable for the genesis of severe weather, including but not limited to a series of tornadoes associated with the outer rainbands of a tropical storm.

This presentation will chronicle several diverse situations when the mesoscale analyses and prognostics allowed meteorologists to enhance forecast details compared to what likely would have been possible otherwise. Continued experimentation with ADAS and ARPS in real-time will undoubtedly expose additional uses and benefits, resulting in an even greater value to customers requiring highly detailed and accurate short-term forecasts and warnings.